SAMPLING AND TAXONOMIC ANALYSES FOR MARINE INVASIVE SPECIES IN CALIFORNIA ESTUARIES: DNA BARCODING AND METABARCODING

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SAMPLING AND TAXONOMIC ANALYSES FOR MARINE INVASIVE SPECIES IN CALIFORNIA ESTUARIES

Part 1: DNA Barcoding

This report includes the work and deliverables by the Moss Landing Marine Laboratories for the DNA barcoding of marine invertebrates collected by the Smithsonian Environmental Research Center (SERC) covering the period 2020-2023. Also included are results from 2017-2020 that were not included in prior reports.

DNA barcoding is the sequencing of a target genetic locus from expertly identified specimens for deposition into genetic databases which, in turn, can be used for identification (ID) of specimens or unsorted bulk samples. For most animal subjects, DNA barcoding uses a fragment of the Cytochrome c oxidase subunit I (COI) mitochondrial gene, and intraspecific variation is usually less than 5% (Hebert et al. 2003; Savolainen et al. 2005; Stoeckle & Hebert 2008; Bucklin et al. 2011). In this study, vouchers were examined by expert taxonomists or para-taxonomists (*i.e*., those with project-specific training in species identification) at SERC. The two main goals of this study were to confirm (or revise) morphological identifications and to generate novel DNA barcodes especially of nonindigenous species (NIS).

METHODS

Specimens were taken primarily from settlement plates that were deployed in the summertime for three months (see accompanying report from SERC for details on sites, dates, and field methods). (The term "voucher" may be used when the specimen is preserved and stored, with only a subsample used for genetic analysis. However, here "voucher" is used synonymously with specimen and in some cases the entire specimen was consumed). The goal for most collecting events was to take up to five specimens of ten species for a total of 50 specimens. Five specimens/taxon were not always found, collected, or yielded good sequence, but we always exceeded the goal of ten species. Specimens in excess of five/species were also sequenced when resources allowed. Additional sampling events were called "bioblitzes." These are collection events that target specific species (i.e., those lacking DNA barcodes, or to maximize species diversity). Lastly two sites (Channel Islands (Catalina Island), and outer coast areas in northern California) were included as "spillover" sites; that is, areas adjacent to a major point of species introduction (mainland of southern California or San Francisco Bay).

Note that the realized collecting schedule was modified from that specified in the contract due to work and travel restrictions imposed during the COVID-19 pandemic, and well as delayed funding to SERC that precluded the planned first summer of field work (2020). Older samples that were provided to MLML too late for inclusion in prior studies were also included (Long Beach 2018, San Francisco 2017, 2018, 2019).

Samples received:

San Francisco Bay, 2022
Channel Islands, 2022 (Spillover site)
Bodega/Tomales Bays, 2022 (Bioblitz site)
Long Beach, 2021
San Francisco, 2021
San Francisco Bay, 2020
Outer Coast*, 2019 (Spillover site)
Long Beach, 2018
Long Beach 2018 (motiles**)
San Francisco 2018
San Francisco, 2018 (motiles**)
San Francisco 2017

*Monterey Peninsula (Monterey Co.); Davenport (Santa Cruz Co.); Slide Ranch, Muir Beach & Duxbury Reef (Marin County).

**Motile collections focused on non-attached organisms. Other samples were mixed sessile and motile.

Specimens were received from SERC as small pieces of tissue (typically ~2 mm^3 but sometimes minuscule) in DNE preservative (20% DMSO (Dimethyl sulfoxide), NaCl (Sodium chloride) at saturation, 500 mM EDTA (Ethylenediaminetetraacetic acid)) or sometimes in ethanol. Morphological data usually provided was an initial "Field ID." A later morphological analysis in the laboratory was called a "Final ID" (or sometimes "Verified ID") for a subset of specimens. Final IDs were made by SERC taxonomists most experienced with a particular taxon. Some small specimens were sent in their entirety for extraction, precluding a Final ID. In general, Final IDs were considered to be more reliable than Field IDs.

DNA was extracted using the Qiagen DNeasy Blood & Tissue kit, following the manufacturer's protocol. The resulting genomic DNA was used in the polymerase chain reaction (PCR) to amplify the barcoding region of the mitochondrial COI gene, using methods described in Geller et al. (2013). PCR is the enzymatic replication of template DNA using repeated cycles of template DNA denaturation, annealing of primers to the template, and extension of primers. Primers are short fragments of single stranded DNA that complement and flank the targeted region in the template DNA. Successfully amplified PCR products were sent to Elim Biopharmaceuticals (Hayward, CA) for bidirectional (forward and reverse directions) DNA sequencing, giving two reads per PCR product.

Forward and reverse sequences were aligned, primer sequences removed, and any ambiguous bases edited using the software package Geneious v10 and later (Biomatters, Christchurch, NZ; now owned by GraphPad, LLC, Boston MA, USA). Sequences were then compared to a database (MLML v2025) of reference sequences generated from current and

previous in-house studies. When we could not find a match in the MLML database, we also searched COI sequences in GenBank Core Nucleotide (Core-nt) database. The MLML database results were given priority because it corrects known errors in Genbank and contains references absent from Genbank. Database searches used the Basic Local Alignment Search Tool (BLAST) (Altschul et al. 1990) built into Geneious for searches of MLML v2025, or as a web-based application at the National Center for Biotechnology Information (www.ncbi.nlm.nih.gov) for searches of Core-nt. BLAST finds the database sequences that are most similar to a query sequence. Here, a genetic match was made when a sequence matched a reference sequence at ≥95% pairwise identity with ≥90% overlap. Genetic identifications were annotated as follows:

> **Verified**. When a specimen had a Final ID and sequence that agreed with previously verified or provisional reference sequences, the identification was considered Verified. When no prior reference sequence existed, the Final ID was also accepted.
>
> **Provisional**. When a specimen had only a Field ID that agreed with previously verified or provisional reference sequences, the identification was considered Provisional. When no prior reference sequence existed, the Field ID was also accepted.
>
> **Unverified.** Identifications based solely on matching of DNA sequences and lacking morphological support. This group included many specimens with low-resolution names from morphology that were resolved to a more specific name by sequence matching.

Phylogenetic analyses of sequences assigned to the same taxon in some cases will uncover evidence of cryptic species complexes. Pending further analysis, these were indicated by adding clade numbers (e.g., *Tricellaria inopinata*-1, *Tricellaria inopinata*-2).

Note: Previous reports also annotated sequences with the terms *conflicting*, *contested*, and *NovelBC* to label sequences that conflicted with Genbank, conflicted with prior SERC names, or had no record in Genbank. The updated labeling scheme above reflects an effort to simplify annotations. Conflicts and novel barcodes were documented in lab notes.

RESULTS

1. MLML database.

The MLML database grows continuously as more specimens are provided and sequenced. Database curation is an ongoing process, and the analyses reported here reflect searches of the most current version (MLML v2025) of the database rather than the 2020 version of the database existing at the onset of this work. Thus, the MLML database included new barcodes added in the course of the work reported here. We also include some sequences from non-CDFW work in our lab.

The MLML sequence database (v2025) now includes 583 sequences and 249 species with Verified or Provisional designations. More sequences with unverified taxonomy are available

but not added to the database. Recall that unverified names come from vouchers that were not fully identified morphologically but match Genbank entries.

Ninety-one (91) new and verified or provisional barcodes (those with field or final morphological IDs) were added to the MLML database since 2020 and are listed below. Only full binomials are listed, although additional new sequences with less resolved names were also found. A new barcode does not necessarily indicate a new record of occurrence as many were known previously as unverified barcodes (i.e., based on Genbank records). Those listed as NIS in California in the NEMESIS database are indicated with an asterisk.

Acerotisa californica
Alcyonidium sp.
*Alitta succinea**
Amathia citrina
Amathia gracilis
*Ampithoe valida**
Antiopella barbarensis
*Ascidiella aspersa**
Balanus glandula
*Barentsia benedeni**
*Botrylloides diegensis**
Celleporaria robertsonae
Chaetozone columbiana
Chone mollis
Cirriformis moorei
*Conopeum chesapeakensis**
Crepidula onyx
Crisulipora occidentalis
Disporella novahollandiae
Dorvillea moniloceras
Doto amyra
Einhornia crustulenta
Electra monostachys
Erichthonius brasiliensis
Eumida longicornis
Eupolymnia heterobranchia
Eurylepta aurantica
*Exaiptasia diaphana**
Exogone lourei
Gammaropsis thompsoni
Glycera robusta
Gnormoisphaeroma oregonensis
*Grandidierella japonica**
*Haloa japonica**

Hemipodia simplex
Hermissenda opalescens
Hiatella arctica
*Hydroides elegans**
Leitoscoloplos pugettensis
*Leucothoe nagatai**
Liljeborgia geminata
Megabalanus californicus
*Melita nitida**
Membranipora serrilamella
Membranipora villosa
Nasageneia quinsana
Neanthes acuminata
Nereis latescens
Nicolea cf amnis
Nicolea venustula
Obelia dichotoma
Odontosyllis phosphorea
*Okenia plana**
Paracerceis sculpta
Paradialychone ecaudata
Parasabella pallida
Phyllodoce hartmanae
Phyllodoce williamsi
*Polyandrocarpa zorritensis**
Polycera atra
Pseudoceros mexicanus
Reginella hippocrepis
*Sakuraeolis enosimensis**
Savignyella lafontii
Schistomeringos longicornis
*Schizoporella japonica**
*Schizoporella variabilis**
Scoloplos acmeceps
*Sphaeroma quoianum**
Spiophanes duplex
Stenothoe estacola
*Styela plicata**
Stylostomum lentum
Syllis gracilis
Thalamoporella californica
Trinchesia albocrusta
Tubulipora pacifica
*Victorella pavida**

2. Overview of morphology compared to genetics.

A total of 1449 voucher samples were sequenced, greatly exceeding the expected number of about 700 (Table 1). The morphological identification was accepted in about 60% of vouchers. Of the remainder, about 25% were resolved to a more specific taxonomic rank by genetic identification. These were not wrongly identified; rather the morphological ID was less specific than genetic identification. Twelve percent (12%) were changed to an entirely different taxon, and the rest were unassigned. Unassigned sequences appeared to be bacterial in origin.

3. Voucher Sequencing by Site

Full lists of vouchers that were sequenced along with results of database searches are given in Appendices 1-12. In the following sections, examples of taxonomic difficulties, potential cryptic species complexes, and potential new NIS are discussed.

Table 1. Summary of voucher sequencing. Taxa detected include sequences attributed to full binomial names, as well as sequences assigned to less resolved names (e.g., genus only). Unassigned sequences mostly appeared to be bacterial in origin.

Bay and date	Expected vouchers	Vouchers sequenced	Accepted	Resolved	Changed	Unassigned	Taxa detected
San Francisco 2022	50	101	51	31	19	0	47
Channel Islands 2022	50	105	64	29	12	0	43
Bodega Bay and Tomales Bay 2022	100	68	50	12	6	0	29
Long Beach 2021	50	179	136	25	15	3	68
San Francisco 2021	50	48	19	24	3	2	32
San Francisco 2020	50	147	86	42	18	1	47
Outer coast 2019*	100	48	15	26	2	5	16
San Francisco 2018	50	261	143	74	34	10	84
San Francisco 2018*	50	37	35	1	1	0	19
Long Beach 2018	50	240	137	57	35	11	65
Long Beach 2018*	50	48	38	3	7	11	18
San Francisco 2017	50	167	104	38	25		52
Totals	700	1449	877	362	177	44	

*motile

4. Potential new NIS

Species [including those identified by Genbank matches alone (i.e., unverified)] in Appendices 1-1 to 1-12 were scanned for unfamiliar names, which were checked in NEMESIS database of invasive species. Those with no record in NEMESIS were then further investigated in WoRMs to determine whether their distribution suggests a non-native source. This exploration of NIS status is not definitive. Further review of the specimens and taxonomic history for these species is recommended. *Disporella novaehollandia*, *Phaenoplana longipenis* and *Schizoporella occidentallae* had morphological identifications (and therefore were known to SERC as potential NIS before this writing), while other possible new NIS were results of genetic analyses that resolved or changed SERC's identifications.

Amathia citrina, Long Beach 2018
Amathia gracilis, San Francisco 2022
Amphitrite ornata, San Francisco 2022
Ascidiella aspersa, Long Beach 2021
Disporella novaehollandia, Catalina 2022
Electra monostachys, San Francisco 2022
Ephydra cooperensis, San Francisco 2017
Eunapius fragilis, San Francisco 2017
Hemipodia simplex, Bodega/Tomales 2022
Hydra hymanae, San Francisco 2017
Lineus sanguineus, San Francisco 2018
Marphysa victori, Bodega/Tomales 2022
Nicolea venustula, Long Beach 2018
Phaenoplana longipenis; Long Beach 2018
Schizoporella occidentallae, Catalina 2022
Xenostrobus securis, San Francisco 2018

5. Freshwater influences (SF2017 and 2018).

The winter of 2017 had historically high levels of precipitation in California and salinity in the San Francisco Bay was notably depressed. Several species were collected and sequenced which are characteristic of brackish or freshwater, and some persisted and were also collected in 2018.

Hydra hymanae.

Originally described from ponds and brooks in New Jersey, this may be a novel NIS.

Victorella pavida.

Victorella pavida is a known NIS, but this voucher's sequence did not match that *of V. pavida* in Genbank. Until the specimen is identified, or its sequence attributed to a known species, it is not known whether this finding represents a NIS.

Fredericella indica

Interestingly, we found two sequences with >5% divergence to which this name was applied. We designated these as *F. indica*-1 *and F. indica*-2.

Eunapius fragilis

This is a sponge that, without record in California (World Porifera Database at www.marinespecies.org/porifera) and not listed in NEMESIS; is a potential new NIS.

Ephydatia cooperensis

This voucher was identified by match to a Genbank record (DQ087505), though the name appears to be a synonym of *Ephydra fluviatilis*. The latter does not have a record in California (www.marinespecies.org/porifera) and is thus a potential new NIS.

Plumatella repens SF2017

This species received a morphological ID as well as matching a Genbank record (FJ196105). This bryozoan is described as native in North America while having a globally widespread distribution (https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=273).

Pectinatella magnifica SF2017

A known NIS

Salinity changes, like other habitat alterations, may open a window for new invasions, although we do not know if the source for these species was upstream freshwater habitat (i.e., older invasions) or from geographically disjunct regions.

6. Problems with sponges

Many specimens of sponges (Phylum Porifera) provided to MLML had morphological identifications such as “Porifera A”, “Porifera B”, “Orange sponge”, “Yellow sponge”, etc. These operational names poorly predicted genetic kinship, and were generally no more informative than would be “sponge”. This suggests that gross features were not useful and spicule analysis is necessary for morphological identification. Some of these vouchers had matches to species in Genbank. However, a query sequence was often very similar to more than one species in Genbank (i.e, 98-100% pairwise similarity). This situation is due to the low interspecies variation in COI seen in Porifera (also the case with Anthozoans). While the top match was reported here, we have low confidence in the specific assignment. Listed below are some of these very cautiously identified sponges that may be NIS. We recommend further detailed spicule analysis and, possibly genome level sequencing.

Eunapius fragilis
Clathria prolifica
Ephydatia cooperensis
Trochospongilla pennsylvanica,
Haliclona xena,
Haliclona cinera,
Haliclona stilensis,
Terpios sp.
Halichondria sp
Halichondria panicea,
Hymeniacidon perlevis,

Also identified was *Suberites lambei*, which is probably native, according to WoRMS. Interestingly, one voucher called "orange sponge" matched a Genbank record for *Suberites lambei* at 100% similarity, while a second voucher also named "orange sponge" matched the same record at only 97%, suggesting these different species, given low intraspecific variability for sponges. Similarly, sequence matches to *Hymenidacidon perlevis* ranged from 94-98% similarity, again suggesting possible undescribed species.

7. Recurrent identification problems

As described above, after database queries, names associated with sequences were accepted, resolved, or changed. Of changes that were not due to contamination, some of the most frequent involved the following species.

Botrylloides diegensis and Botrylloides violaceus
Halosydna johnsoni and H. brevisetosa.
Amathia (many species)
Diadumene (many species, see below)
Amathia vidovice and *A. dichotoma*
Crisulipora and *Nevianipora*

Many low-resolution names were resolved into more specific names. These tended to be genus-only or family-only names (i.e., *Ciona* sp. or Aiptasiidae). A few cases involve cryptic species complexes for which it is known that genetic analysis is necessary (e.g., *Mytilus trossulus* vs *M. galloprovincialis,* or *Watersipora subatra* vs *Watersipora*. n.sp). Other cases might involve small or damaged specimens. Twenty-five percent (25%) or 362 specimens, of all specimens fell in the resolved category. Hopefully the data presented here offer insight into which species could be better identified by seeking more or different morphological characters.

8. Potential Cryptic Species

While reviewing new and older vouchers, we noted numerous possible cryptic species complexes. A cryptic species complex is a group of phylogenetically distinct species that are inseparable morphologically. (It is, of course, possible that anatomical research might reveal diagnostic characteristics). Such species complexes are important to uncover and investigate since they may involve, or even obscure, biological invasions. Potential cryptic species complexes were detected when enough sequences were available through own efforts and in Genbank to make phylogenetic trees. Two examples, discussed in previous reports, that involve NIS abundant in the Californian fouling community are *Bugula neritina* and *Botryllus schlosseri*. A complete review of such cases is not possible here, but some standout examples are presented below.

Harmothoe imbricata

More than 30 specimens named "*Harmothoe imbricata* complex" collected mostly in San Francisco bays are >14% different in pairwise comparisons to 454 Genbank records of *Harmothoe imbricata* or "*Harmothoe aff imbricata*" from Alaska, British Columbia, and the Sea of Okhotsk (Russia). All of the San Francisco Bay specimens fell into a single divergent clade.

Thus, populations in San Francisco appear not to be related to other North Pacific populations. The San Francisco populations have been referred to as *Harmothoe praeclara*, a Western Pacific species (J. Carlton, pers com.). If San Francisco is recipient of this Western Pacific species, the genetic distinctiveness of the San Francisco population makes sense. The absence of *Harmothoe imbricata* (in the sense of the 454 Genbank records) from California requires some explanation.

"*Amathia* sp. *bowerbankia*"

SERC taxonomists have been using the name *Amathia* sp. *bowerbankia* (apparentely a mash-up of two synonyms for the genus *Amathia*) to designate a recurrent and recognizable morphotype in the bryozoan genus *Amathia,* with the impression that the morphotype represents a single species (A. Chang, per. com.). We found that "*Amathia sp bowerbanki"* is not a cohesive genetic cluster; rather it contains many divergent (>5%) clades. This argues against the notion that this is a single species. Pending further analysis, these clades were named *Amathia* sp1 through *Amathia* sp8 to recognize significant sequence variation from each other and from named species of *Amathia*. Eight potentially unrecognized species is remarkably high and suggests an interesting evolutionary history yet to be studied.

***Bougainvillia muscus,* and other *Bougainvillia*.**

Many distinct (>10% pairwise dissimilarity) clades exist among Genbank records of the hydroid *Bougainvillia*. Some of these clades have species names used consistently. However, both *Bougainvilia muscus,* and *B. triestina* were scattered in divergent clades. *Bougainvillia muscus*, in particular, is known as a widely distributed NIS, and deep genetic differences among specimens given that name probably obscure true invasion patterns.

In addition, phylogenetic analysis shows six other clades that were merely named *Bougainvillia* sp. Vouchers from SERC were similar to the Genbank sequences of *Bougainvillia* sp. represented by KF962071 that were collected in the China Sea.

***Membranipora* spp.**

Taxonomy of the bryozoan genus *Membranipora* has long been confused and unstable. Phylogenetic analysis of Genbank records and our own sequences show the names *M. membranacea, M. villosa* and *M. serrilamella* applied indiscriminately in distinct clades that are geographically structured; i.e. clades limited to the Atlantic ocean, the Pacific Northeast, and the Pacific Northwest.

Our analysis showed that *Membranipora membranacea* from the east coast of the US and Europe are a distinct group.

Material from the west coast is genetically different from Atlantic populations, and contains several monophyletic clades that are more than 5% dissimilar to each other– they are likely several species. One of these clades was collected only in Friday Harbor, WA, another in Friday Harbor and from Morro Bay, CA. A third west coast clade was geographically spread across North Pacific shores, with specimens from Alaska to Morro Bay, as well as Japan and Korea. All these specimens have been variously named *M. membranacea, M. villosa*, and *M.*

serrilamella. Finally, two sequences from Catalina Island were distinct from all the above-mentioned clades. With *M. membranacea* reserved for Atlantic populations, west coast species may be *M. villosa* or *M. serrilamella*. WoRMS, however, treats *M. serrilamella* as a synonym of *M. villosa.* That view ignores the phylogenetic structure just described.

Prior to WoRMS' judgement, Osborn (1950) had resurrected Hinck's *M. membranacea forma serrata* as *M. serrilamella* and he notes it was found in British Columbia, and Puget Sound to Southern California, and Japan. Strikingly, we observe a distinct Pacific clade that includes Alaska, Friday Harbor, Morro Bay, Japan and Korea, fitting Osborn's description of *M. serrilamella*, which we accordingly have adopted. Osborn (1950) also notes *M. villosa* as present from British Columbia to San Diego, and we apply the *M. villosa* name to the clade we find with that distribution. Finally, we recognize the Catalina Island *Membranacea* as an undescribed species that we label *Membranacea* sp-Catalina. sp.

We appreciate that ours is a pragmatic scheme to name the distinct clades that are based on COI sequences. Taxonomists might decide the all the clades are single species (despite genetic disparity) or that different names should be applied according to the rules of zoological nomenclature.

Neanthes accuminata

Our phylogenetic analysis showed that six clades exist within the Genbank records named *Neanthes acuminata*, with ~10-15% difference between them. This high level of divergences suggests that this is a cryptic species complex. Sequences from SERC fell within two of these clades. We have designated these clades in our database as *Neanthes acuminata*-1 and *Neanthes acuminata*-2. Further research is needed to assign names to these clades and determine which, if any, corresponds to the original species description.

***Tricellaria inopinata* and *Tricellaria occidentalis*.**

All SERC vouchers of *Tricellaria* were originally called *T. occidentalis* but were renamed collectively as *T. inopinata*. We observe within our collections two clades that are about 5% different. Herein, these have been labeled *T. inopinata-1* and *T. inopinata-2*. A Genbank record called *T. occidentalis* (HQ896152) is found within clade 1. We believe Genbank HQ896152 is a misidentified member of *T inopinata-1*. We also possess unpublished sequences from Japan that fall within *T. inopinata* Clade 2. Another Genbank record (AY061750) is named *T. inopinata* but is highly distinct, no more than 75% similar to other *Tricellaria* species. We consider this identification as completely erroneous.

9. Conflicts with Genbank or among SERC IDs

Frequently, we found conflicts between names given vouchers by SERC and names given in Genbank for similar (i.e., 95-100% identical) sequences. Some of these merely reflected use of synonyms. In other cases, valid but different names were applied to the same sequences. Generally, we adopted SERC's use of names as we have no basis to prefer other researchers' methods or opinions, whereas SERC's opinions are at least known to be based on morphological evidence. We noted any unresolved conflicts in our records. New data may prompt revisions to our barcode names. Some examples are given below.

Amathia vidovici and A. dichotoma.

Several vouchers were identified by Judy Winston and Linda McCann for SERC as *Amathia dichotoma*. There are no records for *A. dichotoma* in Genbank to compare.

However, sequences from SERC's vouchers matched Genbank records of *A. vidovici* from Brazil (KM373351-KM373571). A tree of Brazilian *A. vidovici* revealed two very divergent major clades, each with subclades. SERC's *A. dichotoma* was 99.8% similar to sequences in one of those subclades. Those Brazilian bryozoans were identified by Leandro Vieira or Bruno Aguiar, and Judy Winston was listed a member of the collecting team for some of the records (eg, KM373396). It is evident that either Winston and McCann erred in identifying material from Caliifornia as *A. dichotoma*, or Aguiar, Vieira, and (maybe) Winston erred in naming specimens from one of major clades in Brazil as *A. vidovici*.

This is difficult to resolve, since experienced taxonomists identified the specimens. Further, Winston was a participant in both studies, assigning different name to the same sequence. We adopted McCann and Winston's use of *A. dichotoma* because they appear to have worked independently in Morro Bay and San Francisco.

Thalamoporella californica

Our verified *Thalamoporella californica* is dissimilar to the Genbank records for that species (PQ456604-PQ4566608), whereas our verified *Amathia citrina* is a strong match to those Genbank records. We consider the Genbank records to be misidentified *A. citrina* until further evidence clarifies this conflict.

Distaplia occidentalis

The voucher with vial number 302083 was identified as *Distaplia occidentalis*, but the sequence is very different from the Genbank record for this species (MZ580876, only 63% similar) that was deposited previously by a SERC group. Because the Genbank record was identified by Gretchen Lambert, the ascidian expert often used by SERC, it is likely that it is the voucher that was misidentified rather than the Genbank record.

Paracerceis sculpta

Specimens identified by SERC as *Paracerceis scuplta* are a 100% match to Genbank sequences from the Indian River, Florida (e.g., KP255330) that were assigned to *Cilicea* sp. According to NEMESIS, *P. sculpta* is native to southern California and introduced globally in warm waters. NEMESIS also notes specimens *P. scuplta* introduced to Ft. Pierce, FL. The low-resolution (genus only) of the Genbank record, the native status of *P. sculpta* in California, and its known NIS status in Florida make it likely that the specimens assigned to *Cilicea* sp. in Genbank were misidentified. *Cilicea* and *Paracerceis* are in the same family (Sphaeromatidae), making this mistake plausible.

***Halosydna* spp.**

Scale worms (Polynoidae) in the genus *Halosydna* were assigned by SERC to the species *Halosydna brevisetosa* or *H. johnsoni*, but these all shared sequences that were <1% different and are most probably a single species. These specimens were about 14% different from Genbank records for this *H. brevisetosa*. No records for *H. johnsoni* were found in Genbank. It is unclear which sequences should be attributed to *H. brevisetosa* or *H. johnsoni*. For now, we

regressed these identifications to Polynoidae. Finally, a voucher assigned by SERC to *Halosydna* sp is a match to a recently deposited (February, 2025) sequence in Genbank assigned to *Thormora cf. setosior* (a native species).

An exemplar of the challenges of database curation: *Diadumene*

Diadumene is a good example of the difficulty in establishing a database of reference sequences. There is each type of potential ambiguity in existing database records: different sequences among records with the same name; potential symbionts, ambiguously named pseudo-binomials, low-resolution names; and same sequences with different names.

Names with multiple sequences. Some vouchers identified as *Diadumene franciscana* by SERC had disparate sequences. One set of sequences matched Genbank records for *Aiptasiogeton eruptaurantia* from Florida that were, oddly, contributed by SERC to Genbank. Thus, SERC taxonomists (albeit different teams) have assigned Californian specimens to *D. franciscana* and Floridian specimens to *A. eruptaurantia*, all with the same sequence. No independent Genbank record exists for *D. franciscana*, thus it is unclear which name these sequences should receive

Another set of vouchers identified by SERC as *Diadumene francsicana* does not match any *Diadumene*, nor anything else, in Genbank. We designated these as *Diadumene* sp1. SERC's vouchers named *Diadumene lineata* yielded sequences that matched Genbank records for *D. lineata*, but others were the same as *Diadumene* sp1. [Given low mitochondrial sequence variation for Anthozoans, the sequence for *Diadumene* sp1 would be expected to be somewhat similar to *some* sea anemone in Genbank; perhaps it is a food item or symbiont of some sort (*Diadumene* is azooxanthellate, though)].

Sequences with multiple names. Some vouchers collected by SERC yielded the same sequence, but were named either *D. lineata* or *D. franciscana*. This sequence does not match Genbank records for *D. lineata,* nor other SERC vouchers named *D. lineata.* We might suggest that they were all *D. franciscana*, but recall these are also identical to Genbank's records for *Aiptaseogeton eruptaurantia*.

Low-resolution names. Many specimens were labeled only "*Diadumene*" or "*Diadumene* sp". These could be sorted into *Diadumene leucolena* or *D. franciscana* (which could actually be *Aiptaiseogeton eruptaurantia*). Two specimens were distinct from all known *Diadumene* and were labeled *Diadumene* sp2.

Ambiguous names. *Diadumene leucolena* exists in Genbank in two groups, one with the term "affinis" inserted (*Diadumene aff. leucolena*) and one without. These groups of sequences (both submitted by Smithsonian teams), are distinct. SERC identified vouchers from California match "*Diadumene leucolena*". We surmise these are indeed *D. leucolena*, and those in Genbank with the "affinis" name is not.

DISCUSSION

The purpose of the DNA barcoding work described here was twofold: first, to identify vouchers collected at sites in bays that are included in regular monitoring sponsored by California Department of Fish and Wildlife; second, to populate a COI barcode database with sequences from expertly identified specimens to serve for the identification of both more vouchers and anonymous sequences that are generated by metabarcoding. The most critical step in DNA barcoding is specimen identification. In principle, this is to be performed by taxonomic experts. In practice, there is no official credential of "taxonomic expert", and highly regarded persons may produce different names for the same specimens. We found the quality of morphological identification ranged greatly, from low-resolution names (for example, class only (e.g., Hydrozoa), or a non-taxonomic descriptor (e.g., orange sponge) as Field IDs, to complete binomials as Final IDs. To make a database, we seek consistency and agreement among experts, and monophyletic phylogenetic patterns – the same names should form monophyletic groupings. More data always helps refine trees and improves species assignments.

Aside from disagreement among experts, nominally expert identification can be very difficult for all-taxa surveys. First, for some groups of marine invertebrates, experts are few and unavailable. Second, the bulk of material in these surveys limits the amount of time a competent taxonomist can spend on each specimen. Third, identification manuals are usually place-specific, and it may not be obvious which manual to use when encountering an unfamiliar species. Fourth, for some taxa, morphological identification might require specialized methods or extraordinary expert knowledge (spicule analysis in sponges or nematocysts in Cnidarians are good examples). Fifth, the power of genetics to detect cryptic species means that many known species complexes can, for practical purposes, never be identified morphologically. For example, mussels in the genus *Mytilus edulis* complex are essentially indistinguishable by morphology. When these mussels are collected, genetics will always resolve the low-resolution morphological assignment. These challenges help explain why many vouchers were provided with low-resolution names.

Regardless of name, or even lacking a name, any DNA sequence might find a match in a barcode database, and that serves the first purpose mentioned above. For about 60% of specimens, we confirmed morphological IDs, field or final, via matching barcodes. For about 25% of the total, we were also able to improve the resolution of identification.

Vouchers that were entirely reassigned by genetic analysis belong to two groups: implausible mistakes and plausible mistakes. Implausible mistakes (i.e., mistaking a tunicate for a barnacle) may arise when contamination of tissue or DNA occurs. Contamination might occur when tissue is sampled from an organism growing on another, if tools for handling tissue are not cleaned well, or in the handling of DNA in the laboratory. Too, we have learned that environmental DNA (eDNA) is ubiquitous in the environment, so it is plausible that organisms carry exogenous DNA on their surfaces. Gut contents too cannot be dismissed as a source of tissue or DNA. Implausible mistakes are easy to spot and dismiss. Sometimes DNA sequences

appear to derive from bacteria, also easily recognized. Finally, plausible mistakes are those where there is strong similarity between subjects, i.e., many congeners. These may be more serious when an invasive species is mistaken for a native species. We noted some species are frequently reassigned during our many years of monitoring California bays.

The second purpose for this study was to augment a database of barcodes of species found in California bays, especially NIS. We generated 91 new barcodes with binomial identifications. All these were provided with a Field or Final identification, and were designated as Provisional or Verified barcodes on that basis. However, some of these names conflict with Genbank and we should review our confidence in our naming before submitting those to Genbank.

New NIS barcodes.

We found sixteen new barcodes that appear to belong to NIS. Further scrutiny of Appendices 1-1 to 1-12 by CDFW personnel and other experts may reveal additional candidates. At least one, the mussel *Xenostrobus securis*, is known to be highly invasive (e.g., Astudillo et al. 2017). Interestingly, the specimens were incorrectly identified as *Mytilus* or Mytillidae, underscoring the difficulty of identifying some groups of invertebrates as discussed above. Another worrisome NIS detected here is the tunicate *Ascidiella aspersa*. NEMESIS list multiple impacts to native species and aquaculture. Impacts of NIS are notoriously difficult to predict; hopefully the development of DNA barcodes reported here will help in the effort to monitor and mitigate effects of these species. For example, these barcodes are used to detect native and NIS in metabarcoding studies of plankton and settlement plates in Part 2 of this report.

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APPENDIX CAPTIONS.

Appendix 1-1. Identification of voucher specimens from San Francisco Bay (2022) by DNA barcoding. "Query" is the vial number and morphological identification of a specimen, with status of morphological identification being Field (initial) or Final. "Blast Result" is the highest scoring reference in an in-house reference set of barcodes (MLMLv2025) or in Genbank if no match was found in the former. "Morphological ID Status" indicates if the genetic identification matched (Accepted), improved specificity (Resolved), or Changed the morphological identification. "Genetic Identification" is the current name for a voucher, along with its vial number, for potential entry to the MLML database.

Appendix 1-2. Identification of voucher specimens from the Channel Islands (Catalina, 2022) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-3. Identification of voucher specimens from the Bodega Bay and Tomales Bay (2022) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-4. Identification of voucher specimens from the Long Beach (2021) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-5. Identification of voucher specimens from the San Francisco Bay (2021) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-6. Identification of voucher specimens from the San Francisco Bay (2020) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-7. Identification of voucher specimens from Open Coast sampling in Monterey, Santa Cruz, and Marin Counties (2019) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-8. Identification of primarily sessile voucher specimens from San Francisco Bay (2018) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-9. Identification of primarily motile voucher specimens from San Francisco Bay (2018) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-10. Identification of sessile voucher specimens from Long Beach (2018) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-11. Identification of motile voucher specimens from Long Beach (2018) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-12. Identification of voucher specimens from the San Francisco Bay (2017) by DNA barcoding. See caption for Appendix 1-1 for explanation of terminology.

Appendix 1-1. San Francisco 2022

QUERY	BLAST RESULT	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
295445_Polycera atra (Field)	Provsional_Polycera_atra_189364_COI	99.20%	MLMLv2025	Accepted	Provisional_Polycera_atra_295445
295958_Megasyllis nipponica (Field)	Verified_Megasyllis_nipponica_308091_COI	98.90%	MLMLv2025	Accepted	Provisional_Megasyllis_nipponica_295958
296118_Okenia plana (Field)	none	na	none	Accepted	Provisional_Okenia_plana_296118
296172_Barentsia benedeni (Field)	Provisional_Barentsia_benedeni_313689_COI	99.80%	MLMLv2025	Accepted	Provisional_Barentsia_benedeni_296118
296188_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_2_149756_COI	99.90%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata_2_296188
296198_Terebellidae (Final)	none	na	none	Accepted	Verified_Terebellidae_296198
296612_Porifera sp. B (Field)	Provisional_Barentsia_benedeni_313689_COI	100.00%	MLMLv2025	Changed	Unverified_Barentsia_benedeni_296612
296766_Plumularioidea (Final)	Provisional_Plumularioidea1_313676_COI	99.10%	MLMLv2025	Resolved	Verified_Plumulariioidea1_296766
297002_Syllidae (Final)	Verified_Megasyllis_nipponica_308091_COI	100.00%	MLMLv2025	Resolved	Unverified_Megasyllis_nipponica_297001
297022_Amathia sp. Bowerbankia (Final)	Provisional_Schizoporella_japonica_278014_COI	100.00%	MLMLv2025	Changed	Unverified_Schizoporella_japonica_297022
297108_Ciona sp. (Final)	Provisional_Ciona_robusta_145739_COI	99.70%	MLMLv2025	Resolved	Unverified_Ciiona_robusta_297108
297267_Diadumene franciscana (Field)	Verified_Diadumene_franciscana_313100_COI	99.90%	MLMLv2025	Accepted	Provisional_Diadumene_franciscana_297267
297296_Amathia sp bowerbankia (Field)	Verified_Amathia_sp2_149959_COI	99.30%	MLMLv2025	Resolved	Provisional_Amathia_sp2_297296
297311_Cirratulidae (Field)	Verified_Megasyllis_nipponica_308091_COI	99.70%	MLMLv2025	Changed	Unverified_Megasyllis_nipponica_297311
297311_Cirratulidae (Field)	Cirratulidae sp. MZ322692	99.80%	Core_nt	Accepted	Provisional_Cirratulidae_297311
297335_Arcuatula sehnhousia (Final)	Verified_Musculista_senhousia_female_150494_COI	97.90%	MLMLv2025	Accepted	Verified_Musculista_senhousia_female_297335
299063_Leptoplanidae (Field)	Prosthiostomum_sp OR80085	99.80%	Core_nt	Resolved	Unverified_Prosthiostomum_sp_299063
299083_Diadumene franciscana (Final)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Accepted	Verified_Diadumene_franciscana_299083
299222_Acerotisa californica (Field)	Verified_Amphibalanus improvisus_303460 COI	99.30%	MLMLv2025	Changed	Unverified_Amphibalanus_improvisus_299222
299238_Kamptozoa (Field)	Provisional_Barentsia_benedeni_313689_COI	99.80%	MLMLv2025	Resolved	Unverified_Barentsia_benedeni_299238
299383_Styelidae (Final)	Provisional_Styela_clava_155244_COI	100.00%	MLMLv2025	Resolved	Unverified_Styela_clava_299383
299390_Diadumene lineata (Final)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_299390
299410_Athecata (Final)	Bougainvillia sp KF962079	100.00%	Core_nt	Resolved	Unverified_Bougainvillia_sp_29410
299413_Tubulariidae (Final)	Ectopleura crocea. JX898189	99.80%	MLMLv2025	Resolved	Unverified_Ectopleura_croceea_299413
299443_Plumularioidea (Field)	Provisional_Plumularioidea1_313676_COI	99.00%	MLMLv2025	Accepted	Provisional_Plumularioidea1_299443
299444_Plumularioidea (Field)	Provisional_Plumularioidea1_313676_COI	99.10%	MLMLv2025	Accepted	Provisional_Plumularioidea1_299444
299756_Barentsia_benedeni (Field)	Provisional_Barentsia_benedeni_313689_COI	99.6	MLMLv2025	Accepted	Provisional_Barentsia_benedeni_299756
306768_Nereidae (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Resolved	Unverified_Platynereis_bicanaliculata_306768
306770_Campanulariidae (Field)	Obelia dichotoma AY789913	98.6	Core_nt	Resolved	Unverified_Obelia_dichotoma_306770
306774_Perophora sp. (Final)	Provisional_Perophora_japonica_157825_COI	99.60%	MLMLv2025	Resolved	Unverified_Perophora_japonica_306774
306775_Harmothoe imbricata (Final)	None	na	na	Accepted	Verified_Harmothoe_imbricata_306775
306777_Perophora sp. (Final)	Provisional_Perophora_japonica_157825_COI	99.60%	MLMLv2025	Resolved	Unverified_Perophora_japonica_306777
306778_Perophora_japonica (Field)	Provisional_Perophora_japonica_157825_COI	99.60%	MLMLv2025	Accepted	Provisional_Perophora_japonica_306778

Appendix 1-1. San Francisco 2022

QUERY	BLAST RESULT	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
306781_Diadumene leucolena (Final)	Verified_Diadumene_leucolena_306781_COI	100.00%	MLMLv2025	Accepted	Verified_Diadumene_leucolena_306781
307200_Eudendrium sp. (Final)	None	99.90%	na	Accepted	Verified_Eudendrium_sp_307200
307208_Platynereis bicanaliculata (Final)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Verified_Platynereis_bicanaliculata_307208
307209_Platynereis bicanaliculata (Final)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Verified_Platynereis_bicanaliculata_307209
307210_Schizoporella variabilis (Field)	Verified_Schizoporella_variabilis_149682_COI	99.80%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculara_307210
307214_Tubulariidae (Field)	Ectopleura crocea MT949544	100.00%	MLMLv2025	Resolved	Unverified_Ectopleura_croceea_307214
307221_Leptoplanidae (Field)	Verified_Amphibalanus_amphitrite_312413_COI	99.70%	MLMLv2025	Changed	Unverified_Amphibalanus_amphitrite_307221
307226_Sakuraeolis enosimensis (Final)	Sakuraeolis enosimensis HM162758	100.00%	Core_nt	Accepted	Verified_Sakuraeolis_enomensis_3017226
307227_Arcuatula senhousia (Final)	Verified_Musculista_senhousia_female_150494_COI	98.20%	MLMLv2025	Accepted	Verified_Musculista_senhousia_female_307227
307235_Parasabella sp (Field)	Verified_Parasabella_pallida_307241_COI	100.00%	MLMLv2025	Resolved	Provisional_Parasabella_pallida_307235
307236_Parasabella sp (Field)	Verified_Parasabella_pallida_308134_COI	99.30%	MLMLv2025	Resolved	Provisional_Parasabella_pallida_307236
307238_Crepidula plana (Final)	Verified_Crepidula_plana_146264_COI	99.50%	MLMLv2025	Accepted	Verified_Crepidula_plana_307238
307240_Parasabella pallida (Final)	Verified_Parasabella_pallida_307241_COI	100.00%	MLMLv2025	Accepted	Verified_Parasabella_pallida_307240
307241_Parasabella pallida (Final)	Verified_Parasabella_pallida_307240_COI	100.00%	MLMLv2025	Accepted	Verified_Parasabella_pallida_307241
308437_Amathia sp bowerbankia (Field)	Amathia gracilis MN447925	99.60%	Core_nt	Changed	Unverified_Amathia_graciilis_308437
308495_Amathia sp bowerbankia (Field)	Amathia gracilis MN447925	99.80%	Core_nt	Changed	Unverified_Amathia_graciilis_308495
308499_Crisularia pacifica (Field)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLMLv2025	Changed	Unverified_Bugula_stolonifera_308499
308508_Amathia sp. bowerbankia (Final)	Amathia gracilis MH242683	100.00%	Core_nt	Changed	Unverified_Amathia_gracilis_308508
308510_Schizoporella variabilis (Final)	Verified_Schizoporella_variabilis_149682_COI	99.70%	MLMLv2025	Accepted	Verified_Schizoporella_variabilis_308510
308511_Schizoporella japonica (Final)	Verified_Schizoporella_japonica_16587_COI	99.50%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_308511
308512_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_2_16295_COI	99.90%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata_08512
308513_Schizoporella variabilis (Field)	Verified_Schizoporella_variabilis_149682_COI	99.70%	MLMLv2025	Accepted	Provisional_Schiizoporella_variabilis_308513
308516_Smittoidea prolifica (Final)	Verified_Smittoidea_prolifica_308090_COI	100.00%	MLMLv2025	Accepted	Verified_Smittoidea_prolifica_308516
308517_Porifera (Final)	Halichondria sp OQ32432	100.00%	Core_nt	Resolved	Unverified_Halichondria_sp_308517
308518_Amathia dichotoma (Final)	Amathia vidovici KM373385	100.00%	Core_nt	Changed	Unverified_Amaathia_vidovici_308518
310520_Amathia sp. bowerbankia (Field)	None	na	none	Resolved	Provisional_Amathia_sp9_310520
310521_Polynoidae (Field)	None	na	none	Accepted	Provisional_Polynoidae_310521
310526_Arcuatula senhousia	Verified_Musculista_senhousia_female_150494_COI	99.40%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_female_310526

Appendix 1-1. San Francisco 2022

QUERY	BLAST RESULT	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
(Final)					
313089_Nicolea cf. amnis (Field)	Nicolea venustula ON716039	99.70%	Core_nt	Changed	Unverified_Nicolea_venustula_313089
313095_Amathia_sp_bowerbanki (Field)	Amathia gracilis MH242683	99.85	Core_nt	Changed	Unverified_Amathia_graciis_313095
313100_Diadumene franciscana (Final)	Verified_Diadumene_franciscana_299083_COI	100.00%	MLMLv2025	Accepted	Verified_Diadumene_franciscana_313100
313689_Barentsia benedeni (Final)	Provisional_Barentsia_benedeni_296118	100.00%	MLMLv2025	Accepted	Verified_Barentsia_benedeni_313689
313690_Tricelleria inopinata (Final)	Provisional_Tricellaria_inopinata_2_16295_COI	96.50%	MLMLv2025	Accepted	Verified_Tricellaria_inopiinata2_313690
313691_Cirripedia (Field)	Verified_Amphibalanus_amphitrite_312413_COI	99.70%	MLMLv2025	Resolved	Unverified_Amphibalanus_amphitrite_313691
313697_Porifera _A (Final)	Halichondria sp OQ32432	100.00%	core_nt	Resolved	Unverified_Halichondria_sp_313697
313699_Campanulariidae (Final)	Laoedea calceolifera KX665242	100.00%	MLMLv2025	Resolved	Unverified_Laomedea_calceolifera_313699
313700_Tunicata (Final)	Provisional_Perophora_japonica_157825_COI	99.40%	MLMLv2025	Resolved	Unverified_Perophora_japonica_313700
313701_Conopeum sp. (Final)	Verified_Electra-LM2010_150441_COI	99.40%	MLMLv2025	Changed	Unverified_Electra-LM2020_313701
313704_Stratonice succinea (Final)	Verified_Stratonice_succinea_301291_COI	98.80%	MLMLv2025	Accepted	Verified_Stratonice_succinea_313704
313797_Conopeum sp. (Final)	Provisional_Electra-LM2010_400078_COI	99.20%	MLMLv2025	Changed	Unverified_Electra-LM2020_313797
313799_Porifera_A (Final)	Halichondria sp OQ32432	100.00%	core_nt	Resolved	Unverified_Halichondria_sp_313799
313803_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculara_313803
313804_Balanus crenatus (Field)	Verified_Amphibalanus improvisus_303460 COI	99.50%	MLMLv2025	Changed	Provisional_Amphibalanus_improvisus_313804
313805_Obelia dichotoma (Final)	Obelia dichotoma AY789913	99.70%	Core_nt	Accepted	Verified_Obelia_dichotoma_313805
313807_Megasyllis nipponica (Final)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLMLv2025	Accepted	Verified_Megasyllis_nipponica_313807
313808_Diadumene franciscana (Final)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Accepted	Verified_Diadumene_franciscana_313808
313815_Schizoporella variabilis (Final)	Provisional_Schizoporella_variabilis_313815_COI	100.00%	MLMLv2025	Accepted	Verified_Schizoporella_variabilis_313815
313817_Tricelleria inopinata (Field)	Provisional_Tricellaria_inopinata_1_150262_COI	100.00%	MLMLv2025	Accepted	Provisional_Tricellaria_inopinata_1_313817
313818_Tricellaria_inopinata (Field)	Provisional_Tricellaria_inopinata_2_16295_COI	97.6	MLMLv2025	Accepted	Provisional_Tricellaria_inopinata_2_313818
313822_Alcyonidium sp. (Field)	Provisional_Alcyonidium_sp2_313822_COI	100.00%	MLMLv2025	Accepted	Provisional_Alcyonidium_sp2_313822
313823_Tricellaria inopinata (Field)	Provisional_Tricellaria_inopinata_2_16295_COI	94.20%	MLMLv2025	Accepted	Provisional_Tricellaria_inopinata_3_313823
313827_Amathia sp. (Field)	Amathia vidovici KM373385	100.00%	Core_nt	Resolved	Unverified_Amathia_vidovici_313827
313828_Arcuatula senhousia (Final)	Verified_Musculista_senhousia_female_150494_COI	99.80%	MLMLv2025	Accepted	Provisional_Musculista_senhousia_female_313828
313830_Conopeum sp. (Final)	Verified_Electra-LM2010_150441_COI	100.00%	MLMLv2025	Changed	Unverified_Electra_monostachys_313830
313832_Schizoporella variabilis (Field)	Provisional_Schizoporella variabilis_308513_COI	99.80%	MLMLv2025	Accepted	Provisional_Schizoporella_variabilis_313832
313836_Actinaria (Final)	Provisional_Diadumene_sp2_263595_COI	99.80%	MLMLv2025	Resolved	Unverified_Diadumene_sp2_313836
313837_Haminoea japonica (Final)	Provisional_Haloa_japonica_195714_COI	100.00%	MLMLv2025	Accepted	Verified_Haloa_japonica_313837

Appendix 1-1. San Francisco 2022

QUERY	BLAST RESULT	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
313841_Diadumene_leucolena (Final)	Halichondria sp OQ32432	100.00%	Core_nt	Changed	Unverified_Halichondria_sp_313841
313843_Porifera A (Field)	Verified_Nevianipora_floridana_313849_COI	99.80%	MLMLv2025	Changed	Unverified_Nevianipora_floridana_313843
313847_Sabellidae (Field)	Verified_Parasabella_pallida_310524_COI	99.70%	MLMLv2025	Resolved	Unverified_Parasabella_pallida_313847
313849_Nevianipora floridana (Final)	Verified_Nevianipora_floridana_180310_COI	99.80%	MLMLv2025	Accepted	Verified_Nevianipora_floridana_313849
313852_Parasabella sp (Field)	Verified_Parasabella_pallida_310524_COI	99.80%	MLMLv2025	Resolved	Unverified_Parasabella_pallida_313852
313855_Nereidae (Field)	Verified_Stratonice_succinea_301291_COI	99.20%	MLMLv2025	Resolved	Unverified_Allita_succinea_313855
313857_Stratonice succinea (Final)	Verified_Stratonice_succinea_301291_COI	99.80%	MLMLv2025	Accepted	Verified_Allita_succinea_313857
313867_NA (Field)	Ectopleura crocea MH809676	100.00%	Core_nt	Resolved	Unverified_Ectopleura_crocea_313867
400078_Electra monostachys (Final)	Provisional_Electra-LM2010_400078_COI	100.00%	MLMLv2025	Accepted	Verified_Electra_monostachys_400078
400202_Styela sp. (Final)	Provisional_Styela_clava_155244_COI	99.70%	MLMLv2025	Resolved	Unverified_Styela_clava_400202
400258_Sabellidae (Final)	Verified_Parasabella_pallida_310524_COI	99.90%	MLMLv2025	Resolved	Unverified_Parasabella_pallida_400258

Appendix 1-2. Channel Islands 2022

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
286750_Stenothoe_sp. (Field)	none	na	none	Accepted	Provisional_Stenothoe_sp_286750
286757_Caprella_sp. (Field)	Verified_Caprella_equilibra_183760_COI	96.50%	MLMLv2025	Resolved	Unverified_Caprella_equilibra_286757
286812_Aoroides_secunda (Field)	Verified_Aoroides_secunda_179544_COI	96.60%	MLMLv2025	Accepted	Provisional_Aoroides_secunda_286812
282939_Caprella_sp. (Field)	Verified_Caprella_equilibra_183760_COI	97.30%	MLMLv2025	Resolved	Unverified_Caprella_equilibra_282939
286832_Caprella_scaura (Field)	Verified_Caprella_scaura_245246_COI	97.40%	MLMLv2025	Accepted	Provisional_Caprella_scaura_286832
286907_Caprella_scaura (Field)	Verified_Caprella_scaura_245246_COI	98.00%	MLMLv2025	Accepted	Provisional_Caprella_scaura_286907
286904_Caprella_scaura (Field)	Verified_Caprella_scaura_245246_COI	98.20%	MLMLv2025	Accepted	Provisional_Caprella_scaura_286904
286862_Caprella_scaura (Field)	Verified_Caprella_scaura_245246_COI	98.20%	MLMLv2025	Accepted	Provisional_Caprella_scaura_286862
286811_Laticorophium_baconi (Field)	Provisional_Laticorophium_baconi_219809_COI	98.20%	MLMLv2025	Accepted	Provisional_Laticorophium_baconi_286811
286829_Laticorophium_baconi (Field)	Verified_Monocorophium_sp_183403_COI	98.30%	MLMLv2025	Changed	Unverified_Monocorophium_sp_286829
282993_Paranthura_japonica (Field)	Verified_Paranthura_japonica_184498_COI	98.80%	MLMLv2025	Accepted	Provisional_Panthura_japonica_282993
282986_Elasmopus_bampo (Field)	Verified_Elasmopus_bampo_184990_COI	98.90%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_282986
282985_Elasmopus_bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.10%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_282985
282980_Elasmopus_bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.10%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_282980
282996_Paracerceis_sculpta (Field)	Provisional_Paracerceis_sculpta_283002_COI	99.10%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_282996
282956_Elasmopus_bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.20%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_282956
282959_Elasmopus_bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.20%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_282959
286910_Caprella_sp. (Field)	Verified_Caprella_simia_184719_COI	99.20%	MLMLv2025	Resolved	Unverified_Caprella_simia_286910
286834_Laticorophium_baconi (Field)	Verified_Monocorophium_sp_183403_COI	99.30%	MLMLv2025	Changed	Unverified_Monocorophium_sp_286834
282950_Stenothoe_estacola (Field)	Provisional_Stenothoe_estacola_286802_COI	99.30%	MLMLv2025	Accepted	Provisional_Stenothoe_estacoloa_282950
286873_Tanaidae (Field)	Verified_Zeuxo_sp_240166_COI	99.40%	MLMLv2025	Resolved	Unverified_Zeuxo_sp_286873
282979_Ampithoe_plumulosa (Field)	Provisional_Ampithoe_plumulosa_240370_COI	99.40%	MLMLv2025	Accepted	Provisional_Ampithoe_plumosa_282979
286740_Ampithoe_plumulosa (Field)	Provisional_Ampithoe_plumulosa_240370_COI	99.50%	MLMLv2025	Accepted	Provisional_Ampithoe_plumosa_286740
283004_Ampithoe_plumulosa (Field)	Provisional_Ampithoe_plumulosa_240370_COI	99.50%	MLMLv2025	Accepted	Provisional_Ampithoe_plumosa_283004
282988_Ampithoe_plumulosa (Field)	Provisional_Ampithoe_plumulosa_240370_COI	99.50%	MLMLv2025	Accepted	Provisional_Ampithoe_plumosa_282988
286802_Stenothoe_estacola (Field)	none	na	Core_nt	Accepted	Provisional_Stenothoe_estacoloa_286802
286853_Monocorophium_acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.50%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_286853
286859_Monocorophium_acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.50%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_286859
286728_Caprella_sp. (Field)	Provsional_Caprella_sp4._286728_COI	99.50%	MLMLv2025	Resolved	Unverified_Caprella_sp4_286728
282799_missing_name (Field)	Verified_Nasageneia_quinsana_286801_COI	99.50%	MLMLv2025	Resolved	Unverified_Nasageneia_quinsana_282799
282971_Caprella_sp. (Field)	none	na	Core_nt	Resolved	Unverified_Caprella_sp2_282971
286777_Caprella_sp. (Field)	Provsional_Caprella_sp4_286728_COI	99.70%	MLMLv2025	Resolved	Unverified_Caprella_sp4_286777
282982_Paracerceis_sculpta (Field)	Provisional_Paracerceis_sculpta_283002_COI	99.70%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_282982
286847_Monocorophium_acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.80%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_286847
286796_Ampithoe_lacertosa (Field)	Provisional_Ampithoe_lacertosa_183710_COI	99.90%	MLMLv2025	Accepted	Provisional_Ampithoe_lacertosa_286796
282940_Ericthonius_brasiliensis (Field)	Provisional_Ericthonius_brasiliensis_282934_COI	99.90%	MLMLv2025	Accepted	Provisional_Ericthonius_brasiliensis_282940
286823_Laticorophium_baconi (Field)	Provisional_Laticorophium_baconi_219763_COI	99.90%	MLMLv2025	Accepted	Provisional_Laticorophium_baconi_286823
286850_Monocorophium_acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.90%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_286850
282934_Ericthonius_brasiliensis (Field)	Provisional_Ericthonius_brasiliensis_282934_COI	99.90%	MLMLv2025	Accepted	Provisional_Ericthonius_brasiliensis_282934
282930_Ericthonius_brasiliensis (Field)	Provisional_Ericthonius_brasiliensis_282930_COI	100.00%	MLMLv2025	Accepted	Provisional_Ericthonius_brasiliensis_282930
282944_Ericthonius_brasiliensis (Field)	Provisional_Ericthonius_brasiliensis_282944_COI	100.00%	MLMLv2025	Accepted	Provisional_Ericthonius_brasiliensis_282944
286882_Ericthonius_brasiliensis (Field)	Provisional_Ericthonius_brasiliensis_286882_COI	100.00%	MLMLv2025	Accepted	Provisional_Ericthonius_brasiliensis_286882
282991_Paracerceis_sculpta (Field)	Provisional_Paracerceis_sculpta_282991_COI	100.00%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_282991
283002_Paracerceis_sculpta (Field)	Provisional_Paracerceis_sculpta_283002_COI	100.00%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_283002

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Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
283006_Paracerceis_sculpta (Field)	Provisional_Paracerceis_sculpta_283006_COI	100.00%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_283006
286867_Leucothoe_nagatai (Field)	Verified_Leucothoe_alata_183241_COI	100.00%	MLMLv2025	Changed	Unverified_Leucothoe_alata_286867
286889_Monocorophium_acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	100.00%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_286889
286801_Nasageneia_quinsana (Field)	none	na	none	Accepted	Provisional_Nasageneia_quinsana_286801
286765_Eusiroidea (Field)	Verified_Nasageneia_quinsana_286801_COI	100.00%	MLMLv2025	Resolved	Unverified_Nasageneia_quinsana_286765
286856_Paranthura_japonica (Field)	Verified_Paranthura_japonica_184498_COI	100.00%	MLMLv2025	Accepted	Provisional_Panthura_japonica_286856
286819_Paranthura_japonica (Field)	Verified_Paranthura_japonica_184498_COI	100.00%	MLMLv2025	Accepted	Provisional_Panthura_japonica_286819
294031_Aiptasiidae (Final)	Provisional_Exaiptasia_diaphana_294880_COI	100.00%	MLML January 2025.2	Resolved	Unverified_Exaiptasia_diaphana_294031_COI
294054_Aiptasiidae (Final)	Provisional_Exaiptasia_diaphana_294880_COI	100.00%	MLML January 2025.2	Resolved	Unverified_Exaiptasia_diaphana_294054_COI
294064_Plumularioidea (Field)	Provisional_Plumularioidea1_313676_COI	100.00%	MLML January 2025.2	Resolved	Provisional_Plumularioidea1_294064
294105_Eubranchus sp. (Final)	Eubranchus rustyus KP871641	99.40%	Core_nt	Resolved	Unverified_Eubranchus_rustyus_294105
294392_Exaiptasia diaphana (Final)	Provisional_Exaiptasia_diaphana_294880_COI	100.00%	MLML January 2025.2	Accepted	Verified_Exaiptasia_diaphana_294392
294433_Membranipora villosa (Field)	none	100.00%	MLML January 2025.2	Changed	Provisional_Membranipora_sp_Catalina_294433
294464_Thecata (Field)	none	na	none	Accepted	Provisional_Thecata2_294464
294474_Campanulariidae (Final)	Obelia sp MW277721	96.20%	Core_nt	Resolved	Unverified_Obelia_sp_294474
294502_Halosydna sp. (Final)	none	100.00%	none	Accepted	Verified_Halosydna_sp_294502
294567_Cradoscrupocellaria sp. (Final)	na	100.00%	MLML January 2025.2	Accepted	Verified_Cradoscrupocellaria_sp1_294567
294603_Tubulipora sp. (Final)	Obelia dichotoma MW277711	99.10%	Core_nt	Changed	Unverified_Obelia_dichotoma_294604
294854_Lichenoporidae (Final)	Verified_Disporella_novaehollandiae1_308417_COI	99.50%	MLML January 2025.2	Resolved	Unverified_Diisporella_novaehollandiae1_294854
294880_Exaiptasia diaphana (Final)	na	na	none	Accepted	Verified_Exaiptasia_diaphana_294880
294923_Aiptasiidae (Final)	Provisional_Exaiptasia_diaphana_294880_COI	99.90%	MLML January 2025.2	Resolved	Unverified_Exaiptasia_diaphana_294923
295352_Lichenoporidae (Final)	Verified_Disporella_novaehollandiae1_308417_COI	99.80%	MLML January 2025.2	Resolved	Unverified_Diisporella_novaehollandiae1_295352
295370_Lichenoporidae (Final)	Verified_Disporella_novaehollandiae1_308417_COI	97.90%	MLML January 2025.2	Resolved	Unverified_Diisporella_novaehollandiae1_295370
295797_Aiptasiidae (Field)	Provisional_Exaiptasia_diaphana_294880_COI	99.90%	MLML January 2025.2	Resolved	Unverified_Exaiptasia_diaphana_295797_COI
295798_Aiptasiidae (Field)	Provisional_Exaiptasia_diaphana_294880_COI	100.00%	MLML January 2025.2	Resolved	Unverified_Exaiptasia_diaphana_295787_COI
295814_Campanulariidae (Field)	Obelia dichotoma MW277711	98.90%	MLML January 2025.2	Resolved	Unverified_Obelia_dichotoma_295814
296352_Lichenoporidae (Field)	Verified_Disporella_novaehollandiae1_308417_COI	98.10%	MLML January 2025.2	Resolved	Unverified_Diisporella_novaehollandiae1_296352
296369_Amathia sp. bowerbankia (Field)	none	na	none	Changed	Provisional_Amathia_sp7_296369
296412_Amathia sp. Bowerbankia (Final)	Verified_Amathia sp6_312206_COI	100.00%	MLML January 2025.2	Changed	Unverified_Amathia_sp6_296412
296450_Campanulariidae (Field)	Obelia dichotoma MW277711	98.60%	Core_nt	Resolved	Unverified_Obelia_dichotoma_296450

Appendix 1-2. Channel Islands 2022

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
296469_Campanulariidae (Field	Obelia dichotoma MW277711	98.70%	Core-nt	Resolved	Unverified_Obelia_dichotoma_296469
307183_Megabalanus californicus (Field)	Verified_Megabalanus_californicus_308481_COI	99.80%	MLML January 2025.2	Accepted	Provisional_Megabalanus_californicus_307183
307193_Cradoscrupocellaria sp. (Field)	Verified_Cradoscrupocellaria_sp2_313082_COI	99.80%	MLML January 2025.2	Accepted	Provisional_Cradoscrupellaria_sp2_307193
307194_Amathia sp. Bowerbankia (Final)	Provisional_Amathia_sp4_308425_COI	100.00%	MLML January 2025.2	Accepted	Verified_Amathia_sp4_307194
307195_Cradoscrupocellaria sp. (Final)	Verified_Cradoscrupocellaria_sp2_313082_COI	99.90%	MLML January 2025.2	Accepted	Verified_Cradoscrupocellaria_sp2_307195
308400_Amphibalanus reticulatus (Field)	Verified_Megabalanus_californicus_308481_COI	99.70%	MLML January 2025.2	Changed	Unverified_Megabalanus_californica_308400
308414_Membranipora villosa (Field)	none	na	none	Changed	Provisional_Membranipora_sp_Catalina_294433_COI
308417_Disporella novaehollandiae (Final)	none	na	none	Accepted	Verified_Disporella_novaehollandiae1_308417_COI
308419_Disporella novaehollandiae (Final)	none	na	none	Accepted	Verified_Disporella_novaehollandiae2_308419_COI
308420_Tubulariidae (Final)	Ectopleura crocea MH888021	99.50%	Core_nt	Resolved	Unverified_Ectopeura_crocea_308420
308423_Thalamoporella californica (Final)	Ectopleura crocea JX898192	99.00%	Core_nt	Changed	Unverified_Ectopeura_crocea_308423
308425_Amathia sp. bowerbankia (Field)	Verified_Amathia_sp4_307194_COI	100.00%	MLML January 2025.2	Changed	Provisional_Amathia_sp4_308425
308475_Megabalanus californicus (Final)	Megabalanus californicus KU204249	100.00%	Core_nt	Accepted	Verified_Megabalanus_californicus_308475_COI
308481_Megabalanus californicus (Final)	Megabalanus californicus KU204249	100.00%	Core_nt	Accepted	Verified_Megabalanus_californicus_308481_COI
308485_Megabalanus californicus (Final)	Megabalanus californicus KU204249	99.70%	Core_nt	Accepted	Verified_Megabalanus_californicus_308485_COI
308489_Cradoscrupocellaria sp. (Field)	Verified_Cradoscrupocellaria_sp2_313082_COI	100.00%	MLML January 2025.2	Accepted	Provisional_Cradoscrupocellaria_sp2_308489_COI
308492_Tubulariidae (Final)	Ectopleura crocea MH888021	100.00%	Core_nt	Resolved	Unverified_Ectopeura_crocea_308492
310524_Parasabella pallida (Final)	Verified_Parasabella_pallida_307241_COI	99.60%	MLML January 2025.2	Accepted	Verified_Parasabella_pallida_307241
313069_Cradoscrupocellaria sp. (Final)	Verified_Cradoscrupocellaria_sp2_313082_COI	100.00%	MLML January 2025.2	Accepted	Verified_Cradoscrupocellaria_sp2_313069
313071_Plumularioidea (Field)	Provisional_Plumularioidea1_313676_COI	100.00%	MLML January 2025.2	Accepted	Provisioinal_Plumularioidea1_313071
313082_Cradoscrupocellaria sp. (Final)	Verified_Cradoscrupocellaria_sp2_313069_COI	100.00%	MLML January 2025.2	Accepted	Provisional_Cradoscrupellaria_sp2_313082
313085_Tubulariidae (Final)	Ectopleura crocea MH888021	99.50%	Core_nt	Resolved	Unverified_Ectopeura_crocea_31308
313675_Plumularioidea (Field)	na	na	none	Accepted	Provisional_Plumularioidea2_313675
313676_Plumularioidea (Field)	Provisional_Plumularioidea1_313071_COI	100.00%	MLML January 2025.2	Accepted	Provisioinal_Plumularioidea1_313676
313680_Schizoporella occidentalae (Final)	na	na	none	Accepted	Verified_Schizoporella_occidentalae_313680
313681_Thalamoporella_californica_336811 (Final) (Final)	none	na	none	Accepted	Verified_Thalamoporella_californica_313681
313686_Amathia sp. bowerbankia (Field)	Verified_Amathia_sp4_307194_COI	99.80%	MLML January 2025.2	Accepted	Provisional_Amathia_sp4_313686
313688_Tubulariidae (Final)	Ectopleura crocea JX898192	99.00%	MLML January 2025.2	Resolved	Unverified_Ectopeura_crocea_313688
313778_Botrylloides sp. (Final)	Botrylloides giganteum	79.00%	MLML January 2025.2	Resolved	Unverified_Botrylloiides_giganteum_313778

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Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
313783_Thalamoporella californica (Final)	Provisional_Thecata_313784_COI	99.90%	MLML January 2025.2	Changed	Unverifiied_Thecata_313783
313784_Thecata (Final)	Provisional_Thecata_313784_COI	100.00%	MLML January 2025.2	Accepted	Verified_Thecata_313784

Appendix 1.3. Bodega Bay and Tomales Bays 2022

Query	BLAST Results	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
179244 _Hemipodia simplex (Field)	Glyceridae HQ932536	100.00%	Core-nt	Accepted	Provisional_Hemipodia_simplex_179244_COI
179245 _Neanthes sp. LH1 (Field)	none	na	none	Accepted	Provisional_Neanthes_sp._LH1_179245_COI
179246 _Marphysa sp. C Harris (Field)	Marphysa victori MT396176	100.00%	Core-nt	Resolved	Unverified_Marphysa_victori_179246
179247 _Marphysa sp. C Harris (Field)	Marphysa victori MT396176	100.00%	Core-nt	Resolved	Unverified_Marphysa_victori_179247
179248 _Marphysa sp. C Harris (Field)	Marphysa victori MT396176	100.00%	Core-nt	Resolved	Unverified_Marphysa_victori_179248
179249 _Marphysa sp. C Harris (Field)	Marphysa victori MT396176	100.00%	Core-nt	Resolved	Unverified_Marphysa_victori_179249
179250 _Cirriformia moorei (Field)	none	na	None	Accepted	Provisional_Cirriformia_moorei_179250_COI
179256 _Chone mollis (Field)	none	na	None	Accepted	Provisional_Chone_mollis_179256_COI
180042 _Dorvillea moniloceras (Field)	none	na	None	Accepted	Provisional_Dorvillea_moniloceras_180042_COI
180044 _Dorvillea moniloceras (Field)	none	na	None	Accepted	Provisional_Dorvillea_moniloceras_180044_COI
180046 _Dorvillea moniloceras (Field)	none	na	None	Accepted	Provisional_Dorvillea_moniloceras_180046_COI
180054 _Bispira sp. (Field)	Provisional_Dorvillea_moniloceras_180044_COI	100.00%	MLMLv2025	Changed	Unverified_Dorvillea_moniloceras_180054
180055 _Bispira sp. (Field)	none	na	none	Accepted	Provisional_Bispira_sp_180055
268359 _Ophryotrocha sp. (Field)	Ophryotrocha labronica AY838874.1	99.70%	Core-nt	Resolved	Unverified_Ophryotrocha_labronica_268359
268363 _Exogone lourei (Field)	none	Na	none	Accepted	Provisional_Exogone_lourei_268363_COI
268365 _Armandia brevis (Field)	Provisional_Cirriformia_moorei_304027_COI	99.50%	MLMLv2025	Changed	Unverified_Cirriformia_moorei_268365
268366 _Armandia brevis (Field)	Verified_Amandia_brevis_157451_COI	99.90%	MLMLv2025	Accepted	Provisional_Armandia_brevis_268366
268367 _Stylostomum lentum (Field)	Provisional_Stylostomum_lentum_268367_COI	100.00%	MLMLv2025	Accepted	Provisional_Spiophanes_duplex_304030_COI
268368_Cirratulus_sp (Field)	Cirratulus cirratus HM473343	100.00%	Core-nt	Resolved	Unverified_Cirratulus_cirratus_268368
268369 _Exogone lourei (Field)	Provisional_Exogone_lourei_268370_COI	96.70%	MLMLv2025	Accepted	Provisional_Exogone_lourei_268369
268370 _Exogone lourei (Field)	Provisional_Exogone_lourei_268370_COI	97.60%	MLMLv2025	Accepted	Provisional_Exogone_lourei_268370
268372 _Exogone lourei (Field)	None	na	None	Accepted	Provisional_Exogone_lourei_268372_COI
268373 _Phyllodoce hartmanae (Field)	None	na	None	Accepted	Provisional_Phyllodoce hartmanae_268373_COI
268374 _Mediomastus sp. (Field)	None	na	None	Accepted	Provisional_Mediomastus_sp _268374_COI
268384 _Pseudopolydora kempi (Field)	Verified_Amandia_brevis_157451_COI	99.40%	MLMLv2025	Changed	Unverified_Armandia_brevis_26384
268387 _Phyllodoce williamsi (Field)	none	na	none	Accepted	Provisional_Phyllodoce_williamsi_268387_COI
268388 _Mediomastus sp. (Field)	none	na	none	Accepted	Provisional_Mediomastus_sp _268388_COI
268398 _Glycera robusta (Field)	Glycera sp MF121261	96.80%	Core-nt	Accepted	Provisional_Glycera_robusta_268398_COI
281632 _Phyllodoce williamsi	none	na	none	Accepted	Provisional_Phyllodoce_williamsi_281632_COI

Appendix 1.3. Bodega Bay and Tomales Bays 2022

Query	BLAST Results	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
(Field)					
281636 _Armandia brevis (Field)	Verified_Amandia_brevis_157451_COI	99.90%	MLMLv2025	Accepted	Provisional_Armandia_brevis_281636
281639 _Phyllodoce williamsi (Field)	none	na	None	Accepted	Provisional_Phyllodoce_williamsi_281639_COI
303523 _Nereis latescens (Field)	Verified_Nereis_latescens_178499_COI	98.60%	MLMLv2025	Accepted	Provisional_Nereis_latescens_303523_COI
303524 _Nereis latescens (Field)	Verified_Nereis_latescens_178499_COI	99.10%	MLMLv2025	Accepted	Provisional_Nereis_latescens_303524
303525 _Nereis latescens (Field)	Verified_Nereis_latescens_178499_COI	99.10%	MLMLv2025	Accepted	Provisional_Nereis_latescens_303525
303526 _Paradialychone ecaudata (Field)	Chone magna MH242704	99.50%	Core-nt	Changed	Unverified_Chone_magna_303526
303527_Paradialychone ecaudata (Field)	Phascolosoma agassizi KM226392	99.80%	Core-nt	Changed	Unverified_Phascolosoma_agassizi_303527
304026 _Cirriformia moorei (Field)	None	na	none	Accepted	Provisional_Cirriformia_moorei_304026_COI
304027 _Cirriformia moorei (Field)	None	na	none	Accepted	Provisional_Cirriformia_moorei_304027_COI
304029 _Cirriformia moorei (Field)	None	na	none	Accepted	Provisional_Cirriformia_moorei_304029_COI
304030 _Spiophanes duplex (Field)	None	na	none	Accepted	Provisional_Spiophanes_duplex_304030_COI
304031 _Spiophanes duplex (Field)	None	na	none	Accepted	Provisional_Spiophanes_duplex_304031_COI
308209 _Scoloplos acmeceps (Field)	None	na	none	Accepted	Provisional_Scoloplos_acmeceps_308209_COI
308213 _Nereis vexillosa (Field)	Verified_Nereis_vexillosa_178670_COI	97.50%	MLMLv2025	Accepted	Provisional_Nereis_vexillosa_308213
308214 _Scoloplos acmeceps (Field)	None	na	none	Accepted	Provisional_Scoloplos_acmeceps_308214_COI
308215_Scoloplos_acmeceps	Leitoscoloplos pugettensis HM473440	99.40%	Core-nt	Changed	Provisional_Scoloplos_acmeceps_308214_COI
308216 _Syllis elongata (Field)	None	na	none	Accepted	Provisional_Syllis_elongata2_308216_COI
310051 _Polycirrus sp. (Field)	Polycirrus californica MT167016	99.90%	Core-nt	Resolved	Unverified_Polycirrus_californica_310051
310052_Polycirrus_sp (Field)	Polycirrus californica MT167016	100.00%	Core-nt	Resolved	Unverified_Polycirrus_californica_310052
310053 _Polycirrus sp. (Field)	Polycirrus californica MT167016	99.90%	Core-nt	Resolved	Unverified_Polycirrus_californica_310053
310318 _Capitella sp. (Field)	None	97.80%	none	Accepted	Provisional_Capitella_sp_310318
310319 _Capitella sp. (Field)	Provisional_Capatella_teleta_182511	95.90%	MLMLv2025	Resolved	Unverified_Capitella_teleta_310319
310320 _Capitella sp. (Field)	Provisional_Capatella_teleta_182511	96.30%	MLMLv2025	Resolved	Unverified_Capitella_teleta_310320
310321 _Capitella sp. (Field)	None	na	None	Accepted	Provisional_Capitella_sp_310321_COI
310322 _Capitella sp. (Field)	None	na	None	Accepted	Provisional_Capitella_sp_310322_COI
310323 _Nereis latescens (Field)	Verified_Nereis_latescens_178499_COI	98.80%	MLMLv2055	Accepted	Provisional_Nereis_latescens_310323
310324_Nereis_latescens (Field)	Provisional_Nereis_latescens_303524_COI	99.20%	MLMLv2025	Accepted	Provisional_Nereis_latescens_310324
310328 _Leitoscoloplos pugettensis (Field)	Leitoscoloplos pugettensis	98.78%	Core-nt	Accepted	Provisional_Leiitoscoloplos_pugettensis_310328_COI
310329_Leitoscoloplos_puggetensis (Field)	Leitoscoloplos pugettensis HM473441	95.40%	Core-nt	Accepted	Provisional_Leitoscoloplos_pugettensis_310329
310330_Leitoscoloplos_puggetensis (Field)	Leitoscoloplos pugettensis HM473438	99.40%	Core-nt	Accepted	Provisional_Leitoscoloplos_pugettensis_310330
310331_Chaetozone_columbiania (Field)	None	na	none	Accepted	Provisional_Chaetozone_columbiana_310331
311834_Mediomastus_sp (Field)	Provisional_Mediomastus_sp _268374_COI	99.80%	MLMLv2025	Accepted	Provisional_Mediomastus_sp_311834

Appendix 1.3. Bodega Bay and Tomales Bays 2022

Query	BLAST Results	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
311835_Nereis_vexillosa (Field)	Verified_Nereis_vexillosa_178670_COI	99.70%	MLMLv2025	Accepted	Provisional_Nereis_vexillosa_311835
311837_Syllis_gracilis (Field)	None	na	None	Accepted	Provisional_Mediomastus_sp_311834
311841_Scoloplos_sp (Field)	Provisional_Scoloplos_acmeceps_308214_COI	100.00%	MLMLv2025	Resolved	Unverified_Scoloplos_acmeceps_311841
311945_Mediomastus_sp (Field)	None	na	none	Accepted	Provisional_Mediomastus_sp_311945
312038_Allita_cf_succinea (Field)	Verified_Stratonice_succinea_313857_COI	97.30%	MLMLv2025	Accepted	Provisional_Allita_succinea_312038
312042_Chone_molis (Field)	Provisional_Chone_mollis_179256_CO	99.80%	MLMLv2025	Accepted	Provisional_Chone_mollis_312042
312043_Chone_molis (Field)	Provisional_Chone_mollis_179256_COI	99.80%	MLMLv2025	Accepted	Provisional_Chone_mollis_312043

Appendix 1-4. Long Beach 2021

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
280073_Aceritosa californica (Field)	None	na	None	Accepted	Provisional_Aceritosa_californica_280073
280074_Aceritosa californica (Field)	none	na	none	Accepted	Provisional_Aceritosa_californica_280074
280108_Acerotisa californica (Field)	none	na	none	Accepted	Provisional_Aceritosa_californica_280108
280248_Acerotosa californica (Field)	none	na	none	Accepted	Provisional_Aceritosa_californica_280248
280951_Aegires albopunctata (Field)	Aegires albopunctata MF95439	97.0%	Core-nt	Accepted	Provisional_Aegires_albopunctuata_280951
313369_Aegires albopunctata (Field)	Aegires albopunctata MF95439	97.0%	Core-nt	Accepted	Provisional_Aegires_albopunctuata_313369
313370_Aegires albopunctata (Field)	Aegires albopunctata MF95439	97.0%	Core-nt	Accepted	Provisional_Aegires_albopunctuata_313370
280813_NA (Field)	Amathia gracilis MN447925	98.2%	Core-nt	Resolved	Unverified_Amathia_gracilis_280813
306715_Amathia sp bowerbanki (Field)	Amathia cf gracilis KM373426	99.7%	Core-nt	Changed	Unverified_Amathia_gracilis_306715
307128_Amphibalanus sp (Field)	Verified_Amphibalanus_amphitrite_180862_COI	95.2%	MLML January 2025.3	Resolved	Unverified_Amphibalanus_amphitrite_307128
308194_Amphibalanus amphitrite (Field	Verified_Amphibalanus_amphitrite_180862_COI	99.5%	MLML January 2025.3	Accepted	Provisional_Amphibalanus_amphitrite_308194
306743_Aplidium sp (Field)	Verified_Aplidium_accarense_181546_COI	98.6%	MLML January 2025.3	Resolved	Unverified_Aplidium_accarense_306743
279135_Ascidia zara (Field)	Ascidia zara KF886702	99.1%	Core-nt	Accepted	rovisional_Ascidia_zara_279135
313619_Porifera B (Field)	None	na	None	Changed	Unverified_Ascidiacea_313619
279179_Ascidiella aspersa (Field)	Ascidia_aspersa KF886702	98.9%	Core-nt	Accepted	Provisional_Ascidiella_aspersa_279179
306734_Balanus trigonus (Field)	Verified_Balanus_trigonus_312164_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Balanus_trigonus_306734
307125_Balanus trigonus (Field)	Verified_Balanus_trigonus_312258_COI	99.7%	MLML January 2025.3	Accepted	Provisional_Balanus_trigonus_307125
307127_Balanus trigonus (Field)	Verified_Balanus_trigonus_312234_COI	99.5%	MLML January 2025.3	Accepted	Provisional_Balanus_trigonus_307127
279242_Botrylloides diegensis (Field)	Veriifiied_Botrylloides_diegensis_307076_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botrylloides_diegensis_279242

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
304671_Botrylloides violaceus (Field)	Veriifiied_Botrylloides_diegensis_307076_COI	100.0%	MLML January 2025.3	Changed	Unverified_Botrylloides_diegensis_304671
306716_Botrylloides sp (Field)	Verified_Botrylloides_diegensis_312892_COI	99.8%	MLML January 2025.3	Resolved	Unverified_Botrylloides_diegensis_306716
306720_Botrylloides violaceus (Field)	Verified_Botrylloides_diegensis_304411_COI	100.0%	MLML January 2025.3	Changed	Unverified_Botrylloides_diegensis_306720
306726_Botrylloides diegensis (Field)	Verified_Botrylloides_diegensis_312892_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botrylloides_diegensis_306726
306733_Botrylloides sp (Field)	Verified_Botrylloides_diegensis_312893_COI	98.6%	MLML January 2025.3	Resolved	Unverified_Botrylloides_diegensis_306733
306740_Botrylloides diegensis (Field)	Verified_Botrylloides_diegensis_312892_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botrylloides_diegensis_306740
306741_Savignella lafontii (Field)	Verified_Botrylloides_diegensis_312892_COI	100.0%	MLML January 2025.3	Changed	Unverified_Botrylloides_diegensis_306741
306742_Botrylloides violaceus (Field)	Verified_Botrylloides_diegensis_312892_COI	100.0%	MLML January 2025.3	Changed	Unverified_Botrylloides_diegensis_306742
307119_Botrylloides sp (Field)	Verified_Botrylloides_diegensis_312892_COI	99.8%	MLML January 2025.3	Resolved	Unverified_Botrylloides_diegensis_307119
308176_Botrylloides diegensis (Field)	Verified_Botrylloides_diegensis_312892_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botrylloides_diegensis_308176
279276_Botrylloides sp (Field)	Verified_Botrylloides_violaceus_180228_COI	100.0%	MLML January 2025.3	Resolved	Unverified_Botrylloides_violaceus_279276
279861_Stylostomum lentum (Field)	Verified_Botrylloides_violaceus_149926_COI	100.0%	MLML January 2025.3	Changed	Unverified_Botrylloides_violaceus_279861
308169_Diplosoma sp (Field)	Verified_Botrylloides_violaceus_180228_COI	99.9%	MLML January 2025.3	Changed	Unverified_Botrylloides_violaceus_308169
306717_Botryllus schlosseri (Field)	Verified_Botryllus_schlosseri_312871_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botryllus_schlosseri_306717
306723_Botryllus schlosseri (Field)	Verified_Botryllus_schlosseri_312852_COI	99.7%	MLML January 2025.3	Accepted	Provisional_Botryllus_schlosseri_306723
306730_Botryllus schlosseri (Field)	Verified_Botryllus_schlosseri_312871_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botryllus_schlosseri_306730
306739_Botryllus schlosseri (Field)	Verified_Botryllus_schlosseri_312852_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Botryllus_schlosseri_306739
308151_Botryllus schlosseri (Field)	Verified_Botryllus_schlosseri_312871_COI	99.5%	MLML January 2025.3	Accepted	Provisional_Botryllus_schlosseri_308151
308164_Bugulina cf foliolata (Field)	Verified_Bugulina_foliolata_312888_COI	99.6%	MLML January 2025.3	Accepted	Provisional_Bugulina_foliolata_308164
308192_Bugulina cf foliolata (Field)	Verified_Bugulina_foliolata_312888_COI	99.1%	MLML January 2025.3	Accepted	Provisional_Bugulina_foliolata_308192
308154_Amathia sp (Field)	Verified_Buskia_seriata_178578_COI	100.0%	MLML January 2025.3	Changed	Unverified_Buskia_seriata_308154

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
308148_Celleporaria brunnea (Field)	Celleporaria brunnea MN064622	100.0%	Core-nt	Accepted	Provisional_Celleporaria_brunnea_308148
308157_Celleporaria brunnea (Field)	Verified_Celleporaria_brunnea_153974_COI	95.0%	MLML January 2025.3	Accepted	Provisional_Celleporaria_brunnea_308157
308158_Celleporaria brunnea (Field)	Celleporaria brunnea MN064622	100.0%	MLML January 2025.3	Accepted	Provisional_Celleporaria_brunnea_308158
308170_Celleporaria brunnea (Field)	Celleporaria brunnea MN064622	100.0%	Core-nt	Accepted	Provisional_Celleporaria_brunnea_308170
308187_Celleporaria brunnea (Field)	Verified_Celleporaria_brunnea_153974_COI	95.0%	MLML January 2025.3	Accepted	Provisional_Celleporaria_brunnea_308187
304667_Celleporina robertsoniae (Field)	None	na	None	Accepted	Provisional_Celleporina_robertsonae_304667
304675_Celleporina robinsoniae (Field)	None	na	None	Accepted	Provisional_Celleporina_robertsonae_304675
308188_Celleporina robertsonae (Field)	None	na	None	Accepted	Provisional_Celleporina_robertsonae_308188
307121_Celleporina sp (Field)	None	na	None	Accepted	Provisional_Celleporina_sp_307121
313025_Celleporina sp (Field)	None	na	None	Accepted	Provisional_Celleporina_sp_313025
279110_Ciona robusta (Field)	Provisional_Ciona_robusta_145739_COI	100.0%	None	Accepted	Provisional_Celleporina_sp_313025
279129_Ciona robusta (Field)	Provisional_Ciona_robusta_145739_COI	99.3%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_279110
279177_Ciona robusta (Field)	Provisional_Ciona_robusta_145739_COI	99.7%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_279129
279233_Ciona robusta (Field)	Provisional_Ciona_robusta_145739_COI	99.6%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_279177
273070_Ciona sp (Field)	Provisional_Ciona_savignyi_145705_COI	98.9%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_279233
280523_Ciona savignyi (Field)	Provisional_Ciona_savignyi_145705_COI	99.4%	MLML January 2025.3	Accepted	Unverified_Ciona_savignyi_273070
304663_Crepidula onyx (Field)	Crepidula onyx AF550485	99.0%	MLML January 2025.3	Accepted	Provisional_Ciona_savignyi_280523
304674_Crepidula onyx (Field)	Crepidula onyx PQ966634	99.1%	Core-nt	Accepted	Provisional_Crepidula_onyx_304663
313616_Crisia occidentalis (Field)	None	na	None	Accepted	Provisional_Crisia_occidentalis_313616
304666_Crisulipora occidentalis (Field)	Verified_Crisulipora_occidentalis_312873_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Crisulipora_occidentalis_304666
307115_Nevianipora floridana (Field)	Verified_Crisulipora_occidentalis_306650_COI	99.8%	MLML January 2025.3	Changed	Unverified_Crisulipora_occidentalis_307115

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
308195_Crisulipora occidentalis (Field)	Verified_Crisulipora_occidentalis_312255_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Crisulipora_occidentalis_308195
307116_Cryptosula pallasiana (Field)	Verified_Cryptosula_pallasiana_149496_COI	96.3%	MLML January 2025.3	Accepted	Provisional_Crisulipora_occidentalis_308195
308200_Cryptosula pallasiana (Field)	Verified_Cryptosula_pallasiana_149496_COI	99.2%	MLML January 2025.3	Accepted	Provisional_Cryptosula_pallasiana_308200
313026_Cryptosula pallasiana (Field)	Cryptosula pallasiana KU697655	96.7%	Core-nt	Accepted	Provisional_Cryptosula_pallasiana_313026
274199_Aiptasiidae (Field)	Verified_Diadumene_franciscana_313100_COI	100.0%	MLML January 2025.3	Resolved	Unverified_Diadumene_franciscana_274199
279130_Aiptasiidae (Field)	Verified_Diadumene_franciscana_313100_COI	100.0%	MLML January 2025.3	Resolved	Unverified_Diadumene_franciscana_279130
279166_Exaiptasia diaphana (Field)	Verified_Diadumene_franciscana_313100_COI	99.9%	MLML January 2025.3	Resolved	Unverified_Diadumene_franciscana_279166
281550_Diadumene lineata (Field)	Verified_Diadumene_franciscana_313100_COI	98.4%	MLML January 2025.3	Changed	Unverified_Diadumene_franciscana_281550
308171_Diadumene lineata (Field)	Verified_Diadumene_franciscana_313100_COI	100.0%	MLML January 2025.3	Changed	Unverified_Diadumene_franciscana_308171
308184_Didemnidae (Field)	None	na	None	Accepted	Provisional_Didemindae_308184
279109_Diplosoma listerianum (Field)	Diplosoma listerianum MW872296	99.7%	Core-nt	Accepted	Provisional_Diplosoma_listerianum_279109
306718_Aplidium sp (Field)	Diplosoma listerianum KU299766	99.5%	Core-nt	Changed	Unverified_Diplosoma_listerianum_306718
280178_Doto amyra (Field)	Doto sp KJ486704	98.9%	Core-nt	Accepted	Provisional_Doto_amyra_280178
280193_Doto amyra (Field)	Doto sp KJ486704	98.5%	Core-nt	Accepted	Provisional_Doto_amyra_280193
280194_Doto amyra (Field)	Doto sp KJ486704	98.9%	Core-nt	Accepted	Provisional_Doto_amyra_280194
280209_Doto amyra (Field)	Doto sp KJ486704	98.5%	Core-nt	Accepted	Provisional_Doto_amyra_280209
280435_Doto amyra (Field)	Doto sp PQ966733	100.0%	Core-nt	Accepted	Provisional_Doto_amyra_280435
307113_Tubulariidae (Field)	Ectopleura_crocei JX89189	99.8%	Core-nt	Resolved	Unverified_Ectopleura_crocei_307113
279858_Eupolymnia heterobranchia (Field)	None	na	None	Accepted	Provisional_Eupolymnia_heterobranchia_279858
313358_Eupolyminia heterobranchia (Field)	None	na	None	Accepted	Provisional_Eupolymnia_heterobranchia_313358
279420_Aiptasiidae (Field)	Exaiptasia_diaphana MW278603	99.9%	Core-nt	Resolved	Unverified_Exaiptasia_diaphana_279420

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
306735_Fenestrulina delicia (Field)	Verified_Fenestrulina_sp_301422_COI	99.9%	MLML January 2025.3	Accepted	Provisional_Fenestrulina_delicia_306735
313617_Filicrisia franciscana (Field)	Verified_Filicrisia_franciscana_301588_COI	98.2%	MLML January 2025.3	Accepted	Provisional_Filicrisia_franciscana_313617
306711_Limpet (Field)	none	na	None	Accepted	Provisional_Gastropod_306711
308150_Porifera A (Field)	Halichondria sp OQ323432	100.0%	Core-nt	Resolved	Unverified_Halichondria_sp_308150
313608_Porifera A (Field)	Haliclona sp MK308101	99.3%	Core-nt	Resolved	Unverified_Haliclona_sp_313608
280284_Halosydna brevisetosa (Field)	None	na	MLML January 2025.3	Accepted	Provisional_Polynoidae_280284
313366_Halosydna brevisetosa (Field)	None	na	None	Accepted	Provisional_Polynoidae_313366
313367_Halosydna brevisetosa (Field)	None	na	None	Accepted	Provisional_Polynoidae_313367
313368_Halosynda brevisetosa (Field)	None	na	None	Accepted	Provisional_Polynoidae_313368
313383_Halosydna brevisetosa (Field)	None	na	None	Accepted	Provisional_Polynoidae_313383
280282_Halosydna johnsoni (Field)	None	na	None	Accepted	Provisional_Polynoidae_280282
313379_Halosydna johnsoni (Field)	None	na	None	Accepted	Provisional_Polynoidae_313379
313380_Halosydna johnsoni (Field)	None	na	None	Accepted	Provisional_Polynoidae_313380
313381_Halosydna johnsoni (Field)	None	na	None	Accepted	Provisional_Polynoidae_313381
313365_Halosydna sp (Field)	None	na	None	Accepted	Provisional_Halosydna_sp_313365
279976_Harmothoe imbricata (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_279976
279991_Harmothoe imbricata (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_279991
280052_Harmothoe imbricata (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_280052
280098_Harmothoe imbricata (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_280098
313357_Harmothoe imbricata (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_313357
280281_Hoploplana californica (Field)	None	na	None	Accepted	Provisional_Hoploplana_californica_280281

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
280288_Hoploplana californica (Field)	None	na	None	Accepted	Provisional_Hoploplana_californica_280288
280303_Hoploplana californica (Field)	None	na	None	Accepted	Provisional_Hoploplana_californica_280304
280135_Hydroides elegans (Field)	Hydroides elegans MW553740	98.7%	Core-nt	Accepted	Provisional_Hydroides_elegans_280135
280125_Hydroides gracilis (Field)	Hydroides gracilis MG892558	100.0%	Core-nt	Accepted	Provisional_Hydroides_gracilis_280125
280154_Hydroides gracilis (Field)	Hydroides gracilis MG892558	97.8%	Core-nt	Accepted	Provisional_Hydroides_gracilis_280154
280180_Hydroides gracilis (Field)	Hydroides gracilis MG892558	99.1%	Core-nt	Accepted	Provisional_Hydroides_gracilis_280180
279829_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_279829
279859_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_279859
279970_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_279970
280057_Megasyllis nipponica (Field)	Verifiied_Megasyllis_nipponica_308091_COI	99.8%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_280057
313436_Megasyllis nipponica (Final)	Verifiied_Megasyllis_nipponica_308091_COI	98.8%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_313436
308172_Thalamoporella californica (Field)	Myrianida pentadentata GQ856199	100.0%	Core-nt	Changed	Unverified_Myrianida_pentadentata_308172
306713_Mytilus sp (Field)	Verified_Mytilus_galloprovincialis_female_152343_COI	99.0%	na	Resolved	Unverified_Mytilus_galloprovincialis_female_306713
308152_Mytilus sp (Field)	Verified_Mytilus_galloprovincialis_female_152343_COI	100.0%	MLML January 2025.3	Resolved	Unverified_Mytilus_galloprovincialis_female_308152
274224_Mytilidae (Field)	Verified_Mytilus_galloprovincialis_male_153684_COI	97.9%	MLML January 2025.3	Resolved	Unverified_Mytilus_galloprovincialis_male_274224
308175_Mytilus sp (Field)	Verified_Mytilus_galloprovincialis_male_153684_COI	98.7%	MLML January 2025.3	Resolved	Unverified_Mytilus_galloprovincialis_male_308175
308182_Mytilus sp (Field)	Verified_Mytilus_galloprovincialis_male_153684_COI	98.0%	MLML January 2025.3	Resolved	Unverified_Mytilus_galloprovincialis_male_308182
307120_Porifera A (Field)	None	na	None	na	Unknown_307120
308155_Porifera B (Field)	None	na	None	na	Unknown_308155
308179_Porifera C (Field)	None	na	None	na	Unknown_308179
313361_Neanthes accuminata (Field)	Verified_Neanthes_acuminata-1_310664_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Neanthes_acuminata_313361

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
308166_Nevianipora floridana (Field)	Verified_Nevianipora_floridana_303834_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Nevianipora_floridana_308166
308167_Nevianipora floridana (Field)	Verified_Nevianipora_floridana_180310_COI	99.5%	MLML January 2025.3	Accepted	Provisional_Nevianipora_floridana_308167
308181_Nevianipora floridana (Field)	Verified_Nevianipora_floridana_313849_COI	98.1%	MLML January 2025.3	Accepted	Provisional_Nevianipora_floridana_308181
280086_Nicolea cf amnis (Field)	Verified_Nicolea_cf_amnis_307094_COI	96.8%	MLML January 2025.3	Accepted	Provisional_Nicolea_cf_amnis_280086
313360_Nicolea cf amnis (Field)	Verified_Nicolea_cf_amnis_307094_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Nicolea_cf_amnis_313360
306738_Ostrea lurida (Field)	Verified_Ostrea_lurida_181488_COI	98.5%	MLML January 2025.3	Accepted	Provisional_Ostrea_lurida_306738
308196_Ostrea lurida (Field)	Verified_Ostrea_lurida_181488_COI	98.0%	MLML January 2025.3	Accepted	Provisional_Ostrea_lurida_308196
278828_NA (Field)	Verified_Parasabella_pallida_307241_COI	99.6%	MLML January 2025.3	Resolved	Unverified_Parasabella_pallida_278828
280255_NA (Field)	Verified_Parasabella_pallida_310524_COI	98.9%	MLML January 2025.3	Resolved	Unverified_Parasabella_pallida_280255
280006_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	98.5%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_280006
280006_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	98.5%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_280006
313360_Nicolea cf amnis (Field)	Verified_Nicolea_cf_amnis_307094_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Nicolea_cf_amnis_313360
306738_Ostrea lurida (Field)	Verified_Ostrea_lurida_181488_COI	98.5%	MLML January 2025.3	Accepted	Provisional_Ostrea_lurida_306738
308196_Ostrea lurida (Field)	Verified_Ostrea_lurida_181488_COI	98.0%	MLML January 2025.3	Accepted	Provisional_Ostrea_lurida_308196
278828_NA (Field)	Verified_Parasabella_pallida_307241_COI	99.6%	MLML January 2025.3	Resolved	Unverified_Parasabella_pallida_278828
280255_NA (Field)	Verified_Parasabella_pallida_310524_COI	98.9%	MLML January 2025.3	Resolved	Unverified_Parasabella_pallida_280255
272900_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	98.0%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_272900
280006_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	98.5%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_280006
280056_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.8%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_280056
280272_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.5%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_280272
306732_Plumularioidea (Field)	None	na	None	Accepted	Provisional_Plumularioidea_306732

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
313618_Plumularioidea (Field)	Provisional_Plumularioidea2_313675_COI	99.7%	MLML January 2025.3	Accepted	Provisional_Plumularioidea-2_313618
272901_Polycera atra (Field)	Provisional_Polycera_hedgpethi_201158_COI	99.1%	MLML January 2025.3	Accepted	Provisional_Polycera_atra_272901
280169_Doto amyra (Field)	Provisional_Polycera_atra_295445_COI	99.1%	MLML January 2025.3	Changed	Unverified_Polycera_atra_280169
280236_Polycera atra (Field)	280236_Polycera atra (Field)	99.0%	MLML January 2025.3	Accepted	Provisional_Polycera_atra_280236
304668_Polynoidae (Field)	None	na	None	Accepted	Provisional_Polynoidae_304668
313610_Porifera B (Field)	None	na	None	Accepted	Provisional_Porifera_313610
313356_Pseudoceros mexicanus (Field)	None	na	None	Accepted	Provisional_Pseudoceros_mexicanus_313356
313363_Pseudoceros mexicanus (Field)	None	na	None	Accepted	Provisional_Pseudoceros_mexicanus_313363
313378_Pseudoceros mexicanus (Field)	None	na	None	Accepted	Provisional_Pseudoceros_mexicanus_313378
306714_Savignyella lafontii (Field)	None	na	None	Accepted	Provisional_Savignyella_lafontii_306714
307114_Savignyella lofontii (Field)	None	na	None	Accepted	Provisional_Savignyella_lafontii_307114
308191_Schizoporella occidentalae (Field)	Verified_Schizoporella_occidentalae_313680_COI	98.8%	MLML January 2025.3	Accepted	Provisional_Schizoporella_occidentalae_308191
279270_Sphenia sp (Field)	None	na	None	Accepted	Provisional_Sphenia_sp_279270
280455_Styela clava (Field)	Provisional_Styela_clava_155244_COI	99.7%	MLML January 2025.3	Accepted	Provisional_Styela_clava_280455
280546_Styela sp (Field)	Provisional_Styela_clava_155244_COI	99.8%	MLML January 2025.3	Resolved	Unverified_Styela_clava_280546
279133_Styela plicata (Field)	Provisional_Styela_plicata_248964_COI	99.8%	MLML January 2025.3	Accepted	Provisional_Styela_plilcata_279133
279237_Styela plicata (Field)	Provisional_Styela_plicata_248964_COI	99.7%	MLML January 2025.3	Accepted	Provisional_Styela_plilcata_279237
280358_Styela plicata (Field)	Provisional_Styela_plicata_248964_COI	97.6%	MLML January 2025.3	Accepted	Provisional_Styela_plilcata_280358
280376_Styela sp (Field)	Provisional_Styela_plicata_248964_COI	100.0%	MLML January 2025.3	Resolved	Unverified_Styela_plilcata_280376
280427_Styela sp (Field)	Provisional_Styela_clava_155244_COI	99.7%	MLML January 2025.3	Resolved	Unverified_Styela_plilcata_280427
280102_Stylostomum lentum (Field)	None	na	None	Accepted	Provisional_Stylostomum_lentum_280102

Query	BLAST Result	% Pairwise Identity	Database	Morphological Status	Genetic Identifications
313364_Stylostomum lentum (Field)	None	na	None	Accepted	Provisional_Stylostomum_lentum_313364
304677_Thalamoporella californica (Field)	Thalamoporella californica PQ454607	96.0%	Core-nt	Accepted	Provisional_Thalamoporella californica_304677
308199_Thalamoporella californica (Field)	Thalamoporella californica PQ454607	96.2%	Core-nt	Accepted	Provisional_Thalamoporella californica_308199
280237_Trinchesia albocrusta (Field)	Trinchesia_albocrusta KX889725	98.2%	Core-nt	Accepted	Provisional_Thalamoporella californica_308199
272897_Tubulipora pacifica (Field)	None	na	None	Accepted	Provisional_Tubulipora_pacifica-2 272897
273019_Tubulipora sp (Field)	None	na	None	Accepted	Provisional_Tubulipora_pacifica-2_273019
307122_Watersipora arcuata (Field)	Verified_Watersipora_arcuata_180459_COI	99.1%	MLML January 2025.3	Accepted	Provisional_Watersipora_arcuata_307122
308163_Watersipora arcuata (Field)	Provisional_Watersipora_arcuata_181390_COI	99.9%	MLML January 2025.3	Accepted	Provisional_Watersipora_arcuata_308163
313611_Watersipora arcuata (Field)	Provisional_Watersipora_arcuata_181390_COI	98.4%	MLML January 2025.3	Accepted	Provisional_Watersipora_arcuata_313611
308153_Watersipora subatra (Field)	Verified_Watersipora_subatra_180516_COI	99.8%	MLML January 2025.3	Accepted	Provisional_Watersipora_subatra_308153
308165_Watersipora subatra (Field)	Verified_Watersipora_subatra_180516_COI	99.8%	MLML January 2025.3	Accepted	Provisional_Watersipora_subatra_308165
308177_Watersipora subatra (Field)	Verified_Watersipora_subatra_180740_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Watersipora_subatra_308177
308180_Watersipora subatra (Field)	Verified_Watersipora_subatra_180516_COI	99.8%	MLML January 2025.3	Accepted	Provisional_Watersipora_subatra_308180
308183_Watersipora subatra (Field)	Verified_Watersipora_subatra_180516_COI	100.0%	MLML January 2025.3	Accepted	Provisional_Watersipora_subatra_308183
313613_Watersipora arcuata (Field)	Verified_Watersipora_subatra_180740_COI	98.8%	MLML January 2025.3	Accepted	Provisional_Watersipora_subatra_313613

Appendix 1-5. San Francisco Bay 2021

QUERY	BLAST RESULT	% PAIRWISE IDENTITY	DATABASE	MORPHOLOGICAL ID STATUS	GENETIC IDENTIFICATION
283295_Amathia verticillata (Field)	Verified_Amathia_verticillata_312244_COI	98.10%	MLMLv2025	Accepted	Provisional_Amathia_verticillata_283295
283643_NA	Verified_Amathia_verticillata_312244_COI	97.20%	MLMLv2025	Resolved	Unverified_Amathia_verticillata_283643
306753_Amathia verticillata (Final)	Verified_Amathia_verticillata_180851_COI	99.70%	MLMLv2025	Accepted	Verified_Amathia_verticillata_306753
307133_NA	Verified_Amathia_verticillata_180851_COI	96.10%	MLMLv2025	Resolved	Unverified_Amathia_verticillata_307133
313048_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_309510_COI	99.70%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_313048
313424_Neoamphitrite sp A (Final)	Amphitrite ornata MF784577	99.00%	MLMLv2025	Changed	Unverified_Amphitrite_ornata_313424
283800_Janolus barbarensis (Field)	Provisional_Antiopella_barbarensis_247403_COI	97.60%	MLMLv2025	Accepted	Provisional_Antiopella_barbarensis_283800
306752_Arcuatula senhousia (Final)	Verified_Musculista_senhousia_female_150494_COI	98.50%	MLMLv2025	Accepted	Verified_Arcuatula_senhousi_306752
307134_NA	Verified_Musculista_senhousia_female_150494_COI	98.00%	MLMLv2025	Resolved	Unverified_Arcuatula_senhousi_307134
308146_NA	Verified_Musculista_senhousia_female_150494_COI	97.70%	MLMLv2025	Resolved	Unverified_Arcuatula_senhousi_308146
313038_NA	Verified_Musculista_senhousia_male-149923_COI	96.40%	MLMLv2025	Resolved	Unverified_Arcuatula_senhousi_313038
313439_NA	Verified_Musculista_senhousia_female_150494_COI	98.50%	MLMLv2025	Resolved	Unverified_Arcuatula_senhousi_313439
283583_NA	Verified_Ascidia_zara_149542_CO1	97.80%	MLMLv2025	Resolved	Unverified_Ascidia_zara_283583
280638_Botryllinae (Field)	Verified_Botrylloides_diegensis_312892_COI	98.50%	MLMLv2025	Resolved	Unverified_Botrylloides_diegensis_280638
313419_Botrylloides diegensis (Final)	Verified_Botrylloides_diegensis_304411_COI	98.10%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_313419
313029_Botrylloides sp (Final)	Verified_Botrylloides_violaceus_180228_COI	98.90%	MLMLv2025	Resolved	Unverified_Botrylloides_violaceus_313029
313430_Botrylloides sp (Final)	Verified_Botrylloides_violaceus_180228_COI	98.90%	MLMLv2025	Resolved	Unverified_Botrylloides_violaceus_313430
307131_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_150651_COI	98.90%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_307131
313421_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_304513_COI	99.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_313421
304685_Amathia verticillata	Bougainvillia sp KF962079	95.90%	Core-nt	Changed	Unverified_Bougainvillia_sp_304685
304822_NA	Verified_Bugulina_stolonifera_149716_COI	98.50%	MLMLv2025	Resolved	Unverified_Bugulina_stolonifera_304822
304831_NA	Verified_Bugulina_stolonifera_149716_COI	99.10%	MLMLv2025	Resolved	Unverified_Bugulina_stolonifera_304831
313433_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	100.00%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_313433
281331_Ciona sp (Field)	Provisional_Ciona_robusta_145739_COI	99.40%	MLMLv2025	Resolved	Unverified_Ciona_robusta_281331
273297_Ciona sp (Field)	Provisional_Ciona_savignyi_145705_COI	99.10%	MLMLv2025	Resolved	Unverified_Ciona_savignyi_273297
307137_Conopeum chesapeakensis (Final)	none	na	none	Accepted	Verified_ConopeumConopeurm chesapeakensis_307137
277656_NA	Verified_Cryptosula_pallasiana_149496_COI	95.50%	MLMLv2025	Resolved	Unverified_Cryptosula_pallasiana_277656
283054_Diadumene lineata (Field)	Provisional_Diadumene_franciscana_263560_COI	98.90%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_283054
281234_NA	Provisional_Diadumene_lineata_243914_COI	98.80%	MLMLv2025	Resolved	Unverified_Diadumene_lineata_281234
306749_NA	Provisional_Didemnum_vexillum_147445_COI	99.60%	MLMLv2025	Resolved	Unverified_Didemnum_vexillum_306749
313418_Diplosoma listerianum (Final)	Verified_Diplosoma_listerianum_304794_COI	99.20%	MLMLv2025	Accepted	Verified_Diplosoma_listeranum_313418
283787_NA	Verifiled_Eudendrium_sp_307200_COI	98.10%	MLMLv2025	Resolved	Unverified_Eudendrium_sp_283787

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QUERY	BLAST RESULT	% PAIRWISE IDENTITY	DATABASE	MORPHOLOGICAL ID STATUS	GENETIC IDENTIFICATION
283380_Eurylepta aurantica (Field)	none	na	none	Accepted	Provisional_Eurylepta aurantica_283380
304829_Harmothoe imbricata (Final)	none	na	none	Accepted	Verified_Harmothoe imbricata_304829
306754_Hydrozoa D (Final)	none	na	none	Accepted	Verified_Hydrozoa_306754
313428_NA	Provisional_Megasyllis_nipponica_267649_COI	99.10%	MLMLv2025	Resolved	Unverified_Megasyllis_nipponica_313428
283422_NA	none	na	none	na	Unknown_313428
307136_Amphibalanus improvisus (Final)	none	na	none	na	Unknown_283422
313362_NA	Provisional_Neanthes_acuminata-1_251861_COI	98.40%	MLMLv2025	Resolved	Unverified_Neanthes_acuminata_313362
306748_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	98.20%	MLMLv2025	Accepted	Verified_Ostrea_lurida_306748
313049_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	98.50%	MLMLv2025	Accepted	Verified_Ostrea_lurida_313049
313450_NA	Verified_Parasabella_pallida_310524_COI	99.80%	MLMLv2025	Resolved	Unverified_Parasabella_pallida_313450
283650_NA	Provisional_Polycera_hedgpethi_201158_COI	97.90%	MLMLv2025	Resolved	Unverified_Polycera_hedgpethi_283650
313043_NA	Ruditapes philippinarum JN807366	98.10%	Core-nt	Resolved	Unverified_Ruditapes_philippanarum_313043
306750_NA	Provisional_Tricellaria_inopinata_1_152330_COI	99.40%	MLMLv2025	Resolved	Unverified_Tricellaria_inopinata-1_306750
306751_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_1_150243_COI	99.70%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata-1_306751
304684_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_2_149756_COI	100.00%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata-2_304684
308207_Watersipora subatra (Final)	Verified_Watersipora_subatra_145935_COI	99.10%	MLMLv2025	Accepted	Verified_Watersipora_subatra_308207

Appendix 1-6. San Francisco Bay 2020

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
184079_Bugula	Provisional_Styela_clava_155244_COI	99.8%	MLMLv2025	Changed	Unverified_Styela_clava_184079
184081_Stolidobranc	Verified_Bugula_neritina_179113_COI	100.0%	MLMLv2025	Changed	Unverified_Bugula_neritina_184081
267641_Ascidiidae	Verified_Ascidia_zara_149542_CO1	99.50%	MLMLv2025	Resolved	Unverified_Ascidia_zara_267641
267649_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_267699_COI	99.8%	MLMLv2025	Accepted	Provisional_Megasyllis_nipponica_267649
267653_Molgula sp (Field)	Provisional_Molgula_manhattensis_144447_COI	99.4%	MLMLv2025	Resolved	Provisional_Megasyllis_nipponica_267682
267682_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.0%	MLMLv2025	Accepted	Provisional_Megasyllis_nipponica_267682
267699_Megasyllis nipponica (Field)	Provisional_Megasyllis_japonica_267649_COI	99.9%	MLMLv2025	Accepted	Provisional_Megasyllis_nipponica_267699
267702_Ciona sp	Provisional_Ciona_robusta_145739_COI	98.10%	MLMLv2025	Resolved	Unverified_Ciona_robusta_267702
267709_Diadumene sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Accepted	Unverified_Diadumene_franciscana_267709
267711_Diadumene sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Accepted	Unverified_Diadumene_franciscana_267711
267732_Dorvilleidae (Field)	Verified_Schistomeringos_longicornis_307086_COI	99.8%	MLMLv2025	Resolved	Unverified_Schistomeringos_longicornis_267732
267736_Cirratulidae	Cirratulidae sp MZ322692	99.8%	Core-nt	Accepted	Provisional_Cirratulidae_267736
267777_Cirratulidae	Cirratulidae sp MZ322692	99.8%	Core-nt	Accepted	Provisional_Cirratulidae_267777
267833_Molgula sp	Provisional_Molgula_manhattensis_144447_COI	100.0%	MLMLv2025	Resolved	Unverified_Molgula_manhattensis_267833
267838_Ciona sp (Field)	Provisional_Ciona_savignyi_145705_COI	99.2%	MLMLv2025	Resolved	Unverified_Ciona_savignyi_267838
267847_Cirratulidae	Cirratulidae sp MZ322692	99.8%	Core-nt	Accepted	Provisional_Cirratulidae_267847
273402_Ciona sp (Field)	Provisional_Ciona_robusta_145739_COI	100.0%	MLMLv2025	Resolved	Unverified_Ciona_robusta_273402
277193_Botryllinae	Verified_Botrylloides_diegensis_304411_COI	100.0%	MLMLv2025	Resolved	Unverified_Botryllus_diegensis_277193
277195_Botryllinae	Verified_Botrylloides_diegensis_304411_COI	100.0%	MLMLv2025	Resolved	Unverified_Botryllus_diegensis_277195
277490_Ciona (Field)	None	na	None	na	na
277495_Ascidiidae	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Resolved	Unverified_Ascidia_zara_277495
277781_Ophryotrocha	Ophryotrocha labronica KF305778	100.0%	Core-nt	Resolved	Unverified_Ophryotrocha_labronca_277781
277787_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_141785_COI	100.0%	MLMLv2025	Accepted	Provisional_Megasyllis_nipponica_277787
277804_Porifera (Field)	Provisional_Grantia_sp_178767_COI	99.6%	MLMLv2025	Resolved	Unverified_Grantia_sp_277804
277811_Diadumene sp	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_277811
277843_Anguinella palmata (Field)	Verified_Anguinella_palmata_149685_COI	99.5%	MLMLv2025	Accepted	Provisional_Anguinella_palmata_277843

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
277850_Anguinella palmata (Field)	Verified_Anguinella_palmata_149685_COI	99.5%	MLMLv2025	Accepted	Provisional_Anguinella_palmata_277850
277862_Molgula sp (Field)	Provisional_Molgula_manhattensis_144447_COI	99.2%	MLMLv2025	Resolved	Unverified_Molgula_manhattensis_277862
277864_Diadumene sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_277864
277891_Diadumene sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_277891
277898_Didemnidae (Field)	Verified_Botrylloides_diegensis_179066_COI	99.90%	MLMLv2025	Changed	Unverified_Botryllus_diegensis_277898
277903_Diadumene sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_277903
278014_Schizoporella japonica (Field)	Provisional_Schizoporella_japonica_308511_COI	99.5%	MLMLv2025	Accepted	Provisional_Schiizoporella_japonica_278014
278057_Harmothoe imbricata (Field)	None	na	None	Changed	Unverified_Polynoidae_278057
278092_Diadumene_sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_278092
278095_Stolidobranchia (Field)	Provisional_Styela_clava_155244_COI	99.5%	MLMLv2025	Resolved	Unverified_Styela_clava_278095
278096_Electridae (Field)	Verified_Electra-LM2010_150441_COI	100.0%	MLMLv2025	Resolved	Unverified_Einhornia_crustulenta-LM_278096
278097_Diadumene_sp (Field)	Verified_Diadumene_franciscana_299083_COI	100.0%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_278097
278109_Porifera (Field)	Verified_Ascidia_zara_149542_CO1	98.6%	MLMLv2025	Changed	Unverified_Ascidia_zara_278109
278137_Nemertea (Field)	Cephalothrix_simula KP411247	100.0%	Core-nt	Resolved	Unverified_Cephalothrix_simula_278137
278152_Stolidobranchia (Field)	Provisional_Styela_clava_155244_COI	99.8%	MLMLv2025	Resolved	Unverified_Styela_clava_278152
278165_Cirratulidae (Field)	Cirratulidae sp MZ322692	99.7%	Core-nt	Accepted	Provisional_Cirratulidae_278165
278118_Terebellidae (Field)	Cirratulidae sp MZ322692	99.4%	Core-nt	Changed	Provisional_Cirratulidae_278118
278303_Ascididae (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Resolved	Unverified_Ascidia_zara_278303
278907_Schizoporella japonica (Field)	Provisional_Schizoporella_japonica_278014_COI	96.0%	MLMLv2025	Accepted	Provisional_Schiizoporella_japonica_278907
278931_Ascidiidae (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Resolved	Unverified_Ascidia_zara_278931
278970_Stolidobranchia (Field)	Provisional_Styela_clava_155244_COI	100.0%	MLMLv2025	Accepted	Unverified_Styela_clava_278970

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279005_Arcuatula senhousia (Field)	Verified_Arcuatula_senhousia_female_150494_COI	98.0%	MLMLv2025	Accepted	Provisional_Arcuatula_senhousia_female_279005
303531_Bugula neritina (Final)	Verified_Bugula_neritina_304403_COI	100.0%	MLMLv2025	Accepted	Verified_Bugula_neritina_303531
303532_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	100.0%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_303532
303533_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.0%	MLMLv2025	Accepted	Verified_Ostrea_lurida_303533
303534_Arcuatula senhousia (Final)	Verified_Arcuatula_senhousia_male-149923_COI	95.70%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_male_303534
303535_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_1_150262_COI	99.80%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata_1_303535
303536_Watersipora subatra (Final)	Verified_Watersipora_subatra_16552_COI	99.6%	MLMLv2025	Accepted	Verified_Watersipora_subatra_303536
303537_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.80%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_303537
303538_Arcuatula senhousia (Final)	Verified_Arcuatula_senhousia_female_150494_COI	99.70%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_male_303538
307078_Porifera (Field)	Halichondria bowerbanki MZ487264	99.10%	Core-nt	Resolved	Unverified_Halichondria_bowerbanki_307078
304794_Diplosoma listerianum (Final)	Provisional_Diplosoma listerianum_147295_COI	99.80%	MLMLv2025	Accepted	Verified_Diplosoma_listerianum_304794
304796_Botrylloides diegensis (Final)	Verified_Botrylloides_diegensis_304411_COI	99.70%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_304796
304798_Harmothoe imbricata (Final)	none	na	None	Changed	Unverified_Polynoidae_304798
307074_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_180277_COI	100.0%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_307074
307075_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_179069_COI	99.4%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_307075
307076_Botrylloides diegensis (Final)	Veriifiied_Botrylloides_diegensis_307076_COI	100.0%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_307076
307078_Porifera (Field)	Halichondria bowerbanki MZ487264	99.10%	Core-nt	Resolved	Unverified_Halichondria_bowerbanki_307078
307079_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.60%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_307079
307081_Tubulaniformes (Final)	Cephalothrix_simula GU733830	99.80%	Core-nt	Resolved	Unverified_Cephalothrix_simula_307081
307082_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_307082
307083_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.80%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_307083
307084_Platynereis bincanaliculata (Final)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLMLv2025	Accepted	Verified_Platynereis_bicanaliculata_307084

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307085_Platynereis bincanaliculata (Final)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLMLv2025	Accepted	Verified_Platynereis_bicanaliculata_307085
307086_Schistomeringos longicornis (Final)	Schistomeringos longicornis HM473665	100.0%	Core-nt	Accepted	Verified_Schistomeringos_longicornis_307086
307088_Neanthes acuminata (Final)	Verified_Neanthes_acuminata-1_310661_COI	99.80%	MLMLv2025	Accepted	Verified_Neanthes_acuminata-1_307088
307089_Amathia verticillata (Final)	Verified_Amathia_verticillata_180537_COI	100.0%	MLMLv2025	Accepted	Verified_Amathia_verticillata_307089
307090_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_1_150262_COI	100.0%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata_1_307090
307091_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_2_16295_COI	99.9%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata_2_307091
307092_Tubulariidae (Final)	Ectopleura crocea MT949544	100.00%	Core-nt	Resolved	Unverified_Ectopleura_crocea_307092
307093_Harmothoe imbricata (Final)	None	na	None	Changed	Unverified_Polynoidae_307093
307094_Nicolea cf amnis (Final)	Nicolea sp MH242865	100.0%	Core-nt	Accepted	Verified_Nicolea_cf_amnis_307094
307096_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_303486_COI	99.80%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_307096
307097_Watersipora subatra (Final)	Verified_Watersipora_subatra_145935_COI	100.0%	MLMLv2025	Accepted	Verified_Watersipora_subatra_307097
307098_Watersipora subatra (Final)	Verified_Watersipora_subatra_145935_COI	100.0%	MLMLv2025	Accepted	Verified_Watersipora_subatra_307098
307100_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_308511_COI	99.10%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_307100
307101_Bougainvilliidae (Final)	Verifiled_Eudendrium_sp_307200_COI	99.90%	MLMLv2025	Changed	Verified_Eudendrium_sp_307101
307102_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	96.30%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_307102
307103_Watersipora subatra (Final)	Verified_Watersipora_subatra_145935_COI	100.0%	MLMLv2025	Accepted	Verified_Watersipora_subatra_307103
307104_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_308511_COI	99.50%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_307104
307105_Botryllus diegensis (Final)	Verified_Botrylloides_diegensis_304411_COI	100.0%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_307105
307106_Marphysa sp (Final)	Marphysa sanguinea KP254503	100.0%	Core-nt	Resolved	Unverified_Marphysa_sanguinea_307106
307107_Neoamphitrite sp (Final)	Amphitrite ornata MF78577	100.0%	Core-nt	Resolved	Unverified_Amphitrite_ornata_307107
307108_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_307108_COI	100.0%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_307108
307109_Arcuatula senhousia (Final)	Verified_Arcuatula_senhousia_male-149923_COI	96.40%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_male_307109

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307110_Amphibalanus amphitrite (Final)	Provisional_Amphibalanus_amphitrite_189461_COI	99.50%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_307110
307111_Amphibalanus improvisus (Final)	Verified_Amphibalanus improvisus_303460 COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_307111
307112_Amphibalanus amphitrite (Final)	Provisional_Amphibalanus_amphitrite_189461_COI	98.80%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_307112
307318_Botrylloides violaceus (Final)	Verified_Botrylloides_violaceus_149926_COI	100.0%	MLMLv2025	Accepted	Verified_Botrylloides_violaceus_307318
307321_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_304513_COI	99.80%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_307321
307323_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.60%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_307323
307322_Diplosoma_listerianum (Final)	Provisional_Diplosoma listerianum_147295_COI	99.50%	MLMLv2025	Accepted	Verified_Diplosoma listerianum_307322
307324_Porifera (Final)	Provisional_Grantia_sp_178767_COI	99.60%	MLMLv2025	Resolved	Unverified_Grantia_sp_307324
307325_Porifera (Field)	Halichondria bowerbanki MZ487264	99.10%	Core-nt	Resolved	Unverified_Halichondria_bowerbanki_307325
307327_Amathia sp bowerbanki (Final)	Verified_Amathia_sp2_149959_COI	99.40%	MLMLv2025	Changed	Verified_Amathia_sp2_307327
307328_Amathia sp bowerbanki (Final)	Verified_Amathia_sp2_149959_CO	99.00%	MLMLv2025	Changed	Verified_Amathia_sp2_307328
307329_Porifera (Final)	Provisional_Grantia_sp_178767_COI	99.80%	MLMLv2025	Resolved	Unverified_Grantia_sp_307329
307330_Porifera (Final)	Provisional_Grantia_sp_178767_COI	99.80%	MLMLv2025	Resolved	Unverified_Grantia_sp_307330
308073_Bugula neritina (Final)	Provisional_Bugula_neritina_115290_COI	99.80%	MLMLv2025	Accepted	Verified_Bugula_neritina_308073
308074_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_304513_COI	99.70%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_308074
308076_Harmathoe imbricata (Final)	none	na	MLMLv2025	Changed	Unverified_Polynoidae_308076
308077_Botrylloides violaceus (Final)	Verified_Botrylloides_violaceus_149926_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_violaceus_308077
308078_Smithoidea prolifica (Final)	Verified_Smithoidea_prolifica_308078_COI	100.00%	MLMLv2025	Accepted	Verified_Smithoidea_prolifica_308078
308079_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_303486_COI	99.50%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_308079
308080_Harmathoe imbricata (Final)	none	na	MLMLv2025	Changed	Unverified_Polynoidae_308080
308081_Botryullus schlosseri (Final)	Verified_Botryllus_schlosseri_304513_COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_308081
308082_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_308082
308083_Porifera (Final)	Provisional_Grantia_sp_178767_COI	99.80%	MLMLv2025	Resolved	Unverified_Grantia_sp_308083
308084_Diplosoma listerianum (Final)	Provisional_Diplosoma listerianum_147295_COI	99.80%	MLMLv2025	Accepted	Verified_Diplosoma_listerianum_308084

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308087_Bugula neritina (Final)	Provisional_Bugula_neritina_115290_COI	99.70%	MLMLv2025	Accepted	Verified_Bugula_neritina_303087
308088_Harmathoe imbricata (Final)	None	na	MLMLv2025	Changed	Unverified_Polynoidae_308088
308090_Smithoidea prolifica (Final)	Verified_Smithoidea_prolifica_308078_COI	100.00%	MLMLv2025	Accepted	Verified_Smithoidea_prolifica_308090
308091_Megasyllis nipponica (Final)	Provisional_Megasyllis_nipponica_141785_COI	100.00%	MLMLv2025	Accepted	Verified_Megasyllis_nipponica_308091
308092_Botrylloides sp (Final)	Verified_Botrylloides_violaceus_149926_COI	100.00%	MLMLv2025	Resolved	Unverified_Botrylloides_violaceus_308092
308094_Platynereis bicanaliculata (Final)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Verified_Platynereis_bicanaliculata_308094
308096_Neanthes acuminata (Final)	Verified_Neanthes_accuminata-2_308096_COI	100.00%	MLMLv2025	Accepted	Verified_Neanthes_acuminata-2_308096
308097_Neanthes acuminata (Final)	Verified_Neanthes_acuminata-1_310661_COI	99.60%	MLMLv2025	Accepted	Verified_Neanthes_acuminata-1_308097
308098_Botrylloides sp (Final)	Verified_Botrylloides_diegensis_304411_COI	99.70%	MLMLv2025	Resolved	Unverified_Botrylloides_diegensis_308098
308099_Diplosoma listerianum (Final)	Provisional_Diplosoma listerianum_147295_COI	99.80%	MLMLv2025	Accepted	Verified_Diplosoma_listerianum_308099
308101_Porifera (Final)	Halichondria bowerbanki MZ487264	99.50%	Core-nt	Resolved	Unverified_Halichondria_bowerbanki_308101
308102_Harmathoe imbricata (Final)	None	na	None	Changed	Unverified_Polynoidae_308102
308103_Amathia verticillata (Final)	Verified_Amathia_verticillata_180462_COI	100.00%	MLMLv2025	Accepted	Verified_Amathia_verticillata_308103
308104_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_308104
308105_Harmathoe imbricata (Final)	none	na	none	Changed	Unverified_Polynoidae_308105
308106_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_2_149756_COI	100.00%	MLMLv2025	Accepted	Verified_Tricellaria_inopinata_2_308106
308109_Porifera (Final)	Halichondria bowerbanki MZ487264	99.00%	Core-nt	Resolved	Unverified_Halichondria_bowerbanki_308109
308110_Harmathoe imbricata (Final)	none	na	none	Changed	Unverified_Polynoidae_308110
308112_Cirriformia sp (Final)	Cirratulidae sp MZ322692	99.80%	Core-nt	Accepted	Verified_Cirriformia_308112
308114_Arcuatula senhousia (Final)	Verified_Arcuatula_senhousia_female_150494_COI	99.20%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_female_308114
308116_Amathia verticillata (Final)	Verified_Amathia_verticillata_180537_COI	99.40%	MLMLv2025	Accepted	Verified_Amathia_vertiicillata_308116
308119_Amphibalanus amphitrite (Final)	Provisional_Amphibalanus_amphitrite_189461_COI	99.80%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_308119
308120_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_303486_COI	99.70%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_308120

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
308120_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_303486_COI	99.70%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_308120
308122_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_278014_COI	96.00%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_308122
308123_Bougainvillidae (Final)	Laomedea calceolifera KX665242	100.00%	Core-nt	Changed	Unverified_Laomedea_calceolifera_308123
308124_Mytilus complex (Final)	Verified_Mytilus_galloprovincialis_male_153684_COI	99.50%	MLMLv2025	Resolved	Verified_Mytilus_galloprovincialis_male_308124
308125_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_303486_COI	99.80%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_308125
308131_Arcuatula senhousia (Final)	Verified_Arcuatula_senhousia_female_150494_COI	99.40%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_female_308131
308132_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_302908_COI	99.70%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_308132
308133_Tricellaria inopinata (Final)	Provisional_Tricellaria_inopinata_2_149968_COI	100.00%	MLMLv2025	Accepted	Verified_Triicellaria_inopinata_2_308133
308134_Parasabella pallida (Final)	Verified_Parasabella_pallida_310524_COI	98.80%	MLMLv2025	Accepted	Verified_Parasabella_palliida_308134
308135_Amphibalanus amphitrite (Final)	Provisional_Amphibalanus_amphitrite_189461_COI	99.70%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_308135

APPENDIX 1-7. OPEN COAST 2019

QUERY	Site and Date	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
162770_NA	Na	Verified_Watersipora_subatra_154258_COI	96.60%	MLMLv2025	Resolved	Unverified_Watersipora_subatra_162770
162833 Hymeniacidon	Soquel Point 12/21/14	Hyneniacidon perleviis LC788125	95.80%	Core-nt	Accepted	Provisional_Hymeniacidon_sp_162833
162835_Hymeniacidon	Soquel Point 12/21/14	Hyneniacidon perleviis LC788125	94.70	Core-nt	Accepted	Provisional_Hymeniacidon_sp_162835
162841_Halichondria	Soquel Point 12/21/14	None	na	None	Changed	Unknown_162841
162845_Orange_sponge	Hopkins Main 12/5/14	None	na	None	Changed	Unknown_162845
162850_Orange sponge	Davenport Landing 12/23/14	Suberites lambei OR126069	97.10%	Core-nt	Resolved	Provisional_Porifera_162850
162851_Orange sponge	Davenport Landing 12/23/14	Suberites lambei OR126069	100.00%	Core-nt	Resolved	Provisional_Porifera_162851
162852_Yellow_sponge	Duxbury 12/4/14	Porphyra mumfordii OM401715	98.00%	Core-nt	Changed	Unverified_Porphyra_mumfordi
162889_NA	na	Verified_Watersipora_nsp_149820_COI	97.80%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_162889
162893_NA	na	None	na	MLMLv2025	na	Unknown_162893
162894_NA	na	Verified_Watersipora_nsp_149820_COI	99.40%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_162894
179215_Bryozoa	Breakwater Cove 6/7/19	none	na	none	Accepted	Provisional_Bryozoa_179215
179216_Orange_sponge	Breakwater Cove 6/7/19	Hyneniacidon perleviis LC788125	97.40%	Core-nt	Resolved	Provisional_Hymeniacidon_179216
179217_Bugula 'neritina'	Breakwater Cove 6/7/19	Bugula neritina KC129838	99.70%	Core-nt	Accepted	Provisional_Bugula_neritiina_179217
179218_Bugulina	Breakwater Cove 6/7/19	None	na	none	Acceptede	Provisional_Bugulina_179218
179219_Watersipora	Breakwater Cove 6/7/19	Verified_Watersipora_nsp_149820_COI	99.80%	MLMLv2025	Accepted	Unverified_Watersipora_nsp_179219
179220_Schizoporella	Breakwater Cove 6/7/19	none	na	None	Accepted	Unverified_Schizoporella_179220
179221_Yellow_sponge	Breakwater Cove 6/7/19	Hyneniacidon perleviis LC788125	98.70%	Core-nt	Resolved	Unverified_Hymeniacidon_perlevis_179221
179222_Bugulina	Breakwater Cove 6/7/19	Crisia sp FHL MH242714	98.40%	Core-nt	Changed	Unverified_Crisia_sp_FHL_179222
179223_Watersipora	Breakwater Cove 6/7/19	Verified_Watersipora_nsp_149820_COI	99.40%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_179223
179225_Watersipora	Breakwater Cove 6/7/19	Verified_Watersipora_nsp_149820_COI	99.10%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_179225
179226_Watersipora	Breakwater Cove 6/7/19	Verified_Watersipora_nsp_149820_COI	99.60%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_179226
179228_Tunicate	na	none	na	none	Accepted	Unverified_Tunicate_179228
179229_Tunicate	Hopkins Marine Station West 6/10/19	None	na	None	na	Unknown_179229
180006_Beige_sponge_Halichondria	Muir Beach 6/4/19	Haliclona xena MG423353	99.20%	Core-nt	Changed	Unverified_Haliclona_xena_180006

QUERY	Site and Date	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
180009_Tegellia sp.	Muir Beach 6/4/19	none	na	none	Accepted	Unverified_Tegella_sp_180009
180010_Distaplia	Muir Beach 6/4/19	none	na	none	Accepted	Unverified_Distaplia_sp_180010
180016_Bugula califonica	Muir Beach 6/4/19	none	na	none	Changed	Unverified_Bugula_180016
180019_Watersipora subatra	Muir Beach 6/4/19	Verified_Watersipora_nsp_149820_COI	97.20%	MLMLv2025	Changed	Unverified_Watersipora_nsp_180019
180020_Watersipora subatra	Muir Beach 6/4/19	Verified_Watersipora_nsp_149820_COI	99.80%	MLMLv2025	Changed	Unverified_Watersipora_nsp_180020
180021_Sertularella sp.	Muir Beach 6/4/19	None	na	none	Accepted	Provisional_Sertularella_sp_180021
180023_Pink_sponge	Slide Ranch 6/5/19	Haliclona xena JN242209	97.40%	Core-nt	Resolved	Unverified_Haliclona_xena_180023
180026_Halichondria-like	Slide Ranch 6/5/19	Halichondria panicea MN448237	99.90%	MLMLv2025	Resolved	Unverifiied_Halichondria_panicea_180226
180027_white bryo	Slide Ranch 6/5/19	Dendrobeania lichenoides_MH247723	99.30%	Core-nt	Resolved	Unverified_Dendrobeania_lichenooides_180027
180028_sponge	Slide Ranch 6/5/19	Halichondria panicea MN448237	100.00%	Core-nt	Changed	Unverified_Halichondria_panicea_180028
180025_White_colonial_tunicate	Slide Ranch 6/5/19	none	na	none	Accepted	Unverified_Tunicate_180025
180029_Hydroid	Slide Ranch 6/5/19	Aglaophenia struthionides MH282629	99.40%	Core-nt	Accepted	Unverified_Aglaophenia_struthionides_180029
180033_grey Aplidium	Slide Ranch 6/5/19	Joeropsis sp MG936231	98.70%	Core-nt	Changed	Unverified_Joeropsis_sp_180033
180034_Watersipora	Slide Ranch 6/5/19	Verified_Watersipora_subatra_154258_COI	100.00%	MLMLv2025	Resolved	Unverified_Watersipora_subatra_180034
180035_Watersipora	Slide Ranch 6/5/19	None	na	none	Changed	Unknown_180035
180036_Watersipora	Slide Ranch 6/5/19	Verified_Watersipora_subatra_154258_COI	99.90%	MLMLv2025	Resolved	Unverified_Watersipora_subatra_180036
180040_Sponge	Pleasant Cove 6/8/19	Halichondria panicea MN448237	99.20%	Core-nt	Resolved	Unverified_Halichondria_panicea_180040
180069_Sponge	Duxbury Reef 6/5/19	Halichondria panicea PQ739736	98.30%	Core-nt	Resolved	Unverified_Halichondria_panicea_180069
180077_warty anemone	Duxbury Reef 6/5/19	Anthopleura elegantissima MG421778	99.00%$	Core-nt	Resolved	Unverified_Anthopleura_elegantissima_180077
253549_NA	na	none	na	none	na	Unknown_253549
253554_NA	na	Halichondria panicea PQ739736	99.40%	Core-nt	Resolved	Unverified_Halichondria_panicea_253554
304467_Reginella hippocrepis	Slide Ranch 6/5/19	None	na	none	Accepted	Provisional_Reginella_hippocrepis_304467
304469_pink thing	Slide Ranch 6/5/19	None	na	none	na	Unknown_304469
304471_long, transparent solitary tunicate	Slide Ranch 6/5/19	Enterogona sp MG423380	96.60%	Core-nt	Resolved	Unverified_Enterogona_sp_304471
308022_NA	na	None	na	none	na	Unknown_308022
308023_Hymeniacidon	Lover's Point 10/7/19	None	na	none	na	Unknown_308023
308024_Halichondria	Lover's Point 10/7/19	Bugula neritina KC129839	99.10%	Core-nt	Changed	Unverified_Bugula_neritina_308024
308025_Bugulina	Hopkins Marine Station 10/7/19	Crisia pugeti MH242715	97.10%	Core-nt	Changed	Unverified_Crisia_pugeti_308025
308026_Watersipora	Hopkins Marine Station 10/7/19	Verified_Watersipora_nsp_149820_COI	99.50%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_308026
308027_Schizoporella	Hopkins Marine Station 10/7/19	none	na	none	Accepted	Unverified_Schizoporella_308027
308029_Halichondria	Copper Roof House 10/8/19	Cladocroce sp OP950356	96.30%	Core-nt	Changed	Provisional_Porifera_308029
308030_Watersipora	McAbee 10/8/19	None	na	none	Changed	Unkwnon_308030
308031_Watersipora	McAbee 10/8/19	none	na	none	Changed	Unknown_308031

QUERY	Site and Date	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
308032_Schizoporella	McAbee 10/8/19	Scleractinia MG422024	98.50%	Core-nt	Changed	Unverified_Scleractinia_308032
308033_Bugula	McAbee 10/8/19	Bugula neritina KC129839	99.50%	Core-nt	Resolved	Unverified_Bugula_neritina_308033
308034_Bugula	McAbee 10/8/19	Bugula neritina KC129839	98.20%	Core-nt	Resolved	Unverified_Bugula_neritina_308034
308038_Watersipora	Breakwater 10/9/19	Verified_Watersipora_nsp_149820_COI	99.50%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_308038
308039_Bugula	Breakwater 10/9/19	Polymastia sp MZ580673	96.50%	Core-nt	Changed	Unverified_Porifera_308039
308040_Watersipora	Breakwater 10/9/19	Verified_Watersipora_nsp_149820_COI	99.70%	MLMLv2025	Resolved	Unverified_Watersipora_nsp_308040
308041_Bugula	Breakwater 10/9/19	Bugula neritina KC129839	99.40%	MLMLv2025	Resolved	Unverified_Bugula_neritina_308041

Appendix 1-8. Sessiles, San Francisco Bay 2018

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Acerotisa_californica_264901 (Field)	None	na	None	Accepted	Provisional_Acerotisa_californica_264901
Acerotisa_californica_265301 (Field)	None	na	None	Accepted	Provisional_Acerotisa_californica_265301
Acerotisa_californica_263442 (Field)	None	na	None	Accepted	Provisional_Acerotisa_californica_263442
Nereididae_244752 (Field)	Verified_Stratonice_succinea_313857_COI	99.80%	Core-nt	Resolved	Unverified_Allita_succinea_244752
Stratonice_succinea_303982 (Final)	Verified_Stratonice_succinea_313857_COI	99.10%	MLML January 2025.3	Accepted	Verified_Allita_succinea_303982
Distaplia_occidentalis_303474 (Final)	Amathia gracilis MN447925	99.70%	Core-nt	Changed	Unverified_Amathia_gracilis_303474
Amathia_sp_303984 (Final)	Amathia vidovice KM373385	100.00%	Core-nt	Resolved	Unverified_Amathia_vidovice_303984
Amathia_sp_bowerbanki_179166 (Final)	Amathia gracilis KM373428	98.00%	Core-nt	Changed	Unverified_Amathia_vidovice_179166
Botrylloides_sp_179122 (Final)	Verified_Amphibalanus_amphitrite_312413_COI	99.70%	MLML January 2025.3	Changed	Unverified_Amphibalanus_amphitrite_179122
Amphibalanus_improvisus_303460 (Final	Verified_Amphibalanus_improvisus_309510_COI	100.00%	MLML January 2025.3	Accepted	Verified_Amphibalanus_improvisus_303460
Amphibalanus_improvisus_303486 (Final)	Verified_Amphibalanus_improvisus_309510_COI	100.00%	MLML January 2025.3	Accepted	Verified_Amphibalanus_improvisus_303486
Amphibalanus_improvisus_309510 (Final)	Verified_Amphibalanus_improvisus_309510_COI	100.00%	MLML January 2025.3	Accepted	Verified_Amphibalanus_improvisus_309510
Crassadoma_gigantea_214471 (Field)	Amphitrite ornata MF784577	100.00%	MLML January 2025.3	Changed	Unverified_Amphitrite_ornata_214471
Neoamphitrite_A_179138 (Final)	Amphitrite ornata MF784577	100.00%	Core-nt	Resolved	Unverified_Amphitrite_ornata_179138
Neoamphitrite_sp_A_180162 (Final)	Amphitrite ornata MF784577	99.80%	Core-nt	Resolved	Unverified_Amphitrite_ornata_180162
Neoamphitrite_sp_A_303434 (Final)	Amphitrite ornata MF784577	100.00%	Core-nt	Resolved	Unverified_Amphitrite_ornata_303434
Neoamphitrite_sp_A_304373 (Final)	Amphitrite ornata MF784577	100.00%	Core-nt	Resolved	Unverified_Amphitrite_ornata_304373
Neoamphitrite_sp_A_312670 (Final)	Amphitrite ornata MF784577	100.00%	Core-nt	Resolved	Unverified_Amphitrite_ornata_312670
Arcuatula_senhousia_180155 (Final)	Verified_Musculista_senhousia_male-149923_COI	95.90%	MLML January 2025.3	Accepted	Verified_Arcuatula_senhousia_180155
Arcuatula_senhousia_180159 (Final)	Verified_Musculista_senhousia_female_150494_COI	99.70%	MLML January 2025.3	Accepted	Verified_Arcuatula_senhousia_180159
Arcuatula_senhousia_303484 (Final)	Verified_Musculista_senhousia_female_150494_COI	99.80%	MLML January 2025.3	Accepted	Verified_Arcuatula_senhousia_303484
Arcuatula_senhousia_303497 (Final)	Verified_Musculista_senhousia_male-149923_COI	96.20%	MLML January 2025.3	Accepted	Verified_Arcuatula_senhousia_303497
Arcuatula_senhousia_312672 (Final)	Verified_Musculista_senhousia_female_150494_COI	99.40%	MLML January 2025.3	Accepted	Verified_Arcuatula_senhousia_312672
Ascidia_zara_182460 (Field)	Verified_Ascidia_zara_149542_CO1	99.50%	MLML January 2025.3	Accepted	Provisional_Ascidia_zara_182460
Ascidia_zara_237000 (Field)	Verified_Ascidia_zara_149542_CO1	99.70%	MLML January 2025.3	Accepted	Provisional_Ascidia_zara_237000
Ascidia_zara_243513 (Field)	Verified_Ascidia_zara_149542_CO1	98.60%	MLML January 2025.3	Accepted	Provisional_Ascidia_zara_243513
Ascidia_zara_243724 (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLML January 2025.3	Accepted	Provisional_Ascidia_zara_243724
Ascidia_zara_265115 (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLML January 2025.3	Accepted	Provisional_Ascidia_zara_265115
Aspidelectra_melolontha_303415 (Final)	Provisional_Aspidelectra_melolontha._176160_COI	99.80%	MLML January 2025.3	Accepted	Verified_Aspidelectra_melolontha_303415
Kamptozoa_303411 (Final)	Provisional_Barentsia_benedeni_313689_COI	99.80%	MLML January 2025.3	Resolved	Unverified_Barentsia_benedeni_303411
Botryllinae_180133 (Final)	Verified_Botrylloides_diegensis_312892_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Botrylloides_diegensis_180133
Botrylloides_304363 (Final)	Verified_Botrylloides_diegensis_312892_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Botrylloides_diegensis_304363
Botrylloides_diegensis_179156 (Final)	Veriifiied_Botrylloides_diegensis_307076_COI	100.00%	MLML January 2025.3	Accepted	Verified_Botrylloides_diegensis_179156
Botrylloides_diegensis_312660 (Final)	Verified_Botrylloides_diegensis_179066_COI	100.00%	MLML January 2025.3	Accepted	Verified_Botrylloides_diegensis_312660
Botrylloides_sp_309507 (Final)	Verified_Botrylloides_diegensis_312892_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Botrylloides_diegensis_309507
Ciona_savignyi_242916 (Field)	Verified_Botrylloides_diegensis_179066_COI	100.00%	MLML January 2025.3	Changed	Unverified_Botrylloides_diegensis_242916
Botryllinae_179144 (Final)	Verified_Botrylloides_violaceus_303478 _COI	100.00%	MLML January 2025.3	Resolved	Unverified_Botrylloides_violaceus_179144
Botrylloides_sp._303510 (Final)	Verified_Botrylloides_violaceus_303478 _COI	100.00%	MLML January 2025.3	Resolved	Unverified_Botrylloides_violaceus_303510
Botrylloides_violaceus_303429 (Final)	Verified_Botrylloides_violaceus_303478 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Botrylloides_violaceus_303429
Botrylloides_violaceus_303476 (Final)	Verified_Botrylloides_violaceus_303476 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Botrylloides_violaceus_303476
Botrylloides_violaceus_303478 (Final)	Verified_Botrylloides_violaceus_303478 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Botrylloides_violaceus_303478
Conopeum_tenuissimum_312702 (Final)	Verified_Botrylloides_violaceus_303478 _COI	100.00%	MLML January 2025.3	Changed	Unverified_Botrylloides_violaceus_312702
Dorvilleidae_244723 (Field)	Verified_Botrylloides_violaceus_303478 _COI	100.00%	MLML January 2025.3	Changed	Unverified_Botrylloides_violaceus_244723
Botryllinae_179134 (Final)	Verified_Botryllus_schlosseri_179134 _COI	100.00%	MLML January 2025.3	Resolved	Unverified_Botryllus_schlosseri_179134
Botryllinae_303417 (Final)	Verified_Botryllus_schlosseri_312852_COI	99.80%	MLML January 2025.3	Resolved	Unverified_Botryllus_schlosseri_303417
Botryllus_schlosseri_179133 (Final)	Verified_Botryllus_schlosseri_179133 _COI	99.60%	MLML January 2025.3	Accepted	Verified_Botryllus_schlosseri_179133
Botryllus_schlosseri_303428 (Final)	Verified_Botryllus_schlosseri_303428 _COI	99.80%	MLML January 2025.3	Accepted	Verified_Botryllus_schlosseri_303428
Botryllus_schlosseri_309735 (Final)	Verified_Botryllus_schlosseri_309735 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Botryllus_schlosseri_309735
Amathia_sp._bowerbankia_303870 (Final)	Bougainvillia KF962079	98.80%	MLML January 2025.3	Changed	Unverified_Bougainvillia_sp_303870
Hydrozoa_D_303519 (Final)	Bougainvillia KF962079	100.00%	Core-nt	Resolved	Unverified_Bougainvillia_sp_303519
Hydrozoa_D_303520 (Final)	Bougainvillia KF962079	100.00%	Core-nt	Resolved	Unverified_Bougainvillia_sp_303520
Cryptosula_pallasiana_303500 (Final)	Verified_Bryozoa_15992_COI	100.00%	MLML January 2025.3	Changed	Unverified_Bryozoa_303500
Cryptosula_pallasiana_303500 (Final)	Verified_Bryozoa_15992_COI	100.00%	MLML January 2025.3	Changed	Unverified_Bryozoa_303500

Appendix 1-8. Sessiles, San Francisco Bay 2018

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Bugula_neritina_303426 (Final)	Verified_Bugula_neritina_312254_COI	100.00%	MLML January 2025.3	Accepted	Verified_Bugula_neritina_303426
Bugula_neritina_303461 (Final)	Verified_Bugula_neritina_312254_COI	100.00%	MLML January 2025.3	Accepted	Verified_Bugula_neritina_303461
Bugula_neritina_303471 (Final)	Verified_Bugula_neritina_312254_COI	100.00%	MLML January 2025.3	Accepted	Verified_Bugula_neritina_303471
Bugula_neritina_309733 (Final)	Verified_Bugula_neritina_312254_COI	100.00%	MLML January 2025.3	Accepted	Verified_Bugula_neritina_309733
Bugulina_stolonifera_303418 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.70%	MLML January 2025.3	Accepted	Verified_Bugulina_stolonifera_303418
Bugulina_stolonifera_303472 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.70%	MLML January 2025.3	Accepted	Verified_Bugulina_stolonifera_303472
Bugulina_stolonifera_303502 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLML January 2025.3	Accepted	Verified_Bugulina_stolonifera_303502
Bugulina_stolonifera_309734 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLML January 2025.3	Accepted	Verified_Bugulina_stolonifera_309734
Bugulina_stolonifera_312656 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLML January 2025.3	Accepted	Verified_Bugulina_stolonifera_312656
Smittoidea_prolifica_303447 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.40%	MLML January 2025.3	Changed	Unverified_Bugulina_stolonifera_303447
Porifera_sp._B_208182 (Field)	Provisional_Capitella_capitata_196155_COI	99.60%	MLML January 2025.3	Changed	Unverified_Capitella_capitata_208182
Capitella_sp._264993 (Field)	Provisional_Ciona_robusta_145739_COI	99.70%	MLML January 2025.3	Changed	Unverified_Ciona_robusta_264993
Ciona_intestinalis_257597 (Field)	Provisional_Ciona_robusta_145739_COI	99.70%	MLML January 2025.3	Changed	Unverified_Ciona_robusta_257597
Ciona_intestinalis_258206 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLML January 2025.3	Changed	Unverified_Ciona_robusta_258206
Ciona_intestinalis_258212 (Field)	Provisional_Ciona_robusta_145739_COI	99.70%	MLML January 2025.3	Changed	Unverified_Ciona_robusta_258212
Ciona_robusta_243538 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_243538
Ciona_robusta_243715 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_243715
Ciona_robusta_263499 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_263499
Ciona_robusta_264924 (Field)	Provisional_Ciona_robusta_145739_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_264924
Ciona_robusta_265328 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Ciona_robusta_265328
Amphibalanus_amphitrite_303517 (Final)	Provisional_Ciona_savignyi_145705_COI	99.40%	MLML January 2025.3	Changed	Unverified_Ciona_savignyi_303517
Ciona_savyignyi_264904 (Field)	Provisional_Ciona_savignyi_145705_COI	99.00%	MLML January 2025.3	Accepted	Provisional_Ciona_savignyi_264904
Ciona_savyignyi_243701 (Field)	Provisional_Ciona_savignyi_145705_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Ciona_savignyi_243701
Ciona_savyignyi_243722 (Field)	Provisional_Ciona_savignyi_145705_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Ciona_savignyi_243722
Ciona_savyignyi_264922 (Field)	Provisional_Ciona_savignyi_145705_COI	99.20%	MLML January 2025.3	Accepted	Provisional_Ciona_savignyi_264922
Distaplia_occidentalis_309736 (Final)	Provisional_Ciona_savignyi_145705_COI	99.70%	MLML January 2025.3	Changed	Unverified_Ciona_savignyi_309736
Cirratulidae_244700 (Field)	Cirratulidae MZ322692	99.70%	Core-nt	Accepted	Provisional_Cirratulidae_244700
Cirratulidae_244727 (Field)	Cirratulidae MZ322692	99.70%	Core-nt	Accepted	Provisional_Cirratulidae_244727
Cirratulidae_245801 (Field)	Cirratulidae MZ322692	99.70%	Core-nt	Accepted	Provisional_Cirratulidae_245801
Cirratulidae_265865 (Field)	Cirratulidae MZ322692	99.70%	Core-nt	Accepted	Provisional_Cirratulidae_265865
Hydrozoa_D_303998 (Final)	Clytia sp KU905972	100.00%	Core-nt	Resolved	Unverified_Clytia_sp_303998
Conopeum_chesapeakensis_179119 (Final)	Conopeum chesapeakensis KT956117	100.00%	Core-nt	Accepted	Verified_Conopeum_chesapeakensis_179119
Conopeum_chesapeakensis_303404 (Final)	Conopeum chesapeakensis HM069984	99.70%	Core-nt	Accepted	Verified_Conopeum_chesapeakensis_303404
Conopeum_chesapeakensis_303405 (Final)	Conopeum chesapeakensis HM069984	100.00%	Core-nt	Accepted	Verified_Conopeum_chesapeakensis_303405
Conopeum_chesapeakensis_303451 (Final)	Conopeum chesapeakensis MK308049	100.00%	Core-nt	Accepted	Verified_Conopeum_chesapeakensis_303451
Conopeum_chesapeakensis_303452 (Final)	Conopeum chesapeakensis MK308049	100.00%	Core-nt	Accepted	Verified_Conopeum_chesapeakensis_303452
Botrylloides_sp_179127 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	97.70%	MLML January 2025.3	Changed	Unverified_Conopeum_tenuissimum_2_179127
Conopeum_chesapeakensis_303413 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	98.40%	MLML January 2025.3	Changed	Unverified_Conopeum_tenuissimum_2_303413
Conopeum_sp_243319 (Field)	Verified_Conopeum_tenuissimum_2_154299_COI	98.50%	MLML January 2025.3	Resolved	Unverified_Conopeum_tenuissimum_2_243319
Conopeum_tenuissimum_179120 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	99.00%	MLML January 2025.3	Accepted	Verified_Conopeum_tenuissimum_2_179120
Conopeum_tenuissimum_179150 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	99.30%	MLML January 2025.3	Accepted	Verified_Conopeum_tenuissimum_2_179150
Conopeum_tenuissimum_303454 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	97.90%	MLML January 2025.3	Accepted	Verified_Conopeum_tenuissimum_2_303454
Conopeum_tenuissimum_312651 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	98.70%	MLML January 2025.3	Accepted	Verified_Conopeum_tenuissimum_2_312651
Conopeum_tenuissimum_312653 (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	99.70%	MLML January 2025.3	Accepted	Verified_Conopeum_tenuissimum_2_312653
Membranipora_chesapeakensis_258136 (Field)	Verified_Conopeum_tenuissimum_2_154299_COI	99.10%	MLML January 2025.3	Changed	Unverified_Conopeum_tenuissimum_2_258136
Hydrozoa_D_303396 (Final)	Cordylophora sp EF540790	99.50%	Core-nt	Resolved	Unverified_Cordylophora_sp_303396
Hydrozoa_D_303399 (Final)	Cordylophora sp EF540790	100.00%	Core-nt	Resolved	Unverified_Cordylophora_sp_303399

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Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Hydrozoa_D_303403 (Final)	Cordylophora sp EF540790	99.70%	Core-nt	Resolved	Unverified_Cordylophora_sp_303403
Hydrozoa_D_303863 (Final)	Cordylophora sp EF540790	100.00%	Core-nt	Resolved	Unverified_Cordylophora_sp_303863
Ascidia_zara_258223 (Field)	Verified_Crisularia_pacifica1_149501_COI	99.80%	MLML January 2025.3	Changed	Unverified_Crisularia_pacifica1_258223
Crisularia_pacifica_303993 (Final)\	Verified_Crisularia_pacifica2_312779 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Crisularia_pacifica2_303993
Crisularia_pacifica_312778 (Final)	Verified_Crisularia_pacifica2_312779 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Crisularia_pacifica2_312778
Crisularia_pacifica_312779 (Final)	Verified_Crisularia_pacifica2_312779 _COI	100.00%	MLML January 2025.3	Accepted	Verified_Crisularia_pacifica2_312779
Cryptosula_pallasiana_179129 (Final)	Verified_Cryptosula_pallasiana_149496_COI	96.20%	MLML January 2025.3	Accepted	Verified_Cryptosula_pallasiana_179129
Cryptosula_pallasiana_179135 (Final)	Verified_Cryptosula_pallasiana_149496_COI	99.70%	MLML January 2025.3	Accepted	Verified_Cryptosula_pallasiana_179135
Cryptosula_pallasiana_179155 (Final)	Verified_Cryptosula_pallasiana_149496_COI	96.90%	MLML January 2025.3	Accepted	Verified_Cryptosula_pallasiana_179155
Cryptosula_pallasiana_258719 (Field)	Verified_Cryptosula_pallasiana_149496_COI	99.80%	MLML January 2025.3	Accepted	Verified_Cryptosula_pallasiana_258719
Cryptosula_pallasiana_303419 (Final)	Verified_Cryptosula_pallasiana_149496_COI	97.20%	MLML January 2025.3	Accepted	Verified_Cryptosula_pallasiana_303419
Cryptosula_pallasiana_303470 (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.60%	MLML January 2025.3	Accepted	Verified_Cryptosula_pallasiana_303470
Cuthona_perca_265046 (Field)	Provisional_Cuthona_sp_176039_COI	99.60%	MLML January 2025.3	Accepted	Provisional_Cuthona_perca_265046
Eudendriidae_179161 (Final)	Provisional_Cuthona_sp_176039_COI	99.60%	MLML January 2025.3	Changed	Unverified_Cuthona_perca_179161
Anthozoa_236996 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Diadumene_franciscanus_236996
Anthozoa_246345 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Diadumene_franciscanus_246345
Diadumene_franciscana_243312 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Diadumene_franciscanus_243312
Diadumene_franciscana_263560 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Diadumene_franciscanus_263560
Diadumene_franciscana_263578 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Diadumene_franciscanus_263578
Diadumene_franciscana_263588 (Field)	Verified_Diadumene_franciscana_313100_COI	99.70%	MLML January 2025.3	Accepted	Provisional_Diadumene_franciscanus_263588
Diadumene_franciscana_264936 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Diadumene_franciscanus_264936
Diadumene_sp._244715 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Resolved	Provisional_Diadumene_franciscanus_244715
Diadumene_sp._258151 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLML January 2025.3	Resolved	Provisional_Diadumene_franciscanus_258151
Anthozoa_246349 (Field)	Provisional_Diadumene_lineata_258614_COI	99.80%	MLML January 2025.3	Resolved	Unverified_Diadumene_lineata_246349
Diadumene_lineata_265050 (Field)	Provisional_Diadumene_lineata_258614_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Diadumene_lineata_265050
Diadumene_lineata_265064 (Field)	Provisional_Diadumene_lineata_258614_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Diadumene_lineata_265064
Diadumene_franciscana_244033 (Field)	Provisional_Diadumene_sp1_244027_COI (reversed)	100.00%	MLML January 2025.3	Changed	Unverified_Diadumene_sp1_244033
Diadumene_sp._244027 (Field)	Provisional_Diadumene_sp1_244027_COI (reversed)	100.00%	MLML January 2025.3	Resolved	Provisional_Diadumene_sp1_244027
Actiniaria_240142 (Field)	Provisional_Diadumene_sp2_263595_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Diadumene_sp2_240142
Diadumene_sp._263595 (Field)	Provisional_Diadumene_sp2_263595_COI	100.00%	MLML January 2025.3	Resolved	Provisional_Diadumene_sp2_263595
Diplosoma_listerianum_179126 (Final)	Provisional_Diplosoma listerianum_147295_COI	99.50%	MLML January 2025.3	Accepted	Verified_Diplosoma_listerianum_179126
Diplosoma_listerianum_180136 (Final)	Provisional_Diplosoma listerianum_147295_COI	98.70%	MLML January 2025.3	Accepted	Verified_Diplosoma_listerianum_180136
Diplosoma_listerianum_180161 (Final)	Verified_Diplosoma_listerianum_304794_COI	99.20%	MLML January 2025.3	Accepted	Verified_Diplosoma_listerianum_180161
Diplosoma_listerianum_303473 (Final)	Provisional_Diplosoma listerianum_147295_COI	99.70%	MLML January 2025.3	Accepted	Verified_Diplosoma_listerianum_303473
Diplosoma_listerianum_309501 (Final)	Provisional_Diplosoma listerianum_147295_COI	99.20%	MLML January 2025.3	Accepted	Verified_Diplosoma_listerianum_309501
Einhornia_crustulenta_179121 (Final)	Verified_Einhornia_crustulenta-LM_304493_COI	99.70%	MLML January 2025.3	Accepted	Verified_Einhornia_crustulenta-LM_179121
Einhornia_crustulenta_303964 (Final)	Verified_Einhornia_crustulenta-LM_304493_COI	99.80%	MLML January 2025.3	Accepted	Verified_Einhornia_crustulenta-LM_303964
Einhornia_crustulenta_180167 (Final)	Provisional_Electra_monostachys_400078_COI	99.20%	MLML January 2025.3	Changed	Unverified_Electra monostachys_180167
Porifera_242962 (Field)	Ephydatia cooperensis DQ087505	100.00%	MLML January 2025.3	Resolved	Unverified_Ephydatia_cooperensis_242962
Porifera_E_303407 (Final)	Ephydatia cooperensis DQ087505	100.00%	Core-nt	Resolved	Unverified_Ephydatia_cooperensis_303407
Porifera_E_312648 (Final)	Ephydatia cooperensis DQ087505	100.00%	Core-nt	Resolved	Unverified_Ephydatia_cooperensis_312648
Hydrozoa_D_303521 (Final)	Verifiled_Eudendrium_sp_307200_COI	99.90%	MLML January 2025.3	Resolved	Unverified_Eudendrium_sp_303521
Hydrozoa_D_312684 (Final)	Verifiled_Eudendrium_sp_307200_COI	99.80%	MLML January 2025.3	Resolved	Unverified_Eudendrium_sp_312684
Porifera_E_303387 (Final)	Eunapius fragilis OL979205	100.00%	Core-nt	Resolved	Unverified_Eunapius_fragilis_303387
Porifera_E_303392 (Final)	Trochospongilla pennsylvanica DQ087503	100.00%	Core-nt	Resolved	Unverified_Eunapius_fragilis_303392
Porifera_E_303394 (Final)	Eunapius fragilis OL979205	100.00%	Core-nt	Resolved	Unverified_Eunapius_fragilis_303394
Porifera_E_303862 (Final)	Eunapius fragilis OL979205	100.00%	Core-nt	Resolved	Unverified_Eunapius_fragilis_303862
Ficopomatus_enigmaticus_303444 (Final)	Ficopomatus enigmaticus LC757642	100.00%	Core-nt	Accepted	Verified_Ficopomatus_enigmaticus-1_303444
Ficopomatus_enigmaticus_303453 (Final)	Ficopomatus enigmaticus LC757642	100.00%	Core-nt	Accepted	Verified_Ficopomatus_enigmaticus-1_303453
Ficopomatus_enigmaticus_312650 (Final)	None	na	None	Accepted	Verified_Ficopomatus_enigmaticus-2_312650
Ficopomatus_enigmaticus_312652 (Final)	None	na	None	Accepted	Verified_Ficopomatus_enigmaticus-2_312652
Filicrisia_franciscana_180163 (Final)	Verified_Filicrisia_franciscana_301588_COI	98.40%	MLML January 2025.3	Accepted	Verified_Filicrisia_franciscana_180163
Fredericella_sp_303389 (Final)	Verified_Fredericella_indica2_179035	100.00%	MLML January 2025.3	Resolved	Provisional_Fredericella_indica2_303389
Fredericella_sp._303860 (Final)	Verified_Fredericella_indica2_179035	99.70%	MLML January 2025.3	Resolved	Provisional_Fredericella_indica2_303860

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Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Fredericella_sp._303861 (Final)	Verified_Fredericella_indica2_179035	100.00%	MLML January 2025.3	Resolved	Provisional_Fredericella_indica2_303861
Fredericella_sp._312645 (Final)	Verified_Fredericella indica2_304301	100.00%	MLML January 2025.3	Resolved	Provisional_Fredericella_indica2_312645
Porifera_A_303496 (Final)	Halichondria sp OQ323432	100.00%	Core-nt	Resolved	Unverified_Halichondria_sp_303496
Porifera_A_303515 (Final)	Halichondria sp OQ323432	100.00%	Core-nt	Resolved	Unverified_Halichondria_sp_303515
Porifera_A_303514 (Final)	Haliclona sp MK308101	98.60%	Core-nt	Resolved	Unverified_Haliclona _sp_303514
Porifera_A_303509 (Final)	Haliclona xena MG423353	98.50%	Core-nt	Resolved	Unverified_Haliclona xena_303509
Porifera_A_179143 (Final)	Halliclona cinera OZ194986	99.40%	Core-nt	Resolved	Halliclona cinera OZ194986
Porifera_A_180165 (Final)	Haliclona stilensis MT491528	98.20%	Core-nt	Resolved	Unverified_Haliclona_stilensis_180165
Porifera_A_179149 (Final)	Haliclona stilensis MT491528	98.20%	Core-nt	Resolved	Unverified_Haliclona_stilensis_179149
Haminoea_japonica_244681 (Field)	Provisional_Haloa_japonica_313837_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Haloa_japonica_244681
Haminoea_japonica_257640 (Field)	Provisional_Haloa_japonica_313837_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Haloa_japonica_257640
Haminoea_japonica_265430 (Field)	Provisional_Haloa_japonica_313837_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Haloa_japonica_265430
Halosydna_sp_263547 (Field)	None	na	None	Accepted	Provisional_Halosydna_sp_263547
Harmothoe_imbricata_182440 (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_182440
Harmothoe_imbricata_242897 (Field)	none	na	None	Accepted	Provisional_Harmothoe_imbricata_242897
Harmothoe_imbricata_243718 (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_243718
Harmothoe_imbricata_244121 (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_244121
Harmothoe_imbricata_264916 (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_264916
Harmothoe_imbricata_264982 (Field)	None	na	None	Accepted	Provisional_Harmothoe_imbricata_264982
Hydra_sp._258041 (Field)	Hydra hymanae MF544184	100.00%	Core-nt	Resolved	Unverified_Hydra_hymanae_258041
Kamptozoa_303401 (Final)	Provisional_Kamptozoa_303401_COI	100.00%	MLML January 2025.3	Accepted	Verified_Kamptozoa_303401
Plumatella_repens_303398 (Final)	Provisional_Kamptozoa_303401_COI	99.30%	MLML January 2025.3	Changed	Unverified_Kamptozoa_303398
Hydrozoa_A_257603 (Field)	Laomedia calceolifera KX665242	100.00%	Core-nt	Resolved	Unverified_Laomedia_calceolifera_257603
Nemertea_182468 (Field)	Lineus sanguineus MK047712	100.00%	MLML January 2025.3	Resolved	Unverified_Lineus_sanguineus_182468
Megasyllis_nipponica_243531 (Field)	Verifiied_Megasyllis_nipponica_308091_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_243531
Megasyllis_nipponica_245783 (Field)	Verifiied_Megasyllis_nipponica_308091_COI	99.80%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_245783
Megasyllis_nipponica_253314 (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_253314
Megasyllis_nipponica_263478 (Field)	Verifiied_Megasyllis_nipponica_308091_COI	99.80%	MLML January 2025.3	Accepted	Provisional_Megasyllis_nipponica_263478
Megasyllis_nipponica_303424 (Final)	Verifiied_Megasyllis_nipponica_308091_COI	99.80%	MLML January 2025.3	Accepted	Verified_Megasyllis_nipponica_303424
Megasyllis_nipponica_309504 (Final)	Verifiied_Megasyllis_nipponica_308091_COI	100.00%	MLML January 2025.3	Accepted	Verified_Megasyllis_nipponica_309504
Syllidae_208202 (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Megasyllis_nipponica_208202
Syllidae_208231 (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Megasyllis_nipponica_208231
Molgula_manhattensis_258717 (Field)	Provisional_Molgula_manhattensis_144447_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Molgula_manhattensis_258717
Molgula_manhattensis_263418 (Field)	Provisional_Molgula_manhattensis_144447_COI	99.40%	MLML January 2025.3	Accepted	Provisional_Molgula_manhattensis_263418
Molgula_manhattensis_263497 (Field)	Provisional_Molgula_manhattensis_144447_COI	99.50%	MLML January 2025.3	Accepted	Provisional_Molgula_manhattensis_263497
Molgula_manhattensis_264869 (Field)	Provisional_Molgula_manhattensis_144447_COI	99.40%	MLML January 2025.3	Accepted	Provisional_Molgula_manhattensis_264869
Molgula_manhattensis_264986 (Field)	Provisional_Molgula_manhattensis_144447_COI	99.00%	MLML January 2025.3	Accepted	Provisional_Molgula_manhattensis_264986
Molgula_manhattensis_265283 (Field)	Provisional_Molgula_manhattensis_144447_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Molgula_manhattensis_265283
Mytilus_sp_180160 (Final)	Verified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Mytilus_galloprovincialis_female_180160
Mytilus_sp_303433 (Final)	Verified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Mytilus_galloprovincialis_female_303433
Mytilidae_180137 (Final)	Mytilus trossulus HM462081	98.90%	Core-nt	Resolved	Unverified_Mytilus_trossulus_180137
Mytilidae_244043 (Field)	Verified_Mytilus_trossulus_female_155615_COI	99.50%	MLML January 2025.3	Resolved	Unverified_Mytilus_trossulus_female_244043
Mytilus_sp_312665 (Final)	Verified_Mytilus_trossulus_female_155615_COI	99.50%	MLML January 2025.3	Resolved	Unverified_Mytilus_trossulus_female_312665
Didemnidae_264887 (Field)	None	na	None	na	na
Porifera_B_303508 (Final)	None	na	None	na	na
Porifera_C_303511 (Final)	None	na	None	na	na
Porifera_B_303516 (Final)	None	na	None	na	na
Porifera_A_303992 (Final)	None	na	None	na	na
Porifera_B_221927 (Field)	None	na	None	na	na
Porifera_B_237281 (Field)	None	na	None	na	na
Porifera_B_237289 (Field)	None	na	None	na	na
Spionidae_242857 (Field)	None	na	None	na	na
Opheliidae_236944 (Field)	Nematoda MH826311	100.00%	Core-nt	Changed	Unverified_Nematoda_236944
Nereididae_303442 (Field)	Nereis eakini MF138408	98.90%	Core-nt	Resolved	Unverified_Nereis_eakini_303442

Appendix 1-8. Sessiles, San Francisco Bay 2018

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Okenia_plana_253270 (Field)	None	na	None	Accepted	Provisional_Okenia_plana_253270
Okenia_plana_253271 (Field)	None	na	None	Accepted	Provisional_Okenia_plana_253271
Okenia_plana_264864 (Field)	None	na	None	Accepted	Provisional_Okenia_plana_264864
Okenia_plana_264872 (Field)	None	na	None	Accepted	Provisional_Okenia_plana_264872
Okenia_plana_264947 (Field)	None	na	None	Accepted	Provisional_Okenia_plana_264947
Okenia_plana_265260 (Field)	None	na	None	Accepted	Provisional_Okenia_plana_265260
Ostrea_lurida_303499 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Accepted	Verified_Ostrea_lurida_303499
Ostrea_lurida_303504 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Accepted	Verified_Ostrea_lurida_303504
Ostrea_lurida_304361 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Accepted	Verified_Ostrea_lurida_304361
Ostrea_lurida_304361 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Accepted	Verified_Ostrea_lurida_312674
Ostrea_lurida_312674 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Accepted	Verified_Ostrea_lurida_312674
Ostreidae_303501 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Ostrea_lurida_303501
Ostreidae_304360 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Ostrea_lurida_304360
Pectinatella_magnifica_303388 (Final)	Provisional_Pectinatella_magnifica_176504_COI	99.80%	MLML January 2025.3	Accepted	Verified_Pectinatella_magnifica_303388
Pectinatella_magnifica_303391 (Final)	Provisional_Pectinatella_magnifica_176504_COI	99.80%	MLML January 2025.3	Accepted	Verified_Pectinatella_magnifica_303391
Pectinatella_magnifica_303393 (Final)	Provisional_Pectinatella_magnifica_176504_COI	100.00%	MLML January 2025.3	Accepted	Verified_Pectinatella_magnifica_303393
Platyhelminthes_243717 (Field)	None	na	None	na	Provisional_Platyhelminthes_243717
Nereis_latescens_179136 (Final)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLML January 2025.3	Changed	Unverified_Platynereis_bicanaliculata_179136
Platynereis_bicanaliculata_182438 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_182438
Platynereis_bicanaliculata_243731 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_243731
Platynereis_bicanaliculata_244123 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_244123
Platynereis_bicanaliculata_263480 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Platynereis_bicanaliculata_263480
Platynereis_bicanaliculatum_179137 (Final)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLML January 2025.3	Accepted	Verified_Platynereis_bicanaliculata_179137
Platynereis_bicanaliculatum_303425 (Final)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLML January 2025.3	Accepted	Verified_Platynereis_bicanaliculata_303425
Urosalpinx_cinerea_258148 (Field)	Protosuberites sp MG825741	99.70%	Core-nt	Changed	Unverified_Protosuberites_sp_258148
Cuthona_perca_246389 (Field)	Verified_Schistomeringos_longicornis_307086_COI	99.40%	MLML January 2025.3	Changed	Unverified_Schistomeringos_longicornis_246389
Dorvilleidae_240103 (Field)	Verified_Schistomeringos_longicornis_307086_COI	99.70%	MLML January 2025.3	Resolved	Unverified_Schistomeringos_longicornis_240103
Dorvilleidae_244696 (Field)	Verified_Schistomeringos_longicornis_307086_COI	99.70%	MLML January 2025.3	Resolved	Unverified_Schistomeringos_longicornis_244696
Dorvilleidae_in_240108 (Field)	Verified_Schistomeringos_longicornis_307086_COI	99.70%	MLML January 2025.3	Resolved	Unverified_Schistomeringos_longicornis_240108
Schizoporella_japonica_179130 (Final)	Provisional_Schizoporella_japonica_278014_COI	96.00%	MLML January 2025.3	Accepted	Verified_Schizoporella_japonica_179130
Schizoporella_japonica_242909 (Field)	Provisional_Schizoporella_japonica_278014_COI	96.00%	MLML January 2025.3	Accepted	Provisional_Schizoporella_japonica_242909
Schizoporella_japonica_303420 (Final)	Provisional_Schizoporella_japonica_278014_COI	100.00%	MLML January 2025.3	Accepted	Verified_Schizoporella_japonica_303420
Schizoporella_japonica_309511 (Final)	Provisional_Schizoporella_japonica_308511_COI	99.50%	MLML January 2025.3	Accepted	Verified_Schizoporella_japonica_309511
Schizoporella_errata_242867 (Field)	Provisional_Schizoporella_variabilis_313815_COI	100.00%	MLML January 2025.3	Changed	Unverified_Schizoporella_variabilis_242867
Smittoidea_prolifica_244819 (Field)	Verified_Smittoidea_prolifica_308090_COI	100.00%	MLML January 2025.3	Accepted	Provisional_Smittoidea_prolifica_244819
Smittoidea_prolifica_303996 (Final)	Verified_Smittoidea_prolifica_308090_COI	99.80%	MLML January 2025.3	Accepted	Verified_Smittoidea_prolifica_303996
Smittoidea_prolifica_312675 (Final)	Verified_Smittoidea_prolifica_308090_COI	100.00%	MLML January 2025.3	Accepted	Verified_Smittoidea_prolifica_312675
Styela_sp._258228 (Field)	Provisional_Styela_clava_155244_COI	99.50%	MLML January 2025.3	Resolved	Unverified_Styela_clava_258228
Styelidae_258102 (Field)	Provisional_Styela_clava_155244_COI	99.80%	MLML January 2025.3	Resolved	Unverified_Styela_clava_258102
Nudibranchia_242953 (Field)	Tenellia sp OQ322951	99.50%	Core-nt	Resolved	Unverified_Terpios_sp_312654
Porifera_A_312654 (Final)	Terpios sp OQ413313	97.60%	MLML January 2025.3	Resolved	Unverified_Terpios_sp_312655
Porifera_A_312655 (Final)	Terpios sp OQ413313	97.60%	MLML January 2025.3	Resolved	Unverified_Terpios_sp_312655
Thecata_179148 (Final)	none	na	None	Accepted	Verified_Thecata_179148
Tricellaria_inopinata_303506 (Final)	Provisional_Tricellaria_inopinata_1_152330_COI	99.90%	MLML January 2025.3	Accepted	Verified_Tricellaria_inopinata_1_303506
Tricellaria_occidentalis_265507 (Field)	Provisional_Tricellaria_inopinata_1_152330_COI	99.90%	MLML January 2025.3	Changed	Unverified_Tricellaria_inopinata_1_265507
Tricellaria_occidentalis_243649 (Field)	Provisional_Tricellaria_inopinata_2_16257_COI	99.90%	MLML January 2025.3	Changed	Unverified_Tricellaria_inopinata_2_243649
Kamptozoa_303390 (Final)	Provisional_Urnatella_gracilis1_175860_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Urnatella_gracilis1_303390
Kamptozoa_303395 (Final)	Provisional_Urnatella_gracilis1_175860_COI	100.00%	MLML January 2025.3	Resolved	Unverified_Urnatella_gracilis1_303395
Urosalpinx_cinerea_265038 (Field)	Provisional_Urosalpinx_cinerea_196192_COI	99.40%	MLML January 2025.3	Accepted	Provisional_Urosalpinx_cinerea_265038
Watersipora_subatra_179128 (Final)	Verified_Watersipora_subatra_258536_COI	100.00%	MLML January 2025.3	Accepted	Verified_Watersipora_subatra_179128
Watersipora_subatra_303421 (Final)	Verified_Watersipora_subatra_258536_COI	100.00%	MLML January 2025.3	Accepted	Verified_Watersipora_subatra_303421
Watersipora_subatra_312662 (Final)	Verified_Watersipora_subatra_258536_COI	100.00%	MLML January 2025.3	Accepted	Verified_Watersipora_subatra_312662
Watersipora_subatra_312669 (Final)	Verified_Watersipora_subatra_258536_COI	100.00%	MLML January 2025.3	Accepted	Verified_Watersipora_subatra_312669
Arcuatula_senhousia_180156 (Final)	Xenostrobus securis KC509694	100.00%	Core-nt	Changed	Unverified_Xenostrobus_securis_180156

Appendix 1-8. Sessiles, San Francisco Bay 2018

Query	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Mytilidae_303494 (Final)	Xenostrobus securis KX859898	99.50%	Core-nt	Changed	Unverified_Xenostrobus_securis_303494

Appendix 1-9. Motiles, San Francisco Bay 2018

QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	ID Identification
240485_Gnorimosphaeroma oregonensis (Field)	Provisonal_Gnorisphaeroma_oregonesis_240531 _COI	99.50%	MLMLv2025	Accepted	Provisional_Gnorisphaeroma_oregonensis_240485
240490_Gnorimosphaeroma oregonensis (Field)	Provisional_Gnorisphaeroma_oregonesis_240531 _COI	98.90%	MLMLv2025	Accepted	Provisional_Gnorisphaeroma_oregonensis_240490
240493_Paranthura japonica (Field)	Verified_Paranthura_japonica_184498_COI	99.00%	MLMLv2025	Accepted	Provisional_Paranthura_japonica_240493
240499_Paranthura japonica (Field)	Verified_Paranthura_japonica_184498_COI	98.80$	MLMLv2025	Accepted	Provisional_Paranthura_japonica_240499
240527_Monocorophium acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.90%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_240527
240531_Gnorimosphaeroma oregonensis (Field)	Provisonal_Gnorisphaeroma_oregonesis_240531 _COI	100.00%	MLMLv2025	Accepted	Provisional_Gnorisphaeroma_oregonensis_240531
240534_Synidotea laticauda (Field)	Synidotea_laticauda_240534_COI	99.80%	MLMLv2025	Accepted	Provisional_Synidotea_laticauda_240531
240540_Monocorophium acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.40%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_240540
240543_Gnorimosphaeroma oregonensis (Field)	Provisonal_Gnorisphaeroma_oregonesis_240531 _COI	97.90%	MLMLv2025	Accepted	Provisional_Gnorisphaeroma_oregonensis_240543
Provisonal_Gnorisphaeroma_oregonesis_240531 _COI	Provisonal_Gnorisphaeroma_oregonesis_240531 _COI	99.00%	MLMLv2025	Accepted	Provisional_Gnorisphaeroma_oregonensis_243326
243330_Grandidierella japonica (Field)	Grandidierella japonica KC248761	98.40%	MLMLv2025	Accepted	Provisional_Grandidierella_japonica_243330
243333_Monocorophium acherusicum (Field)	Verified_Monocorophium_acherusicum_184887_COI	99.80%	MLMLv2025	Accepted	Provisional_Monocorophium_acherusicum_243333
243336_Melita nitida (Field)	Melita nitida KF273531	99.80%	MLMLv2025	Accepted	Provisional_Melita_nitida_243336
243338_Ampithoe_valida (Field)	Ampithoe valida GU048411	99.80%	Core-nt	Accepted	Provisional_Ampithoe_valida_243338
243352_Paranthura japonica (Field)	Verified_Paranthura_japonica_184498_COI	99.40%	MLMLv2025	Accepted	Provisional_Paranthura_japonica_243352
243381_Americorophium spinicorne (Field)	Verified_Americorophium_spinicorne_179531_COI	99.90%	MLMLv2025	Accepted	Provisional_Americorophium_spinicorne_243381
243383_Gammarus daiberi (Field)	Verified_Gammarus_daiberi_179604_COI	97.50%	MLMLv2025	Accepted	Provisional_Gammarus_daiberi_243383
243386_Americorophium spinicorne (Field)	Verified_Americorophium_spinicorne_179531_COI	99.50%	MLMLv2025	Accepted	Provisional_Americorophium_spinicorne_243386
243389_Gammarus daiberi (Field)	Verified_Gammarus_daiberi_179604_COI	99.50%	MLMLv2025	Accepted	Provisional_Gammarus_daiberi_243389
243397_Americorophium spinicorne (Field)	Verified_Americorophium_spinicorne_179531_CO	100.00%	MLMLv2025	Accepted	Provisional_Americorophium_spinicorne_243397
243408_Sphaeroma quoianum (Field)	None		MLMLv2025	Accepted	Provisional_Sphaeroma_quoianum_243408
243442_Grandidierella japonica (Field)	Grandidierella japonica LC606757	96.60%	Core-nt	Accepted	Provisional_Grandidierella_japonica_243442
243447_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.90%	MLMLv2025	Accepted	Provisional_Caprella_simia_243447
243456_Caprella californica (Field)	None	na	None	Changed	Unverified_Caprella_sp_243456
243458_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.20%	MLMLv2025	Accepted	Provisional_Caprella_simia_243458
245218_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.70%	MLMLv2025	Accepted	Provisional_Caprella_simia_245218
245222_Zeuxo sp. (Field)	Verified_Zeuxo_s240166_COI	99.60%	MLMLv2025	Accepted	Provisional_Zeuxo_s245222
245246_Caprella scaura (Field)	Verified_Caprella_scaura_245246_COI	99.90%	MLMLv2025	Accepted	Provisional_Caprella_scaura_245246
245255_Caprella scaura (Field)	Verified_Caprella_scaura_245246_COI	98.50%	MLMLv2025	Accepted	Provisional_Caprella_scaura_245255
245272_Caprella scaura (Field)	Verified_Caprella_scaura_245246_COI	98.00%	MLMLv2025	Accepted	Provisional_Caprella_scaura_245272
245290_Caprella equilibra (Field)	Verified_Caprella_equilibra_183760_COI	99.90%	MLMLv2025	Accepted	Provisional_Caprella_equilibra_245290
245292_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	97.20%	MLMLv2025	Accepted	Provisional_Caprella_mutica_245292
245312_Caprella californica (Field)	Verified_Caprella_californica_179944_COI	97.60%	MLMLv2025	Accepted	Provisional_Caprella_californica_245312
245325_Aoroides secunda (Field)	Verified_Aoroides_secunda_179544_COI	96.20%	MLMLv2025	Accepted	Provisional_Aoroides_secunda_245325
245331_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.30%	MLMLv2025	Accepted	Provisional_Caprella_simia_245331
245337_Caprella sp. (Field)	Provisional_Caprella_mutica_147429_COI	98.00%	MLMLv2025	Resolved	Unverified_Caprella_mutica_245337
245354_Americorophium spinicorne (Field)	Verified_Americorophium_spinicorne_179531_COI	99.90%	MLMLv2025	Accepted	Provisional_Americorophium_spinicorne_245354

Appendix 1-10. Sessiles, Long Beach 2018

Query	Name	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Actiniaria_303842 (Final)	Exaiptasia diaphana MW278603	100.00%	Core-nt	Resolved	Unverified_Exaiptasia_diaphana_303842
Amathia_sp_312866 (Final)	Verified_Amathia_verticillata_180537_COI	100.00%	MLMLv2025	Resolved	Unverified_Amathia_verticillata_312866
Amathia_sp._306656 (Final)	Amathia cf citrina KM373423	100.00%	MLMLv2025	Resolved	Unverified_Amathia_cf_citrina_306656
Amathia_verticillata_262788 (Field)	Provisional_Amathia_verticillata_262788_COI	100.00%	MLMLv2025	Accepted	Provisional_Amathia_verticilliata_262788
Amathia_verticillata_303371 (Final)	Provisional_Amathia_verticillata_303371_COI	99.90%	MLMLv2025	Accepted	Verified_Amathia_verticillata_303371
Amphibalanus_amphitrite_262420 (Field)	Provisional_Amphibalanus_amphitrite_262420_COI	100.00%	MLMLv2025	Accepted	Provisional_Amphibalanus_amphitrite_262420
Amphibalanus_amphitrite_303383 (Final)	Verified_Amphibalanus_amphitrite_307108_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_303383
Amphibalanus_amphitrite_303386 (Final)	Verified_Amphibalanus_amphitrite_303386_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_303386
Amphibalanus_amphitrite_304549 (Final)	Verified_Amphibalanus_amphitrite_304549_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_304549
Amphibalanus_amphitrite_304566 (Final)	Verified_Amphibalanus_amphitrite_304566_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_304566
Aplidium_ sp_256923 (Field)	Verified_Aplidium_accarense_181546_COI	98.50%	MLMLv2025	Resolved	Unverified_Aplidium_accarense_256923
Aplidium_sp._304554 (Final)	None	na	None	na	Unknown_304554
Aplidium_sp._312876 (Final)	Provisional_Styela_plicata_248964_COI	99.50%	MLMLv2025	Changed	Unverified_Styela_plicata_312876
Arcuatula_senhousia_312895 (Final)	Verified_Arcuatula_senhousia_female_150494_COI	98.00%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_312895
Ascidia_ sp_262456 (Field)	Provisional_Ascidia_ceratodes_168057_COI	97.00%	MLMLv2025	Resolved	Unverified_Ascidia_ceratodes_262456
Ascidia_ sp_264213 (Field)	Provisional_Ascidia_ceratodes_168057_COI	98.80%	MLMLv2025	Resolved	Unverified_Ascidia_ceratodes_264213
Ascidia_ sp_264216 (Field)	Provisional_Ascidia_ceratodes_168057_COI	98.00%	MLMLv2025	Resolved	Unverified_Ascidia_ceratodes_264216
Ascidia_ sp_264311 (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Resolved	Unverified_Ascidia_zara_264311
Ascidia_ sp_264321 (Field)	Verified_Ascidia_zara_149542_CO1	98.70%	MLMLv2025	Resolved	Unverified_Ascidia_zara_264321
Ascidia_ceratodes_261957 (Field)	Provisional_Ascidia_ceratodes_168057_COI	99.50%	MLMLv2025	Accepted	Provisional_Ascidia_ceratodes_261957
Ascidia_zara_255488 (Field)	Verified_Ascidia_zara_149542_CO1	98.40%	MLMLv2025	Accepted	Provisional_Ascidia_zara_255488
Ascidia_zara_261653 (Field)	Verified_Ascidia_zara_149542_CO1	99.30%	MLMLv2025	Accepted	Provisional_Ascidia_zara_261653
Ascidia_zara_261956 (Field)	Verified_Ascidia_zara_149542_CO1	98.50%	MLMLv2025	Accepted	Provisional_Ascidia_zara_261956
Ascidia_zara_262846 (Field)	Verified_Ascidia_zara_149542_CO1	98.70%	MLMLv2025	Accepted	Provisional_Ascidia_zara_262846
Ascidia_zara_264342 (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Accepted	Provisional_Ascidia_zara_264342
Balanus_trigonus_262921 (Field)	Provisional_Balanus_trigonus_262921_COI	100.00%	MLMLv2025	Accepted	Provisional_Balanus_trigonus_262921
Balanus_trigonus_303851 (Final)	Verified_Balanus_trigonus_303851_COI	99.80%	MLMLv2025	Accepted	Verified_Balanus_trigonus_303851
Balanus_trigonus_303855 (Final)	Verified_Balanus_trigonus_303855_COI	100.00%	MLMLv2025	Accepted	Verified_Balanus_trigonus_303855
Balanus_trigonus_312882 (Final)	Provisional_Balanus_trigonus_312882_COI	100.00%	MLMLv2025	Accepted	Verified_Balanus_trigonus_303882
Botryllinae_256737 (Field)	Verified_Botryllus_schlosseri_180808_COI	100.00%	MLMLv2025	Resolved	Unverified_Botryllus_schlosseri_256737
Botryllinae_303378 (Final)	Verified_Botryllus_schlosseri_180808_COI	100.00%	MLMLv2025	Resolved	Unverified_Botryllus_schlosseri_256738
Botryllinae_306659 (Final)	Provisional_Botrylloides_violaceus_255494_COI	98.10%	MLMLv2025	Resolved	Unverified_Botrylloides_violaceus_306659
Botryllinae_306660 (Final)	Verified_Botrylloides_violaceus_149926_COI	100.00%	MLMLv2025	Resolved	Unverified_Botrylloides_violaceus_306660
Botrylloides_diegensis_304564 (Final)	Verified_Botrylloides_diegensis_304564_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_304564
Botrylloides_diegensis_312864 (Final)	Verified_Botrylloides_diegensis_312864_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_312864
Botrylloides_diegensis_312875 (Final)	Verified_Botrylloides_diegensis_304564_COI	99.90%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_312875
Botrylloides_diegensis_312887 (Final)	none	na	None	na	na
Botrylloides_diegensis_312892 (Final)	Verified_Botrylloides_diegensis_304564_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_312892
Botrylloides_diegensis_312893 (Final)	Verified_Botrylloides_diegensis_304564_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_312893
Botrylloides_violaceus_255494 (Field)	Verified_Botrylloides_violaceus_149926_COI	100.00%	MLMLv2025	Accepted	Provisional_Botrylloides_violaceus_255494
Botrylloides_violaceus_255515 (Field)	Verified_Botrylloides_violaceus_149926_COI	100.00%	MLMLv2025	Accepted	Provisional_Botrylloides_violaceus_255515
Botryllus_schlosseri_306641 (Final)	Verified_Botryllus_schlosseri_306644_COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_306641
Botryllus_schlosseri_306644 (Final)	Verified_Botryllus_schlosseri_306644_COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_306644
Botryllus_schlosseri_312852 (Final)	Verified_Botryllus_schlosseri_306644_COI	99.90%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_312852
Botryllus_schlosseri_312871 (Final)	Verified_Botryllus_schlosseri_180808_COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_312871

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Query	Name	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Branchiomma_ sp_SF_256503 (Field)	none	na	none	Accepted	Provisional_Branchiomma_sp_256503
Branchiomma_ sp_SF_263143 (Field)	none	na	none	Accepted	Provisional_Branchiomma_sp_263143
Branchiomma_ sp_SF_263160 (Field)	none	na	none	Accepted	Provisional_Branchiomma_sp_263160
Branchiomma_sp_313104 (Final)	Provisional_Polycera_atra_295445_COI	97.50%	MLMLv2025	Changed	Unverified_Polycera_atra_313104
Branchiomma_sp_313105 (Final)	none	na	none	Accepted	Provisional_Branchiomma_sp_313105
Bugula_neritina_255447 (Field)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Provisional_Bugula_neritina_255447
Bugula_neritina_303377 (Final)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_303377
Bugula_neritina_303849 (Final)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_303849
Bugula_neritina_304551 (Final)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_304551
Bugula_neritina_306647 (Final)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_306647
Bugulina_foliolata_304563 (Final)	Verified_Bugulina_foliolata_304563_COI	98.10%	MLMLv2025	Accepted	Verified_Bugulina_foliolata_304563
Bugulina_foliolata_312888 (Final)	Verified_Bugulina_foliolata_312888_COI	99.70%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_312888
Bugulina_stolonifera_303384 (Final)	Verified_Bugulina_stolonifera_149716_COI	100.00%	MLMLv2025	*Accepted*	Verified_Bugulina_stolonifera_303384
Bugulina_stolonifera_303838 (Final)	Verified_Bugulina_stolonifera_149716_COI	98.20%	MLMLv2025	*Accepted*	Verified_Bugulina_stolonifera_303838
Bugulina_stolonifera_304552 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.60%	MLMLv2025	*Accepted*	Verified_Bugulina_stolonifera_304552
Bugulina_stolonifera_312886 (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLMLv2025	*Accepted*	Verified_Bugulina_stolonifera_312886
Campanulariidae_303843 (Final)	Obelia dichotoma AY789913	99.50%	Core-nt	*Resolved*	Unverified_Obelia_dichotoma_303843
Campanulariidae_312897 (Final)	Obelia dichotoma AY789913	99.50%	Core-nt	*Resolved*	Unverified_Obelia_dichotoma_312897
Celleporaria_brunnea_153974 (Field)	Verified_Celleporaria_brunnea_153974_COI	100.00%	MLMLv2025	*Accepted*	Provisional_Celleporaria_brunnea_153974
Celleporaria_brunnea_303833 (Final)	Celleporaria brunnea MN06422	100.00%	Core-nt	*Accepted*	Verified_Celleporaria_brunnea_3030833
Celleporaria_brunnea_303844 (Final)	Verified_Celleporaria_brunnea_153974_COI	95.00%	MLMLv2025	*Accepted*	Verified_Celleporaria_brunnea_303844
Celleporaria_brunnea_306637 (Final)	Celleporaria sp KY235524	100.00%	Core-nt	Changed	Unverified_Celleporaria_sp_306637
Celleporaria_brunnea_306646 (Final)	Celleporaria sp KY235524	100.00%	Core-nt	Changed	Unverified_Celleporaria_sp_306646
Celleporaria_brunnea_306663 (Final)	Verified_Celleporaria_brunnea_153974_COI	95.00%	MLMLv2025	Accepted	Verified_Celleporaria_brunnea_306663
Ciona_ sp_261663 (Field)	Provisional_Ciona_robusta_145739_COI	99.50%	MLMLv2025	Resolved	Unverified_Ciona_robusta_261663
Ciona_ sp_263377 (Field)	Provisional_Ciona_robusta_145739_COI	99.30%	MLMLv2025	Resolved	Unverified_Ciona_robusta_263377
Ciona_ sp_264192 (Field)	Provisional_Ciona_robusta_145739_COI	98.80%	MLMLv2025	Resolved	Unverified_Ciona_robusta_264192
Ciona_intestinalis_255492 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLMLv2025	Changed	Unverified_Ciona_robusta_255492
Ciona_intestinalis_261669 (Field)	Provisional_Ciona_robusta_145739_COI	99.70%	MLMLv2025	Changed	Unverified_Ciona_robusta_261669
Ciona_intestinalis_262833 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLMLv2025	Changed	Unverified_Ciona_robusta_262833
Ciona_savignyi_256694 (Field)	Provisional_Ciona_savignyi_145705_COI	97.80%	MLMLv2025	Accepted	Provisional_Ciona_savignyi_256694
Ciona_savignyi_261611 (Field)	Provisional_Ciona_savignyi_145705_COI	98.90%	MLMLv2025	Accepted	Provisional_Ciona_savignyi_261611
Ciona_savignyi_261654 (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLMLv2025	Changed	Unverified_Ciona_robusta_261654
Ciona_savignyi_261670 (Field)	Provisional_Ciona_savignyi_145705_COI	98.90%	MLMLv2025	Accepted	Provisional_Ciona_savignyi_261670
Crepidula_convexa_306643 (Final)	Crepidula onyx OP759427	99.70%	Core-nt	Changed	Unverified_Crepidula_onyx_306643
Crepidula_onyx_303846 (Final)	Crepidula onyx OP759427	99.60%	Core-nt	Accepted	Verified_Crepidula_onyx_303846
Crepidula_onyx_303847 (Final)	Crepidula onyx OP759427	99.70%	Core-nt	Accepted	Verified_Crepidula_onyx_303847
Crepidula_onyx_313109 (Final)	Crepidula onyx OP759427	99.70%	Core-nt	Accepted	Verified_Crepidula_onyx_313109
Crepipatella_lingulata_263140 (Field)	Crepipatella lingulata PQ966610	100.00%	Core-nt	Accepted	Provisional_Crepipatella_lingulata_263140
Crepipatella_lingulata_313110 (Final)	Crepipatella lingulata PQ966610	99.80%	Core-nt	Accepted	Verified_Crepipatella_lingulata_313110
Crepipatella_lingulata_313112 (Final)	Crepipatella lingulata PQ966610	99.80%	Core-nt	Accepted	Verified_Crepipatella_lingulata_313112
Crisia_occidentalis_304561 (Final)	Crisia sp FHL MH242714	94.5%	Core-nt	Accepted	Verified_Crisia_occidentalis_304561
Crisulipora_occidentalis_256960 (Field)	Provisional_Crisulipora_occidentalis_256960_COI	100.00%	MLMLv2025	Accepted	Provisional_Crisulipora_occidentalis_256960
Crisulipora_occidentalis_304558 (Final)	Verified_Crisulipora_occidentalis_180837_COI	100.00%	MLMLv2025	Accepted	Verified_Crisulipora_occidentalis_304558
Crisulipora_occidentalis_306640 (Final)	Verified_Nevianipora_floridana_180310_COI	99.70%	MLMLv2025	Changed	Unverified_Nevianipora_floridana_306640
Crisulipora_occidentalis_306650 (Final)	Provisional_Crisulipora_occidentalis_256960_COI	100.00%	MLMLv2025	Accepted	Verified_Crisulipora_occidentalis_306650

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Query	Name	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Crisulipora_occidentalis_312873 (Final)	Verified_Crisulipora_occidentalis_312873_COI	99.90%	MLMLv2025	Accepted	Verified_Crisulipora_occidentalis_312873
Crucibulum_spinosum_303845 (Final)	none	na	none	Accepted	Verified_Crucibulum_spinosum_303845
Cryptosula_pallasiana_261978 (Field)	Verified_Cryptosula_pallasiana_149496_COI	96.40%	MLMLv2025	Accepted	Provisional_Cryptosula_pallasiana_261978
Cryptosula_pallasiana_303374 (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.80%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_303374
Cryptosula_pallasiana_304565 (Final)	Verified_Cryptosula_pallasiana_149496_COI	96.00%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_304565
Cryptosula_pallasiana_312861 (Final)	Verified_Bryozoa_15992_COI	100.00%	MLMLv2025	Changed	Unverified_Bryozoa_312861
Diadumene_franciscana_264350 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Accepted	Provisional_Diadume_franciscana_313100
Diadumene_lineata_262871 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_262871
Diadumene_lineata_264327 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_264327
Diadumene_lineata_264543 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_264543
Diadumene_lineata_264568 (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_264568
Diplosoma_listerianum_306642 (Final)	Verified_Diplosoma_listerianum_304794_COI	99.20%	MLMLv2025	Accepted	Verified_Diplosoma_listerianum_306642
Diplosoma_listerianum_312872 (Final)	Diplosoma listerianum KU299766	100.00%	Core-nt	Accepted	Verified_Diplosoma_listerianum_312872
Diplosoma_listerianum_312877 (Final)	Diplosoma listerianum MW872296	99.80%	Core-nt	Accepted	Verified_Diplosoma_listerianum_312877
Distaplia_ sp_255506 (Field)	Verified_Watersipora_subatra_180740_COI	99.60%	MLMLv2025	Changed	Unverified_Watersipora_subatra_255506
Exaiptasia_diaphana_256663 (Field)	Exaiptasia diaphana MW278603	100.00%	MLMLv2025	Accepted	Unverified_Exaiptasia_diaphana_256663
Exaiptasia_diaphana_256664 (Field)	Exaiptasia diaphana MW278603	100.00%	MLMLv2025	Accepted	Unverified_Exaiptasia_diaphana_256664
Exaiptasia_diaphana_256665 (Field)	Exaiptasia diaphana MW278603	100.00%	MLMLv2025	Accepted	Unverified_Exaiptasia_diaphana_256665
Exaiptasia_diaphana_303841 (Final)	Exaiptasia diaphana MW278603	100.00%	MLMLv2025	Accepted	Verified_Exaiptasia_diaphana_303841
Fissurellidea_bimaculata_256574 (Field)	Fissurellidea bimaculata KF644308	99.10%	Core-nt	Accepted	Provisional_Fissurellidea_bimaculata_256574
Gastropoda_264318 (Field)	Alia carinata KX069384	99.80%	Core-nt	Resolved	Unverified_Alia_carinata_264318
Halosydna_brevisetosa_256552 (Field)	none	na	none	Changed	Provisional_Polynoidae_256552
Halosydna_brevisetosa_256608 (Field)	none	na	none	Changed	Provisional_Polynoidae_256608
Halosydna_brevisetosa_263148 (Field)	none	na	none	Changed	Provisional_Polynoidae_263148
Halosydna_brevisetosa_263187 (Field)	none	na	none	Changed	Provisional_Polynoidae_263187
Halosydna_brevisetosa_313113 (Final)	none	na	none	Changed	Verified_Polynoidae_313113
Halosydna_johnsoni_263179 (Field)	none	na	none	Changed	Provisional_Polynoidae_263188
Halosydna_johnsoni_263188 (Field)	none	na	none	Changed	Provisional_Polynoidae_263188
Halosydna_johnsoni_313115 (Final)	none	na	none	Changed	Provisional_Polynoidae_313115
Harmothoe_"imbricata"_complex_256551 (Field)	none	na	none	Changed	Provisional_Polynoidae_256551
Harmothoe_"imbricata"_complex_256607 (Field)	none	na	none	Changed	Provisional_Polynoidae_256607
Harmothoe_"imbricata"_complex_263216 (Field)	none	na	none	Changed	Provisional_Polynoidae_263216
Harmothoe_"imbricata"_complex_263229 (Field)	none	na	none	Changed	Provisional_Polynoidae_263229
Harmothoe_imbricata_313114 (Final)	none	na	none	Changed	Verified_Polynoidae_313114
Hoploplana_ sp_263142 (Field)	none	na	none	Accepted	Provisional_Hoploplana_sp_263142
Hoploplana_ sp_263151 (Field)	none	na	none	Accepted	Provisional_Hoploplana_sp_263151
Hoploplana_ sp_263152 (Field)	none	na	none	Accepted	Provisional_Hoploplana_sp_263152
Hoploplana_ sp_263153 (Field)	none	na	none	Accepted	Provisional_Hoploplana_sp_263153
Hoploplana_ sp_263154 (Field)	none	na	none	Accepted	Provisional_Hoploplana_sp_263154
Hydroides_elegans_263126 (Field)	Hydroides elegans MT044500	95.00%	Core-nt	Accepted	Provisional_Hydroides_elegans_263126
Hydroides_elegans_263132 (Field)	Hydroides elegans MW553741	100.00%	Core-nt	Accepted	Provisional_Hydroides_elegans_263132
Hydrozoa_B_303839 (Final)	none	na	none	Accepted	Verified_Hydrozoa_1_303839

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Hydrozoa_B_303853 (Final)	Provisional_Plumularioidea2_313675_COI	100.00%	MLMLv2025	Resolved	Unverified_Plumularioidea2_303853
Hydrozoa_B_306654 (Final)	Provisional_Plumularioidea2_313675_COI	100.00%	MLMLv2025	Resolved	Unverified_Plumularioidea2_306654
Hydrozoa_D_306667 (Final)	Bougainvillia muscus PP909522	98.20%	Core-nt	Resolved	Unverified_Bougainvillia_muscus_306667
Leptopecten_latiauratus_312884 (Final)	none	na	none	Accepted	Provisional_Leptopecten_latiauratus_312884
Leptopecten_latiauratus_312885 (Final)	none	na	none	na	na
Limpet_256575 (Field)	Crepidula onyx OP759429	100.00%	Core-nt	Resolved	Unverified_Crepidula_onyx_256575
Limpet_256584 (Field)	Crepidula onyx OP759427	99.20%	Core-nt	Resolved	Unverified_Crepidula_onyx_256584
Limpet_256594 (Field)	Crepidula onyx OP759429	100.00%	Core-nt	Resolved	Unverified_Crepidula_onyx_256594
Limpet_256610 (Field)	Crepidula onyx OP759429	99.80%	Core-nt	Resolved	Unverified_Crepidula_onyx_256610
Limpet_262474 (Field)	Crepipatella lingulata PQ966610	99.40%	Core-nt	Resolved	Unverified_Crepipatella_lingulata_262474
Limpet_313111 (Final)	Crepipatella lingulata PQ966610	99.80%	Core-nt	Resolved	Unverified_Crepipatella_lingulata_313111
Megasyllis_nipponica_263094 (Field)	Megasyllis nipponica OR381452	99.30%	Core-nt	Accepted	Provisional_Megasyllis_nipponica_263094
Megasyllis_nipponica_263095 (Field)	Megasyllis nipponica OR381452	99.30%	Core-nt	Accepted	Provisional_Megasyllis_nipponica_263095
Megasyllis_nipponica_263096 (Field)	Megasyllis nipponica OR381452	99.30%	Core-nt	Accepted	Provisional_Megasyllis_nipponica_263096
Megasyllis_nipponica_263135 (Field)	Megasyllis nipponica OR381452	99.30%	Core-nt	Accepted	Provisional_Megasyllis_nipponica_263135
Microcosmus_squamiger_255499 (Field)	Verified_Botryllus_schlosseri_306644_COI	99.40%	MLMLv2025	Changed	Unverified_Botryllus_schlosseri_255499
Microcosmus_squamiger_256638 (Field)	Microcosumus squamiger ON060764	100.00%	Core-nt	Accepted	Provisional_Microcosmus_squamiger_256638
Molgula_ sp_261879 (Field)	none	na	none	na	na
Molgula_ficus_261954 (Field)	none	na	none	na	na
Molgula_ficus_264605 (Field)	none	na	none	na	na
Molgula_ficus_264628 (Field)	none	na	none	na	na
Mytilidae_255485 (Field)	Unverified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_255485
Mytilidae_303381 (Field)	Unverified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_303381
Mytilidae_304555 (Field)	Unverified_Mytilus_galloprovincialis_male_153684_COI	97.80%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_304555
Mytilidae_304557 (Field)	Unverified_Mytilus_galloprovincialis_female_152343_COI	95.40%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_304557
Mytilidae_312879 (Field)	Unverified_Mytilus_galloprovincialis_male_153684_COI	97.80%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_312879
Mytilidae_312901 (Final)	Unverified_Mytilus_galloprovincialis_male_153684_COI	97.80%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_312901
Mytilus_sp_303375 (Final)	Unverified_Mytilus_galloprovincialis_female_152343_COI	97.90%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_303375
Mytilus_sp_306664 (Final)	Unverified_Mytilus_galloprovincialis_female_152343_COI	99.80%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_306664
Mytilus_sp_306666 (Final)	Unverified_Mytilus_galloprovincialis_male_153684_COI	99.50%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_306666
Mytilus_sp_312902 (Final)	Unverified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_312902
Mytilus_sp_312903 (Final)	Unverified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_312903
Nevianipora_floridana_303368 (Final)	Verified_Nevianipora_floridana_303368_COI	100.00%	MLMLv2025	Accepted	Verified_Nevianipora_floridana_303368
Nevianipora_floridana_303834 (Final)	Verified_Nevianipora_floridana_180273_COI	100.00%	MLMLv2025	Accepted	Verified_Nevianipora_floridana_303834
Nevianipora_floridana_312858 (Final)	Verified_Nevianipora_floridana_180273_COI	100.00%	MLMLv2025	Accepted	Verified_Nevianipora_floridana_312858
Nevianipora_floridana_312869 (Final)	Verified_Nevianipora_floridana_180719_COI	99.90%	MLMLv2025	Accepted	Verified_Nevianipora_floridana_312869
Nicolea_ sp_A_263246 (Field)	Nicolea venustula ON716039	100.00%	Core-nt	Resolved	Unverified_Nicolea_venustula_263246
Nicolea_ sp_A_263247 (Field)	Nicolea venustula ON716039	99.50%	Core-nt	Resolved	Unverified_Nicolea_venustula_263247
Nicolea_ sp_A_263249 (Field)	Nicolea venustula ON716039	99.50%	Core-nt	Resolved	Unverified_Nicolea_venustula_263249
Ophiuroidea_261666 (Field)	Amphipholis squamata PQ739755	100.00%	Core-nt	Resolved	Unverified_Amphipholis_squamata_261666
Ophiuroidea_262476 (Field)	Amphipholis squamata KU895013	98.60%	Core-nt	Resolved	Unverified_Amphipholis_squamata_262476
Ophiuroidea_264281 (Field)	Amphipholis squamata KU895013	98.00%	Core-nt	Resolved	Unverified_Amphipholis_squamata_264281
Ostrea_lurida_312896 (Final)	Verified_Ostrea_lurida_181488_COI	99.50%	MLMLv2025	Accepted	Verified_Ostrea_lurida_312896
Ostreidae_306661 (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Resolved	Unverified_Ostrea_lurida_306661
Parasabella_pallida_256499 (Field)	Verified_Parasabella_pallida_307240_COI	100.00%	MLMLv2025	Accepted	Provisional_Parasabella_pallida_256499
Parasabella_pallida_313106 (Final)	Verified_Parasabella_pallida_307240_COI	100.00%	MLMLv2025	Accepted	Verified_Parasabella_pallida_313106

Appendix 1-10. Sessiles, Long Beach 2018

Query	Name	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Parasabella_pallida_313107 (Final)	Verified_Parasabella_pallida_307240_COI	100.00%	MLMLv2025	Accepted	Verified_Parasabella_pallida_313107
Parasabella_pallida_313108 (Final)	Verified_Parasabella_pallida_310524_COI	99.90%	MLMLv2025	Accepted	Verified_Parasabella_pallida_313108
Phaenoplana_longipenis_256454 (Field)	Echinoplana celerrima MW375911	98.20%	Core-nt	Accepted	Unverified_Echinoplana_celerrima_256454
Phaenoplana_longipenis_256567 (Field)	none	na	none	Accepted	Provisional_Phaenoplana_longipenis_256567
Platynereis_bicanaliculata_256585 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculata_256585
Platynereis_bicanaliculata_263116 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculata_263116
Platynereis_bicanaliculata_263176 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculata_263176
Platynereis_bicanaliculata_263177 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	100.00%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculata_263177
Platynereis_bicanaliculata_263186 (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculata_263186
Plumularioidea_304556 (Final)	Provisional_Plumularioidea2_313675_COI	100.00%	MLMLv2025	Accepted	Verified_Plumularioidea2_304556
Polycera_atra_263194 (Field)	Provisional_Polycera_atra_295445_COI	99.50%	MLMLv2025	Accepted	Provisional_Polycera_atra_263194
Polycera_atra_263197 (Field)	Provisional_Polycera_atra_295445_COI	98.90%	MLMLv2025	Accepted	Provisional_Polycera_atra_263197
Polycera_atra_263198 (Field)	Provisional_Polycera_atra_295445_COI	99.20%	MLMLv2025	Accepted	Provisional_Polycera_atra_263198
Polycera_hedgpethi_263181 (Field)	Provisional_Polycera_hedgpethi_201158_COI	99.70%	MLMLv2025	Accepted	Provisional_Polycera_hedgpethi_263181
Polycera_hedgpethi_263182 (Field)	Provisional_Polycera_hedgpethi_201158_COI	98.90%	MLMLv2025	Accepted	Provisional_Polycera_hedgpethi_263182
Polycera_hedgpethi_263183 (Field)	Provisional_Polycera_hedgpethi_201158_COI	99.50%	MLMLv2025	Accepted	Provisional_Polycera_hedgpethi_263183
Polycera_hedgpethi_263195 (Field)	Provisional_Polycera_hedgpethi_201158_COI	99.50%	MLMLv2025	Accepted	Provisional_Polycera_hedgpethi_263195
Polycera_hedgpethi_263212 (Field)	Provisional_Polycera_hedgpethi_201158_COI	99.50%	MLMLv2025	Accepted	Provisional_Polycera_hedgpethi_263212
Porifera_A_303837 (Final)	Haliclona sp MK308101	99.80%	Core-nt	Resolved	Unverified_Haliclona_sp_303837
Porifera_A_303848 (Final)	Halichondria sp OQ323432	100.00%	Core-nt	Resolved	Unverified_Halichondria_sp_303848
Porifera_A_306648 (Final)	Haliclona xena MG423353	98.20%	Core-nt	Resolved	Unverified_Haliclona_xena_306648
Porifera_A_306649 (Final)	Halichondria sp OQ323005	98.90%	Core-nt	Resolved	Unverified_Halichondria_sp_306649
Porifera_A_306665 (Final)	Halichondria sp OQ323432	100.00%	Core-nt	Resolved	Unverified_Halichondria_sp_306665
Porifera_B_303376 (Final)	none	na	none	na	Unknown_303376
Porifera_C_303366 (Final)	none	na	none	na	Unknown_303366
Porifera_C_303372 (Final)	none	na	none	na	Unknown_303372
Porifera_C_303835 (Final)	none	na	none	na	Unknown_303385
Porifera_C_304550 (Final)	Provisional_Ciona_robusta_145739_COI	99.50%	MLMLv2025	Changed	Unverified_Ciona_robusta_304550
Prosthiostomum_latocelis_263241 (Field)	Provisional_Platyhelminthes4_190069_COI	99.50%	MLMLv2025	Accepted	Provisional_Prosthiostomum_latocelis_263241
Prosthiostomum_latocelis_263248 (Field)	Provisional_Platyhelminthes4_190069_COI	99.10%	MLMLv2025	Accepted	Provisional_Prosthiostomum_latocelis_263248
Pseudoceros_mexicanus_313116 (Field)	none	na	none	Accepted	Provisional_Pseudoceros_mexicanus_313116
Schizoporella_japonica_262513 (Field)	Verified_Schizoporella_occidentalae_313680_COI	99.90%	MLMLv2025	Changed	Unverified_Schizoporella_occidentalae_262513
Steyla_ sp_264242 (Field)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Changed	Unverified_Bugula_neritina_264242
Steyla_clava_262468 (Field)	Verified_Ianiropsis_serricaudis_179625_COI	99.10%	MLMLv2025	Changed	Unverified_Ianiropsis_serracaudis_262468
Steyla_clava_263382 (Field)	Provisional_Styela_clava_155244_COI	99.60%	MLMLv2025	Accepted	Provisional_Styela_clava_263382
Steyla_clava_264186 (Field)	Provisional_Styela_clava_155244_COI	99.50%	MLMLv2025	Accepted	Provisional_Styela_clava_264186
Styela_canopus_256687 (Field)	Provisional_Styela_clava_155244_COI	99.70%	MLMLv2025	Changed	Unverified_Styela_plicata_256687
Styela_plicata_261617 (Field)	Provisional_Styela_plicata_248964_COI	100.00%	MLMLv2025	Accepted	Provisional_Styela_plicata_261617
Styela_plicata_262849 (Field)	Provisional_Styela_plicata_248964_COI	100.00%	MLMLv2025	Accepted	Provisional_Styela_plicata_262489
Styela_plicata_262911 (Field)	Provisional_Styela_plicata_248964_COI	100.00%	MLMLv2025	Accepted	Provisional_Styela_plicata_262911
Styelidae_255455 (Field)	Provisional_Styela_plicata_248964_COI	99.10%	MLMLv2025	Resolved	Unverified_Styela_plicata_255455
Thalamoporella_californica_303367 (Final)	Thalamoporella californica PQ454607	97.80%	Core-nt	Accepted	Verified_Thalamoporella_californica_303367
Thalamoporella_californica_306639 (Final)	Thalamoporella californica PQ454607	97.80%	Core-nt	Accepted	Verified_Thalamoporella_californica_306639

Appendix 1-10. Sessiles, Long Beach 2018

Query	Name	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
Thalamoporella_californica_312863 (Final)	Thalamoporella californica PQ454607	99.00%	Core-nt	Accepted	Verified_Thalamoporella_californica_312863
Tubulariidae_256635 (Field)	Ectopleura crocei JX898192	100.00%	Core-nt	Resolved	Unverified_Ectopleura_crocei_256635
Tubulariidae_264552 (Field)	Ectopleura crocei MH888021	99.80%	Core-nt	Resolved	Unverified_Ectopleura_crocei_264552
Tubulariidae_303840 (Final)	Ectopleura crocei JX898192	100.00%	Core-nt	Resolved	Unverified_Ectopleura_crocei_303840
Tubulariidae_304562 (Final)	Ectopleura crocei MH809676	100.00%	Core-nt	Resolved	Unverified_Ectopleura_crocei_304562
Tubulipora_pacifica_261722 (Field)	none	na	none	Accepted	Provisional_Tubulipora_pacifica_261722
Tubulipora_pacifica_304567 (Final)	none	na	none	Accepted	Provisional_Tubulipora_pacifica_304567
Tunicata_312900 (Final)	Verified_Botrylloides_violaceus_149926_COI	100.00%	MLMLv2025	Resolved	Unverified_Botrylloides_violaceus_149926
Watersipora_arcuata_261752 (Field)	Provisional_Watersipora_arcuata_181390_COI	99.40%	MLMLv2025	Accepted	Provisional_Watersipora_arcuata_261752
Watersipora_arcuata_263012 (Field)	Provisional_Watersipora_arcuata_181390_COI	99.40%	MLMLv2025	Accepted	Provisional_Watersipora_arcuata_263012
Watersipora_arcuata_264196 (Field)	Provisional_Watersipora_arcuata_181390_COI	98.60%	MLMLv2025	Accepted	Provisional_Watersipora_arcuata_264196
Watersipora_arcuata_303380 (Final)	Provisional_Watersipora_arcuata_181390_COI	100.00%	MLMLv2025	Accepted	Verified_Watersipora_arcuata_303380
Watersipora_arcuata_306657 (Final)	Provisional_Watersipora_arcuata_181390_COI	98.50%	MLMLv2025	Accepted	Verified_Watersipora_arcuata_306657
Watersipora_subatra_303831 (Final)	Verified_Watersipora_subatra_180325_COI	100.00%	MLMLv2025	Accepted	Verified_Watersipora_subatra_303831
Watersipora_subatra_306638 (Final)	Verified_Watersipora_subatra_180325_COI	100.00%	MLMLv2025	Accepted	Verified_Watersipora_subatra_306638
Watersipora_subatra_306645 (Final)	Verified_Watersipora_subatra_115273_COI	99.70%	MLMLv2025	Accepted	Verified_Watersipora_subatra_306645
Watersipora_subatra_312854 (Final)	Verified_Watersipora_subatra_180440_COI	99.80%	MLMLv2025	Accepted	Verified_Watersipora_subatra_312854
Watersipora_subatra_312862 (Final)	Verified_Watersipora subatra_181402_COI	100.00%	MLMLv2025	Accepted	Verified_Watersipora_subatra_312862

Appendix 1-11. Motiles, Long Beach 2018

QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
207097_Elasmopus bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.00%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_207097
207099_Liljeborgia geminata complex (Field)	Provisional_Liljeborgia_geminata_207099	100.00%	MLMLv2025	Accepted	Provisional_Liljeborgia_geminata_207099
207112_Elasmopus bampo (Field)	Verified_Elasmopus_bampo_184990_COI	98.60%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_207112
207114_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.90%	MLMLv2025	Accepted	Provisional_Caprella_simia_207114
207120_Elasmopus bampo (Field)	Verified_Elasmopus_bampo_184990_COI	98.40%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_207120
207135_Elasmopus bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.30%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_207135
207138_Caprella californica (Field)	Provisional_Caprella_californica_207138_COI	99.80%	MLMLv2025	Accepted	Provisional_Caprella_californica_207138
207146_Ianiropsis sp. (Field)	Verified_Ianiropsis_serricaudis_179625_COI	99.50%	MLMLv2025	Resolved	Unverified_Ianiropsis_serricaudis_207146
207149_Zeuxo sp (Field)	Verified_Zeuxo_sp_240166_COI	99.40%	MLMLv2025	Accepted	Provisional_Zeuxo_sp_207149
207151_Caprella californica (Field)	Provisional_Caprella_californica_207138_COI	99.20%	MLMLv2025	Accepted	Provisional_Caprella_californica_207151
207153_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	99.50%	MLMLv2025	Accepted	Provisional_Caprella_mutica_207153
207182_Paracerceis sculpta (Field)	Provisional_Paraceis_sculpta_207182 _COI	99.90%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_207182
207185_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	98.40%	MLMLv2025	Accepted	Provisional_Caprella_mutica_207185
219712_Caprella californica (Field)	Provisional_Caprella_californica_207138_COI	99.20%	MLMLv2025	Accepted	Provisional_Caprella_californica_219712
219714_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.80%	MLMLv2025	Accepted	Provisional_Caprella_simia_219714
219720_Caprella simia (Field)	Provisional_Liljeborgia_geminata_219720	99.80%	MLMLv2025	Changed	Unverified_Liljeborgia_geminata_219720
219726_Ericthonius brasiliensis (Field)	Gammaropsis digitata OL311553	99.50%	Core-nt	Changed	Unverified_Gammaropsis_digitiata_219726
219730_Gammaropsis thompsoni (Field)	Provisional_Amphipoda_219730_COI	99.20%	MLMLv2025	Changed	Provisional_Amphipoda_219730
219735_Ianiropsis sp. (Field)	Verified_Ianiropsis_serricaudis_179625_COI	98.30%	MLMLv2025	Resolved	Unverified_Ianiropsis_serricaudis_219735
219738_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	96.70%	MLMLv2025	Accepted	Provisional_Caprella_mutica_219738
219742_Caprella simia (Field)	Verified_Caprella_simia_184719_COI	99.80%	MLMLv2025	Accepted	Provisional_Caprella_simia_219742
219749_Gammaropsis thompsoni (Field)	Provisional_Amphipoda_219730_COI	99.20%	MLMLv2025	Changed	Provisional_Amphipoda_219749
219763_Laticorophium baconi (Field)	Provisional_Laticorophium_baconi_219800_COI	100.00%	MLMLv2025	Accepted	Provisional_Laticorophium_baconi_219763
219793_Zeuxo sp. (Field)	Verified_Zeuxo_sp_240166_COI	99.10%	MLMLv2025	Accepted	Provisional_Zeuxo_sp_219793
219800_Laticorophium baconi (Field)	Provisional_Laticorophium_baconi_219800_COI	99.60%	MLMLv2025	Accepted	Provisional_Laticorophium_baconi_219800
219809_Laticorophium baconi (Field)	Provisional_Laticorophium_baconi_219809_COI	99.90%	MLMLv2025	Accepted	Provisional_Laticorophium_baconi_219809
219819_Laticorophium baconi (Field)	Verified_Monocorophium_sp_183403_COI	99.40%	MLMLv2025	Accepted	Provisional_Laticorophium_baconi_219819
219821_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	99.90%	MLMLv2025	Accepted	Provisional_Caprella_mutica_219821
219824_Caprella sp. (Field)	Verified_Caprella_simia_184719_COI	99.20%	MLMLv2025	Resolved	Unverified_Caprella_simia_219824
219827_Aoroides secunda (Field)	Verified_Aoroides_secunda_179544_COI	96.10%	MLMLv2025	Accepted	Provisional_Aoroides_secunda_219827
219832_Paracerceis sculpta (Field)	Provisional_Paraceis_sculpta_207182 _COI	99.80%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_219832
219847_Liljeborgia geminata complex (Field)	Provisional_Liljeborgia_geminata_219847	100.00%	MLMLv2025	Accepted	Provisional_Liljeborgia_geminata_219847
240166_Zeuxo sp. (Field)	Verified_Zeuxo_sp_240166_COI	99.40%	MLMLv2025	Accepted	Provisional_Zeuxo_sp_240166
240172_Paracerceis sculpta (Field)	Provisional_Paracerceis_sculpta_283002_COI	99.00%	MLMLv2025	Accepted	Provisional_Paracerceis_sculpta_240172
240176_Zeuxo sp. (Field)	Verified_Zeuxo_sp_240166_COI	99.30%	MLMLv2025	Accepted	Provisional_Zeuxo_sp_240176
240182_Leucothoe alata (Field)	Verified_Leucothoe_alata_183241_COI	99.30%	MLMLv2025	Accepted	Provisional_Leucothoe_alata_240182
240345_Ericthonius brasiliensis (Field)	Gammaropsis digitata OL311553	100.00%	Core-nt	Changed	Unverified_Gammaropsis_digitiata_240345
240370_Ampithoe plumulosa (Field)	Provisional_Ampithoe_plumulosa_240370_COI	99.50%	MLMLv2025	Accepted	Provisional_Ampithoe_plumulosa_240370
240402_Ampithoe sp. (Field)	none	na	none	Accepted	Provisional_Ampithoe_sp_240402
240420_Laticorophium baconi (Field)	Verified_Monocorophium_sp_183403_COI	98.60%	MLMLv2025	Changed	Unverified_Monocorophium_sp_240420
303878_Elasmopus bampo (Field)	Verified_Elasmopus_bampo_184990_COI	98.40%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_303878
303879_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	98.30%	MLMLv2025	Accepted	Provisional_Caprella_mutica_303879
303881_Elasmopus bampo (Field)	Verified_Elasmopus_bampo_184990_COI	99.50%	MLMLv2025	Accepted	Provisional_Elasmopus_bampo_303881
303882_Synidotea laticauda (Field)	Verified_Colidotea_rostrata_183000_COI	98.70%	MLMLv2025	Changed	Unverified_Colidotea_rostrata_303882
303883_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	99.00%	MLMLv2025	Accepted	Provisional_Caprella_mutica_303883
303886_Caprella mutica (Field)	Provisional_Caprella_mutica_147429_COI	96.20%	MLMLv2025	Accepted	Provisional_Caprella_mutica_303886
303890_Caprella scaura (Field)	Verified_Caprella_scaura_245246_COI	98.10%	MLMLv2025	Accepted	Provisional_Caprella_scaura_303890

Appendix 1-11. Motiles, Long Beach 2018

QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
303891_Caprella sp. (Field)	Verified_Caprella_sp3_179589_COI	98.80%	MLMLv2025	Accepted	Provisional_Caprella_sp3_303891

Appendix 1-12. San Francisco Bay 2017

QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
304533_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	100.00%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_304533
304530_Bugula neritina (Final)	Verified_Bugula_neritina_304530_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_304530
304527_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_304527_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_304527
304525_Ostreidae (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Resolved	Unverified_Ostrea_lurida_304525
304519_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	99.30%	MLMLv2025	Accepted	Verified_Ostrea_lurida_304519
304516_Bougainvilliidae (Final)	none	na	none	Accepted	Verified_Bougainvilliidae_304516
304515_Arcuatula senhousia (Final)	Verified_Musculista_senhousia_female_150494_COI	98.50%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_304515
304513_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_309735 _COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_304513
304509_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_304509_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_304509
304504_Botrylloides sp (Final)	Verified_Botrylloides_diegensis_304564_COI	100.00%	MLMLv2025	Resolved	Unverified_Botrylloides_diegensis_304504
304500_Einhornia crustulenta (Final)	Verified_Electra-LM_304493_COI	100.00%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_304500
304499_Conopeum sp. (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	98.70%	MLMLv2025	Resolved	Unverified_Conopeum_tenuissimum_2_304499
304494_Einhornia crustulenta (Final)	Verified_Electra_LM_304494_COI	99.80%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_304494
304493_Einhornia crustulenta (Final)	Verified_Electra-LM_304493_COI	100.00%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_304493
304484_Fredericella sp (Final)	Verified_Hydrozoa_178363_COI	99.00%	MLMLv2025	Changed	Unverified_Fredericella_indica2_304484
304478_Porifera sp. E (Final)	Eunapius fragilis OL979210	99.80%	Core-nt	Changed	Unverified_Eunapius_fragilis_304478
304448_Campanulariidae (Final)	Obelia longissima KC440003	100.00%	Core-nt	Resolved	Unverified_Obelia_longissima_304448
304447_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	99.80%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_304447
304430_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_304430
304421_Crisularia pacifica (Final)	Verified_Crisularia_pacifica2_312779 _COI	100.00%	MLMLv2025	Accepted	Verified_Crisularia_pacifica_304421
304417_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_304417
304416_Mytilus sp. (Final)	Verified_Mytilus_galloprovincialis_female_152343_COI	100.00%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_female_304416
304415_Conopeum (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	98.50%	MLMLv2025	Resolved	Unverified_Conopeum_tenuissimum_2_304415
304412_Styela sp (Final)	Provisional_Styela_clava_155244_COI	99.80%	MLMLv2025	Resolved	Unverified_Styela_clava_304412
304411_Botrylloides diegensis (Final)	Verified_Botrylloides_diegensis_304411_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_304411
304407_Barnacle or Tunicata (Final)	Verified_Amphibalanus improvisus_303460 COI	99.70%	MLMLv2025	Changed	Unverified_Amphibalanus_improvisus_304407
304406_Mytilus sp (Final)	Verified_Mytilus_galloprovincialis_male_153684_COI	99.50%	MLMLv2025	Resolved	Unverified_Mytilus_galloprovincialis_male_304406
304405_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	95.60%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_304405
304403_Bugula neritina (Final)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_304403
304398_Einhornia crustulenta (Final)	Verified_Electra-LM_304493_COI	99.80%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_304398
304395_Conopeum chesapeakensis (Final)	Conopeum chesapeakensis HM069984	100.00%	Core-nt	Accepted	Verified_Conopeum_chesapeakensis_304395
304390_Porifera sp. A (Final)	Eunapius fragilis OL979205	100.00%	MLMLv2025	Resolved	Unverified_Eunapius_fragilis_304390
304389_Fredericella indica (Final)	Verified_Hydrozoa_178363_COI	99.20%	MLMLv2025	Accepted	Verified_Fredericella_indica1_304389
304386_Plumatella repens (Final)	Plumatella repens FJ196105	94.60%	Core-nt	Accepted	Verified_Plumatella_repens2_304386
304385_Porifera sp. E (Final)	Eunapius fragilis OL979205	99.90%	Core-nt	Resolved	Unverified_Eunapius_fragilis_304385
304358_Ostreidae (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Resolved	Unverified_Ostrea_lurida_304358
304356_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_308511_COI	99.50%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_304356
304350_Porifera A (Final)	Haliclona sp MK308101	99.70%	Core-nt	Changed	Unverified_Haliclona_sp_304350
304349_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	100.00%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_304349

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QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
304348_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_278014_COI	100.00%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_304348
304347_Campanulariidae (Final)	Laomedea calceolifera KX665242	100.00%	MLMLv2025	Resolved	Unverified_Laomedea_calceolifera_304347
304344_Conopeum sp. (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	99.50%	MLMLv2025	Resolved	Unverified_Conopeum_tenuissimum_2_304344
304338_Crisularia pacifica (Final)	Verified_Crisularia_pacifica2_312779 _COI	100.00%	MLMLv2025	Resolved	Unverified_Crisularia_pacifica2_304338
304337_Bugula neritina (Final)	Verified_Bugula_neritina_304337_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_304337
304335_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_304566_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_304335
304333_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_304333
304332_Porifera (Final)	Clathria prolifera KU906059	98.80%	Core-nt	Resolved	Unverified_Clathria_prolifera_304332
304328_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_304328
304326_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	99.80%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_304326
304325_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_304325_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_304325
304317_Amathia sp bowerbanki (Final)	none	na	none	Accepted	Verified_Amathia_sp9_304317
304315_Membranipora chesapeakensis (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	98.70%	MLMLv2025	Changed	Unverified_Conopeum_tenuissimum_2_304315
304314_Arcuatula senhousia (Final)	Verified_Musculista_senhousia_male-149923_COI	96.40%	MLMLv2025	Accepted	Verified_Arcuatula_senhousia_304314
304308_Amphibalanus improvisus (Final)	Verified_Amphibalanus improvisus_303460 COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_304308
304305_Botrylloides diegensis (Final)	Verified_Botrylloides_diegensis_304564_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_304305
304304_Molgula sp (Final)	Verified_Botryllus_schlosseri_304304_COI	100.00%	MLMLv2025	Changed	Unverified_Botryllus_schlosseri_304304
304301_Fredericella indica (Final)	Verified_Hydrozoa_178363_COI	99.20%	MLMLv2025	Accepted	Verified_Fredericella_indica1_304301
304300_Porifera sp. E (Final)	Eunapius fragilis OL979205	100.00%	Core-nt	Resolved	Unverified_Eunapius_fragilis_304300
304299_Plumatella repens (Final)	Plumatella repens KU720129	93.20%	Core-nt	Accepted	Verified_Plumatella_repens1_304299
304293_Watersipora subatra (Final)	Verified_Watersipora_subatra_149915_COI	100.00%	MLMLv2025	Accepted	Verified_Watersipora_subatra_304293
304064_Neoamphitrite sp. A (Final)	Amphitrite ornata MF784577	100.00%	Core-nt	Changed	Unverified_Amphitrite_ornata_304064
304063_Harmothoe imbricata (Final)	none	na	none	Accepted	Verified_Harmothoe_imbricata_304063
304060_Megasyllis nipponica (Final)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLMLv2025	Accepted	Verified_Megasyllis_nipponica_304060
304059_Megasyllis nipponica (Final)	Verifiied_Megasyllis_japonica_308091_COI	100.00%	MLMLv2025	Accepted	Verified_Megasyllis_nipponica_304059
304056_Neoamphitrite sp. A (Final)	Amphitrite ornata MF784577	99.80%	Core-nt	Changed	Unverified_Amphitrite_ornata_304056
304054_Megasyllis nipponica (Final)	Verifiied_Megasyllis_japonica_308091_COI	99.70%	MLMLv2025	Accepted	Verified_Megasyllis_nipponica_304054
304053_Neoamphitrite sp. A (Final)	Amphitrite ornata MF784577	80.20%	MLMLv2025	Changed	Unverified_Amphitrite_ornata_304053
304052_Megasyllis nipponica (Final)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLMLv2025	Accepted	Verified_Megasyllis_nipponica_304052
304051_Harmothoe imbricata (Final)	none	na	none	Accepted	Verified_Harmothoe_imbricata_304051
304048_Harmothoe imbricata (Final)	none	na	none	Accepted	Verified_Harmothoe_imbricata_304048
303011_Crisularia pacifica (Final)	Verified_Crisularia_pacifica2_312779 _COI	100.00%	MLMLv2025	Resolved	Unverified_Crisularia_pacifica2_303011
302998_Membranipora chesapeakensis (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	99.60%	MLMLv2025	Changed	Unverified_Conopeum_tenuissimum_2_302998
302997_Victorella pavida (Final)	none	na	none	Accepted	Verified_Victorella_pavida_302997
302995_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_302995_COI	99.80%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_302995
302993_Botrylloides diegensis (Final)	Verified_Botrylloides_diegensis_304564_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_302993

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QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
302979_Conopeum sp. (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	98.50%	MLMLv2025	Resolved	Verified_Conopeum_tenuissimum_2_302979
302975_Porifera sp. A (Final)	Eunapius fragilis OL979205	100.00%	Core-nt	Resolved	Unverified_Eunapius_fragilis_302975
302971_Cryptosula pallasiana (Final)	Verified_Cryptosula_pallasiana_149496_COI	96.00%	MLMLv2025	Accepted	Verified_Cryptosula_pallasiana_302971
302908_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_302908_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_302908
302907_Amathia sp bowerbankia (Final)	Verified_Amathia_sp2_302907_COI	100.00%	MLMLv2025	Changed	Unverified_Amathia_sp2_302907
302906_Anguinella palmata (Final)	Verified_Anguinella_palmata_149685_COI	99.10%	MLMLv2025	Accepted	Verified_Anguinella_palmata_302906
302903_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_302903
302901_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	99.20%	MLMLv2025	Accepted	Verified_Ostrea_lurida_302901
302899_Kamptozoa (Final)	Provisional_Barentsia_benedeni_313689_COI	99.40%	MLMLv2025	Resolved	Unverified_Barentsia_benedeni_302899
302894_Bugula neritina (Final)	Provisional_Bugula_neritina_115290_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_302894
302890_Einhornia crustulenta (Final)	Verified_Electra-LM_304493_COI	100.00%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_302890
302887_Einhornia crustulenta (Final)	Verified_Electra-LM_302887_COI	99.40%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_302887
302881_Plumatella repens (Final)	Provisional_Plumatella_sp_182293_COI	94.70%	MLMLv2025	Accepted	Verified_Plumatella_repens1_302881
302880_Porifera sp. E (Final)	Eunapius fragilis OL979205	82.90%	MLMLv2025	Resolved	Unverified_Eunapius_fragilis_302880
302876_Pectinatella magnifica (Field)	Provisional_Pectinatella_magnifica_176504_COI	100.00%	MLMLv2025	Accepted	Provisional_Pectinatella_magnifica_302876
259242_Porifera_A (Field)	Halichondria panicea KY492589	97.70%	Core-nt	Resolved	Unverified_Halichondria_panicea_259242
259294_Amathia sp. (Field)	Amathia gracilis MN447925	99.70%	Core-nt	Resolved	Unverified_Amathia_gracilis_259294
259258_Molgula manhattensis (Field)	Provisional_Molgula_manhattensis_144447_COI	99.40%	MLMLv2025	Accepted	Provisional_Molgula_manhattensis_259258
259250_Cryptosula pallasiana (Field)	Verified_Cryptosula_pallasiana_149496_COI	99.70%	MLMLv2025	Accepted	Provisional_Cryptosula_pallasiana_259250
259221_Schizoporella japonica (Field)	Provisional_Schizoporella_japonica_278014_COI	99.80%	MLMLv2025	Accepted	Provisional_Schizoporella_japonica_259221
259101_Conopeum sp. (Field)	Verified_Conopeum_tenuissimum_2_154299_COI	99.00%	MLMLv2025	Resolved	Unverified_Conopeum_tenuissimum_2_259101
259042_Ctenostomata (Field)	Plumatella repens FJ196105	94.90%	Core-nt	Resolved	Unverified_Plumatella_repens2_259042
258762_Hydrozoa sp. A (Field)	Obelia longissima AY789908	99.80%	Core-nt	Resolved	Unverified_Obelia_longissima_258762
258719_Cryptosula pallasiana (Field)	Verified_Cryptosula_pallasiana_149496_COI	99.80%	MLMLv2025	Accepted	Provisional_Cryptosula_pallasiana_258719
258717_Molgula manhattensis (Field)	Provisional_Molgula_manhattensis_144447_COI	99.50%	MLMLv2025	Accepted	Provisional_Molgula_manhattensis_258717
258696_Ascidia zara (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Accepted	Provisional_Ascidia_zara_258696
258662_Anguinella palmata (Field)	Verified_Anguinella_palmata_149685_COI	99.10%	MLMLv2025	Accepted	Provisional_Anguinella_palmata_258662
258659_Hydrozoa sp. D (Field)	Clytia sp KU905972	99.70%	Core-nt	Resolved	Unverified_Clytia_sp_258659
258648_Diadumene lineata (Field)	Verified_Diadumene_franciscana_313100_COI	99.80%	MLMLv2025	Changed	Unverified_Diadumene_franciscana_258648
258614_Diadumene lineata (Field)	Provisional_Diadumene_lineata_243923_COI	100.00%	MLMLv2025	Accepted	Provisional_Diadumene_lineata_258614
258594_Arcuatula senhousia (Field)	Verified_Musculista_senhousia_male-149923_COI	96.90%	MLMLv2025	Accepted	Provisional_Arcuatula_senhousia_258594
258588_Styela clava (Field)	Provisional_Styela_clava_155244_COI	99.80%	MLMLv2025	Accepted	Provisional_Styela_clava_258588
258568_Molgula manhattensis (Field)	Provisional_Molgula_manhattensis_144447_COI	99.50%	MLMLv2025	Accepted	Provisional_Molgula_manhattensis_258568
258536_Watersipora subtorquata (Field)	Verified_Watersipora_subatra_149915_COI	100.00%	MLMLv2025	Accepted	Unverified_Watersipora_subatra_258536
258228_Styela sp. (Field)	Provisional_Styela_clava_155244_COI	99.50%	MLMLv2025	Resolved	Unverified_Styela_clava_258228
258223_Ascidia zara (Field)	Verified_Crisularia_pacifica1_149501_COI	99.80%	MLMLv2025	Accepted	Provisional_Ascidia_zara_258223
258217_Diplosoma listerianum (Field)	Provisional_Diplosoma listerianum_147295_COI	99.80%	MLMLv2025	Accepted	Provisional_Diplosoma_listerianum_258217

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QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
258212_Ciona intestinalis (Field)	Provisional_Ciona_robusta_145739_COI	99.70%	MLMLv2025	Changed	Unverified_Ciona_robusta_258212
258206_Ciona intestinalis (Field)	Provisional_Ciona_robusta_145739_COI	100.00%	MLMLv2025	Changed	Unverified_Ciona_robusta_258206
258180_Ciona savignyi (Field)	Provisional_Ciona_savignyi_145705_COI	98.90%	MLMLv2025	Accepted	Provisional_Ciona_savignyi_258180
258158_Anguinella palmata (Field)	Verified_Anguinella_palmata_149685_COI	100.00%	MLMLv2025	Accepted	Provisional_Anguinella_palmata_258158
258151_Diadumene sp. (Field)	Verified_Diadumene_franciscana_313100_COI	100.00%	MLMLv2025	Resolved	Unverified_Diadumene_franciscana_258151
258148_Urosalpinx_cinerea (Field)	Protosuberites sp MG825741	99.70%	Core-nt	Changed	Unverified_Protosuberites_sp_258148
258136_Membranipora chesapeakensis (Field)	Verified_Conopeum_tenuissimum_2_154299_COI	99.10%	MLMLv2025	Changed	Unverified_Conopeum_tenuissimum_2_258136
258102_Styelidae (Field)	Provisional_Styela_clava_155244_COI	99.80%	MLMLv2025	Resolved	Unverified_Styela_clava_258102
258041_Hydra sp. (Field)	Hydra hymanae MF544184	100.00%	Core-nt	Resolved	Unverified_Hydra_hymanae_258041
257658_Molgula manhattensis (Field)	Provisional_Molgula_manhattensis_144447_COI	100.00%	MLMLv2025	Accepted	Provisional_Molgula_manhattensis_257658
257640_Haminoea japonica (Field)	Provisional_Haloa_japonica_313837_COI	100.00%	MLMLv2025	Accepted	Provisional_Haminoea_japonica_257640
257603_Hydrozoa sp. A (Field)	Laomedea calceolifera KX665242	100.00%	MLMLv2025	Changed	Unverified_Laomedea_calceolifera_257603
257597_Ciona intestinalis (Field)	Provisional_Ciona_robusta_145739_COI	99.70%	MLMLv2025	Changed	Unverified_Ciona_robusta_257597
257496_Diadumene lineata (Field)	Provisional_Diadumene_lineata_243923_COI	100.00%	MLMLv2025	Accepted	Provisional_Diadumene_lineata_257496
253323_Neoamphitrite sp. A (Field)	Amphitrite ornata MF784577	100.00%	Core-nt	Changed	Unverified_Amphitrite_ornata_253323
253314_Megasyllis nipponica (Field)	Provisional_Megasyllis_nipponica_267699_COI	100.00%	MLMLv2025	Accepted	Provisional_Megasyllis_nipponica_253314
253271_Okenia plana (Field)	none	na	none	Accepted	Verified_Okenia_plana_253271
253270_Okenia plana (Field)	none	na	none	Accepted	Verified_Okenia_plana_253270
253185_Ficopomatus enigmatica (Field)	Ficopomatus enigmaticus KU697660	99.00%	Core-nt	Accepted	Provisional_Ficopomatus_enigmaticus_253185
253258_Polydora_cornuta (Field)	Polydora cornuta EF525289	100.00%	Core-nt	Accepted	Provisional_Polydora_cornuta_253258
253081_Okenia plana (Field)	none	na	none	Accepted	Verified_Okenia_plana_253081
244123_Platynereis bicanaliculata (Field)	Verified_Platynereis_bicanaliculata_307085_COI	99.80%	MLMLv2025	Accepted	Provisional_Platynereis_bicanaliculata_244123
244121_Harmothoe imbricata (Field)	none	na	none	Accepted	Verified_Harmothoe_imbricata_244121
244043_Mytilidae (Field)	Verified_Mytilus_trossulus_female_155615_COI	99.50%	MLMLv2025	Resolved	Unverified_Mytilus_trossulus_female_244043
244033_Diadumene franciscana (Field)	Provisional_Diadumene_sp1_244027_COI (reversed)	100.00%	MLMLv2025	Changed	Unverified_Diadumene_sp1_244033
244027_Diadumene sp. (Field)	Provisional_Diadumene_sp1_244027_COI (reversed)	100.00%	MLMLv2025	Resolved	Unverified_Diadumene_sp1_244027
243976_Ascidia zara (Field)	Verified_Ascidia_zara_149542_CO1	98.80%	MLMLv2025	Accepted	Provisional_Ascidia_zara_243976
243923_Diadumene lineata (Field)	Provisional_Diadumene_lineata_243923_COI	100.00%	MLMLv2025	Accepted	Provisional_Diadumene_lineata_243923
243914_Diadumene lineata (Field)	Provisional_Diadumene_lineata_243914_COI	100.00%	MLMLv2025	Accepted	Provisional_Diadumene_lineata_243914
243857_Molgula manhattensis (Field)	Provisional_Molgula_manhattensis_144447_COI	99.40%	MLMLv2025	Accepted	Provisional_Molgula_manhattensis_243857
243806_Bryozoa (Field)	none	na	none	Accepted	Provisional_Bryozoa_243806
243786_Pectinatella magnifica (Field)	Provisional_Pectinatella_magnifica_176504_COI	99.80%	MLMLv2025	Accepted	Provisional_Pectinatella_magnifica_243786
179116_Bugulina stolonifera (Final)	Verified_Bugulina_stolonifera_149716_COI	100.00%	MLMLv2025	Accepted	Verified_Bugulina_stolonifera_179116
179113_Bugula neritina (Final)	Verified_Bugula_neritina_304530_COI	100.00%	MLMLv2025	Accepted	Verified_Bugula_neritina_179113
179109_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_179109
179108_Porifera_A (Final)	Halichondria sp OQ323005	99.70%	Core-nt	Resolved	Unverified_Halichondria_sp_179108
179104_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_278014_COI	99.80%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_179104
179098_Ostrea lurida (Final)	Verified_Ostrea_lurida_181488_COI	100.00%	MLMLv2025	Accepted	Verified_Ostrea_lurida_179098

Appendix 1-12. San Francisco Bay 2017

QUERY	BLAST Result	% Pairwise Identity	Database	Morphological ID Status	Genetic Identification
179096_Amphibalanus amphitrite (Final)	Verified_Amphibalanus_amphitrite_179096_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_amphitrite_179096
179091_Crisularia pacifica (Final)	Verified_Crisularia_pacifica2_179091_COI	100.00%	MLMLv2025	Resolved	Unverified_Crisularia_pacifica2_179091
179085_Conopeum sp (Final)	Provisional_Barentsia_benedeni_313689_COI	99.70%	MLMLv2025	Changed	Unverified_Barentsia_benedeni_179085
179078_Kamptozoa (Final)	Provisional_Barentsia_benedeni_313689_COI	99.80%	MLMLv2025	Resolved	Unverified_Barentsia_benedeni_179078
179071_Amphibalanus improvisus (Final)	Verified_Amphibalanus_improvisus_179071_COI	100.00%	MLMLv2025	Accepted	Verified_Amphibalanus_improvisus_179071
179069_Botryllus schlosseri (Final)	Verified_Botryllus_schlosseri_306644_COI	100.00%	MLMLv2025	Accepted	Verified_Botryllus_schlosseri_179069
179068_Botrylloides sp (Final)	Verified_Botrylloides_diegensis_304411_COI	100.00%	MLMLv2025	Resolved	Unverified_Botrylloides_diegensis_179068
179067_Botrylloides violaceus (Final)	Provisional_Botrylloides_violaceus_255494_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_violaceus_179067
179066_Botrylloides diegensis (Final)	Verified_Botrylloides_diegensis_179066_COI	100.00%	MLMLv2025	Accepted	Verified_Botrylloides_diegensis_179066
179065_Botrylloides violaceus (Final)	Verified_Botrylloides_diegensis_304411_COI	100.00%	MLMLv2025	Changed	Unverified_Botrylloides_diegensis_179065
179062_Einhornia crustulenta (Final)	Verified_Electra-LM_304493_COI	99.80%	MLMLv2025	Accepted	Verified_Einhornia_crustulenta-LM_179062
179059_Conopeum sp. (Final)	Verified_Conopeum_tenuissimum_2_154299_COI	99.60%	MLMLv2025	Resolved	Unverified_Conopeum_tenuissimum_2_179059
179056_Porifera sp. E (Final)	Eunapius fragilis OL979205	82.90%	MLMLv2025	Changed	Unverified_Eunapius_fragilis_179056
179050_Schizoporella japonica (Final)	Provisional_Schizoporella_japonica_308511_COI	99.70%	MLMLv2025	Accepted	Verified_Schizoporella_japonica_179050
179048_Crisularia pacifica (Final)	Verified_Ascidia_zara_149542_CO1	98.60%	MLMLv2025	Changed	Unverified_Ascidia_zara_179048
179042_Watersipora subtorquata (Final)	Verified_Watersipora_subatra_115273_COI	100.00%	MLMLv2025	Changed	Unverified_Watersipora_subatra_179042
179035_Fredericella_indica (Final)	Verified_Hydrozoa_178363_COI	99.00%	MLMLv2025	Accepted	Verified_Fredericella_indica1_179035

Sampling and Taxonomic Analyses for Marine Invasive Species in California Estuaries

Part 2: DNA Metabarcoding

This report includes the results and deliverables of surveys to detect marine non-indigenous invertebrate species (NIS) in California using DNA metagenetic methods by the Moss Landing Marine Laboratories (MLML) in collaboration with the Smithsonian Environmental Research Center (SERC). Metagenetics (synonymous with "metabarcoding" in the literature) is the high throughput DNA sequencing (currently using the Illumina MiSeq platform) of PCR-amplified DNA from bulk organismal samples. In this study, samples included plankton, biomass from settlement (fouling) plates, and eDNA from settlement plate soak-water and sediment soak-water. The primary goal of this study was to produce a list of species found in each sample, to identify known nonindigenous species (NIS), and flag potentially novel NIS. A secondary goal was to compare results from different sample types so as to inform future decisions on allocation of effort in sampling.

Key findings:

1. Six hundred-sixty nine (669) DNA sequences could be assigned to genus and species among a total of 136,545 sequences from 663 samples taken from seven bays between 2019 and 2022.
2. Ninety-nine (99) species were identified as NIS using a list of known NIS in California (NEMESIS).
3. An additional 149 species were not listed in NEMESIS but have globally widespread distributions that included California, according to the GBIF and OBIS biogeographic databases. Some of these may be novel NIS, but others are native or cryptogenic (biogeographic origins unknown).
4. One hundred seventeen (117) species were not listed in NEMESIS, were included in GBIF or OBIS only outside of California. Two of these were considered as cryptogenic, seven as native, and the remainder require further investigation.
5. Two hundred and fifteen (215) species were included neither in NEMESIS, OBIS, nor GBIF. One hundred twenty-eight (128) of these were considered native, seven were NIS, and 71 were considered cryptogenic.
6. Plankton samples recovered the most species overall, and the most NIS specifically.
7. Plate-soak environmental DNA (eDNA) generally recovered more species and NIS than plate-scrape DNA; however, plate soaks failed on one occasion for unknown technical reasons.
8. Enriched eDNA (from seawater used to soak biomass) always recovered more species and NIS than eDNA from unenriched seawater.
9. The majority of NIS found were in one bay only, likely a product of sampling limitations and true geographic heterogeneity.
10. More NIS are detected as more habitats are included, and continuation of a program of multi-habitat sampling is recommended. Sediments are a promising new source of

information, and the eDNA method was applicable to sediments. Settlement plate soak-water eDNA outperformed plates but may be more sensitive to deviations from the standard protocol.

Methods

Site details were provided in the 2023 SERC report (Appendix A3.1) covering morphological data. In brief, San Diego Bay, Mission Bay, Los Angeles/Long Beach Harbor, Santa Catalina Island, San Francisco Bay, Bodega and Tomales Bays, and Humboldt Bay were visited in 2021 and 2022. Older samples from San Francisco and Humboldt Bay were also processed to complete an earlier cycle of sampling. Plankton samples were collected from all bays in 2021 and 2022, as well as fouling plates which were deployed for three summer months. Retrieved plates were either soaked in ambient seawater in an attempt to enrich the seawater with eDNA (San Diego Bay, Mission Bay, Channel Islands, Bodega/Tomales Bay, Humboldt Bay), or also scraped to generate homogenates for DNA extraction (San Francisco Bay). Sediments were collected in San Francisco Bay in 2021 and soaked in ambient seawater to enrich for eDNA. Ambient seawater (without soaking) was used to make unenriched eDNA for comparison to enriched eDNA.

DNA Extractions

Plate scrapes were homogenized in a laboratory blender at the time of plate retrieval and stored in a tissue preservative (20% DMSO and 500 mM EDTA in water saturated with NaCl (DNE)). For extraction of DNA from each sample, DNE was decanted and 10 g of the plate scrape homogenate transferred to a bead-beating tube from a Qiagen PowerMax Soil DNA extraction kit (Qiagen 12988-10). Further steps of DNA extraction followed the manufacturer's instructions. Plankton samples were stored in DNE at the time of collection. DNE was decanted and 0.25 g of plankton was extracted using the Qiagen PowerSoilPro® DNA Isolation Kit (Qiagen 47016) following the manufacturer's instructions.

For eDNA extractions, settlement plates were soaked in 1.2 L seawater (soak water) taken from the site of plate retrieval for 4 hours. Soak water was prefiltered through a 25 µm mesh size sock filter to remove large particles, and 500 mL of the prefiltered soak water were then passed through a 0.22-µm Millipore Sterivex filter using a peristaltic pump. If 500 mL could not be passed due to clogging of the filter, additional Sterivex filters were used until a total of 500 mL had been filtered. Extraction of DNA from Sterivex filters was modified from the general Qiagen PowerSoilPro® DNA Isolation Kit (Qiagen 47016) instructions. Specifically, lysis buffer containing Proteinase-K was introduced into the input port of the Sterivex filter, which was incubated overnight at 56°C in the rotating incubator. Lysis buffer was then removed from the Sterivex filter and processed further according to the kit instructions. When more than one filter was used for a sample of soak water, lysate was pooled and then further processed as a single sample.

Library preparation

A DNA "library" is a mixed collection of DNA molecules in which additional nucleotides have been added to the 5' and 3' ends of each DNA molecule. The additional nucleotides are used for indexing and sequencing the DNA molecules. Metagenetic libraries for all sample types were prepared and sequenced following protocols previously published (Lohan et al., 2019). This process consists of Polymerase Chain Reaction (PCR) amplification of the Cytochrome c oxidase subunit I (COI) DNA barcode; addition of adaptor and indexing nucleotides by a second PCR; and sequencing on an Illumina MiSeq instrument. PCR is the cyclically repeated enzymatic replication of a template DNA molecule targeted by sequence-specific priming DNA molecules (primers). Illumina MiSeq sequencing resulted in paired DNA reads (paired reads are a duo of complementary sequences from individual COI amplification products (amplicons) for the species contained in each sample.

Bioinformatic pipeline and taxonomic assignment

We analyzed the Illumina pair-end raw data with the *dada2* pipeline, available in the *dada2* package (Callahan et al., 2016) through R (R Core Team, 2023) software. We removed primer sequences using *cutadapt* (Martin, 2011; version 1.18 with Python 3.7.12) before processing reads with the *dada2* pipeline. Both *cutadapt* and the *dada2* pipeline were run in the Smithsonian Institution High Performance Computing Cluster (SI/HPC). The *dada2* pipeline filters low quality reads, removes errors by statistical modeling, merges paired reads, and removes chimeras (artifacts in which different DNA fragments have recombined). Identical reads are then identified. The result is a collection of unique amplicon sequence variants (ASVs).

Taxonomic assignment of ASVs

We used BLAST (Altschul et al., 1990) version 2.12, software that compares query DNA sequence to a database to find best matches, for the taxonomic assignment of ASVs. We used two reference databases to match unknown ASVs: 1) Moss Landing Marine Laboratories in-house database (MLML), and 2) MIDORI2 (Leray et al., 2022) version GB256. MIDORI2 database includes sequences from GenBank for mitochondrial markers. It filters out a large set of likely erroneous sequences identified in the scientific literature, but unknown or missed taxonomic errors in Genbank will be found in MIDORI2. While unknown errors may also be found in the MLML database, taxonomic assignments are more easily reviewed, as we used our own (known) taxonomists, have access to taxonomists' notes, and have physical specimens, in many cases. Thus, we prioritized the MLML database when results from the two databases conflicted (see below).

Each database was queried with each ASV using BLAST. We quality-filtered BLAST results by keeping only matches with more than 95% overlap ("coverage"), and e-value (a measure of likelihood of an erroneous false positive match) under 0.01. After quality filters, if an ASV

matched more than one record with equal similarity criteria we kept only the taxonomic level for which the matches agree, for example the including genus.

Finally, for each ASV we compared the matches to the MLML and MIDORI databases to make the final taxonomic assignments. We followed these rules to choose the best match from:

- If only one of the matches had higher than 95% percent identity, we kept that one.
- If both matches had higher than 95% percent identity but pointed to different species, we kept the match to MLML database as that reflects the current opinion of the SERC experts and aligns these results with morphological analyses.
- If both matches were under 95% similarity, we noted the match with highest similarity measures, but did not treat the result as a positive identification.

ASVs that were unassigned, had similarity under 95%, or were not assigned to a metazoan phylum were excluded from further analyses. We also removed avian and mammalian sequences. For each taxonomic assignment, we preserved the information on the database source of the match for our records.

For genetic assignments, we used nomenclature in the queried databases but noted possible synonymy or name changes when known to us. Name changes in databases such as WoRMS are not necessarily unanimously accepted by authoritative experts.

Species were identified as NIS, cryptogenic, or native based first on their status in the National Exotic Marine and Estuarine Species Information System (NEMESIS), the web-published invasions database at SERC (https://invasions.si.edu/nemesis/). We also marked many species as native, NIS, or cryptogenic based on familiarity (i.e., well-known and common species), type-localities, and distributional maps in World Register of Marine Species. A review of every species was beyond the scope of this study, and these annotations are subjective. Nonetheless, these annotations provide a starting point for further investigation. As an objective approach to annotation, we also examined distributional records in the biogeographic databases Ocean Biodiversity Information system (OBIS; https://obis.org/) and Global Biodivesity Information Facility (GBIF; https://www.gbif.org), and sorted species into those with records only in California or the Northeastern Pacific (NEP) (presumptively native), only beyond NEP (presumptively NIS), and in both NEP and beyond (cryptogenic pending further analysis).

We also annotated species as present in the morphology-based surveys using a list provided by the SERC marine invasions laboratory (A. Chang, pers com). This list includes the SERC lab's assignment of species as NIS, native, or cryptogenic. Those assignments may differ from NEMESIS or MLML's assessments described above. Such disagreements highlight cases for further review.

Results

A total of 663 samples of all types were processed, yielding 92,925,646 forward and reverse read pairs. After filtering for quality and denoising, 68,664,470 pairs were successfully merged. Removal of chimeras left 67,206,199 sequences for further analysis. Reads from no-template controls (NTC: no biomass added to extractions) were sparse (8-27 sequences per sample), suggesting the integrity of DNA extractions and PCR reactions. NTC were omitted from further analysis.

A total of 136,545 unique DNA sequences, or Amplicon Sequence Variants (ASVs), were found among the 67,206,199 sequences. The breakdown of ASVs across organismal kingdoms was:

Animalia: 56,302
Chromista: 15,989
Fungi: 2242
Plantae: 6132
Protozoa: 8023
Unassigned: 47,857

The preponderance of sequences assigned as Animalia reflects the widespread use of COI for animal DNA barcoding and their relative abundance among COI accessions in databases. Filtering out animal ASVs with less than 95% to a database record, 12,230 ASVs remained.

Among ASVs, 943 taxa were assigned at the class level or more narrowly. The bay-wide distribution of these taxa is shown in Figure 1. Plankton samples were the most species-rich in every site where they were collected. Fouling soak water eDNA generated more species than unenriched fouling water (ambient water near fouling plates *in situ*), as well as fouling plate scrapes in two of three comparisons.

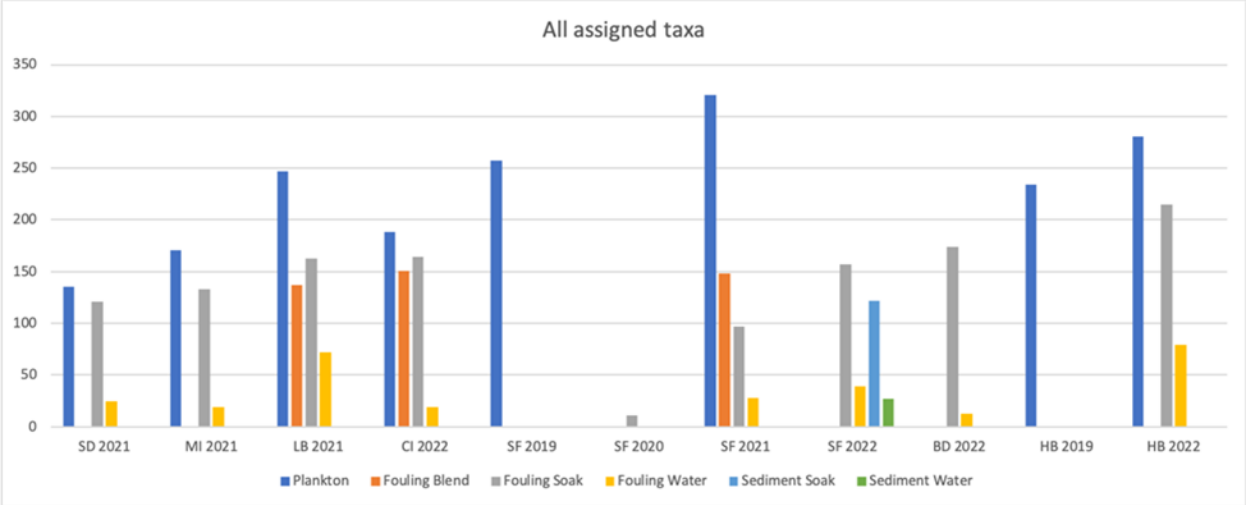


Figure 1. Total number of all identifiable taxa found in each bay, separated by sample type. Plankton and plate-soak-water eDNA generally recovered the most species. Plankton: net tow or pump; Fouling Blend: plate-scrape homogenate; Fouling Soak: plate-soak-water eDNA; Fouling Water: eDNA from seawater adjacent to settlement plates; Sediment Soak: sediment soak-water eDNA; Sediment water: eDNA from seawater collected above sediment surface.

Six hundred sixty-nine (669) binomial (genus and species) names were assigned, disregarding mammals and birds. Appendix 2-1 provides a full list of the 669 species detected in all samples, with information on bays and habitat (sample type) of occurrence. A great majority (N=523) of species were found only with metagenetics, with 146 found with both morphology and metagenetics. Appendix 2-2 presents geographic data for these species, as represented in GBIF and OBIS.

Figure 2 shows the number of species with assigned binomial names found in each bay, year, and sample type. Plankton yielded the most species in every bay in every year. For settlement panels, soak-water eDNA contained more species than homogenates of biomass in two of the three bay-years in which both were collected (Long Beach 2021, Santa Catalina 2022, and San Francisco 2021). In contrast, harbor water collected near fouling plates yielded fewer species than plate-soak-water or homogenates on all eight occasions where both were collected. Sediment soak-water was collected only once, and yielded more species than water collected near the sediment-water interface. Plate soak-water eDNA in San Francisco Bay in 2020 yielded few species compared to other years in San Francisco and to soak water from other bays, suggesting an undiagnosed technical error.

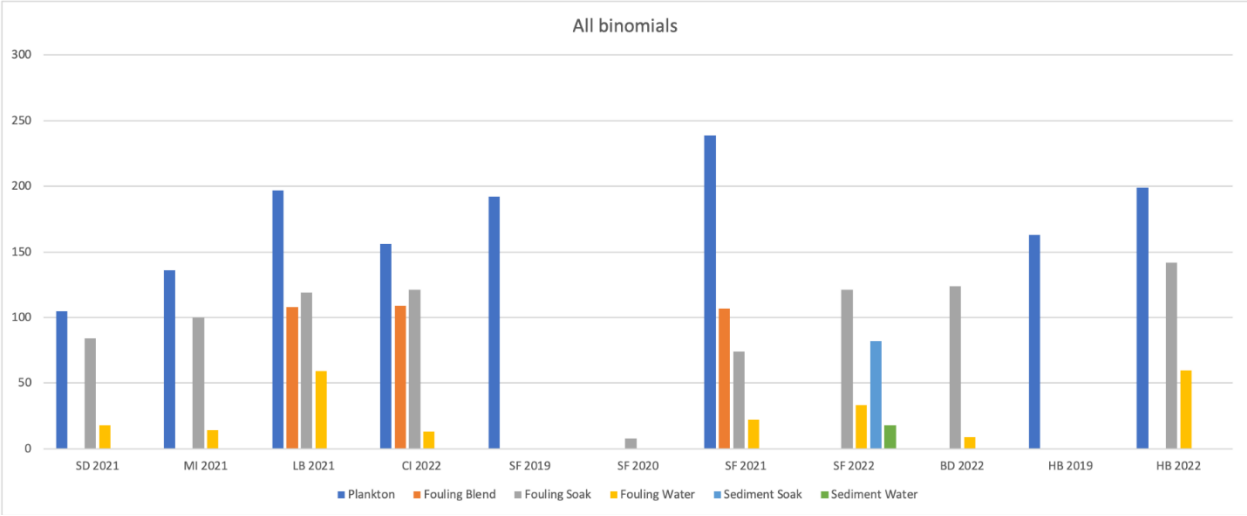


Figure 2. Total number of species (binomials only) found in each bay, separated by sample type. Plankton and plate-soak-water eDNA generally recovered the most species.

Numbers and Distribution of NIS

Appendix 2-1 lists the NIS status in NEMESIS for all binomial names found in metagenetic analysis. Appendixx 2-2 shows which countries in which each species has been found, according to the GBIF and OBIS databases. Distributional data in OBIS and GBIF should be viewed cautiously, as misidentifications or the existence of unrecognized cryptic species can lead to erroneous geographic ranges. Nonetheless, Appendix 2-2 will be useful to preliminarily assess species not listed in the SERC list.

NIS known in NEMESIS

Ninety-nine (99) binomial species considered as NIS in the NEMESIS database were found across all bays and sample types (Figure 3). Sixty-four (64) of these NIS were also found in morphological surveys, wherein two were considered as cryptogenic (*Botrylloides diegensis*) or status unresolved (*Mytilus galloprovincialis*). (MLML considers both these as NIS). The NIS found with metagenetics but not by morphology are shown in Table 1.

Table 1. NIS in NEMESIS found with metagenetics but not morphology.

Tubificoides brownae	*Amphibalanus eburneus*
Tubificoides diazi	*Schizoporella variabilis*
Alitta succinea	*Corella inflata*
Hediste diadroma	*Anthopleura hermaphroditica*
Epigamia noroi	*Cladonema pacificum*
Myrianida convoluta	*Ectopleura crocea*
Syllis nipponica	*Blackfordia virginica*
Syllis japonica	*Maeotias marginata*

Acartiella sinensis	*Potamocorbula amurensis*
Pseudodiaptomus forbesi	*Lyrodus pedicellatus*
Pseudodiaptomus marinus	*Teredo bartschi*
Tortanus dextrilobatus	*Teredo navalis*
Mytilicola orientalis	*Geukensia demissa*
Limnoithona tetraspina	*Spurwinkia salsa*
Ampelisca abdita	*Ilyanassa obsoleta*
Jassa marmorata	*Halichondria bowerbanki*

Note that *Syllis japonica* and *Syllis nipponica* are not valid names, according to WoRMS, and the Genbank authors may have meant to use *Megasyllis nipponica*. However, *Megasyllis nipponica* is present in Genbank with different DNA sequences, and we find matches to those different sequences in our data. Thus the *S. nipponica* and *S. japonica* sequences in Genbank are of uncertain identity. *Anthopleura hermaphroditica* from New Zealand (the source of the Genbank sequence originally accessioned as *A. aureoradiata*) is also probably misnamed in Genbank, as there is no evidence that the sequence is found in anemones given this name in Chile, the type locality for this species. We are investigating Chilean anemones to clarify this.

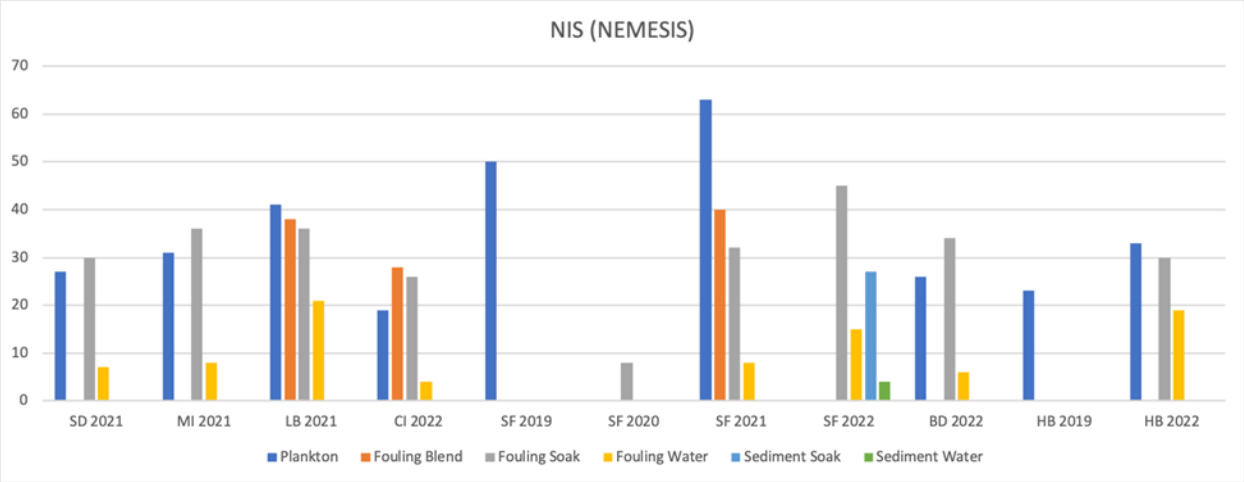


Figure 3. Number of species across sample types, bays, and years of species assigned as NIS in NEMESIS. Unenriched eDNA (Fouling Water and Sediment Water) recovered few species. [Samples with no species found were given an arbitrary richness of 0.5 species to display differently from those with no data (shown as no bar)]. See Figure 1 for label explanations.

No consistent spatial or habitat-related patterns of occurrence are evident by eye, except that unenriched eDNA (from the ambient water samples) yielded fewer NIS than enriched (plate and sediment soak-water) eDNA.

Summed over all habitats, San Francisco Bay in 2021 had the most (n=74) NIS species known in NEMESIS (Figure 4), while San Francisco in 2022 and Long Beach in 2021 had the next highest number (54 and 53, respectively). However, fouling plate homogenates were included

only in San Francisco Bay and Long Beach Harbor (in 2021), which biases these results toward higher NIS numbers in those sites. San Francisco in 2022 was also the only site to include sediment samples. Overall, it is hard to see a strong spatial pattern in NIS numbers across sites.

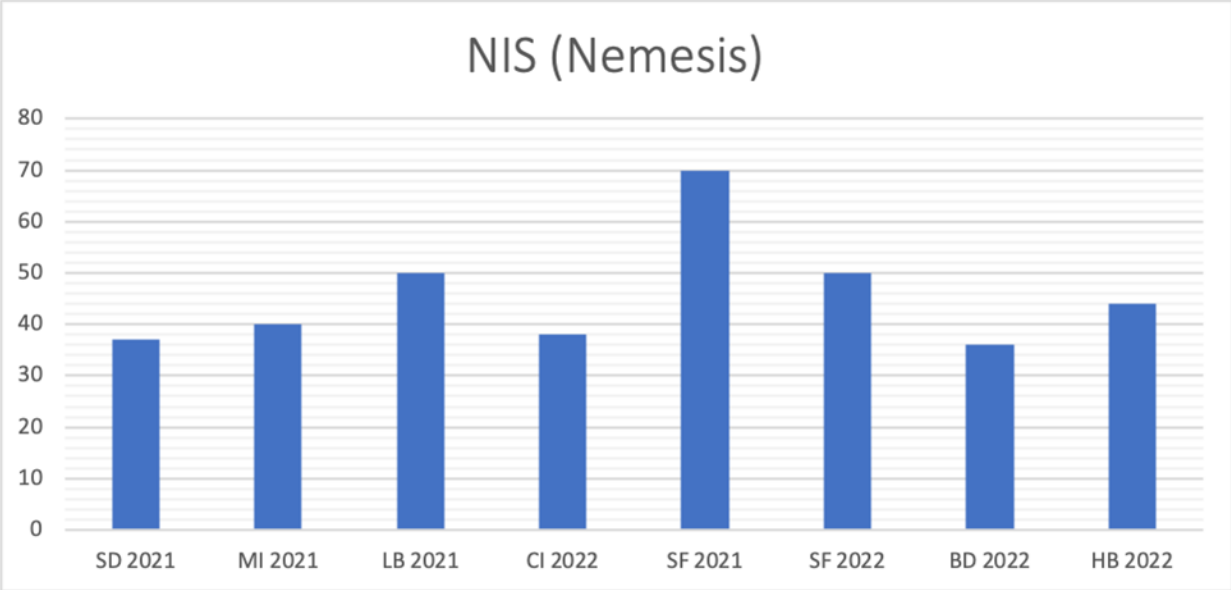


Figure 4. Richness of NIS listed in Nemesis by bay, aggregating habitat types. Plankton, plate soak eDNA, and harbor water eDNA were collected in each site. Fouling plate homogenate was also collected in San Francisco and Long Beach in 2021, while sediment soak eDNA and sediment-overlaying water was collected in San Francisco in 2022. Data from San Francisco in 2019 and 2020 and Humboldt Bay in 2019 were not included here, being from single habitat types.

Species not documented in California within GBIF or OBIS

We found 117 species (Appendix 2-1) that were not present in NEMESIS and also not known in California and the NEP according to both GBIF or OBIS (Fig. 5). Some of these may be native and simply not sampled in California in the collections that make up these databases. However, the majority are likely NIS not included in NEMESIS.

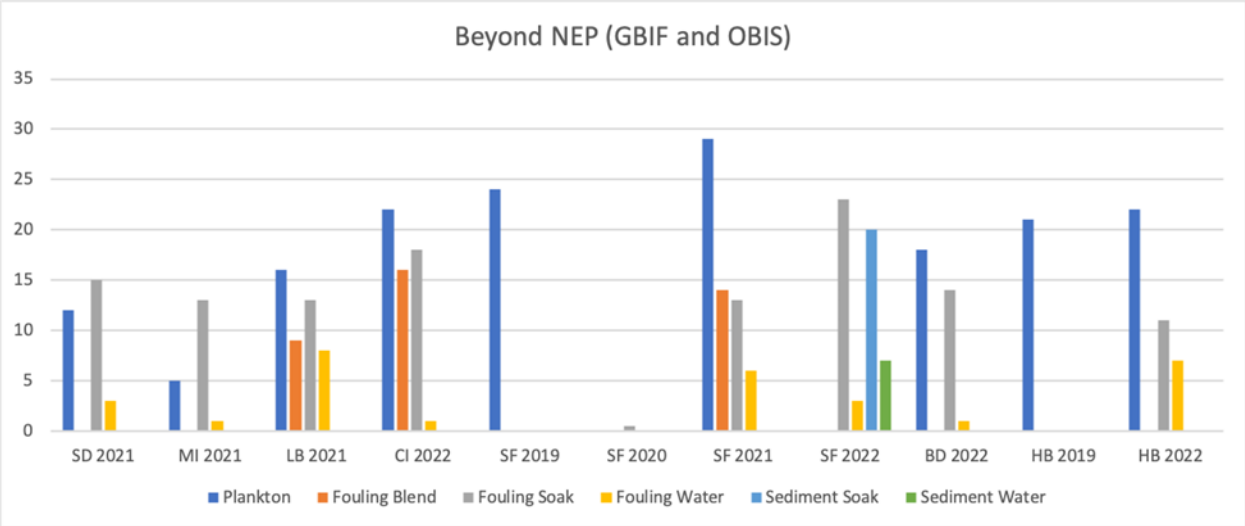


Figure 5. Species not listed in NEMESIS and without documented occurrence in California or more broadly in the Northeastern Pacific Ocean (NEP) in the OBIS or GBIF databases. Some may be understudied native species, but the majority are potential NIS. [Samples with no species found were given an arbitrary richness of 0.5 species to display differently from absence of data (shown as no bar)]. See Figure 1 for label explanations.

Summed over all habitats, the species without records of presence in California GBIF and OBIS (Fig. 6) show a similar pattern of species richness across sites as the NIS found in NEMESIS (Fig 4), with the exception of a marked relative increase in the Channel Islands.

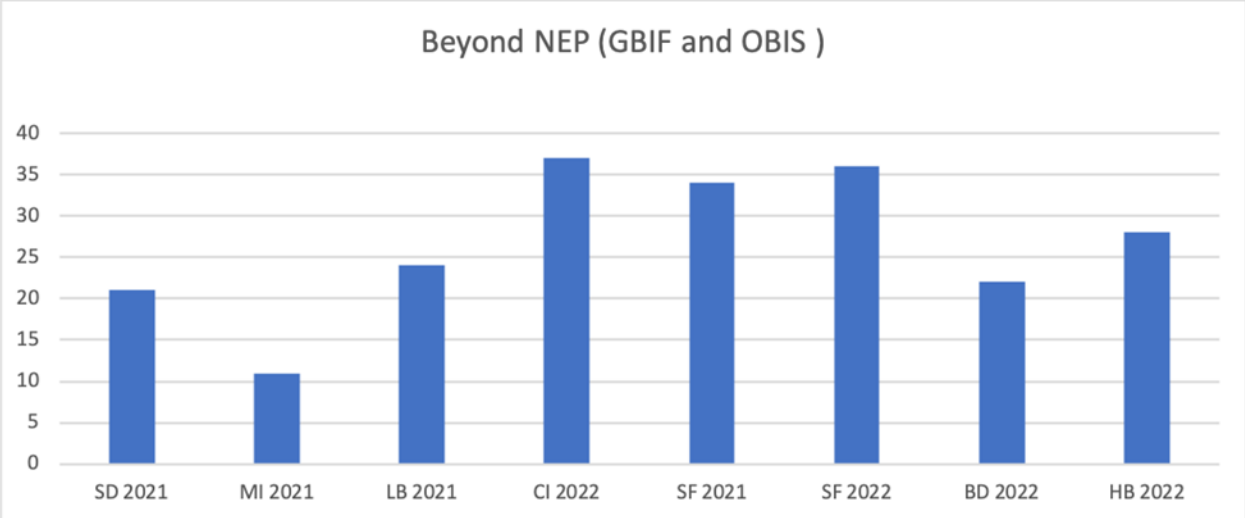


Figure 6. Species not listed in NEMESIS nor with documented occurrence in California in the OBIS or GBIF databases, summed across all habitat types. Some may be understudied native species, but the majority are potential NIS. See Figure 4 for habitat type information.

Geographically widespread species in GBIF and OBIS

We found 149 species that have been documented in GBIF and OBIS as present in both in California and biogeographic provinces beyond the Northeastern Pacific region but were not

listed in NEMESIS (Fig. 7). This group thus includes potential NIS as well as Northeastern Pacific species that have naturally extra-provincial distributions, or may have been introduced elsewhere. When species occurrences were aggregated across habitats (Fig. 8), the Channel Islands and Bodega Bay sites appear to be richer than other sites with these widespread species.

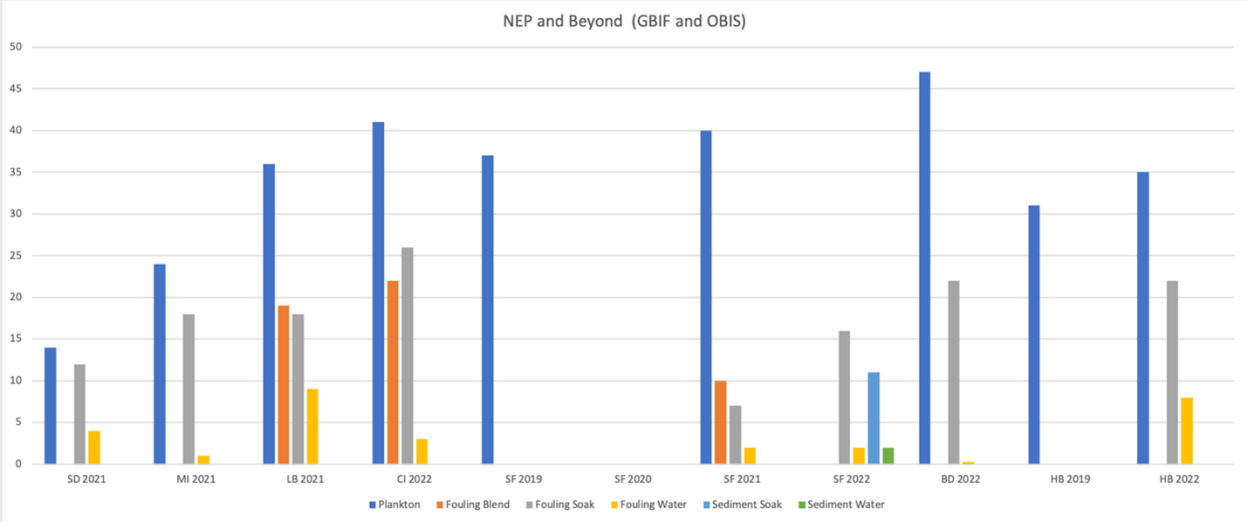


Figure 7. Species (n=149) not listed in NEMESIS but with distributions including California or the NEP, and locations beyond the NEP region, according to GBIF or OBIS. These species are candidate NIS, but may be native or cryptogenic. [Samples with no species found were given an arbitrary richness of 0.5 species to display differently from absence of data (shown as no bar)]. See Figure 1 for label explanations.

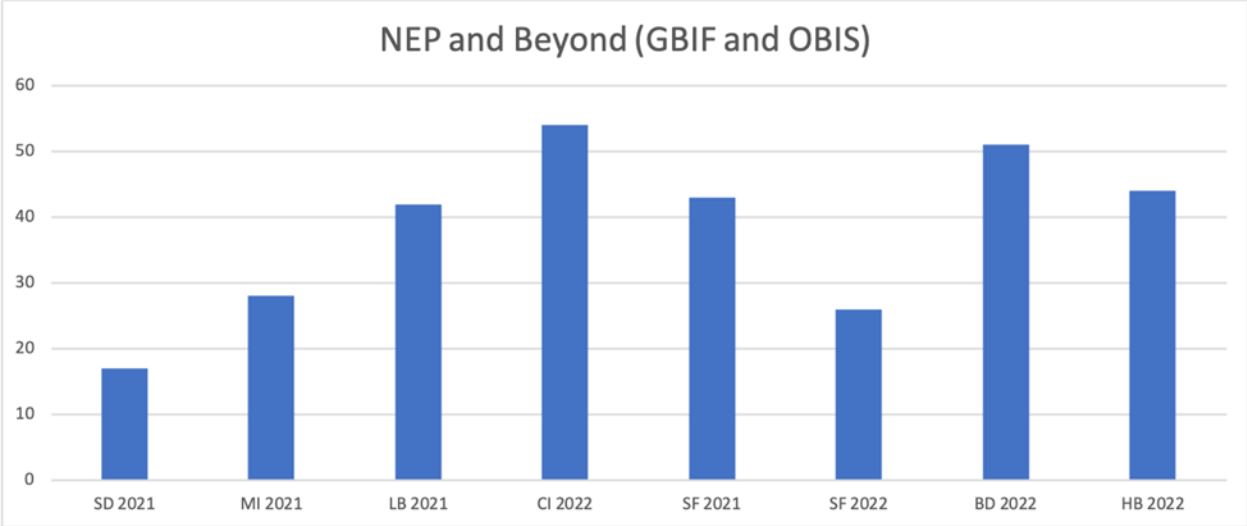


Figure 8. Species not listed in NEMESIS with documented occurrence in California, the NEP and beyond the NEP according to the OBIS or GBIF databases, summed across all habitat types. Some may be native species with broad distributions, while others are potential NIS. See Figure 4 for habitat type information.

Native Species: restricted to Northeastern Pacific in GBIF and OBIS

We identified 73 species that occur only in the NEP (including USA, Canada, and Mexico; a few had records in central America) in the OBIS and GBIF databases but not in NEMESIS (Fig. 9). Eleven of these were also found in morphological surveys. These NEP only species appear to truly be mostly native species. Plankton samples contained the most of this subset of species. Interestingly, the smaller ports, Bodega Bay and Humboldt Bay, contained a larger number of these presumptively native species (Figure 10).

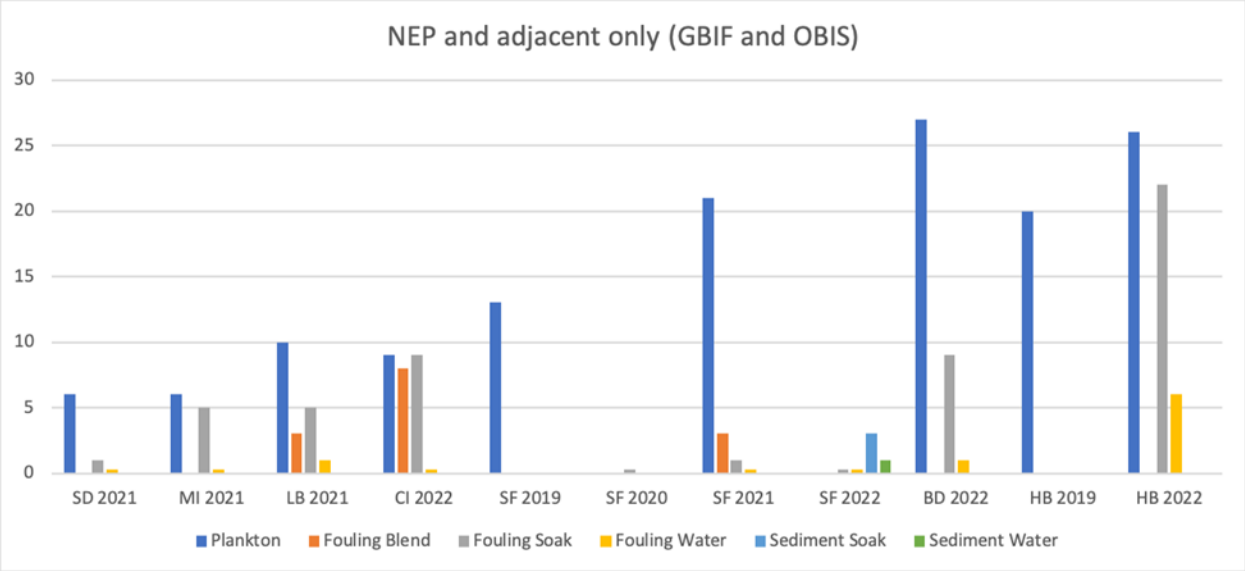


Figure 9. Species (n=73) not in the NEMESIS database and found only in California or the NEP and NEP-adjacent (central America to Canada) according to OBIS or GBIF. These species are likely to be native or have had recent range expansions. [Samples with no species found were given an arbitrary richness of 0.5 species to display differently from absence of data (shown as no bar)]. See Figure 1 for label explanations.

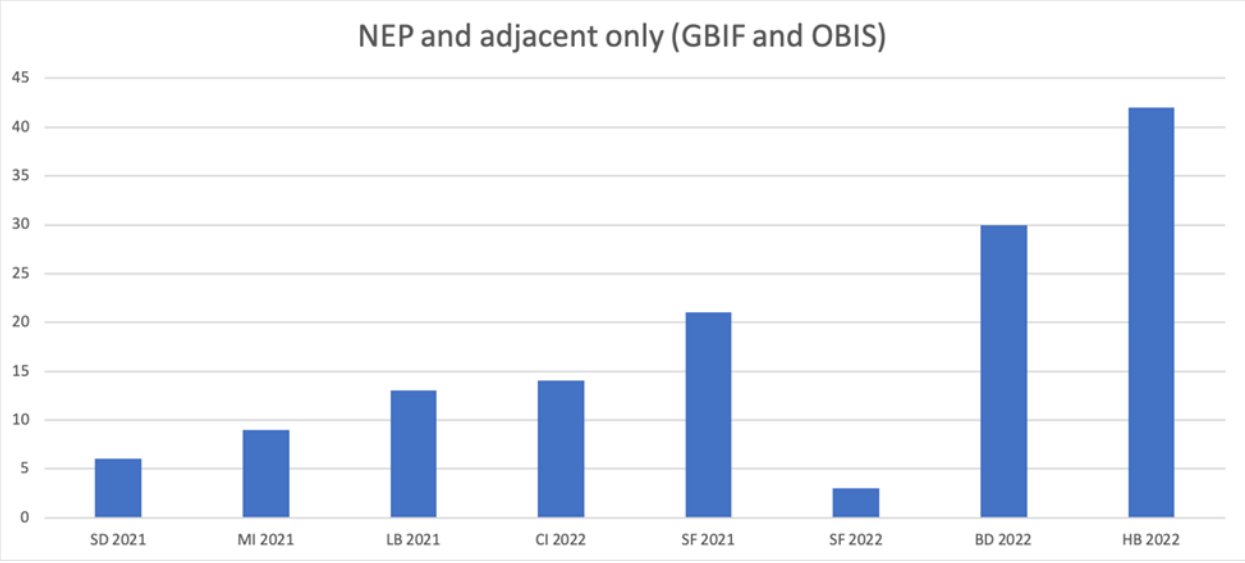


Figure 10. Species not in the NEMESIS database and found only in California or the NEP and NEP-adjacent (central America to Canada) according to OBIS or GBIF, summed across habitats. See Figure 1 for label explanations. See Figure 4 for habitat type information.

Species without record in NEMESIS, GBIF or OBIS.

Two hundred fifteen (215) species were found in our metagenetic results that were not in NEMESIS, GBIF, nor OBIS. (Fig. 11). Forty-three (43) of these were found in morphological surveys. By examination of records in WoRMS and due to the familiarity of many of these species to us, we annotated 128 of these as native (See Appendix 2-1). By the same criteria, we suggest 7 to be NIS and 71 to be cryptogenic. Those considered to be cryptogenic species were widely and abundantly distributed such that we could not favor assignment as NIS in California, native in California (introduced elsewhere), or as cryptic species complexes. Again, these annotations are offered as a starting point for further studies.

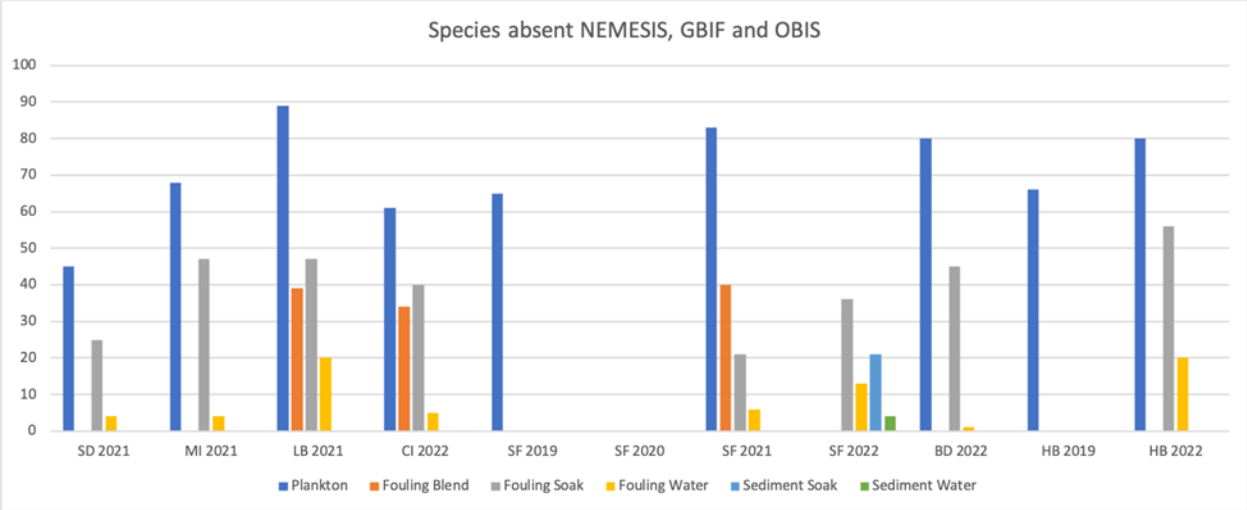


Figure 11. Species (n=215) not listed in NEMESIS, GBIF, or OBIS. These are a mix of native, NIS, and cryptogenic species. [Samples with no species found were given an arbitrary richness of 0.25 species to display differently from absence of data (shown as no bar)].

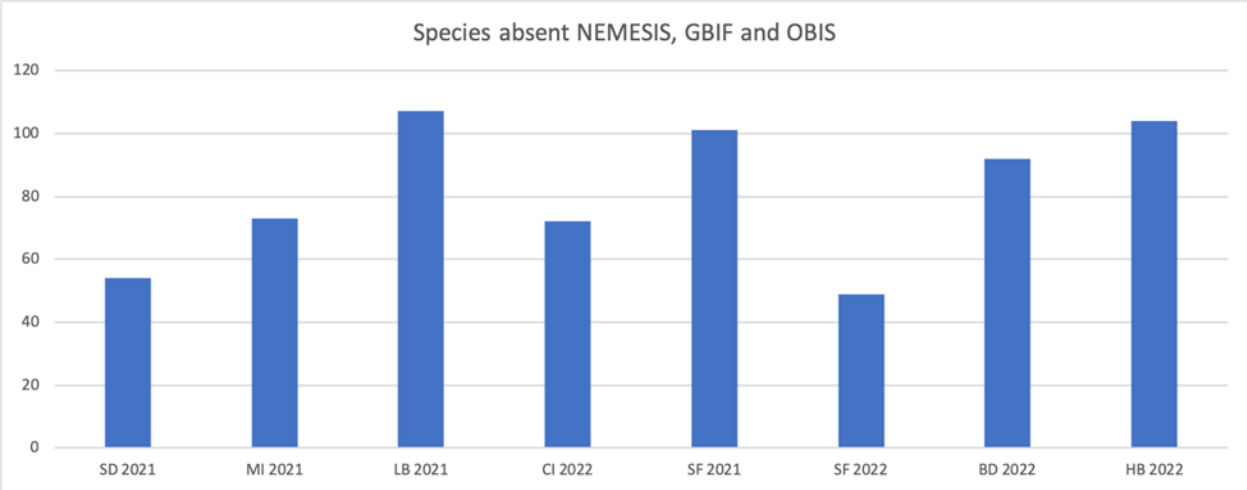


Figure 12. Species not in the NEMESIS, GBIF or OBIS, summed across habitats. These are largely native or cryptogenic species. See Figure 1 for label explanations. See Figure 4 for habitat type information.

Taxonomic composition of NIS and Cryptogenic Species.

Higher taxonomic composition of all NIS or cryptogenic species showed dominance of planktonic and typically abundant fouling organisms (Figure 13). Arthropods were the largest group of NIS or cryptogenic species across all samples. Malacostracans (primarily decapods, amphipods, and isopods) were the richest group of arthropods, followed by copepods. Chordates were the next most specious phylum, followed by annelids, molluscs, and bryozoans.

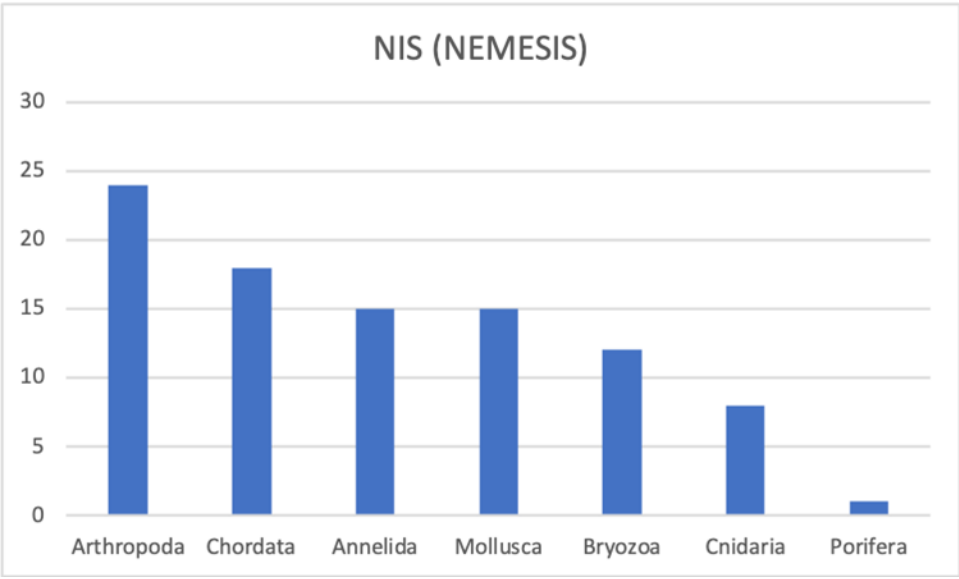


Figure 13. NIS and cryptogenic species. Richness at higher taxonomic level in metagenetic results aggregated across bays, sampling dates and habitat types.

Frequency of Occurrence of NIS

The majority of NIS and cryptogenic species were found in one bay only (Figure 14). This result may suggest a general pattern of under-sampling, as the environments are not strikingly different within the southern (San Diego Bay, Mission Bay, Long Beach) and northern (San Francisco Bay, Bodega Bay, Humboldt Bay) regions. We are currently synthesizing data that includes additional sites, as well as morphological data, to better understand NIS distributions.

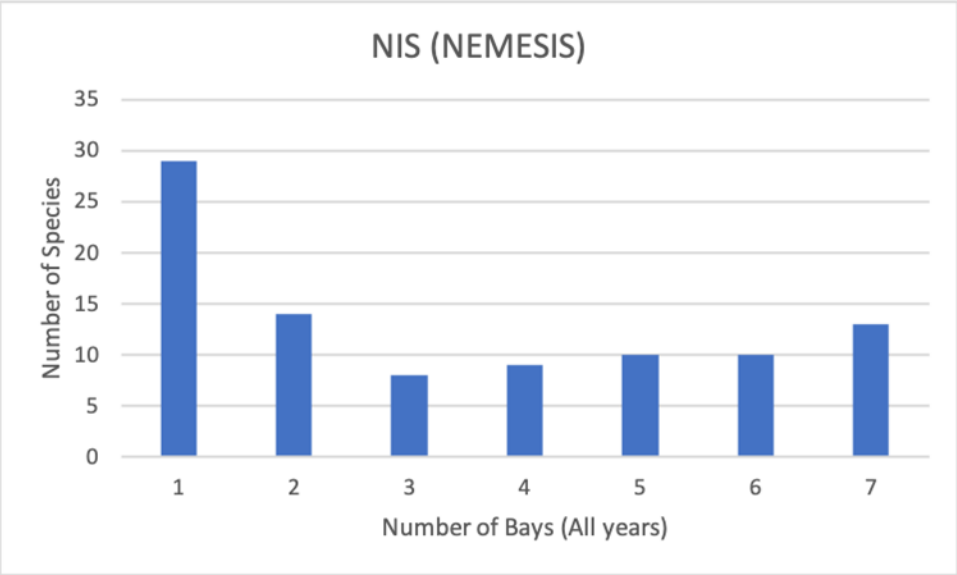


Figure 14. Frequency distribution of NIS and cryptogenic species In California bays. Most species (n=29) were found in one or two bays, however 33 species were found in 5 to 7 bays.

Crustaceans (amphipods and isopods), bryozoans and ascidians dominated in the list of species that occurred in at least 6 of the 7 bays (Table 2A, 2B).

Table 1A. Most widespread NIS (NEMESIS). Present in 7 bays

Annelida	Polychaeta	*Pseudopolydora paucibranchiata*
Arthropoda	Malacostraca	*Aoroides secunda*
Bryozoa	Gymnolaemata	*Bugulina stolonifera*
Bryozoa	Gymnolaemata	*Watersipora subatra*
Chordata	Ascidiacea	*Diplosoma listerianum*
Chordata	Ascidiacea	*Ascidia zara*
Chordata	Ascidiacea	*Ciona savignyi*
Chordata	Ascidiacea	*Botrylloides diegensis*
Chordata	Ascidiacea	*Botrylloides violaceus*
Chordata	Ascidiacea	*Botryllus schlosseri*
Mollusca	Bivalvia	*Arcuatula senhousia*
Mollusca	Bivalvia	*Ruditapes philippinarum*
Porifera	Demospongiae	*Halichondria bowerbanki*

Table 2B. Most widespread NIS (NEMESIS). Present in 6 bays

Annelida	Polychaeta	*Megasyllis nipponica*
Arthropoda	Copepoda	*Pseudodiaptomus marinus*
Arthropoda	Malacostraca	*Caprella simia*
Arthropoda	Malacostraca	*Monocorophium acherusicum*
Arthropoda	Malacostraca	*Monocorophium insidiosum*
Arthropoda	Maxillopoda	*Amphibalanus amphitrite*
Bryozoa	Gymnolaemata	*Bugula neritina*
Bryozoa	Gymnolaemata	*Amathia verticillata*
Chordata	Ascidiacea	*Styela plicata*
Mollusca	Bivalvia	*Mytilus galloprovincialis*

Taxa unique to sample types

Including all species (including those identified only at higher taxonomic ranks), 266 were found only in plankton samples. Restricted to species listed in NEMESIS, plankton samples contained 25 NIS that were not found in any other habitat (Table 3). None were found in more than two bays except *Leostyletus misakiensis* found in three bays.

Forty-four species were found only on plates, including both plate scrapes and plate soaks. Of these, 37 were found only in plate soak eDNA, while 7 were found only in plate scrape DNA. Of species listed in NEMESIS, eight species were found only on settlement panels (scrapes and soaks) (Table 4); these species were found in one to five bays.

Table 3. NIS (NEMESIS) found only in plankton samples Number of bays in which each species occurred is shown in the right column.

Annelida	Clitellata	*Tubificoides brownae*	1
Annelida	Clitellata	*Tubificoides diazi*	1
Annelida	Polychaeta	*Hediste diadroma*	1
Arthropoda	Copepoda	*Acartiella sinensis*	1
Arthropoda	Copepoda	*Pseudodiaptomus forbesi*	1
Arthropoda	Copepoda	*Tortanus dextrilobatus*	1
Arthropoda	Copepoda	*Mytilicola orientalis*	1
Arthropoda	Malacostraca	*Melita nitida*	1
Arthropoda	Malacostraca	*Palaemon macrodactylus*	1
Arthropoda	Malacostraca	*Rhithropanopeus harrisii*	1
Arthropoda	Malacostraca	*Synidotea laticauda*	2
Arthropoda	Maxillopoda	*Amphibalanus eburneus*	1
Bryozoa	Gymnolaemata	*Conopeum chesapeakensis*	1
Cnidaria	Hydrozoa	*Maeotias marginata*	1
Mollusca	Bivalvia	*Potamocorbula amurensis*	1

Mollusca	Bivalvia	*Lyrodus pedicellatus*	1
Mollusca	Bivalvia	*Teredo bartschi*	2
Mollusca	Bivalvia	*Teredo navalis*	1
Mollusca	Bivalvia	*Geukensia demissa*	1
Mollusca	Gastropoda	*Sakuraeolis enosimensis*	2

Table 4. NIS (NEMESIS) found only on settlement plates. Number of bays in which each species occurred is shown in the right column.

Annelida	Polychaeta	*Amblyosyllis nigrolineata*	4
Annelida	Polychaeta	*Epigamia noroi*	1
Annelida	Polychaeta	*Myrianida convoluta*	5
Annelida	Polychaeta	*Myrianida pachycera*	4
Annelida	Polychaeta	*Myrianida pentadentata*	3
Annelida	Polychaeta	*Syllis nipponica**	1
Annelida	Polychaeta	*Syllis japonica**	3
Annelida	Polychaeta	*Aoroides secunda*	7
Arthropoda	Malacostraca	*Caprella scaura*	1
Arthropoda	Malacostraca	*Caprella simia*	6
Arthropoda	Malacostraca	*Monocorophium acherusicum*	6
Arthropoda	Malacostraca	*Monocorophium insidiosum*	6
Arthropoda	Malacostraca	*Jassa marmorata*	2
Arthropoda	Malacostraca	*Melita rylovae*	1
Arthropoda	Malacostraca	*Upogebia major*	1
Arthropoda	Malacostraca	*Paranthura japonica*	7
Arthropoda	Malacostraca	*Amphibalanus improvisus*	1
Bryozoa	Gymnolaemata	*Bugula neritina*	6
Bryozoa	Gymnolaemata	*Bugulina stolonifera*	7
Bryozoa	Gymnolaemata	*Cryptosula pallasiana*	5
Bryozoa	Gymnolaemata	*Schizoporella japonica*	5
Bryozoa	Gymnolaemata	*Watersipora arcuata*	4
Bryozoa	Gymnolaemata	*Watersipora subatra*	7
Bryozoa	Gymnolaemata	*Watersipora subtorquata*	4
Bryozoa	Gymnolaemata	*Anguinella palmata*	2
Chordata	Ascidiacea	*Didemnum vexillum*	4
Chordata	Ascidiacea	*Diplosoma listerianum*	7
Chordata	Ascidiacea	*Ascidia zara*	7
Chordata	Ascidiacea	*Ciona robusta*	5
Chordata	Ascidiacea	*Ciona savignyi*	7
Chordata	Ascidiacea	*Perophora japonica*	3
Chordata	Ascidiacea	*Botrylloides diegensis*	7
Chordata	Ascidiacea	*Botrylloides giganteus*	5
Chordata	Ascidiacea	*Botryllus schlosseri*	7
Chordata	Ascidiacea	*Styela clava*	5
Chordata	Ascidiacea	*Symplegma reptans*	2
Cnidaria	Anthozoa	*Diadumene franciscana*	4

Cnidaria	Anthozoa	*Diadumene lineata*	2
Cnidaria	Hydrozoa	*Cladonema pacificum*	3
Cnidaria	Hydrozoa	*Ectopleura crocea*	4
Mollusca	Bivalvia	*Mytilus galloprovincialis*	6
Mollusca	Gastropoda	*Haloa japonica*	2
Mollusca	Gastropoda	*Tenellia adspersa*	2
Porifera	Demospongiae	*Halichondria bowerbanki*	7

Thirteen species were found only in sediment-soak eDNA (taken only in San Francisco Bay). No species listed in NEMESIS were found only in sediments. However, distributional data in GBIF or OBIS suggest that the following (Table 5) may be NIS in California:

Table 5. Potential NIS found only in sediment-soak eDNA.

Annelida	Polychaeta	*Allonais pectinata*
Annelida	Polychaeta	*Aulophorus furcatus*
Annelida	Polychaeta	*Praxillella affinis*
Arthropoda	Branchiopoda	*Bosmina longirostris*
Arthropoda	Branchiopoda	*Holopedium glacialis*
Arthropoda	Branchiopoda	*Sida crystallina*
Arthropoda	Copepoda	*Skistodiaptomus oregonensis*
Arthropoda	Malacostraca	*Caprella acanthogaster*
Porifera	Demospongiae	*Protosuberites mereui*
Rotifera	Eurotatoria	*Keratella cochlearis*
Rotifera	Eurotatoria	*Euchlanis dilatata*
Rotifera	Eurotatoria	*Polyarthra dolichoptera*
Rotifera	Eurotatoria	*Synchaeta pectinata*

eDNA: Sediment soaks, plate soaks, and ambient seawater controls.

Enriched eDNA from different sources yielded overlapping lists of species. A total of 383 assignable species were recovered from plate soaks and sediment soaks, of which 54 were present in both sample types. Three hundred and one (301) species were found only in plate-soaks, while 28 species were found only in sediment soaks. Ambient seawater, taken near fouling plates to represent unenriched eDNA, uniquely contained only *Amegila bombiformis*, an Australian bee. No species were unique to sediment water controls. Comparing only data from San Francisco in 2022, 81 species were found only in plate soak eDNA, 42 species were found only in sediment soak eDNA, and 163 species found in both soak eDNA types.

Discussion

Metabarcoding was an effective method to describe species composition of plankton and benthic samples of marine invertebrates. The primary aim of this study was to list non-indigenous species found in California bays, and these are presented in Appendix 2-1. In this section, we highlight some of the newly detected species -those not listed in NEMESIS and not

reported in California in GBIF and OBIS. We first discuss several methodological issues and make general recommendations for future sampling. The first issue is the importance of reference databases for identification of species and their status as NIS. The second issue is the choice of habitat to sample. The third issue is the effectiveness of eDNA versus DNA from biomass extractions.

Importance of databases

Reference databases are at the heart of the metagenetic method. Metagenetics (synonymously metabarcoding) involves the collection of mixed species DNA samples, PCR of barcode loci, and high throughput single molecule DNA sequencing. In the method, DNA sequences are not associated with specific specimens, and therefore can be identified only by comparison to sequence databases of known species. In this study, 669 unique ASVs could be assigned a binomial genus and species name by reference to an in-house database and a curated version of Genbank. (The majority of ASVs were omitted from analyses as being unassignable or similar to known non-metazoan sequences). Continued work to expand COI databases will improve taxonomic assignment. On the other hand, databases are subject to revision as errors of identification are uncovered, species complexes are resolved into distinct constituent species, and names are changed. Thus, results of metagenetics are date-dependent and should be occasionally revisited.

Assignment of NIS status to species is another database-dependent process. Even assuming that complete distributional data is available (probably never true) for accurately identified specimens of the species detected by metagenetics, it is difficult to propose algorithms to objectively determine where a species is native and where it is not. Criteria used include disjunct distribution across biogeographic boundaries, history of reported occurrences, ecological characteristics, and proximity to known vectors of invasion (Chapman and Carlton, 1991). Phylogenetic analyses can be helpful when sequences and geographic information are available for many related species. Expert consensus is also often used. The lack of a consensus method for status assignment leads to inconsistent results due to different weighting of these data types. In this study, we used the NEMESIS database for definitive assignments.

We also relied on the biogeographic databases OBIS and GBIF to make hypotheses of NIS status for species not found in NEMESIS. For example, a species with records in California limited to a few sites but a multitude of records throughout the Northeast Atlantic Ocean might be hypothesized to be a NIS originating from Europe. Nonetheless, collection-based databases are likely biased toward particular geographic regions and particular taxa. Less sampled regions and poorly known species will have high false negative rates. The inclusion of amateur identifications (*e.g.,* from iNaturalist.ca) in these databases may also result in misidentified records and false positives.

Choice of habitat for species monitoring

In this study, plankton was the highest yielding sample type. Favoring high species diversity, plankton includes both meroplanktonic (larvae of benthic species) and holoplanktonic species. Conversely, benthos lacks holoplankton species except rare adventitious individuals. The exclusion of plankton from sampling programs, therefore, will omit most NIS that are holoplanktonic. Moreover, we also found a large number of species that are benthic as adults *only* in plankton samples, presumably occurring there as larvae. Even some peracarids (e.g., isopods and amphipods) that lack larvae were found only in plankton (possibly as tychoplankton – benthic organisms temporarily swept into the water column). On the other hand, not all benthos that produce larvae will have done so at the time of sampling, and many benthic species do not produce larvae at all. Therefore, plankton can be expected to miss some NIS species that are locally present. Indeed, 12 NIS or cryptogenic species were found on plates (eDNA and scrapes) and not in the plankton. An additional 13 NIS or cryptogenic species were found only in sediment samples.

The use of plankton for species detection has clear advantages: plankton is relatively easy to collect, plankton samples contain large numbers of individuals, which may reduce sampling artifacts, plankton samples are compact and easy to store; and plankton samples are generally free from sediments, skeletal material, and chemicals that can inhibit DNA extraction and PCR amplification. (The latter may not be true during algal blooms, however). Given the high yield of native and NIS species from plankton, particularly those found in no other habitat, sampling of plankton is always highly recommended. However, the results here also showed that many potentially harmful NIS were not detected by plankton, therefore it is important to also sample benthic species.

In this study, we performed our first molecular analyses of sediment samples. To avoid expected problems from the copurification of inhibitory substances when directly processing sediment, we attempted to isolate eDNA from infauna by soaking sediments in ambient seawater, and then extracted DNA from the water. This was evidently successful, as soak-water yielded more species overall and more NIS than ambient water alone. As mentioned above, 13 of these species were NIS not found in any other sample type. Sediment soak-water appears as promising and low-cost addition to the scope of sampling in ongoing monitoring efforts.

Effectiveness of eDNA

eDNA has gained popularity in aquatic metabarcoding projects for its inherent sampling simplicity: a small volume of water can be collected in seconds in a bottle and passed through a filter to retain water-borne DNA. Such a method promises high cost-effectiveness. However, in this study, untreated seawater processed in this way was *least effective* in detecting assignable species and NIS in particular. As such, low cost may not be a compelling argument to adopt the eDNA method. However, we found that eDNA collected from the seawater used to soak biomass for 4 hours was far more productive than untreated seawater for species detection, indicating that soaking does enrich the seawater with DNA. Consequently, we cannot

recommend replacing biomass collection and analysis with unenriched eDNA, but we can recommend doing so with enriched eDNA. A caveat, though, is that on one occasion (San Francisco in 2021) soak-water eDNA failed for unknown reason(s). It may be advisable to explore the robustness of the soak-water protocol to variation due to accident or contingencies of field work.

A drawback of the settlement plate soak method of eDNA collection, relative to a simple bottle dip in harbor waters, is the need to deploy plates on one date and collect them three months later. A different approach might be to omit plates altogether, instead using fouling biomass taken directly from harbor substrata for soaking in seawater from which to extract eDNA. This approach would obviate the need for plate deployment. Biomass collection can be done using quadrats or other quantitative methods for statistical comparability, though substratum differences and successional age variation of samples might introduce noise avoided by use of plates. In the end, the cost-effectiveness of the biomass soaking approach may be attractive.

Newly detected species.

This study revealed a large number of species without prior record in California in the NEMESIS, GBIF, or OBIS databases. Before highlighting some of these species, we repeat that these detections are based on anonymous DNA sequences from a metagenetic library matched to DNA databases. Errors in the identification of the specimens reported in those databases will be passed into our results.

Appendix 2-1 lists 569 species (with binomial names) not found in NEMESIS detected by metagenetics. Many of these, upon analysis, will be known native species therefore appropriately not included in NEMESIS. Indeed, 73 of these species were documented as found only in the NEP by GBIF and OBIS, consistent with native status. However, 149 species had distributions that included the NEP but also other biogeographic provinces. Another 214 species were not listed in GBIF and OBIS, although at least 128 were native and 10 were NIS (based on previous assignments or our familiarity with well-known native species), leaving 76 potential NIS. Finally, 117 species found with metagenetics were not documented as present in NEP and thus possibly NIS. Thus at least 569-73-128-10=358 species need further analysis to ascertain NIS status in California.

It is beyond the scope of this study to undertake an evaluation the biogeographic histories of 346 potential NIS. Too, predicting ecological or economic impact of potential novel invaders is problematic and beyond our ability. Nonetheless, we provide some interpretation here while deferring a full case-by-case (or model-based) analysis to future collaborations with expert taxonomists and invasion ecologists.

Some new records found here for California may simply be cases of native species of the Pacific coast currently known only outside of California. The tiny meiofaunal kinorhynch *Echinoderes kozloffi*, for example is known from the state of Washington; we presume it is

native to California. The copepod *Skistodiaptomus oregonensis* appears to be another native species known primarily north of California.

Range expansion could explain some new records for California. The barnacle *Chthamalus anisopoma* is abundant and widespread in the Gulf of California. It was found in this study in 26 samples of plankton from Long Beach in 2021. If its presence in southern California is substantiated, it could have been introduced by shipping or small boats. However, a hypothesis of range expansion along the Pacific coast can also be considered. While the species is best known inside the Gulf of California (where northward migration is a geographic trap), OBIS includes sparse records on the Pacific coast of Baja California Sur, making northward boundary expansion plausible.

Others in this list may be new or overlooked invaders, with shipping vectors most plausibly responsible. The ctenophore *Mnemiopsis leidyi* is a west Atlantic species that has caused damage to fisheries in the Black and Mediterranean Seas. It was found in a 2019 plankton sample in San Francisco Bay, and would be cause for concern if it has or will become established.

At least one species, *Bugula tsunamiensis*, in this list is associated with Japanese debris rafting subsequent to the Tohoku tsunami in 2011. Another may be a species of *Anthopleura* which has been popularly called *A. hermaphroditic*a since its appearance in Tomales Bay. In actuality, its COI sequence matches a record of *Anthopleura aureoradiata* from New Zealand. That species was informally suggested to be the same as the Chilean *Anthopleura hermaphroditica*, but this has not been definitively evaluated by morphology or genetics. It should also be recalled that COI is very conserved in all Anthozoa, so additional genetic loci should be assessed in ambiguous cases such as this. Indeed, the COI sequence of the California specimens from Tomales Bay are also similar to a Northwestern Pacific species of *Anthopleura*, suggesting a possible link to the 2011 tsunami.

Acknowledgements

The Molecular Ecology Laboratory at MLML acknowledges the critical contributions of the entire team in the Marine Invasions Laboratory at SERC, who performed all the field work needed to collect the samples used in this report. They also performed important pre-processing of samples before delivery to MLML. Paula Pappalardo executed the bioinformatics pipelines used to generate Appendix 2-1. Brian Steves created customized R scripts to query GBIF and OBIS as presented in Appendix 2-2. Many MLML students assisted with lab-work at various stages of this project, including Emily Pierce, Katie Duncan, Felicia Miller, Anna Heasley, Amanda Heidt, and Sydney McDermott. Jinchen Guo made many contributions over the years and provided continuity of project knowledge.

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Appendix Captions

Appendix 2-1. Full list of species identified by metabarcoding. Definitions and abbreviations: NA, no record; NIS, non-indigenous species; Cryptogenic, native status unknown; SD, San Diego Bay; MI, Mission Bay; LB, Long Beach; CI, Channel Islands (Catalina); SF, San Francisco Bay; BD, Bodega Bay; HB, Humboldt Bay; f.soak, fouling plate soak water (eDNA); f.water, control bay water; f.blend, fouling plate scape homogenate; s.water, sediment soak water (eDNA); 1, present; 0, absent; ASV, amplicon sequence variant.

Appendix 2-2. Global distribution of species listed in Appendix 2-1, according to GBIF and OBIS. See text.

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Annelida	Naididae	Allonais pectinata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	7
Annelida	Naididae	Amphichaeta sannio	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	112
Annelida	Naididae	Aulophorus furcatus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	6
Annelida	Naididae	Paranais frici	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	4
Annelida	Naididae	Paranais litoralis	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	1	5	7	488
Annelida	Naididae	Tubificoides brownae	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	98
Annelida	Naididae	Tubificoides diazi	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	5
Annelida	Naididae	Tubificoides fraseri	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	206
Annelida	Naididae	Tubificoides heterochaetus	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	26
Annelida	Dorvilleidae	Dorvillea moniloceras	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	3	12	3311
Annelida	Dorvilleidae	Ophryotrocha diadema	NA	Native	No	3	1	0	0	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	11	3846
Annelida	Dorvilleidae	Ophryotrocha labronica	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	31
Annelida	Dorvilleidae	Ophryotrocha xiamen	NA	NA	No	3	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	5	95
Annelida	Dorvilleidae	Protodorvillea gracilis	NA	Native	No	5	0	0	0	0	1	0	1	1	0	0	1	1	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	10	46	3775
Annelida	Dorvilleidae	Schistomeringos longicornis	NA	Cryptogenic	Native	8	0	0	0	0	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	0	0	1	0	1	1	0	0	1	0	1	1	0	1	1	1	1	0	0	1	62	181	67063
Annelida	Eunicidae	Marphysa californica	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	138
Annelida	Eunicidae	Marphysa sanguinea	NA	Cryptogenic	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	4	5	120
Annelida	Eunicidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	5	177
Annelida	Lumbrineridae	Lumbrineris perkinsi	NA	Cryptogenic	NIS	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	57
Annelida	Onuphidae	Diopatra ornata	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	8	9	417
Annelida	Capitellidae	Capitella teleta	NA	NA	No	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	1	19	64	14145
Annelida	Capitellidae	NA	NA	NA	No	5	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	15	22	1707
Annelida	Capitellidae	NA	NA	NA	No	8	1	0	0	1	1	1	0	1	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	1	0	1	0	0	1	15	28	261
Annelida	Capitellidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	1	0	0	1	1	12	12	161
Annelida	Capitellidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	2	10	255
Annelida	Chaetopteridae	Chaetopterus dewysee	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	17	1483
Annelida	Chaetopteridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	237
Annelida	Chaetopteridae	Mesochaetopterus taylori	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3	4	102
Annelida	Dinophilidae	Dimorphilus gyrociliatus	NA	NA	No	7	0	0	0	0	1	0	0	1	1	1	0	0	1	1	1	0	0	1	0	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	1	0	0	1	36	78	4971
Annelida	Dinophilidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	4	5	183
Annelida	Maldanidae	Axiothella rubrocincta	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	122
Annelida	Maldanidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	3	178
Annelida	Maldanidae	Praxillella affinis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1926
Annelida	NA	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	1	0	1	0	0	1	9	17	1255
Annelida	Opheliidae	Armandia brevis	NA	Native	Native	5	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	26	45	2250
Annelida	Opheliidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	6
Annelida	Orbiniidae	Leitoscoloplos pugettensis	NA	Native	Native	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	9	22	749
Annelida	Orbiniidae	NA	NA	NA	No	3	1	0	1	1	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	26	3430
Annelida	Orbiniidae	Naineris dendritica	NA	Native	No	6	0	0	1	1	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	20	21	463
Annelida	Protodrilidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	3	30
Annelida	Alciopidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	50
Annelida	Phyllodocidae	Rhynchonereella gracilis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	283
Annelida	Chrysopetalidae	Chrysopetalum occidentale	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	278
Annelida	Chrysopetalidae	Hyalopale zerofskii	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	15
Annelida	Chrysopetalidae	Paleanotus bellis	NA	Native	Native	7	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	1	0	0	1	1	1	0	1	1	28	44	2519
Annelida	Glyceridae	Glycera americana	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
Annelida	Glyceridae	Hemipodia simplex	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	40
Annelida	Goniadidae	Glycinde armigera	NA	Native	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	9
Annelida	Goniadidae	Glycinde picta	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Annelida	Goniadidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	1	0	1	1	0	0	1	1	0	0	1	1	21	53	9458
Annelida	Hesionidae	Amphiduros fuscescens	NA	Cryptogenic	Cryptogenic	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	0	0	0	0	0	3	4	157
Annelida	Hesionidae	Micropodarke dubia	NA	NIS	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	6	8	92
Annelida	Hesionidae	Oxydromus pugettensis	NA	Native	Native	3	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	11	34	8101
Annelida	Nereididae	Alitta succinea	NIS	NIS	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	32	77	61031
Annelida	Nereididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6
Annelida	Nereididae	Cheilonereis cyclurus	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	32
Annelida	Nereididae	Hediste diadroma	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
Annelida	Nereididae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	10
Annelida	Nereididae	Micronereis nanaimoensis	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	4	6	253
Annelida	Nereididae	NA	NA	NA	No	5	1	0	0	1	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	13	26	2288
Annelida	Nereididae	Neanthes acuminata	NA	Cryptogenic	Cryptogenic	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	60
Annelida	Nereididae	Nereis grubei	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	38	2153
Annelida	Nereididae	Nereis latescens	NA	Native	Native	4	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	1	9	9	971
Annelida	Nereididae	Nereis vexillosa	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	57
Annelida	Nereididae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	1	16	19	432
Annelida	Nereididae	Platynereis bicanaliculata	NA	Native	Native	7	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	1	1	0	1	1	1	1	1	1	1	60	220	162275
Annelida	Sigalionidae	Pholoides asperus	NA	Native	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	7
Annelida	Phyllodocidae	Eteone longa	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	54
Annelida	Phyllodocidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6	12	743
Annelida	Phyllodocidae	Eulalia aviculiseta	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	19	19	1771
Annelida	Phyllodocidae	Eulalia gracilior	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	708
Annelida	Phyllodocidae	Eulalia levicornuta	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3
Annelida	Phyllodocidae	Eulalia quadrioculata	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	5	5	810
Annelida	Phyllodocidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	2	3	73
Annelida	Phyllodocidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	11	17	980
Annelida	Phyllodocidae	Eumida longicornuta	NA	Native	Native	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	7	9	160
Annelida	Phyllodocidae	Hypereteone heteropoda	NA	Native	No	5	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	1	0	0	1	1	36	100	28636
Annelida	Phyllodocidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	4	4	46
Annelida	Phyllodocidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	45
Annelida	Phyllodocidae	Phyllodoce hartmanae	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	11	16	2137
Annelida	Phyllodocidae	Phyllodoce williamsi	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	7	18	2584
Annelida	Phyllodocidae	Pterocirrus montereyensis	NA	Native	No	2	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	13	2163
Annelida	Polynoidae	Arctonoe vittata	NA	Native	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	52
Annelida	Polynoidae	Halosydna brevisetosa	NA	Native	Native	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	19	23	1387
Annelida	Polynoidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	8879
Annelida	Polynoidae	Harmothoe imbricata	NA	Cryptogenic	Cryptogenic	6	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	0	1	0	1	1	0	1	1	0	1	1	1	1	117	236	313771
Annelida	Polynoidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	7
Annelida	Polynoidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	4	7	117
Annelida	Polynoidae	Lepidasthenia berkeleyae	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	5	14	955
Annelida	Polynoidae	Lepidonotus squamatus	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	21
Annelida	Sigalionidae	Sthenelais berkeleyi	NA	Native	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	4
Annelida	Sigalionidae	Sthenelanella uniformis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9
Annelida	Syllidae	Amblyosyllis hectori	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	11
Annelida	Syllidae	Amblyosyllis nigrolineata	NIS	NA	NIS	4	1	0	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	48	18493
Annelida	Syllidae	Epigamia noroi	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Annelida	Syllidae	Megasyllis nipponica	NIS	NIS	NIS	8	0	0	1	1	1	0	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0	1	1	0	1	1	0	0	0	1	1	26	143	17457
Annelida	Syllidae	Myrianida convoluta	NIS	NIS	No	6	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	1	17	30	2056
Annelida	Syllidae	Myrianida inermis	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	19
Annelida	Syllidae	Myrianida pachycera	NIS	NIS	NIS	4	1	0	0	1	0	0	1	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	228
Annelida	Syllidae	Myrianida pentadentata	NIS	NIS	NIS	3	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	60	17277
Annelida	Syllidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	7	6	103
Annelida	Syllidae	Odontosyllis detecta	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	2420
Annelida	Syllidae	Odontosyllis phosphorea	NA	NA	Native	4	1	0	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	31	8298
Annelida	Syllidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	223
Annelida	Syllidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	12
Annelida	Syllidae	Proceraea nigropunctata	NA	Native	Native	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	19	43	8859
Annelida	Syllidae	Procerastea nematodes	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	1180
Annelida	Syllidae	Syllis alternata	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	5	6	165
Annelida	Syllidae	Syllis elongata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	29
Annelida	Syllidae	Syllis nipponica*	NIS	NA	No	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	54
Annelida	Syllidae	Syllis pigmentata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	10
Annelida	Syllidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	3	3	55
Annelida	Syllidae	Syllis japonica*	NIS	NA	No	3	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	12	18	1747
Annelida	Sabellariidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	60	92	10754
Annelida	Sabellariidae	Neosabellaria cementarium	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	10	14	1222
Annelida	Sabellariidae	Phragmatopoma californica	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	11	11	229
Annelida	Sabellidae	Chone magna	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	14	21	1671
Annelida	Sabellidae	Chone mollis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	9
Annelida	Sabellidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	24	25	1810
Annelida	Sabellidae	Eudistylia vancouveri	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	4	6	113
Annelida	Sabellidae	Myxicola aesthetica	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	26
Annelida	Sabellidae	Myxicola infundibulum	NA	Cryptogenic	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	5	17	490
Annelida	Sabellidae	NA	NA	NA	No	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	19	11614
Annelida	Sabellidae	Paradialychone ecaudata	NA	NA	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	17	18	616
Annelida	Sabellidae	Parasabella crassichaetae	NA	NA	No	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	55
Annelida	Sabellidae	Parasabella pallida	NA	Native	Native	6	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	35	54	80547
Annelida	Sabellidae	Schizobranchia insignis	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	7	11	290
Annelida	Serpulidae	Hydroides dirampha	NA	Cryptogenic	No	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	147
Annelida	Magelonidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	9	8	701
Annelida	Spionidae	Boccardia proboscidea	NA	Native	No	7	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	47	51	6188
Annelida	Spionidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	12	14	220
Annelida	Spionidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	17	40	2559
Annelida	Spionidae	Polydora cornuta	NIS	NIS	NIS	8	0	0	1	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	1	1	0	1	1	0	1	1	1	1	0	1	1	99	263	166250
Annelida	Spionidae	Polydora hoplura	NIS	NA	NIS	4	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	30	1611
Annelida	Spionidae	Pseudopolydora bassarginensis	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	22	123	38846

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Annelida	Spionidae	Pseudopolydora paucibranchiata	NIS	NIS	NIS	9	1	0	1	1	1	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	1	0	1	1	1	0	1	0	1	1	0	1	1	1	0	0	1	1	129	117	22180
Annelida	Spionidae	Spiophanes duplex	NA	NA	No	9	0	0	1	1	0	0	1	1	0	1	1	1	1	0	1	1	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	0	1	151	141	140612
Annelida	Spionidae	Spiophanes hakaiensis	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10	42	29989
Annelida	Spionidae	Streblospio benedicti	NIS	NIS	NIS	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	0	1	1	11	30	784
Annelida	Ampharetidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	1	1	0	0	0	0	10	13	346
Annelida	Cirratulidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	15
Annelida	Cirratulidae	Cirriformia moorei	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6	10	3412
Annelida	Cirratulidae	NA	NA	NA	No	2	1	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	35
Annelida	Cirratulidae	Ctenodrilus serratus	NA	Cryptogenic	Cryptogenic	6	1	0	1	1	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	0	1	0	0	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	18	50	3009
Annelida	Cirratulidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	13	25	1334
Annelida	Cirratulidae	NA	NA	NA	No	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	3	60
Annelida	Cirratulidae	NA	NA	NA	No	7	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	1	1	33	91	45332
Annelida	Cirratulidae	Raphidrilus misakiensis	NA	NA	No	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	393
Annelida	Cirratulidae	Tharyx setigera	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1333
Annelida	Pectinariidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	3	144
Annelida	Pectinariidae	Pectinaria californiensis	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	4	9	182
Annelida	Terebellidae	Amphitrite ornata	NA	NIS	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	0	1	0	1	1	0	0	1	0	0	0	1	1	12	63	11690
Annelida	Terebellidae	Eupolymnia heterobranchia	NA	Native	Native	3	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	24	33	1301
Annelida	Terebellidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8
Annelida	Terebellidae	Neoamphitrite robusta	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	5	22	765
Annelida	Terebellidae	Nicolea amnis	NA	NIS	Unresolved	7	1	0	0	1	1	0	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	1	1	1	81	126	115362
Annelida	Terebellidae	Polycirrus californicus	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	5	9	3311
Annelida	Terebellidae	Streblosoma uncinatus	NA	Native	No	2	1	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	32
Annelida	Urechidae	Urechis caupo	NA	Native	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	1	0	1	1	1	1	1	1	1	40	142	19901
Arthropoda	Agelenidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	9
Arthropoda	Anyphaenidae	Anyphaena pacifica	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1638
Arthropoda	Linyphiidae	Erigone arctica	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	151
Arthropoda	Lycosidae	Pardosa altamontis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	14
Arthropoda	Acaridae	Tyrophagus fanetzhangorum	NA	NA	No	2	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	4	4	46
Arthropoda	Acaridae	Tyrophagus putrescentiae	NA	NA	No	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	78
Arthropoda	Phenopelopidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Arthropoda	Pyroglyphidae	Dermatophagoides pteronyssinus	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	4	117
Arthropoda	Halacaridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Arthropoda	Tydeidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	21
Arthropoda	Bosminidae	Bosmina liederi	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	13	41	8913
Arthropoda	Bosminidae	Bosmina longirostris	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3	3	21
Arthropoda	Bosminidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	2	78
Arthropoda	Cercopagididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	9
Arthropoda	Chydoridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	2	7
Arthropoda	Chydoridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	17
Arthropoda	Daphniidae	Ceriodaphnia dubia	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	5	29	849
Arthropoda	Daphniidae	Daphnia mendotae	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	4	32	2331
Arthropoda	Daphniidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	2	25	1205
Arthropoda	Holopediidae	Holopedium glacialis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3	7	201
Arthropoda	Leptodoridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	2	18	427
Arthropoda	Macrotrichidae	NA	NA	NA	No	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	6	8	53
Arthropoda	Podonidae	Evadne nordmanni	NA	Cryptogenic	No	6	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	25	92	49149
Arthropoda	Podonidae	Evadne spinifera	NA	Cryptogenic	No	4	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12	64	87006
Arthropoda	Podonidae	Pleopis polyphemoides	NA	Cryptogenic	No	5	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	21	116	194533
Arthropoda	Podonidae	Podon leuckarti	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	18	85	97951
Arthropoda	Podonidae	Pseudevadne tergestina	NA	Cryptogenic	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	29	739
Arthropoda	Sididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	8	21	346
Arthropoda	Sididae	Penilia avirostris	NA	Cryptogenic	No	2	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	63	121738
Arthropoda	Sididae	Sida crystallina	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	3	22
Arthropoda	Entomobryidae	Entomobrya atrocincta	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	10
Arthropoda	Isotomidae	NA	NA	NA	No	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	42
Arthropoda	Acartiidae	Acartia californiensis	NA	Native	No	9	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	3352	410	5910898
Arthropoda	Acartiidae	Acartia danae	NA	NA	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	29	474
Arthropoda	Acartiidae	Acartia hudsonica	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2	10	900
Arthropoda	Acartiidae	Acartia longiremis	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	33	98	252534
Arthropoda	Acartiidae	Acartia tonsa	NA	Cryptogenic	No	8	0	0	1	1	0	0	1	1	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	0	0	0	1	1	50	118	70081
Arthropoda	Acartiidae	Acartiella sinensis	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	49	36	454137
Arthropoda	Calanidae	Calanus marshallae	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6	23	6665
Arthropoda	Calanidae	Calanus pacificus	NA	Native	No	5	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	22	34	3223
Arthropoda	Clausocalanidae	Ctenocalanus vanus	NA	Cryptogenic	No	8	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	47	136	128784
Arthropoda	Paracalanidae	Calocalanus kristalli	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	11	2061
Arthropoda	Paracalanidae	Calocalanus minutus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	80
Arthropoda	Paracalanidae	Calocalanus tenuis	NA	Native	No	3	0	0	0	0	0	0	1	1	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	44	2636
Arthropoda	Calocalanidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	25	11867
Arthropoda	Candaciidae	Candacia bipinnata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	68
Arthropoda	Candaciidae	Candacia curta	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	2428
Arthropoda	Centropagidae	Centropages abdominalis	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	14	76	15058
Arthropoda	Clausocalanidae	Clausocalanus arcuicornis	NA	Native	No	3	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	32	14213
Arthropoda	Clausocalanidae	Clausocalanus furcatus	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	75	228224
Arthropoda	Clausocalanidae	Clausocalanus jobei	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	9	214
Arthropoda	Clausocalanidae	Clausocalanus paraperegens	NA	Native	No	3	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	32	7980
Arthropoda	Clausocalanidae	Clausocalanus pergens	NA	Native	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	15	48	3734
Arthropoda	Clausocalanidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	140
Arthropoda	Clausocalanidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	4	4	201
Arthropoda	Clausocalanidae	Pseudocalanus acuspes	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	5	9	381
Arthropoda	Clausocalanidae	Pseudocalanus mimus	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	111	86	341282
Arthropoda	Diaptomidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	5	65
Arthropoda	Diaptomidae	Skistodiaptomus oregonensis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	9
Arthropoda	Eucalanidae	Eucalanus californicus	NA	Native	No	4	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	22	20	2083
Arthropoda	Eucalanidae	Eucalanus hyalinus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	14
Arthropoda	Eucalanidae	Pareucalanus attenuatus	NA	NA	No	3	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	27	3033
Arthropoda	Rhincalanidae	Rhincalanus nasutus	NA	NA	No	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	57
Arthropoda	Lucicutiidae	Lucicutia flavicornis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	27
Arthropoda	Paracalanidae	Mecynocera clausi	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	12	444
Arthropoda	Metridinidae	Metridia lucens	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4	78
Arthropoda	Metridinidae	Pleuromamma abdominalis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17
Arthropoda	Metridinidae	Pleuromamma borealis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	54
Arthropoda	Metridinidae	Pleuromamma gracilis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8
Arthropoda	NA	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	1	1	1	0	1	1	47	82	586706
Arthropoda	Paracalanidae	NA	NA	NA	No	9	0	0	1	1	1	0	1	1	0	1	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	1	1	0	1	1	218	257	962983
Arthropoda	Paracalanidae	Paracalanus nanus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	16
Arthropoda	Paracalanidae	Paracalanus quasimodo	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Arthropoda	Paracalanidae	Paracalanus tropicus	NA	Cryptogenic	No	3	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	47	59032
Arthropoda	Paracalanidae	Parvocalanus crassirostris	NA	Cryptogenic	No	5	1	0	1	1	1	0	1	1	0	1	1	0	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	80	382891
Arthropoda	Pontellidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	3	15
Arthropoda	Pseudodiaptomidae	Pseudodiaptomus forbesi	NIS	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6	9	284
Arthropoda	Pseudodiaptomidae	Pseudodiaptomus marinus	NIS	NIS	No	8	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	1	0	0	0	1	26	148	172221
Arthropoda	Scolecitrichidae	Scolecithrix danae	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	146
Arthropoda	Temoridae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	4	13	179
Arthropoda	Temoridae	Temora discaudata	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	28	24931
Arthropoda	Tortanidae	Tortanus derjugini	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	80	320491
Arthropoda	Tortanidae	Tortanus dextrilobatus	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	47	38380
Arthropoda	Tortanidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	41	49093
Arthropoda	Cyclopidae	Acanthocyclops americanus	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	7	10	2070
Arthropoda	Cyclopidae	Acanthocyclops brevispinosus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	2	2	28
Arthropoda	Cyclopidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	2	40	1660
Arthropoda	Cyclopidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	5	24	1715
Arthropoda	Cyclopidae	NA	NA	NA	No	7	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	1	1	0	1	1	1	1	0	1	1	33	90	19509
Arthropoda	Cyclopidae	NA	NA	NA	No	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3	3	17
Arthropoda	Cyclopidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	129	77	129856
Arthropoda	Cyclopidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	2	105
Arthropoda	Cyclopidae	Thermocyclops crassus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3	44	2285
Arthropoda	Mytilicolidae	Mytilicola orientalis	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	23	570
Arthropoda	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	13	44	4499
Arthropoda	Cyclopettidae	Limnoithona sinensis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	20
Arthropoda	Cyclopettidae	Limnoithona tetraspina	NIS	NA	No	5	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	1	1	0	0	1	29	85	1336661
Arthropoda	Oithonidae	NA	NA	NA	No	8	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	46	206	96728
Arthropoda	Oithonidae	Oithona similis	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	4	13	309
Arthropoda	Ameiridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	15
Arthropoda	Cletodidae	Geehydrosoma intermedia	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	9	475
Arthropoda	Dactylopusiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	11
Arthropoda	Dactylopusiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	2	7	186
Arthropoda	Ectinosomatidae	Ectinosoma melaniceps	NA	NA	No	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	18	41	4356
Arthropoda	Ectinosomatidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	18	56	6036
Arthropoda	Harpacticidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	10	104	41417
Arthropoda	Laophontidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	19	82	32755
Arthropoda	Miraciidae	Amonardia perturbata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	3	26	574
Arthropoda	Miraciidae	NA	NA	NA	No	5	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	53	81	14501
Arthropoda	Miraciidae	Amphiascopsis cinctus	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	1	1	0	1	1	8	44	3159
Arthropoda	Miraciidae	Diosaccus spinatus	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	11	30	62369

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Arthropoda	Miraciidae	Itostenhelia polyhymnia	NA	Cryptogenic	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	11	19	575
Arthropoda	Miraciidae	Sarsamphiascus kawamurai	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	6	6	195
Arthropoda	Miraciidae	Sarsamphiascus undosus	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	16	98	54912
Arthropoda	NA	NA	NA	NA	No	9	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0	1	0	0	1	1	1	1	0	0	1	1	0	1	1	1	1	0	1	1	159	242	162219
Arthropoda	Porcellidiidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	4	6	111
Arthropoda	Thalestridae	Rhynchothalestris helgolandica	NA	NA	No	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	1	1	1	0	0	0	1	1	0	1	1	0	0	0	1	1	9	53	7197
Arthropoda	Tisbidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	28	65	17612
Arthropoda	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	25	6809
Arthropoda	Bomolochidae	Bomolochus cuneatus	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	24	35	2038
Arthropoda	Lichomolgidae	Modiolicola bifida	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	28	109	33707
Arthropoda	Myicolidae	Pseudomyicola spinosus	NA	Cryptogenic	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	17	41	2119
Arthropoda	NA	NA	NA	NA	No	8	0	0	1	1	0	0	1	1	0	1	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	1	24	140	26748
Arthropoda	Oncaeidae	Oncaea scottodicarloi	NA	Cryptogenic	No	3	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	21	771
Arthropoda	Sapphirinidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	22	22	938
Arthropoda	Caligidae	Caligus clemensi	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	11	21	9484
Arthropoda	Cecidomyiidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	226
Arthropoda	Ceratopogonidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	124
Arthropoda	Ceratopogonidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	95
Arthropoda	Chironomidae	Clunio tsushimensis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	8
Arthropoda	Chironomidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	2	40
Arthropoda	Chironomidae	NA	NA	NA	No	4	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	5	6	132
Arthropoda	Chironomidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Arthropoda	Ephydridae	Lamproscatella quadrisetosa	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	48
Arthropoda	Ephydridae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	17
Arthropoda	Sciaridae	Bradysia urticae	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	5
Arthropoda	Sciaridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	10
Arthropoda	Sciaridae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	2	154
Arthropoda	Aphalaridae	Ctenarytaina spatulata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	10
Arthropoda	Aphididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	113
Arthropoda	Aphididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	16
Arthropoda	Aphididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	14
Arthropoda	Belostomatidae	Appasus major	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	27
Arthropoda	Coccidae	Ceroplastes cirripediformis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9
Arthropoda	Diaspididae	Aspidiotus nerii	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	18
Arthropoda	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10
Arthropoda	Aphididae	Euthoracaphis heterotricha	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	14
Arthropoda	Phylloxeridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	518
Arthropoda	Apidae	Amegilla bombiformis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	9
Arthropoda	Formicidae	NA	NA	NA	No	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	210
Arthropoda	Formicidae	Linepithema humile	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	2	2	49
Arthropoda	Formicidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	5
Arthropoda	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	53
Arthropoda	Elachistidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	28
Arthropoda	Calopterygidae	Calopteryx maculata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3	4	56
Arthropoda	Liposcelididae	Liposcelis decolor	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	11
Arthropoda	Liposcelididae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3	3	35
Arthropoda	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	283
Arthropoda	Trichopsocidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	3	3	28
Arthropoda	Thripidae	Frankliniella occidentalis	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	2	65
Arthropoda	Ampeliscidae	Ampelisca abdita	NIS	NIS	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	17	1895
Arthropoda	Ampithoidae	Ampithoe lacertosa	NA	Native	Cryptogenic	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	1	10	18	14622
Arthropoda	Ampithoidae	Ampithoe plumulosa	NA	Native	Cryptogenic	4	0	0	1	1	1	0	0	1	0	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	17	526
Arthropoda	Ampithoidae	Ampithoe sectimana	NA	Native	Native	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	44
Arthropoda	Ampithoidae	Ampithoe valida	NIS	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	5	8	706
Arthropoda	Ampithoidae	Ampithoe koreana	NA	NIS	No	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
Arthropoda	Aoridae	Aoroides columbiae	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	1	15	25	4240
Arthropoda	Aoridae	Aoroides intermedius	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	4	30	3839
Arthropoda	Aoridae	Aoroides secunda	NIS	Cryptogenic	NIS	8	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	1	0	0	1	1	0	1	1	0	1	1	1	1	59	226	48732
Arthropoda	Calliopiidae	Paracalliopiella pratti	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	1	6	8	1641
Arthropoda	Caprellidae	Caprella acanthogaster	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	10
Arthropoda	Caprellidae	Caprella californica	NA	Native	Native	7	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	117	134	81195
Arthropoda	Caprellidae	Caprella equilibra	NA	Cryptogenic	Cryptogenic	6	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	1	1	0	0	1	57	77	91677
Arthropoda	Caprellidae	Caprella laeviuscula	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	10	15	3908
Arthropoda	Caprellidae	Caprella mutica	NIS	NIS	NIS	6	0	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	39	194	97065
Arthropoda	Caprellidae	Caprella scaura	NIS	NIS	NIS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	13	766
Arthropoda	Caprellidae	Caprella simia	NIS	NIS	NIS	8	1	0	0	1	1	0	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	0	1	0	1	1	0	0	1	1	1	1	1	1	37	111	20976
Arthropoda	Caprellidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	1	1	1	0	1	16	74	35456
Arthropoda	Caprellidae	Deutella californica	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	7	288
Arthropoda	Caprellidae	Metacaprella kennerlyi	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	29
Arthropoda	Caprellidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	8	11	2287
Arthropoda	Aoridae	Grandidierella japonica	NIS	NIS	NIS	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	4	5	280
Arthropoda	Corophiidae	Laticorophium baconi	NA	Native	Native	6	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	27	65	8535
Arthropoda	Corophiidae	Monocorophium acherusicum	NIS	NIS	NIS	8	0	0	0	0	1	0	1	1	1	1	0	1	1	1	1	0	0	1	1	0	1	0	0	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	1	47	130	48047
Arthropoda	Corophiidae	Monocorophium insidiosum	NIS	NIS	NIS	8	0	0	0	0	1	0	0	1	0	1	0	1	1	1	0	0	0	1	1	0	1	0	0	1	1	1	0	0	0	1	1	0	1	1	1	1	0	1	1	26	59	7806
Arthropoda	Corophiidae	NA	NA	NA	No	6	0	0	0	0	1	0	0	1	1	1	0	1	1	1	1	0	1	1	0	0	1	0	0	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	30	76	25906
Arthropoda	Corophiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	31
Arthropoda	Dexaminidae	NA	NA	NA	No	7	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0	1	31	113	34130
Arthropoda	Dexaminidae	Polycheria osborni	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	451
Arthropoda	Hyalidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3	6	1073
Arthropoda	Hyperiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	2
Arthropoda	Hyperiidae	Themisto pacifica	NA	Native	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	104
Arthropoda	Ischyroceridae	Ericthonius brasiliensis	NA	Cryptogenic	Cryptogenic	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0	20	29	33029
Arthropoda	Ischyroceridae	Ischyrocerus anguipes	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6
Arthropoda	Ischyroceridae	Jassa marmorata	NIS	NIS	No	2	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	19	7999
Arthropoda	Ischyroceridae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	1	3	9	1174
Arthropoda	Ischyroceridae	Jassa slatteryi	NA	Native	Cryptogenic	7	0	0	0	0	1	0	1	1	1	1	0	1	1	1	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	1	0	1	60	127	34090
Arthropoda	Ischyroceridae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	11	74	29477
Arthropoda	Ischyroceridae	Jassa staudei	NA	Native	Native	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	8	11	2207
Arthropoda	Ischyroceridae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	9	10	500
Arthropoda	Ischyroceridae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	3	72
Arthropoda	Liljeborgiidae	Liljeborgia geminata	NA	Native	Cryptogenic	5	0	0	0	0	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1	0	1	12	12	733
Arthropoda	Liljeborgiidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	4	667
Arthropoda	Lysianassidae	Aruga holmesi	NA	Cryptogenic	Cryptogenic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	2	39
Arthropoda	Maeridae	Elasmopus bampo	NA	NA	Cryptogenic	6	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	132	180	156245
Arthropoda	Melitidae	Megamoera subtener	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	4
Arthropoda	Melitidae	Melita nitida	NIS	NIS	NIS	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	76
Arthropoda	Melitidae	Melita rylovae	NIS	NIS	NIS	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	3	32
Arthropoda	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	21
Arthropoda	Photidae	Gammaropsis thompsoni	NA	NIS	Native	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	3	4	292
Arthropoda	Photidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	5	11	812
Arthropoda	Photidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	0	1	1	0	1	1	1	1	1	1	1	25	42	13502
Arthropoda	Podoceridae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	5	8	1218
Arthropoda	Podoceridae	Podocerus brasiliensis	NA	Cryptogenic	Cryptogenic	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	4	6	391
Arthropoda	Podoceridae	Podocerus cristatus	NA	Cryptogenic	Cryptogenic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	17	1441
Arthropoda	Pontogeneiidae	Nasageneia quinsana	NA	NA	Native	3	1	0	0	1	1	0	0	1	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	45	4500
Arthropoda	Stenothoidae	Metopa cistella	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	35
Arthropoda	Stenothoidae	Stenothoe estacola	NA	NA	Native	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	35	3418
Arthropoda	Stenothoidae	Stenothoe valida	NA	NA	NIS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	4	99
Arthropoda	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	5	6	485
Arthropoda	Cancridae	Romaleon antennarium	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	10	25	3878
Arthropoda	Cancridae	Cancer productus	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	6	16	918
Arthropoda	Cancridae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3	6	767
Arthropoda	Cancridae	Metacarcinus gracilis	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	11	12	5493
Arthropoda	Cancridae	Metacarcinus magister	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	159
Arthropoda	Carcinidae	Carcinus maenas	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3	16	1083
Arthropoda	Crangonidae	Crangon crangon	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Arthropoda	Crangonidae	Crangon franciscorum	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	198
Arthropoda	Epialtidae	Pugettia dalli	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	209
Arthropoda	Epialtidae	Pugettia producta	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	1	3	3	188
Arthropoda	Grapsidae	Pachygrapsus crassipes	NA	Native	No	7	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	30	28	4435
Arthropoda	Hippidae	Emerita analoga	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	485
Arthropoda	Hippolytidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	0	1	1	27	40	11829
Arthropoda	Hippolytidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	161
Arthropoda	Inachoididae	Pyromaia tuberculata	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	62	98510
Arthropoda	Palaemonidae	Palaemon macrodactylus	NIS	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	30	46563
Arthropoda	Panopeidae	Lophopanopeus bellus	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	35	36	4108
Arthropoda	Panopeidae	Rhithropanopeus harrisii	NIS	NIS	NIS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	277
Arthropoda	Penaeidae	Penaeus californiensis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	48
Arthropoda	Pinnotheridae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	162	110	95579
Arthropoda	Pinnotheridae	Scleroplax faba	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	12	23	1170
Arthropoda	Pinnotheridae	Scleroplax franciscana	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	15	15	991
Arthropoda	Epialtidae	Scyra acutifrons	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	941
Arthropoda	Porcellanidae	Pachycheles pubescens	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	2163
Arthropoda	Upogebiidae	Upogebia major	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	4
Arthropoda	Varunidae	Hemigrapsus estellinensis	NA	NIS	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	0	1	1	25	28	5807

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Arthropoda	Varunidae	Hemigrapsus oregonensis	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	5	5	200
Arthropoda	Varunidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	3605
Arthropoda	Euphausiidae	Euphausia eximia	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	69
Arthropoda	Euphausiidae	Hansarsia difficilis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	567
Arthropoda	Euphausiidae	Nyctiphanes simplex	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	366
Arthropoda	Euphausiidae	Thysanoessa gregaria	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	160
Arthropoda	Euphausiidae	Thysanoessa spinifera	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	12	27	3964
Arthropoda	NA	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	4	9	474
Arthropoda	Bopyridae	Orthione mesoamericana	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	17	23	617
Arthropoda	Cymothoidae	Elthusa californica	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	85
Arthropoda	Entoniscidae	Portunion conformis	NA	Native	No	8	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	17	138	29669
Arthropoda	Idoteidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	5	8	2615
Arthropoda	Idoteidae	Synidotea laticauda	NIS	NIS	NIS	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	176
Arthropoda	Limnoriidae	Limnoria quadripunctata	NIS	cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	14
Arthropoda	Munnidae	Munna japonica	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	132
Arthropoda	Munnidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	9	24	2887
Arthropoda	Paranthuridae	Paranthura japonica	NIS	NIS	NIS	9	1	0	1	1	1	0	0	1	1	1	0	1	1	1	0	0	1	1	1	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	0	1	1	1	38	124	11390
Arthropoda	Sphaeromatidae	NA	NA	NA	No	2	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	2449
Arthropoda	Sphaeromatidae	Paracerceis cordata	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	6	11	493
Arthropoda	Sphaeromatidae	Paracerceis sculpta	NA	NA	Native	5	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	37	100	50154
Arthropoda	Mysidae	Inusitatomysis insolita	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	8
Arthropoda	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	8345
Arthropoda	NA	NA	NA	NA	No	5	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	12	18	462
Arthropoda	Tanaididae	Hexapleomera sasuke	NA	NA	No	3	0	0	1	1	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	77
Arthropoda	Tanaididae	NA	NA	NA	No	7	1	0	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	1	0	1	41	121	58269
Arthropoda	Tanaididae	Zeuxo ezoensis	NA	NANIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	3
Arthropoda	Loxoconchidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	4	273
Arthropoda	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	68
Arthropoda	Fujientomidae	Fujientomon dicestum	NA	NA	No	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	12
Arthropoda	NA	NA	NA	NA	No	5	1	0	0	1	0	0	1	1	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	23	1224
Arthropoda	Ammotheidae	Ammothea hilgendorfi	NA	Native	Native	4	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	10	14	651
Arthropoda	Phoxichilidiidae	Anoplodactylus viridintestinalis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	2	2	13
Arthropoda	Pycnogonidae	Pycnogonum stearnsi	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	962
Arthropoda	Balanidae	Amphibalanus amphitrite	NIS	NIS	NIS	8	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	1	1	1	1	0	0	1	0	0	0	0	0	1	0	0	1	65	95	299781
Arthropoda	Balanidae	Amphibalanus eburneus	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	71
Arthropoda	Balanidae	Amphibalanus improvisus	NIS	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	32	106	147653
Arthropoda	Balanidae	Amphibalanus subalbidus	NA	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	188
Arthropoda	Balanidae	Balanus crenatus	NA	Native	Native	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	384	186	1433093
Arthropoda	Balanidae	Balanus glandula	NA	Native	Native	5	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	254	145	93140
Arthropoda	Balanidae	Balanus nubilus	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	70	59	57940
Arthropoda	Balanidae	Balanus trigonus	NA	Cryptogenic	Native	5	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	251	136	216532
Arthropoda	Balanidae	Fistulobalanus kondakovi	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10
Arthropoda	Balanidae	Megabalanus californicus	NA	Native	Native	6	0	0	0	0	0	0	1	1	1	0	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	151	80	498750
Arthropoda	Balanidae	Megabalanus coccopoma	NA	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	18412
Arthropoda	Balanidae	Megabalanus rosa	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8
Arthropoda	Balanidae	NA	NA	NA	No	5	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	9	9	156
Arthropoda	Archaeobalanidae	Semibalanus cariosus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	16
Arthropoda	Archaeobalanidae	Solidobalanus engbergi	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	5	167
Arthropoda	Chthamalidae	Chthamalus anisopoma	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	63
Arthropoda	Chthamalidae	Chthamalus dalli	NA	Native	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	60	93	39310
Arthropoda	Chthamalidae	Chthamalus fissus	NA	Native	No	7	1	0	1	1	0	0	1	1	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	104	104	109579
Arthropoda	Chthamalidae	Chthamalus panamensis	NA	Cryptogenic	No	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	49
Arthropoda	Chthamalidae	Chthamalus sinensis	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	14
Arthropoda	Chthamalidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	54	99	52084
Arthropoda	Chthamalidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	11	44	8849
Arthropoda	Tetraclitidae	NA	NA	NA	No	6	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	11	4031
Arthropoda	Tetraclitidae	Tetraclita rubescens	NA	Native	No	5	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	13	12	1267
Arthropoda	Lepadidae	Lepas testudinata	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	71
Arthropoda	Lernaeodiscidae	Lernaeodiscus porcellanae	NA	NA	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	26	808
Arthropoda	Peltogastridae	Peltogaster boschmai	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	5	92
Arthropoda	Pollicipedidae	Pollicipes polymerus	NA	Native	No	7	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	30	43	2393
Bryozoa	Bugulidae	Bugula neritina	NIS	NIS	NIS	8	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	77	318	697236
Bryozoa	Bugulidae	Bugula tsunamiensis	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Bryozoa	Bugulidae	Bugulina longirostrata	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	63
Bryozoa	Bugulidae	Bugulina stolonifera	NIS	NIS	NIS	9	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	0	1	1	1	0	0	1	1	0	1	1	1	1	0	1	1	62	192	187897
Bryozoa	Bugulidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	2	2	28
Bryozoa	Candidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	44	48	47447
Bryozoa	Candidae	Pomocellaria californica	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	4	180
Bryozoa	Candidae	Tricellaria inopinata	NA	Cryptogenic	Cryptogenic	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	17	20	4041
Bryozoa	Cryptosulidae	Cryptosula pallasiana	NIS	NIS	NIS	6	0	0	0	0	1	0	0	1	1	1	0	0	1	0	1	1	0	1	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	30	40	3048
Bryozoa	Electridae	Aspidelectra melolontha	NIS	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	7	71	2588
Bryozoa	Electridae	Conopeum chesapeakensis	NIS	NIS	NIS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	32	2859
Bryozoa	Electridae	Conopeum reticulum	NA	Cryptogenic	Cryptogenic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	2	82
Bryozoa	Electridae	Conopeum tenuissimum	NIS	NIS	NIS	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	0	0	1	0	0	0	0	1	1	0	1	1	10	23	721
Bryozoa	Electridae	Einhornia crustulenta	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	27	2539
Bryozoa	Electridae	Electra monostachys	NA	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	25	62	4819
Bryozoa	Hippothoidae	Celleporella hyalina	NA	Cryptogenic	Cryptogenic	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	5	5	425
Bryozoa	Celleporidae	Celleporaria brunnea	NA	Native	Native	5	1	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	23	20	18074
Bryozoa	Membraniporidae	Membranipora membranacea	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	11	1472
Bryozoa	Membraniporidae	Membranipora villosa	NA	Native	No	3	0	0	0	0	0	0	1	1	0	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	52	37	7109
Bryozoa	Membraniporidae	Membranipora villosa	NA	NA	No	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	15	1164
Bryozoa	Fenestrulinidae	Fenestrulina delicia	NA	Cryptogenic	Cryptogenic	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	9	157
Bryozoa	Microporidae	Micropora coriacea	NA	NA	No	6	1	0	0	1	1	0	0	1	0	1	0	1	1	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	20	82	64215
Bryozoa	Schizoporellidae	Schizoporella japonica	NIS	NIS	NIS	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	1	0	0	1	1	0	1	0	0	1	1	0	0	1	1	1	0	0	1	28	43	62005
Bryozoa	Schizoporellidae	Schizoporella occidentalae	NA	Native	Native	3	1	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	17	2991
Bryozoa	Schizoporellidae	Schizoporella variabilis	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	2	23
Bryozoa	Scrupariidae	NA	NA	NA	No	4	0	0	0	0	1	0	1	1	0	1	0	1	1	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	29	817
Bryozoa	Smittinidae	Smittoidea prolifica	NA	Native	Native	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	1	4	5	110
Bryozoa	Watersiporidae	NA	NA	NA	No	8	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	0	1	1	1	0	1	1	1	19	147	81837
Bryozoa	Watersiporidae	Watersipora arcuata	NIS	NIS	NIS	4	1	0	0	1	1	0	0	1	1	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	58	24771
Bryozoa	Watersiporidae	Watersipora subatra	NIS	NIS	NIS	8	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1	1	0	0	0	1	1	0	1	1	1	0	1	0	1	1	91	268	506634
Bryozoa	Watersiporidae	Watersipora subtorquata	NIS	NIS	NIS	4	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	24	78	39882
Bryozoa	Alcyonidiidae	Alcyonidium verrilli	NA	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	28
Bryozoa	Alcyonidiidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	1	0	0	1	0	0	0	0	1	1	1	1	1	40	68	22709
Bryozoa	Buskiidae	Buskia seriata	NA	Native	Native	6	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	18	66	5341
Bryozoa	Nolellidae	Anguinella palmata	NIS	NIS	NIS	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	0	0	1	1	0	0	1	0	0	0	0	0	7	23	1180
Bryozoa	Vesiculariidae	Amathia brasiliensis	NA	Cryptogenic	No	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	251
Bryozoa	Vesiculariidae	Amathia gracilis	NA	Native	No	8	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	0	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	89	237	221446
Bryozoa	Vesiculariidae	Amathia tertia	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9
Bryozoa	Vesiculariidae	Amathia verticillata	NIS	NIS	NIS	7	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	1	1	1	153	130	462601
Bryozoa	Vesiculariidae	Amathia vidovici	NA	Cryptogenic	No	5	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10	34	3901
Bryozoa	Vesiculariidae	NA	NA	NA	No	10	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	74	208	169095
Bryozoa	Vesiculariidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	21	1386
Bryozoa	Vesiculariidae	NA	NA	NA	No	9	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	1	0	1	1	17	68	28911
Bryozoa	Crisiidae	Crisia occidentalis	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	3	3	16
Bryozoa	Crisiidae	Filicrisia franciscana	NA	Native	Native	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	10	191
Bryozoa	Diaperoeciidae	Nevianipora floridana	NIS	NIS	NIS	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	62	96	143084
Bryozoa	Lichenoporidae	Disporella novaehollandiae	NA	NIS	Native	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	66	173351
Chaetognatha	Sagittidae	Flaccisagitta enflata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	449
Chaetognatha	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	15
Chordata	Clupeidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	16
Chordata	Gobiidae	NA	NA	NA	No	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12
Chordata	Gobiidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16	8450
Chordata	Didemnidae	Didemnum vexillum	NIS	NIS	NIS	5	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	0	1	0	1	1	23	48	2725
Chordata	Didemnidae	Diplosoma listerianum	NIS	NIS	NIS	8	1	0	0	1	1	0	0	1	0	1	1	1	1	0	1	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	1	0	1	1	1	1	0	1	1	27	115	8209
Chordata	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	2	2	258
Chordata	Polyclinidae	NA	NA	NA	No	4	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	121	44891
Chordata	Ascidiidae	Ascidia ahodori	NA	Cryptogenic	No	7	1	1	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	1	0	0	1	30	165	51583
Chordata	Ascidiidae	Ascidia ceratodes	NA	Native	Native	6	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	1	46	142	168732
Chordata	Ascidiidae	Ascidia malaca	NA	NIS	No	2	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	11	3156
Chordata	Ascidiidae	Ascidia zara	NIS	NIS	NIS	10	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1	0	1	0	1	1	76	212	753231
Chordata	Ascidiidae	NA	NA	NA	No	2	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	31	14818
Chordata	Ascidiidae	Ascidiella aspersa	NIS	NIS	NIS	4	1	0	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	112	588586
Chordata	Cionidae	Ciona intestinalis	NA	Cryptogenic	No	7	1	0	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1	13	66	69233
Chordata	Cionidae	Ciona robusta	NIS	NIS	NIS	7	1	0	0	1	1	1	0	1	1	1	1	1	1	0	1	0	0	1	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	20	95	99823
Chordata	Cionidae	NA	NA	NA	No	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1	0	0	1	1	1	0	1	1	0	1	1	1	1	151	299	973879
Chordata	Cionidae	Ciona savignyi	NIS	NIS	NIS	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	1	1	1	1	1	1	101	258	879829
Chordata	Corellidae	Corella inflata	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	3	21	15128
Chordata	Perophoridae	Perophora annectens	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3	10	1313
Chordata	Perophoridae	Perophora japonica	NIS	NIS	No	4	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	1	5	12	2498
Chordata	Perophoridae	Perophora viridis	NA	Cryptogenic	No	3	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	43	36073
Chordata	Molgulidae	Molgula manhattensis	NIS	NIS	NIS	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0	71	172	325325
Chordata	Pyuridae	Microcosmus squamiger	NIS	NIS	NIS	5	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	33	89	5468
Chordata	Styelidae	Botrylloides diegensis	NIS	NIS	Cryptogenic	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	606	335	3221338
Chordata	Styelidae	Botrylloides giganteus	NIS	NIS	NIS	5	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	25	42	94096

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Chordata	Styelidae	Botrylloides violaceus	NIS	NIS	NIS	8	0	0	1	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	205	307	1578455
Chordata	Styelidae	Botryllus schlosseri	NIS	NIS	NIS	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	1	59	313	395876
Chordata	Styelidae	Cnemidocarpa finmarkiensis	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	4	131
Chordata	Styelidae	Polyandrocarpa zorritensis	NIS	NIS	NIS	5	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	125	85	203320
Chordata	Styelidae	Styela canopus	NIS	NIS	NIS	4	1	0	1	1	1	0	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	43	25462
Chordata	Styelidae	Styela clava	NIS	NIS	NIS	7	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	1	1	1	1	26	95	5477
Chordata	Styelidae	Styela plicata	NIS	NIS	NIS	6	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1	45	89	174968
Chordata	Styelidae	Symplegma brakenhielmi	NA	NIS	No	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	547
Chordata	Styelidae	Symplegma reptans	NIS	NIS	NIS	2	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	5502
Chordata	Myliobatidae	Myliobatis californica	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	6	186
Chordata	Rajidae	Beringraja rhina	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	49
Chordata	Myxinidae	Eptatretus stoutii	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	2	2	22
Chordata	Doliolidae	Doliolum nationalis	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	9
Cnidaria	Actiniidae	Anthopleura hermaphroditica*	NIS	NIS	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	1	0	1	1	8	28	473
Cnidaria	Actiniidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	19
Cnidaria	Actinostolidae	Paranthus rapiformis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	28
Cnidaria	Aiptasiidae	Aiptasiogeton eruptaurantia	NA	NIS	No	8	1	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0	1	25	139	243438
Cnidaria	Aiptasiidae	Exaiptasia diaphana	NA	Cryptogenic	Cryptogenic	4	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	88	486073
Cnidaria	Diadumenidae	Diadumene franciscana	NIS	NIS	NIS	6	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	0	1	0	1	0	0	1	1	0	1	0	1	0	0	0	0	0	1	1	0	1	10	32	6192
Cnidaria	Diadumenidae	Diadumene leucolena	NIS	NIS	NIS	7	1	0	1	1	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	1	1	0	0	0	0	0	1	0	1	1	27	142	51772
Cnidaria	Diadumenidae	Diadumene lineata	NIS	NIS	NIS	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	4	6	529
Cnidaria	Edwardsiidae	Edwardsia elegans	NA	NIS	No	2	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	11
Cnidaria	Edwardsiidae	Edwardsia longicornis	NA	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	2	29
Cnidaria	Halcampidae	Halcampa chrysanthellum	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	23
Cnidaria	Metridiidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	1	1	1	1	8	29	8307
Cnidaria	Cerveridae	Cervera atlantica	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
Cnidaria	Plexauridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	27
Cnidaria	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
Cnidaria	Virgulariidae	Stylatula elegans	NA	NA	No	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0	1	23	80	274037
Cnidaria	Botrucnidiferidae	Botruanthus benedeni	NA	NA	No	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	57
Cnidaria	Bougainvilliidae	Bougainvillia carolinensis	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	7	455
Cnidaria	Bougainvilliidae	Bougainvillia muscus	NA	NIS	No	8	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	0	1	1	0	1	1	0	1	0	1	1	55	119	113075
Cnidaria	Bougainvilliidae	NA	NA	NA	No	8	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	24	102	59257
Cnidaria	Bougainvilliidae	NA	NA	NA	No	5	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	24	42	13845
Cnidaria	Bougainvilliidae	Rhizorhagium arenosum	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6
Cnidaria	Cladonematidae	Cladonema pacificum	NIS	NA	No	4	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	1	1	0	1	1	0	0	0	0	0	11	19	1304
Cnidaria	Corymorphidae	Corymorpha bigelowi	NA	Cryptogenic	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0	1	0	0	0	0	0	4	10	408
Cnidaria	Corynidae	Coryne eximia	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	15	30	1772
Cnidaria	Corynidae	NA	NA	NA	No	3	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	247
Cnidaria	Corynidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	1	12	16	1605
Cnidaria	Corynidae	Sarsia tubulosa	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	2	6	177
Cnidaria	Corynidae	Stauridiosarsia cliffordi	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	27
Cnidaria	NA	NA	NA	NA	No	4	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	6	18	3927
Cnidaria	Moerisiidae	Moerisia inkermanica	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	243
Cnidaria	Oceaniidae	NA	NA	NA	No	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	9	628
Cnidaria	Oceaniidae	Turritopsis nutricula	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	105
Cnidaria	Pandeidae	Amphinema dinema	NA	NA	No	4	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	5	6	284
Cnidaria	Pandeidae	NA	NA	NA	No	6	1	0	0	1	1	1	0	1	0	0	0	1	1	1	1	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	15	25	1172
Cnidaria	Pandeidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	7	7	264
Cnidaria	Pandeidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	7
Cnidaria	Pandeidae	Pandeopsis ikarii	NA	NA	No	6	1	0	0	1	1	0	0	1	1	1	0	0	1	0	1	0	0	1	0	0	1	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	11	15	1013
Cnidaria	Tubulariidae	Ectopleura crocea	NIS	NIS	No	6	1	0	0	1	1	0	0	1	1	0	1	1	1	1	1	1	0	1	0	0	1	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	39	59	287454
Cnidaria	Tubulariidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	3	144
Cnidaria	Aequoreidae	Aequorea australis	NA	NA	No	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	46
Cnidaria	Aequoreidae	Aequorea macrodactyla	NA	Cryptogenic	No	3	0	0	0	0	0	1	0	1	1	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	9	3878
Cnidaria	Aequoreidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	7	9	187
Cnidaria	Blackfordiidae	Blackfordia virginica	NIS	NIS	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	6	354
Cnidaria	Campanulinidae	Calycella syringa	NA	NA	No	7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	128	207	272192
Cnidaria	Campanulariidae	Campanularia hincksii	NA	Cryptogenic	No	7	1	0	0	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	1	1	59	139	466265
Cnidaria	Campanulariidae	Campanularia volubilis	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	3	262
Cnidaria	Campanulariidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Cnidaria	Lovenellidae	Eucheilota maculata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Cnidaria	Lovenellidae	Eucheilota menoni	NA	NA	No	5	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	9	17	1837
Cnidaria	Campanulariidae	Gonothyraea loveni	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	1	1	14	29	1324
Cnidaria	Campanulariidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	1	0	1	1	52	85	153214
Cnidaria	Campanulariidae	Orthopyxis caliculata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Cnidaria	Campanulariidae	Orthopyxis crenata	NA	NA	No	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	151
Cnidaria	Campanulariidae	Orthopyxis integra	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	18
Cnidaria	Campanulariidae	Clytia elsaeoswaldae	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	22	21357
Cnidaria	Campanulariidae	Clytia gracilis	NA	Cryptogenic	No	8	1	0	0	1	1	0	1	1	1	0	0	1	1	1	1	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	1	0	1	1	41	83	142852
Cnidaria	Campanulariidae	Clytia gregaria	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	1	19	47	6955
Cnidaria	Clytiidae	NA	NA	NA	No	7	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	0	1	1	0	0	0	1	0	1	1	1	0	1	1	1	1	14	26	12184
Cnidaria	Campanulariidae	Clytia noliformis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	14	350
Cnidaria	Clytiidae	NA	NA	NA	No	5	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	0	1	0	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	21	73	85768
Cnidaria	Eirenidae	Eirene brevistylus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	11
Cnidaria	Eirenidae	Eutonina indicans	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	17	18	1171
Cnidaria	Eirenidae	Tima nigroannulata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	5	101
Cnidaria	Kirchenpaueriidae	Kirchenpaueria halecioides	NA	NA	No	5	1	0	0	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	10	17	46158
Cnidaria	Laodiceidae	Laodicea undulata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	37
Cnidaria	Malagazziidae	Malagazzia taeniogonia	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	9	181
Cnidaria	Mitrocomidae	Mitrocoma cellularia	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	25
Cnidaria	Mitrocomidae	Mitrocomella brownei	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	3
Cnidaria	NA	NA	NA	NA	No	6	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0	1	0	0	1	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	27	47	28371
Cnidaria	Obeliidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	11	4375
Cnidaria	Obeliidae	NA	NA	NA	No	6	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	1	0	0	1	0	1	0	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	106	92	453614
Cnidaria	Campanulariidae	Obelia bidentata	NA	Cryptogenic	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	1	0	0	1	0	0	0	0	0	1	1	1	1	19	59	12176
Cnidaria	Campanulariidae	Obelia dichotoma	NA	Cryptogenic	No	9	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	0	0	1	1	0	1	1	0	1	0	1	1	70	122	570274
Cnidaria	Campanulariidae	Obelia geniculata	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	859
Cnidaria	Plumulariidae	Plumularia setacea	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	12	22749
Cnidaria	Sugiuridae	Sugiura chengshanense	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Cnidaria	Olindiidae	Gonionemus vertens	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	19
Cnidaria	Olindiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Cnidaria	Olindiidae	Maeotias marginata	NIS	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	91
Cnidaria	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	3	4	135
Cnidaria	Agalmatidae	Agalma elegans	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	30
Cnidaria	Diphyidae	Chelophyes appendiculata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	223
Cnidaria	Diphyidae	Lensia campanella	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	22	3753
Cnidaria	Prayidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2	71
Cnidaria	NA	NA	NA	NA	No	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	66	40018
Cnidaria	Geryoniidae	Liriope tetraphylla	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	76
Cnidaria	Mastigiidae	NA	NA	NA	No	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Cnidaria	Pelagiidae	Chrysaora fuscescens	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	7	10	214
Cnidaria	Pelagiidae	Sanderia malayensis	NA	NA	No	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Cnidaria	Ulmaridae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	7	669
Cnidaria	Ulmaridae	Aurelia labiata	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	1	1	0	1	1	0	1	0	1	1	20	57	50998
Cnidaria	Ulmaridae	NA	NA	NA	No	5	0	0	0	0	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	18	25	21099
Cnidaria	Phacellophoridae	Phacellophora camtschatica	NA	Native	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	4	39
Cnidaria	Haliclystidae	Haliclystus inabai	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	23	318
Cnidaria	Haliclystidae	Haliclystus tenuis	NA	NA	No	2	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	106
Ctenophora	Haeckeliidae	Haeckelia beehleri	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Ctenophora	Pleurobrachiidae	Pleurobrachia bachei	NA	Native	No	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	1	1	28	34	2146
Ctenophora	Bolinopsidae	Bolinopsis microptera	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	4
Ctenophora	Bolinopsidae	Mnemiopsis leidyi	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Echinodermata	Asteriidae	Evasterias troschelii	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	6
Echinodermata	Asteriidae	Pisaster ochraceus	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	5	45	4541
Echinodermata	Asterinidae	Patiria miniata	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	8	12	420
Echinodermata	Strongylocentrotidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	2
Echinodermata	Strongylocentrotidae	Strongylocentrotus purpuratus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	4	4	63
Echinodermata	Dendrasteridae	Dendraster excentricus	NA	Native	No	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	31	95	39455
Echinodermata	Diadematidae	Centrostephanus coronatus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	37
Echinodermata	Sclerodactylidae	Eupentacta quinquesemita	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	3	86
Echinodermata	Sclerodactylidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	3	5	87
Echinodermata	Caudinidae	Paracaudina chilensis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12
Echinodermata	Amphiuridae	Amphipholis squamata	NA	Native	Cryptogenic	3	1	0	1	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	17	4036
Echinodermata	Amphiuridae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	3	60
Echinodermata	Amphiuridae	NA	NA	NA	No	2	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	16	1788
Echinodermata	Ophiactidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	10
Echinodermata	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12
Hemichordata	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	41
Kinorhyncha	Echinoderidae	Echinoderes kozloffi	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	6	202
Mollusca	Pharidae	Siliqua patula	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	6	27	665
Mollusca	Arcidae	Barbatia reeveana	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	54
Mollusca	Cardiidae	Clinocardium nuttallii	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	14	42	1260
Mollusca	Tellinidae	Macoma nasuta	NA	Native	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	1	1	0	1	0	1	1	13	28	857
Mollusca	Tellinidae	Tellina nuculoides	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	7	38	1953

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Mollusca	Lasaeidae	Kellia suborbicularis	NA	Native	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	1	1	0	0	1	1	14	15	324
Mollusca	Lasaeidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	31
Mollusca	Lasaeidae	Neaeromya rugifera	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	4	8	141
Mollusca	Corbulidae	Potamocorbula amurensis	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	40	12886
Mollusca	Teredinidae	Lyrodus pedicellatus	NIS	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	327
Mollusca	Teredinidae	Teredo bartschi	NIS	NIS	No	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	17
Mollusca	Teredinidae	Teredo navalis	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	11	149
Mollusca	Mytilidae	Adula californiensis	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	9	11	588
Mollusca	Mytilidae	Arcuatula papyria	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6
Mollusca	Mytilidae	Arcuatula senhousia	NIS	NIS	NIS	9	1	1	1	1	1	0	1	1	1	1	0	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	213	238	242406
Mollusca	Mytilidae	Geukensia demissa	NIS	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	48
Mollusca	Mytilidae	Mytilus californianus	NA	Native	No	4	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	26	27	535
Mollusca	Mytilidae	Mytilus galloprovincialis	NIS	NIS	Unresolved	7	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	1	0	1	1	1	0	0	1	1	0	1	1	0	0	0	0	0	44	108	24408
Mollusca	Mytilidae	Mytilus trossulus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	5	6	73
Mollusca	Mytilidae	Xenostrobus securis	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	16	1822
Mollusca	NA	NA	NA	NA	No	6	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	36	71	6601
Mollusca	Ostreidae	NA	NA	NA	No	3	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	18	416
Mollusca	Ostreidae	Ostrea lurida	NA	Native	Native	9	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	42	344	232052
Mollusca	Pectinidae	Argopecten ventricosus	NA	Native	No	3	0	0	0	0	1	0	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	12	1089
Mollusca	Mactridae	Tresus capax	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	2	15
Mollusca	Veneridae	Callithaca tenerrima	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	5	8	62
Mollusca	Veneridae	NA	NA	NA	No	3	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	4	5	70
Mollusca	Veneridae	Nutricola tantilla	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	22
Mollusca	Veneridae	Ruditapes philippinarum	NIS	NIS	NIS	9	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	1	0	0	1	1	1	0	1	1	1	1	0	0	1	0	0	0	1	1	44	91	8762
Mollusca	Veneridae	Saxidomus gigantea	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	5	75
Mollusca	Veneridae	Tivela stultorum	NA	Native	No	3	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	12	216
Mollusca	Aplysiidae	Aplysia californica	NA	Native	No	4	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	9	24	1024
Mollusca	Aplysiidae	Aplysia vaccaria	NA	Native	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	17	410
Mollusca	Aplysiidae	Phyllaplysia taylori	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	7	32	7077
Mollusca	Aglajidae	Aglaja ocelligera	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	6	6	96
Mollusca	Aglajidae	Melanochlamys diomedea	NA	Native	No	6	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	9	12	324
Mollusca	Aglajidae	Navanax inermis	NA	Native	Native	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	44
Mollusca	Aglajidae	NA	NA	NA	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	42	2318
Mollusca	Bullidae	Bulla gouldiana	NA	Native	No	4	1	0	1	1	1	0	1	1	0	1	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	100	117318
Mollusca	Gastropteridae	Gastropteron pacificum	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	5
Mollusca	Haminoeidae	Haloa japonica	NIS	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	7	25	25298
Mollusca	Haminoeidae	Haminoea vesicula	NA	Native	Native	7	0	0	1	1	1	0	1	1	1	0	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	60	116	27821
Mollusca	Haminoeidae	Haminoea virescens	NA	Native	No	4	0	0	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	60	6775
Mollusca	Philinidae	Philine kinglipini	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	1	1	0	0	1	1	0	0	1	0	1	52	99	34991
Mollusca	Trimusculidae	Trimusculus reticulatus	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	2
Mollusca	Fissurellidae	Fissurella volcano	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Mollusca	Fissurellidae	Fissurellidea bimaculata	NA	Native	No	2	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	4	4	973
Mollusca	Haliotidae	Haliotis fulgens	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Mollusca	Haliotidae	Haliotis rufescens	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	14
Mollusca	Atlantidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	42	26664
Mollusca	Calyptraeidae	Crepidula convexa	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	3	65
Mollusca	Calyptraeidae	Crepidula onyx	NA	Cryptogenic	Native	5	0	0	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	49	82	30318
Mollusca	Calyptraeidae	Crepidula plana	NIS	NIS	NIS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	45	74	130861
Mollusca	Calyptraeidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	202
Mollusca	Calyptraeidae	Crepipatella lingulata	NA	Native	Native	4	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	1212
Mollusca	Calyptraeidae	NA	NA	NA	No	7	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	34	86	14327
Mollusca	Cochliopidae	Spurwinkia salsa	NIS	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	46	113351
Mollusca	Littorinidae	Lacuna variegata	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	16	30	1885
Mollusca	Littorinidae	Lacuna vincta	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3	3	48
Mollusca	Littorinidae	Littorina plena	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	9	13	428
Mollusca	Littorinidae	Littorina scutulata	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	24
Mollusca	Pterotracheidae	Firoloida desmarestia	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	15	638
Mollusca	Velutinidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	77
Mollusca	Vermetidae	Thylacodes squamigerus	NA	NA	Native	3	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27	3651
Mollusca	Limapontiidae	Alderia willowi	NA	Native	No	5	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	11	12	135
Mollusca	Limapontiidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	39	40	1976
Mollusca	Limapontiidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	19	17	2465
Mollusca	Limapontiidae	Placida dendritica	NA	NIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	3	4	22
Mollusca	Limapontiidae	Stiliger fuscovittatus	NA	Cryptogenic	No	8	0	0	1	1	0	0	1	1	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	1	1	0	1	1	47	83	4107
Mollusca	Lottiidae	Lottia limatula	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	9	18	1284
Mollusca	Lottiidae	Lottia paradigitalis	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3	14	536
Mollusca	Lottiidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	3	4	37
Mollusca	Lottiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	31
Mollusca	Pyramidellidae	Boonea impressa	NA	ÑIS	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	13	554
Mollusca	Pyramidellidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	143
Mollusca	Pyramidellidae	NA	NA	NA	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	35	1861
Mollusca	Pyramidellidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	8	9	372
Mollusca	Pyramidellidae	Odostomia tenuisculpta	NA	Native	No	5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	18	16	646
Mollusca	Columbellidae	Alia carinata	NA	Native	Native	7	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	35	72	4465
Mollusca	Columbellidae	Columbella aureomexicana	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	87
Mollusca	Columbellidae	Mitrella gausapata	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	4	4	47
Mollusca	Columbellidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	4	4	177
Mollusca	Conidae	Californiconus californicus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	217
Mollusca	Nassariidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	0	1	1	5	5	365
Mollusca	Nassariidae	Nassarius mendicus	NA	Native	No	6	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	1	1	90	71	10065
Mollusca	Nassariidae	Ilyanassa obsoleta	NIS	NIS	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	6	83
Mollusca	Olividae	Callianax biplicata	NA	Native	No	7	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	34	64	8086
Mollusca	Aeolidiidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	16	46	3741
Mollusca	Aeolidiidae	Anteaeolidiella oliviae	NA	Native	Native	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	229
Mollusca	Apataidae	Apata pricei	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Mollusca	Arminidae	Armina californica	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	27
Mollusca	Chromodorididae	Felimare californiensis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8
Mollusca	Dorididae	Conualevia alba	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	10	200
Mollusca	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	5	4	1371
Mollusca	Coryphellidae	Coryphella trilineata	NA	Native	No	6	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	0	1	13	15	415
Mollusca	Coryphellidae	Coryphella trophina	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	5
Mollusca	Coryphellidae	NA	NA	NA	No	6	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	1	1	38	61	4285
Mollusca	Dendrodorididae	Doriopsilla albopunctata	NA	Native	No	3	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	81
Mollusca	Dendrodorididae	Doriopsilla davebehrensi	NA	Native	No	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Mollusca	Dendrodorididae	Doriopsilla gemela	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	19
Mollusca	Dendronotidae	Dendronotus albus	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	31
Mollusca	Dendronotidae	Dendronotus iris	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	6	8	93
Mollusca	Dendronotidae	Dendronotus subramosus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	4	4	41
Mollusca	Dendronotidae	Dendronotus venustus	NA	Native	No	5	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	1	77	52	47136
Mollusca	Tethydidae	Melibe leonina	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	14	15	1961
Mollusca	Dironidae	Dirona picta	NA	Native	Native	6	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	10	130
Mollusca	Dironidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	14	23	2068
Mollusca	Discodorididae	Diaulula sandiegensis	NA	Native	No	7	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	22	35	1420
Mollusca	Discodorididae	Peltodoris nobilis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	30
Mollusca	NA	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	5	11	616
Mollusca	Dorididae	Doris montereyensis	NA	Native	No	5	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	14	39	1654
Mollusca	Discodorididae	Geitodoris heathi	NA	Cryptogenic	No	5	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	11	13	399
Mollusca	Dotidae	Doto lancei	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	89
Mollusca	Dotidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	40
Mollusca	Eubranchidae	Eubranchus alexei	NA	Cryptogenic	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	16	32	784
Mollusca	Eubranchidae	Eubranchus olivaceus	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	4	4	48
Mollusca	Eubranchidae	Eubranchus rustyus	NA	Native	Native	7	0	0	1	1	0	0	1	1	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	149	84	32184
Mollusca	Eubranchidae	Leostyletus misakiensis	NIS	NIS	NIS	4	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	885
Mollusca	NA	NA	NA	NA	No	2	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	26
Mollusca	Abronicidae	Abronica abronia	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	35
Mollusca	Myrrhinidae	Hermissenda opalescens	NA	NIS	Native	8	0	0	1	1	1	0	1	1	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	47	109	27161
Mollusca	Facelinidae	Sakuraeolis enosimensis	NIS	NIS	NIS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	48	2449
Mollusca	Goniodorididae	Ancula gibbosa	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	7
Mollusca	Goniodorididae	Okenia angelensis	NA	NA	No	5	0	0	1	1	1	0	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	16	1173
Mollusca	Goniodorididae	Trapania velox	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	29
Mollusca	Janolidae	Antiopella barbarensis	NA	NA	Native	2	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	22
Mollusca	Janolidae	Antiopella fusca	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	9
Mollusca	Polyceridae	Triopha maculata	NA	Native	No	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	30
Mollusca	Onchidorididae	Acanthodoris rhodoceras	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	4	4	86
Mollusca	Corambidae	Corambe pacifica	NA	Native	No	3	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	74
Mollusca	Corambidae	Corambe steinbergae	NA	Native	No	4	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	16	981
Mollusca	Calycidorididae	Diaphorodoris lirulatocauda	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	4	334
Mollusca	Onchidorididae	Onchidoris bilamellata	NA	Cryptogenic	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	7	8	105
Mollusca	Onchidorididae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	19
Mollusca	Polyceridae	Polycera atra	NA	Cryptogenic	Native	5	0	0	1	1	0	0	1	1	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	19	22	1495
Mollusca	Polyceridae	Polycera hedgpethi	NA	Native	Native	8	0	0	1	1	1	0	1	1	1	1	0	1	1	0	0	0	1	1	1	0	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	36	57	4725
Mollusca	Trinchesiidae	Catriona columbiana	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	5	65
Mollusca	Trinchesiidae	Diaphoreolis lagunae	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9
Mollusca	Trinchesiidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	24
Mollusca	Trinchesiidae	Tenellia adspersa	NIS	NIS	NIS	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	7	6	309

Appendix 2-1. All taxa found by metabarcoding.

Phylum	Family	Species	NEMESIS Status	MLML classification	Collected in surveys	Number of Bay-Dates	SD_2021_f.soak	SD_2021_f.water	SD_2021_plankton	SD 202 all	MI_2021_f.soak	MI_2021_f.water	MI_2021_plankton	MI 2021 all	LB_2021_f.blend	LB_2021_f.soak	LB_2021_f.water	LB_2021_plankton	LB 2021 all	CI_2022_f.blend	CI_2022_f.soak	CI_2022_f.water	CI_2022_plankton	CI 2022 all	SF_2019_plankton	SF_2020_f.soak	SF_2021_f.blend	SF_2021_f.soak	SF_2021_f.water	SF_2021_plankton	SF 2021 all	SF_2022_f.soak	SF_2022_f.water	SF_2022_s.soak	SF_2022_s.water	SF 2022 all	BD_2022_f.soak	BD_2022_f.water	BD_2022_plankton	BD 2022 all	HB_2019_plankton	HB_2022_f.soak	HB_2022_f.water	HB_2022_plankton	HB 2022 all	ASV count	Sample count	Total Read Abundance
Mollusca	Trinchesiidae	Trinchesia albocrusta	NA	NA	Native	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	2	5	67
Mollusca	Tritoniidae	Tritonia exsulans	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	23
Mollusca	Tritoniidae	Tritonia festiva	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	4
Mollusca	Tritoniidae	Tritonia tetraquetra	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	38
Mollusca	Janolidae	Janolus anulatus	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	5	44
Mollusca	Pleurobranchidae	Berthella strongi	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10
Mollusca	Creseidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	436
Mollusca	Creseidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	71	29	64859
Mollusca	Creseidae	Creseis conica	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	24	10851
Mollusca	Creseidae	Creseis virgula	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	359
Mollusca	Cymbuliidae	Corolla spectabilis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	38	34391
Mollusca	Limacinidae	Limacina helicina	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	5	81
Mollusca	Siphonariidae	Williamia peltoides	NA	Native	No	3	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	70
Mollusca	Calliostomatidae	Calliostoma ligatum	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	2038
Mollusca	Margaritidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	4	4	119
Mollusca	Tegulidae	Norrisia norrisii	NA	Native	No	2	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	52
Mollusca	Tegulidae	Tegula aureotincta	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11	162
Mollusca	Tegulidae	Tegula brunnea	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	5	197
Mollusca	Tegulidae	Tegula eiseni	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	18	351
Mollusca	Tegulidae	Tegula funebralis	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	7	9	224
Mollusca	Tegulidae	Tegula gallina	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6
Mollusca	Trochidae	Lirularia succincta	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	13
Mollusca	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	38
Mollusca	Tylodinidae	Tylodina fungina	NA	NA	No	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Mollusca	Acanthochitonidae	Acanthochitona avicula	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	183
Mollusca	Chaetopleuridae	Chaetopleura lanuginosa	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	56
Mollusca	Ischnochitonidae	Stenoplax conspicua	NA	Native	No	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	201
Mollusca	Mopaliidae	Dendrochiton gothicus	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	45
Mollusca	Mopaliidae	Mopalia hindsii	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	423
Mollusca	Mopaliidae	Mopalia muscosa	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	4	161
Mollusca	Tonicellidae	Cyanoplax hartwegii	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	25
Nematoda	Linhomoeidae	Terschellingia longicaudata	NA	Cryptogenic	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	0	1	1	0	1	1	0	1	0	1	1	12	20	3292
Nematoda	Diplogastridae	Parapristionchus giblindavisi	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	14
Nematoda	Rhabditidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	13
Nemertea	Amphiporidae	NA	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	0	1	0	1	1	15	41	11426
Nemertea	Zygonemertidae	Zygonemertes virescens	NA	Cryptogenic	Cryptogenic	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	8	29	5677
Nemertea	Carcinonemertidae	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	11	21	3139
Nemertea	Emplectonematidae	Emplectonema gracile	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	97
Nemertea	Emplectonematidae	Emplectonema viride	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	72
Nemertea	Emplectonematidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	3	5	135
Nemertea	Emplectonematidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2	4	108
Nemertea	Neesiidae	Paranemertes californica	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	2	2	23
Nemertea	NA	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	1	11	28	3009
Nemertea	NA	Quasitetrastemma nigrifrons	NA	NA	No	5	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	21	22	1928
Nemertea	Ototyphlonemertidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	7	12	427
Nemertea	Ototyphlonemertidae	Ototyphlonemertes parmula	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	11
Nemertea	Ototyphlonemertidae	Ototyphlonemertes lactea	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	4	4	67
Nemertea	Poseidonemertidae	Poseidonemertes collaris	NA	NA	No	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	1	1	1	1	0	1	1	15	54	2668
Nemertea	Tetrastemmatidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	1	1	4	7	687
Nemertea	Tetrastemmatidae	Tetrastemma reticulatum	NA	NA	No	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
Nemertea	Cephalotrichidae	Cephalothrix spiralis	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	42
Nemertea	Cephalotrichidae	NA	NA	NA	No	9	1	0	0	1	1	0	0	1	1	1	0	1	1	1	1	0	0	1	1	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1	30	62	3919
Nemertea	Carinomidae	Carinoma hamanako	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	4	13	494
Nemertea	Carinomidae	Carinoma mutabilis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	10
Nemertea	Carinomidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	23
Nemertea	Tubulanidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	3	3	680
Nemertea	Tubulanidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	11	12	17751
Nemertea	Valenciniidae	Baseodiscus punnetti	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8
Nemertea	Baseodiscidae	NA	NA	NA	No	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	20
Nemertea	Lineidae	Cerebratulus californiensis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	32
Nemertea	Lineidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	50
Nemertea	Lineidae	Lineus flavescens	NA	Native	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	5	11	242
Nemertea	Lineidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	3
Nemertea	Lineidae	Maculaura alaskensis	NA	Native	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	7	8	427
Nemertea	Lineidae	Maculaura oregonensis	NA	Native	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	1	1	1	0	1	22	58	16770
Nemertea	Lineidae	Micrura wilsoni	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	20
Nemertea	Lineidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	97
Nemertea	NA	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	4	33
Nemertea	Riseriellidae	NA	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	6	489
Placozoa	Hoilungidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	18
Platyhelminthes	NA	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	16
Platyhelminthes	Callioplanidae	Kaburakia excelsa	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	18
Platyhelminthes	Callioplanidae	Koinostylochus elongatus	NA	NA	No	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	151
Platyhelminthes	Callioplanidae	NA	NA	NA	No	3	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	119
Platyhelminthes	Euplanidae	Euplana gracilis	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	6	22	36262
Platyhelminthes	Gnesiocerotidae	Echinoplana celerrima	NA	NA	No	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	102
Platyhelminthes	Ilyplanidae	Postenterogonia orbicularis	NA	NA	No	2	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	60
Platyhelminthes	NA	NA	NA	NA	No	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	18	30	6640
Platyhelminthes	Notocomplanidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	5	118
Platyhelminthes	Pseudocerotidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	1	9	8	1130
Platyhelminthes	Stylochidae	Stylochus ellipticus	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	15	32104
Porifera	Desmoxyidae	Desmoxya pelagiae	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	4
Porifera	NA	NA	NA	NA	No	6	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	1	1	0	1	0	1	1	0	0	1	0	1	0	1	1	11	33	3276
Porifera	Chondrillidae	Thymosiopsis conglomerans	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	339
Porifera	Clionaidae	Cliona celata	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Porifera	Clionaidae	Cliona chilensis	NA	NA	No	2	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	6	21	702
Porifera	Clionaidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	5	17	923
Porifera	Clionaidae	Clionaopsis platei	NA	NA	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	5	176
Porifera	Clionaidae	Pione velans	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
Porifera	Dictyodendrillidae	Igernella notabilis	NA	Cryptogenic	No	7	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	1	1	0	0	1	0	0	1	0	1	20	81	10030
Porifera	Dysideidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	3808
Porifera	Dysideidae	NA	NA	NA	No	3	1	0	1	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	239
Porifera	Chalinidae	NA	NA	NA	No	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	13	19122
Porifera	Chalinidae	Haliclona stilensis	NA	NA	No	9	1	1	0	1	1	0	0	1	1	1	0	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	1	1	0	1	1	0	1	19	103	52549
Porifera	Chalinidae	NA	NA	NA	No	4	1	1	1	1	1	0	0	1	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	27	154133
Porifera	Chalinidae	NA	NA	NA	No	5	1	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	9	22	2104
Porifera	NA	NA	NA	NA	No	8	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	1	0	0	1	0	0	1	0	1	17	97	11538
Porifera	NA	NA	NA	NA	No	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	70
Porifera	Niphatidae	Pachychalina tenera	NA	NA	No	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	485	243	731145
Porifera	Microcionidae	Ophlitaspongia papilla	NA	NIS	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	42
Porifera	Microcionidae	NA	NA	NA	No	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	4	4	97
Porifera	Mycalidae	Mycale cecilia	NA	NA	No	8	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	0	1	0	0	1	1	1	1	1	1	0	0	0	1	1	0	1	1	0	1	1	1	1	26	79	28194
Porifera	Mycalidae	Mycale fibrexilis	NA	Cryptogenic	No	6	1	0	0	1	1	0	1	1	0	1	0	0	1	1	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	12	25	1110
Porifera	Myxillidae	Myxilla incrustans	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	26
Porifera	Acarnidae	Acarnus levii	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8
Porifera	Spongillidae	Ephydatia cooperensis	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Porifera	Halichondriidae	Halichondria bowerbanki	NIS	Cryptogenic	No	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	44	245	126346
Porifera	Halichondriidae	Halichondria panicea	NA	Cryptogenic	No	6	0	0	0	0	1	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	1	1	0	1	1	0	1	0	0	1	11	35	4631
Porifera	Halichondriidae	NA	NA	NA	No	3	0	1	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	4	58
Porifera	Halichondriidae	NA	NA	NA	No	3	1	0	0	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	21	1042
Porifera	Halichondriidae	NA	NA	NA	No	6	1	0	0	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	1	0	1	12	45	2157
Porifera	Suberitidae	NA	NA	NA	No	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	328
Porifera	Suberitidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	143
Porifera	Suberitidae	Protosuberites mereui	NA	Cryptogenic	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	5
Porifera	Tethyidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	69
Porifera	Tethyidae	NA	NA	NA	No	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	55
Porifera	Tetillidae	Tetilla dactyloidea	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	15
Porifera	Tetillidae	NA	NA	NA	No	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Porifera	Oscarellidae	NA	NA	NA	No	2	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	85
Porifera	Oscarellidae	Oscarella carmela	NA	Native	No	3	0	0	0	0	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	4	7	361
Rotifera	Philodinidae	Rotaria rotatoria	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	26
Rotifera	Philodinidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	312
Rotifera	Euchlanidae	Euchlanis dilatata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	3
Rotifera	Brachionidae	Keratella cochlearis	NA	Native	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	2	16
Rotifera	Synchaetidae	NA	NA	NA	No	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	9	21	725
Rotifera	Synchaetidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	5	15	609
Rotifera	Synchaetidae	Polyarthra dolichoptera	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3	8	150
Rotifera	Synchaetidae	NA	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	9
Rotifera	Synchaetidae	Synchaeta grimpei	NA	NA	No	3	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	10	371
Rotifera	Synchaetidae	Synchaeta hutchingsi	NA	NA	No	4	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	14	33	1403
Rotifera	Synchaetidae	Synchaeta pectinata	NA	NA	No	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	8
Rotifera	Synchaetidae	Synchaeta triophthalma	NA	NA	No	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	1	1	0	1	1	0	1	1	0	1	1	1	1	0	1	1	21	110	11655
Rotifera	Synchaetidae	Synchaeta vorax	NA	NA	No	4	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	12	53	6083

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Annelida	Naididae	Allonais pectinata	69	FALSE	Australia,South Africa,Paraguay,Tajikistan,India,Iraq,TV⁹rkiye,Madagascar,Sudan,Congo, Democratic Republic of the,China,Somalia,Argentina,Nigeria,Central African Republic,South Sudan,United States of America,Korea, Republic of,Indonesia,Japan,Cambodia,Viet Nam,French Polynesia,Aruba,Venezuela (Bolivarian Republic of),Ethiopia,Togo	NA	NA	NA
Annelida	Naididae	Amphichaeta sannio	132	FALSE	Norway,Netherlands,Sweden,Spain,Ukraine,Russian Federation,Uzbekistan,Latvia,Germany,United Kingdom of Great Britain and Northern Ireland,TV⁹rkiye,Denmark,Poland,Finland,France,Italy,Viet Nam,Belgium,Estonia	72	FALSE	NA,GB
Annelida	Naididae	Aulophorus furcatus	731	TRUE	Netherlands,Australia,France,United States of America,Italy,Chinese Taipei,Spain,South Africa,Guadeloupe,Martinique,India,Saint BarthV©lemy,Saint Martin (French part),Azerbaijan,Ukraine,Russian Federation,Belarus,Latvia,Georgia,Uzbekistan,Iran (Islamic Republic of),Morocco,Iraq,Bangladesh,Romania,Nigeria,Argentina,TV⁹rkiye,Serbia,Brazil,United Kingdom of Great Britain and Northern Ireland,Switzerland,Ghana,Zimbabwe,Canada,China,Guyana,Uruguay,Sri Lanka,Haiti,Virgin Islands (British),unknown or invalid,Antigua and Barbuda,Anguilla,Puerto Rico,Venezuela (Bolivarian Republic of),Barbados,Poland,Somalia,Algeria,Germany,Central African Republic,South Sudan,Sudan,Ethiopia,Suriname,Costa Rica,Lao People,Ã©s Democratic Republic,Thailand,Luxembourg,Czechia,Bulgaria,Montenegro,Slovenia,Croatia,Hungary,Chad,Bolivia (Plurinational State of),Oman,Tanzania, United Republic of,Indonesia,Ecuador,Denmark,Ireland,Nepal,Japan,Cambodia,Israel,Egypt,Mexico,Viet Nam,Cayman Islands,Saint Kitts and Nevis,Montserrat,Dominica,Grenada,Trinidad and Tobago,Aruba,Sweden,Pakistan,Austria,Finland,Bosnia and Herzegovina,Benin,Belgium,Estonia,Moldova, Republic of	1	FALSE	NA
Annelida	Naididae	Paranais frici	509	TRUE	Netherlands,United States of America,Ukraine,France,Sweden,Australia,China,Spain,South Africa,Brazil,Russian Federation,Kyrgyzstan,Romania,Moldova, Republic of,Latvia,Georgia,Lithuania,TV⁹rkiye,Serbia,Canada,Bulgaria,Italy,Argentina,Poland,Germany,Hong Kong,Czechia,Slovakia,Finland,Austria,Japan,Belgium,Hungary,Montenegro,Bosnia and Herzegovina,Estonia	238	FALSE	NA,Australia
Annelida	Naididae	Paranais litoralis	1225	TRUE	Netherlands,Ukraine,Norway,United Kingdom of Great Britain and Northern Ireland,France,Canada,Germany,Sweden,United States of America,China,Australia,Spain,Iran (Islamic Republic of),Belgium,Finland,South Africa,Korea, Republic of,Estonia,Russian Federation,Georgia,Latvia,Lithuania,TV⁹rkiye,Egypt,Denmark,Morocco,Hong Kong,Bulgaria,Italy,Chinese Taipei,Faroe Islands,Poland,Serbia,Iceland,Argentina,Romania,Croatia,Iraq,Bolivia (Plurinational State of),Slovakia,Japan,Ireland,Israel,unknown or invalid,Montenegro,Czechia,Azerbaijan,Venezuela (Bolivarian Republic of)	1015	FALSE	NA,GB,IE,Denmark,Canada
Annelida	Naididae	Tubificoides brownae	123	TRUE	Ireland,Belgium,France,United States of America,United Kingdom of Great Britain and Northern Ireland,Canada,Saudi Arabia,Netherlands	459	TRUE	NA,US,GB,United States
Annelida	Naididae	Tubificoides diazi	353	FALSE	Belgium,France,United Kingdom of Great Britain and Northern Ireland,United States of America,Netherlands,Norway,Canada,Australia	209	FALSE	NA,United States,GB,IE,US
Annelida	Naididae	Tubificoides fraseri	67	TRUE	Iran (Islamic Republic of),United States of America,United Kingdom of Great Britain and Northern Ireland,New Zealand,Canada,Australia	1	FALSE	NA
Annelida	Naididae	Tubificoides heterochaetus	NA	NA	NA	NA	NA	NA
Annelida	Dorvilleidae	Dorvillea moniloceras	146	TRUE	United States of America,Colombia,Mexico,Canada	9	FALSE	USA,Colombia,Canada,Hawaiian Islands
Annelida	Dorvilleidae	Ophryotrocha diadema	NA	NA	NA	NA	NA	NA
Annelida	Dorvilleidae	Ophryotrocha labronica	NA	NA	NA	NA	NA	NA
Annelida	Dorvilleidae	Ophryotrocha xiamen	NA	NA	NA	NA	NA	NA
Annelida	Dorvilleidae	Protodorvillea gracilis	NA	NA	NA	NA	NA	NA
Annelida	Dorvilleidae	Schistomeringos longicornis	NA	NA	NA	NA	NA	NA
Annelida	Eunicidae	Marphysa californica	3	TRUE	United States of America	2	TRUE	United States
Annelida	Eunicidae	Marphysa sanguinea	NA	NA	NA	NA	NA	NA
Annelida	Eunicidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Lumbrineridae	Lumbrineris perkinsi	NA	NA	NA	NA	NA	NA
Annelida	Onuphidae	Diopatra ornata	238	TRUE	United States of America,Canada,Costa Rica,Mexico,Brazil,El Salvador	63	TRUE	United States of America,United States,USA,Costa Rica,NA,Canada,Brazil
Annelida	Capitellidae	Capitella teleta	29	FALSE	United States of America,Sweden,France,Korea, Republic of,China,unknown or invalid	53	FALSE	NA
Annelida	Capitellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Capitellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Capitellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Capitellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Chaetopteridae	Chaetopterus dewysee	25	TRUE	United States of America,unknown or invalid	9	TRUE	USA,NA
Annelida	Chaetopteridae	NA	NA	NA	NA	NA	NA	NA
Annelida	Chaetopteridae	Mesochaetopterus taylori	94	TRUE	Canada,United States of America,Mexico	99	FALSE	NA,Australia,United States,USA,Canada
Annelida	Dinophilidae	Dimorphilus gyrociliatus	17	FALSE	Sweden,France,Spain,United Kingdom of Great Britain and Northern Ireland,India	20	FALSE	NA
Annelida	Dinophilidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Maldanidae	Axiothella rubrocincta	146	TRUE	United States of America,Canada,Mexico,Costa Rica	46	TRUE	Canada,USA,NA,United States
Annelida	Maldanidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Maldanidae	Praxillella affinis	8856	TRUE	Norway,Sweden,Denmark,France,United States of America,United Kingdom of Great Britain and Northern Ireland,Canada,Isle of Man,Korea, Republic of,Italy,Greece,Ireland,Faroe Islands,Egypt,Greenland	13309	TRUE	NA,Sweden,Denmark,GB,United States,Japan,IE,Namibia,Canada,United States of America,Italy,Indonesia,USA
Annelida	NA	NA	NA	NA	NA	NA	NA	NA
Annelida	Opheliidae	Armandia brevis	564	TRUE	Canada,United States of America,Antarctica,Mexico,Panama,Costa Rica	415	TRUE	NA,United States,Canada,USA,Panama,United States of America
Annelida	Opheliidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Orbiniidae	Leitoscoloplos pugettensis	891	TRUE	Canada,Korea, Republic of,United States of America,unknown or invalid,Japan,Costa Rica,China,Mexico,Russian Federation,India	708	TRUE	NA,United States,Japan,Canada,Costa Rica,Korea, Republic of,USA,United States of America,Chile
Annelida	Orbiniidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Orbiniidae	Naineris dendritica	NA	NA	NA	NA	NA	NA
Annelida	Protodrilidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Alciopidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Rhynchonereella gracilis	67	TRUE	United States of America,Mexico,Cuba,Costa Rica,NA,Peru,Chile,Portugal,Madagascar,Italy	15	FALSE	NA,United States,Peru
Annelida	Chrysopetalidae	Chrysopetalum occidentale	425	TRUE	Korea, Republic of,United States of America,Colombia,Mexico,Canada,Belize,Brazil,Japan,Panama,Ecuador,France,NA	68	TRUE	Brazil,Colombia,Korea, Republic of,India,United States,NA,United States of America
Annelida	Chrysopetalidae	Hyalopale zerofskii	2	TRUE	Algeria,United States of America	1	TRUE	NA
Annelida	Chrysopetalidae	Paleanotus bellis	124	TRUE	United States of America,Canada,unknown or invalid,Mexico,Chile	87	TRUE	United States,USA,NA,Canada,United States of America
Annelida	Glyceridae	Glycera americana	1194	TRUE	United States of America,Canada,Chile,Mexico,unknown or invalid,Argentina,New Zealand,Japan,Cayman Islands,Brazil,Australia,Costa Rica,Russian Federation,French Southern Territories,NA,Uruguay	3019	TRUE	United States,NA,United States of America,Australia,Brazil,Chile,Brasil,USA,Japan,New Zealand,Costa Rica,Canada,Argentina,Indonesia,Cayman Islands
Annelida	Glyceridae	Hemipodia simplex	1007	TRUE	United States of America,Colombia,Peru,Chile,New Zealand,Brazil,Canada,Mexico,unknown or invalid,Australia,Bahamas,Argentina,NA	767	TRUE	NA,United States,New Zealand,USA,Brazil,Brasil,Canada,Australia,Mexico,Argentina,Chile
Annelida	Goniadidae	Glycinde armigera	1302	TRUE	Russian Federation,United States of America,Canada,Costa Rica,Mexico	653	TRUE	NA,United States of America,United States,Canada,Costa Rica,USA,Mexico
Annelida	Goniadidae	Glycinde picta	327	TRUE	Canada,United States of America,Brazil,El Salvador,Mexico	199	TRUE	NA,United States,Canada,USA,Brasil,Brazil
Annelida	Goniadidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Hesionidae	Amphiduros fuscescens	NA	NA	NA	NA	NA	NA
Annelida	Hesionidae	Micropodarke dubia	137	TRUE	Canada,United States of America,Korea, Republic of,Japan,Australia,New Caledonia	87	TRUE	NA,Canada,USA,Japan,Australia,India,United States

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Annelida	Hesionidae	Oxydromus pugettensis	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	Alitta succinea	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	NA	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	Cheilonereis cyclurus	109	TRUE	Canada,United States of America,Korea, Republic of,Russian Federation,unknown or invalid,Mexico,Japan	133	FALSE	NA,Canada,United States,Japan,USA
Annelida	Nereididae	Hediste diadroma	178	FALSE	United States of America,Korea, Republic of,Japan	48	FALSE	Japan
Annelida	Nereididae	NA	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	Micronereis nanaimoensis	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	NA	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	Neanthes acuminata	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	Nereis grubei	151	TRUE	United States of America,unknown or invalid,Canada,Mexico,Peru,Chile	14	TRUE	United States,United States of America,Mexico,NA
Annelida	Nereididae	Nereis latescens	107	TRUE	United States of America,Canada,Mexico	53	TRUE	United States,NA,United States of America
Annelida	Nereididae	Nereis vexillosa	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	NA	NA	NA	NA	NA	NA	NA
Annelida	Nereididae	Platynereis bicanaliculata	NA	NA	NA	NA	NA	NA
Annelida	Sigalionidae	Pholoides asperus	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Eteone longa	9712	FALSE	Norway,Svalbard and Jan Mayen,Sweden,Russian Federation,France,Denmark,United States of America,Mexico,Belgium,Korea, Republic of,Brazil,United Kingdom of Great Britain and Northern Ireland,Spain,Germany,NA,Tunisia,Canada,Ireland,Netherlands,Faroe Islands,Japan,unknown or invalid	29931	TRUE	NA,GB,Sweden,Netherlands,Germany,United States,Belgium,Denmark,Canada,Korea, Republic of,IE,Japan,UNITED STATES,United Kingdom,USA,Greece,United States of America,Ireland,Spain,Finland,Russia
Annelida	Phyllodocidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Eulalia aviculiseta	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Eulalia gracilior	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Eulalia levicornuta	26	TRUE	United States of America,Canada,Mexico	56	TRUE	Canada,NA,United States,USA
Annelida	Phyllodocidae	Eulalia quadrioculata	116	TRUE	Canada,United States of America,Mexico	24	TRUE	United States,USA,Canada,NA
Annelida	Phyllodocidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Eumida longicornuta	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Hypereteone heteropoda	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Phyllodocidae	Phyllodoce hartmanae	89	TRUE	United States of America,Brazil,Mexico	180	TRUE	NA,United States,USA,United States of America
Annelida	Phyllodocidae	Phyllodoce williamsi	50	TRUE	Canada,United States of America,Mexico	16	TRUE	USA,NA,United States,Canada
Annelida	Phyllodocidae	Pterocirrus montereyensis	33	TRUE	United States of America,Canada,Mexico	10	TRUE	USA,NA,Canada
Annelida	Polynoidae	Arctonoe vittata	299	TRUE	United States of America,Canada,unknown or invalid,Mexico	61	TRUE	NA,United States,Canada,USA
Annelida	Polynoidae	Halosydna brevisetosa	NA	NA	NA	NA	NA	NA
Annelida	Polynoidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Polynoidae	Harmothoe imbricata	NA	NA	NA	NA	NA	NA
Annelida	Polynoidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Polynoidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Polynoidae	Lepidasthenia berkeleyae	NA	NA	NA	NA	NA	NA
Annelida	Polynoidae	Lepidonotus squamatus	4187	TRUE	Netherlands,Norway,Germany,Canada,France,United States of America,Russian Federation,Sweden,Denmark,United Kingdom of Great Britain and Northern Ireland,Korea, Republic of,Belgium,China,Ireland,unknown or invalid,Philippines,Isle of Man,Mexico,NA,Guernsey,Trinidad and Tobago,Egypt,Portugal,Greenland,Saint Pierre and Miquelon,Spain,Cuba,Iceland	8672	TRUE	NA,United States of America,USA,GB,Netherlands,DK,Canada,IE,Russia,United States,Denmark,Germany,Sweden,Ireland,US,North Atlantic ocean NE,United Kingdom,North Pacific ocean,Philippines,Indonesia,Belgium
Annelida	Sigalionidae	Sthenelais berkeleyi	11	TRUE	United States of America,Canada,Mexico	15	TRUE	NA,Canada,USA
Annelida	Sigalionidae	Sthenelanella uniformis	64	TRUE	United States of America,Colombia,Costa Rica,Mexico,India	95	TRUE	NA,Mexico,United States,United States of America,Colombia,Brazil
Annelida	Syllidae	Amblyosyllis hectori	11	TRUE	United States of America	3	TRUE	United States of America
Annelida	Syllidae	Amblyosyllis nigrolineata	16	TRUE	United States of America	NA	NA	NA
Annelida	Syllidae	Epigamia noroi	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Megasyllis nipponica	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Myrianida convoluta	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Myrianida inermis	75	TRUE	United Kingdom of Great Britain and Northern Ireland,Norway,Greece,United States of America,Sweden	117	FALSE	NA,GB,IE
Annelida	Syllidae	Myrianida pachycera	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Myrianida pentadentata	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Odontosyllis detecta	6	FALSE	Australia	6	FALSE	Australia
Annelida	Syllidae	Odontosyllis phosphorea	107	TRUE	Canada,United States of America,unknown or invalid,Mexico,Belize,Panama	97	TRUE	NA,United States of America,Canada,United States
Annelida	Syllidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Proceraea nigropunctata	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Procerastea nematodes	8	TRUE	unknown or invalid,United Kingdom of Great Britain and Northern Ireland,Norway,South Africa,France,Portugal	41	FALSE	NA
Annelida	Syllidae	Syllis alternata	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Syllis elongata	103	TRUE	United States of America,Canada,Mexico	3	TRUE	United States of America
Annelida	Syllidae	Syllis nipponica*	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Syllis pigmentata	106	TRUE	United States of America,Canada,Mexico	9	TRUE	NA,Canada
Annelida	Syllidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Syllidae	Syllis japonica*	1	FALSE	Japan	1	FALSE	NA
Annelida	Sabellariidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Sabellariidae	Neosabellaria cementarium	118	TRUE	United States of America,Canada,Colombia,unknown or invalid,Korea, Republic of,Japan,Mexico,India	39	TRUE	United States,USA,United States of America,Canada,NA,Colombia
Annelida	Sabellariidae	Phragmatopoma californica	NA	NA	NA	NA	NA	NA
Annelida	Sabellidae	Chone magna	NA	NA	NA	NA	NA	NA
Annelida	Sabellidae	Chone mollis	87	TRUE	Canada,NA,Mexico,Greenland,Costa Rica,United States of America	83	TRUE	United States,NA,Canada
Annelida	Sabellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Sabellidae	Eudistylia vancouveri	900	TRUE	United States of America,Canada,China	19	FALSE	Canada,United States,NA,United States of America
Annelida	Sabellidae	Myxicola aesthetica	480	TRUE	France,Canada,United Kingdom of Great Britain and Northern Ireland,Ireland,Norway,United States of America	170	FALSE	NA,GB,Canada
Annelida	Sabellidae	Myxicola infundibulum	NA	NA	NA	NA	NA	NA
Annelida	Sabellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Sabellidae	Paradialychone ecaudata	139	TRUE	United States of America,Canada,unknown or invalid,Mexico	91	TRUE	Canada,NA,United States,United States of America,Indonesia
Annelida	Sabellidae	Parasabella crassichaetae	76	FALSE	Australia,United States of America	1	FALSE	NA
Annelida	Sabellidae	Parasabella pallida	56	TRUE	United States of America,Mexico,Costa Rica	NA	NA	NA
Annelida	Sabellidae	Schizobranchia insignis	NA	NA	NA	NA	NA	NA
Annelida	Serpulidae	Hydroides dirampha	257	FALSE	Morocco,Greece,Brazil,Hong Kong,United States of America,Australia,Panama,Korea, Republic of,Israel,Mexico,Trinidad and Tobago,Colombia,Netherlands,Antigua and Barbuda,South Africa,New Zealand,Cuba,India,Egypt,unknown or invalid,Virgin Islands (U.S.)	181	FALSE	Australia,United States,Hong Kong,NA,USA,US,Trinidad and Tobago,Panama,Greece,Mexico,Brazil,Israel,Hawaiian Islands,China
Annelida	Magelonidae	NA	NA	NA	NA	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Annelida	Spionidae	Boccardia proboscidea	280	TRUE	New Zealand,United States of America,Korea, Republic of,Sweden,United Kingdom of Great Britain and Northern Ireland,Ireland,South Africa,Argentina,Australia,Chile,Mexico,France	153	TRUE	Australia,United States,NA,New Zealand,Argentina
Annelida	Spionidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Spionidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Spionidae	Polydora cornuta	NA	NA	NA	NA	NA	NA
Annelida	Spionidae	Polydora hoplura	134	TRUE	France,Spain,Netherlands,United States of America,Korea, Republic of,Brazil,Italy,South Africa,New Zealand,Japan,Australia,United Kingdom of Great Britain and Northern Ireland,Belgium,NA,Greece	89	FALSE	NA,Greece,Australia,South Africa,Japan,New Zealand
Annelida	Spionidae	Pseudopolydora bassarginensis	24	FALSE	Russian Federation,United States of America,Korea, Republic of	NA	NA	NA
Annelida	Spionidae	Pseudopolydora paucibranchiata	9516	TRUE	Norway,France,Korea, Republic of,Sweden,Netherlands,Denmark,Russian Federation,United States of America,Svalbard and Jan Mayen,United Kingdom of Great Britain and Northern Ireland,Belgium,Australia,New Zealand,Greece,Japan,Ireland	12750	TRUE	NA,Australia,GB,Sweden,United States,Korea, Republic of,US,United States of America,Belgium,New Zealand,Japan
Annelida	Spionidae	Spiophanes duplex	771	TRUE	Chile,United States of America,Brazil,Costa Rica,China,Egypt,Mexico,Greece,Puerto Rico,Argentina,Uruguay,South Africa,South Georgia and the South Sandwich Islands,Antarctica	798	TRUE	NA,Namibia,India,Brasil,Brazil,Argentina,Chile,United States,United States of America,Uruguay,Costa Rica,Puerto Rico,Greece
Annelida	Spionidae	Spiophanes hakaiensis	4	FALSE	Canada	1	FALSE	NA
Annelida	Spionidae	Streblospio benedicti	2594	TRUE	Sweden,Netherlands,Belgium,United States of America,France,Trinidad and Tobago,Canada,Mexico,Spain,Poland,Germany,Belize,Venezuela (Bolivarian Republic of)	7511	TRUE	NA,US,United States,Netherlands,Canada,Sweden,Brazil,Lithuania,Belgium,Germany,Venezuela,USA,Poland,United States of America
Annelida	Ampharetidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	Cirriformia moorei	5	TRUE	United States of America	28	TRUE	NA,United States
Annelida	Cirratulidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	Ctenodrilus serratus	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	Raphidrilus misakiensis	NA	NA	NA	NA	NA	NA
Annelida	Cirratulidae	Tharyx setigera	51	FALSE	United States of America	60	FALSE	United States,USA,NA
Annelida	Pectinariidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Pectinariidae	Pectinaria californiensis	319	TRUE	United States of America,Canada,Mexico,Costa Rica	602	TRUE	NA,United States,Canada,USA,United States of America
Annelida	Terebellidae	Amphitrite ornata	76	FALSE	United States of America,Sweden,Canada	95	FALSE	Australia,USA,United States,NA,United States of America
Annelida	Terebellidae	Eupolymnia heterobranchia	111	TRUE	Canada,United States of America,Costa Rica,Mexico	19	TRUE	USA,United States,Canada,NA,United States of America
Annelida	Terebellidae	NA	NA	NA	NA	NA	NA	NA
Annelida	Terebellidae	Neoamphitrite robusta	NA	NA	NA	NA	NA	NA
Annelida	Terebellidae	Nicolea amnis	322	FALSE	Philippines,Australia	395	FALSE	Australia,NA,Philippines
Annelida	Terebellidae	Polycirrus californicus	44	TRUE	American Samoa,United States of America,unknown or invalid,Mexico,Canada	93	TRUE	NA,Canada,United States
Annelida	Terebellidae	Streblosoma uncinatus	NA	NA	NA	NA	NA	NA
Annelida	Urechidae	Urechis caupo	91	TRUE	United States of America,Mexico,Canada,Panama	6	TRUE	Canada,USA,Mexico,NA,United States
Arthropoda	Agelenidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Anyphaenidae	Anyphaena pacifica	286	TRUE	Canada,United States of America	NA	NA	NA
Arthropoda	Linyphiidae	Erigone arctica	1457	FALSE	Norway,Canada,Netherlands,Svalbard and Jan Mayen,Denmark,United Kingdom of Great Britain and Northern Ireland,Finland,Germany,United States of America,Ireland,Greenland,France,Belgium,Estonia,vÖland Islands,Sweden,Russian Federation	66	FALSE	NA
Arthropoda	Lycosidae	Pardosa altamontis	102	TRUE	United States of America,Canada	NA	NA	NA
Arthropoda	Acaridae	Tyrophagus fanetzhangorum	1	FALSE	Korea, Republic of	NA	NA	NA
Arthropoda	Acaridae	Tyrophagus putrescentiae	571	TRUE	Australia,Chinese Taipei,Sweden,Estonia,United States of America,Spain,Mexico,Korea, Republic of,Canada,Brazil,New Zealand,Guadeloupe,Netherlands,NA,Ghana,Cuba,Italy,Portugal,Greece,Argentina,Germany,India,China,Singapore,United Kingdom of Great Britain and Northern Ireland,Czechia,Japan,Costa Rica,Peru,Colombia,Belgium,Congo, Democratic Republic of the,Rwanda,France,Myanmar,Austria,Mayotte,Paraguay,Papua New Guinea,Tunisia,Ecuador,Kenya,Indonesia,Ukraine	NA	NA	NA
Arthropoda	Phenopelopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Pyroglyphidae	Dermatophagoides pteronyssinus	338	FALSE	Chinese Taipei,Benin,China,United States of America,Pakistan,Singapore,Malaysia,Australia,Mexico,Niue,Netherlands,Canada,NA,Brazil,Japan,Burundi,French Polynesia,Rwanda,Congo, Democratic Republic of the,Peru,Germany,Morocco	NA	NA	NA
Arthropoda	Halacaridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Tydeidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Bosminidae	Bosmina liederi	219	FALSE	Canada,Mexico,United States of America	NA	NA	NA
Arthropoda	Bosminidae	Bosmina longirostris	7362	FALSE	Belgium,United States of America,Germany,Sweden,Ukraine,Russian Federation,Thailand,Norway,Austria,Japan,Czechia,Uganda,Spain,Argentina,Canada,Hong Kong,United Kingdom of Great Britain and Northern Ireland,France,Mexico,Nigeria,Brazil,Korea, Republic of,Netherlands,Colombia,Switzerland,Italy,Botswana,Ecuador,Tanzania, United Republic of,Estonia,Denmark,Finland,TV?rkiye,Ireland,Portugal,Mozambique,Zimbabwe,South Africa,Greece,India	NA	NA	NA
Arthropoda	Bosminidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cercopagididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Chydoridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Chydoridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Daphniidae	Ceriodaphnia dubia	375	FALSE	Ukraine,United States of America,Russian Federation,Uganda,Spain,Canada,United Kingdom of Great Britain and Northern Ireland,Brazil,Mexico,Belgium,Guatemala,Germany,India,Mongolia,Norway,South Africa	NA	NA	NA
Arthropoda	Daphniidae	Daphnia mendotae	467	TRUE	Canada,United States of America	NA	NA	NA
Arthropoda	Daphniidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Holopediidae	Holopedium glacialis	55	FALSE	Canada	NA	NA	NA
Arthropoda	Leptodoridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Macrotrichidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Podonidae	Evadne nordmanni	NA	NA	NA	NA	NA	NA
Arthropoda	Podonidae	Evadne spinifera	NA	NA	NA	NA	NA	NA
Arthropoda	Podonidae	Pleopis polyphemoides	NA	NA	NA	NA	NA	NA
Arthropoda	Podonidae	Podon leuckarti	NA	NA	NA	NA	NA	NA
Arthropoda	Podonidae	Pseudevadne tergestina	NA	NA	NA	NA	NA	NA
Arthropoda	Sididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Sididae	Penilia avirostris	NA	NA	NA	NA	NA	NA
Arthropoda	Sididae	Sida crystallina	4883	FALSE	Russian Federation,Sweden,United Kingdom of Great Britain and Northern Ireland,Norway,United States of America,Canada,Netherlands,Germany,Finland,France,China,Belgium,Mexico,Denmark,Estonia,Ireland	36	FALSE	NA,Belgium,United States
Arthropoda	Entomobryidae	Entomobrya atrocincta	9999	TRUE	United States of America,Mexico,Spain,Australia,France,Russian Federation,Canada,South Africa,Argentina,Egypt,Bulgaria	NA	NA	NA
Arthropoda	Isotomidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Acartiidae	Acartia californiensis	NA	NA	NA	NA	NA	NA
Arthropoda	Acartiidae	Acartia danae	2339	TRUE	Australia,NA,Korea, Republic of,Namibia,Canada,United States of America,Brazil,Indonesia,Ghana,Mexico,Colombia,Nigeria,Portugal,New Caledonia,New Zealand,Venezuela (Bolivarian Republic of),Ireland,Madagascar,Chile,Chinese Taipei,Viet Nam,China,Ecuador,Japan,Spain,Benin,Marshall Islands,Kiribati,Fiji,Tonga,Norfolk Island,Mauritius,Christmas Island,Bermuda,Philippines,Peru,Panama,Seychelles,Kenya	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Arthropoda	Acartiidae	Acartia hudsonica	NA	NA	NA	NA	NA	NA
Arthropoda	Acartiidae	Acartia longiremis	8931	TRUE	Canada,Norway,United States of America,NA,Svalbard and Jan Mayen,Sweden,Denmark,Latvia,Iceland,Brazil,Faroe Islands,Russian Federation,Australia,Nigeria,Netherlands,United Kingdom of Great Britain and Northern Ireland,Japan,Spain,Germany,Portugal,Chinese Taipei,Finland,France,Estonia,Poland,Guernsey,Belgium,Ireland,Marshall Islands,Kiribati,New Zealand,Tonga,Christmas Island,Indonesia,Chile	NA	NA	NA
Arthropoda	Acartiidae	Acartia tonsa	NA	NA	NA	NA	NA	NA
Arthropoda	Acartiidae	Acartiella sinensis	NA	NA	NA	NA	NA	NA
Arthropoda	Calanidae	Calanus marshallae	4454	TRUE	United States of America,NA,Canada,Russian Federation,Japan	4153	FALSE	UNITED STATES,CANADA,NA,SOVIET UNION,United States,Canada
Arthropoda	Calanidae	Calanus pacificus	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Ctenocalanus vanus	NA	NA	NA	NA	NA	NA
Arthropoda	Paracalanidae	Calocalanus kristalli	37	FALSE	Australia,unknown or invalid	3760	FALSE	Australia,SOVIET UNION,NA
Arthropoda	Paracalanidae	Calocalanus minutus	119	FALSE	NA,Australia,Indonesia,United States of America,unknown or invalid,New Zealand	116	FALSE	NA,New Zealand
Arthropoda	Paracalanidae	Calocalanus tenuis	NA	NA	NA	NA	NA	NA
Arthropoda	Calocalanidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Candaciidae	Candacia bipinnata	1523	TRUE	Australia,NA,Canada,Korea, Republic of,Sweden,United States of America,Portugal,United Kingdom of Great Britain and Northern Ireland,Chile,Japan,Chinese Taipei,Spain,Mexico,New Zealand,Norfolk Island,Venezuela (Bolivarian Republic of),Trinidad and Tobago,Suriname,Peru,Christmas Island,Marshall Islands,Brazil,Philippines,Costa Rica	1875	TRUE	NA,SOVIET UNION,Brazil,CANADA,Australia,Korea, Republic of,JAPAN,Portugal,Lebanon,Japan,Chile,New Zealand,Philippines,Republic of the Marshall Islands,Venezuela,United States,Commonwealth of Australia,South Africa,Peru,Spain,Mexico
Arthropoda	Candaciidae	Candacia curta	286	FALSE	unknown or invalid,Brazil,Australia,United States of America,Korea, Republic of,Norway,NA,Mexico,Chile,Spain,Portugal,Chinese Taipei,Ecuador,Venezuela (Bolivarian Republic of),Canada,Japan,CV¥te d,Äôlvoire,Nigeria,Guyana,Saudi Arabia,Peru,Christmas Island,Micronesia (Federated States of),Kiribati,Indonesia,Marshall Islands,Nauru,Northern Mariana Islands,India,Bermuda,Russian Federation,Costa Rica	480	FALSE	NA,SOVIET UNION,Indonesia,JAPAN,Australia,Republic of the Marshall Islands,Venezuela,Ecuador,Brazil,Russia,GREAT BRITAIN,South Africa,United States,Peru,Nauru,Northern Mariana Islands,India,Japan
Arthropoda	Centropagidae	Centropages abdominalis	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Clausocalanus arcuicornis	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Clausocalanus furcatus	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Clausocalanus jobei	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Clausocalanus parapergens	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Clausocalanus pergens	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Clausocalanidae	Pseudocalanus acuspes	1785	FALSE	Sweden,Japan,Svalbard and Jan Mayen,Norway,United States of America,unknown or invalid,Canada,Greenland,Russian Federation,NA	2842	FALSE	NA,Estonia
Arthropoda	Clausocalanidae	Pseudocalanus mimus	NA	NA	NA	NA	NA	NA
Arthropoda	Diaptomidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Diaptomidae	Skistodiaptomus oregonensis	75	FALSE	Canada,United States of America	NA	NA	NA
Arthropoda	Eucalanidae	Eucalanus californicus	NA	NA	NA	NA	NA	NA
Arthropoda	Eucalanidae	Eucalanus hyalinus	1241	FALSE	NA,Namibia,Australia,Faroe Islands,United Kingdom of Great Britain and Northern Ireland,Portugal,Iceland,New Zealand,Ireland,Korea, Republic of,Chile,Canada,United States of America,Chinese Taipei,Russian Federation,Japan,Norway,France,Mexico,Spain,New Caledonia,Norfolk Island	1267	FALSE	NA,New Zealand,Chile,Spain,Commonwealth of Australia,Australia,New Caledonia,Colombia
Arthropoda	Eucalanidae	Pareucalanus attenuatus	841	FALSE	Philippines,unknown or invalid,Korea, Republic of,Australia,NA,Mexico,Chinese Taipei,Madagascar,Portugal,Chile,Viet Nam,China,Ecuador,Japan,Italy,Marshall Islands,Kiribati,Tuvalu,Fiji,New Zealand,Tonga,Venezuela (Bolivarian Republic of),Martinique,Mauritius,Somalia,Sudan,Saudi Arabia,Maldives,United States of America,Christmas Island,Micronesia (Federated States of),United States Minor Outlying Islands,French Polynesia,Indonesia,Nauru,Northern Mariana Islands,India,Bermuda,Colombia,Brazil,Canada,Russian Federation,Guatemala,Costa Rica,Peru,Mayotte,France,Seychelles,Cabo Verde	5601	FALSE	SOVIET UNION,NA,UNITED STATES,JAPAN,Indonesia,Somalia,Chile,United States,Micronesia,Australia,Spain,Portugal,Brazil,Venezuela,Peru,Japan,Lebanon,Canada,New Zealand,Nauru,Philippines,Vietnam,Republic of the Marshall Islands,Mexico,GREAT BRITAIN,Ecuador,Korea, Republic of,South Africa,Bermuda,Italy,India,Northern Mariana Islands,Kiribati
Arthropoda	Rhincalanidae	Rhincalanus nasutus	2668	TRUE	Australia,NA,Philippines,Suriname,United States of America,Korea, Republic of,Faroe Islands,United Kingdom of Great Britain and Northern Ireland,Norway,Svalbard and Jan Mayen,Iceland,France,Ireland,Canada,Spain,Portugal,Chile,Chinese Taipei,Ghana,Nigeria,unknown or invalid,Ecuador,Venezuela (Bolivarian Republic of),Mexico,Japan,Saint Pierre and Miquelon,New Zealand,Netherlands,Kiribati,Tuvalu,Fiji,Norfolk Island,Brazil,Somalia,Saudi Arabia,Sudan,Indonesia,Bermuda,Bahamas,Peru,Maldives,India,South Africa	6708	TRUE	SOVIET UNION,NA,JAPAN,Australia,Lebanon,UNITED STATES,GREAT BRITAIN,Chile,Commonwealth of Australia,New Zealand,Portugal,United States,Indonesia,Ecuador,Philippines,Peru,Japan,United Kingdom,Brazil,Venezuela,KOREA; REPUBLIC OF,South Africa,Spain,India,Bermuda
Arthropoda	Lucicutiidae	Lucicutia flavicornis	2996	FALSE	Australia,NA,Canada,United States of America,Brazil,Korea, Republic of,Indonesia,Colombia,Mexico,Spain,Italy,New Caledonia,Philippines,New Zealand,Chile,Chinese Taipei,Madagascar,Norfolk Island,Viet Nam,Japan,China,Ecuador,Malaysia,Bahamas,Marshall Islands,Kiribati,Fiji,Tonga,Venezuela (Bolivarian Republic of),Mauritius,Sudan,Christmas Island,Nauru,Micronesia (Federated States of),Northern Mariana Islands,Bermuda,Portugal,Peru,Anguilla,France,Kenya,Seychelles	13642	FALSE	SOVIET UNION,NA,Commonwealth of Australia,JAPAN,UNITED STATES,Australia,Lebanon,Italy,Chile,New Zealand,Philippines,Nauru,Republic of the Marshall Islands,Spain,Brazil,Venezuela,United States,Colombia,Japan,Northern Mariana Islands,Kenya,GREAT BRITAIN,Vietnam,Korea, Republic of,Micronesia,Kiribati,Ecuador,South Africa,Canada,India
Arthropoda	Paracalanidae	Mecynocera clausi	NA	NA	NA	NA	NA	NA
Arthropoda	Metridinidae	Metridia lucens	9991	FALSE	Norway,NA,Canada,United States of America,unknown or invalid,Namibia,Australia,Svalbard and Jan Mayen,United Kingdom of Great Britain and Northern Ireland,France,Faroe Islands,Netherlands,Germany,Iceland,Antarctica,New Zealand,Denmark,Japan,Sweden,Ireland,Saint Pierre and Miquelon,Guernsey,Spain,Greenland,Portugal,Falkland Islands (Malvinas),South Georgia and the South Sandwich Islands,Philippines	88088	FALSE	SOVIET UNION,NA,GREAT BRITAIN,UNITED STATES,Ross Dependency,UK,Portugal,Sweden,CANADA,Chile,Australia,GERMANY,Antarctica,United Kingdom,Canada,JAPAN,New Zealand,United States of America,KOREA; REPUBLIC OF,United States,GB,Argentina,South Sandwich Islands,Philippines,Denmark
Arthropoda	Metridinidae	Pleuromamma abdominalis	7306	TRUE	Australia,United States of America,NA,Namibia,Suriname,Canada,Brazil,Korea, Republic of,United Kingdom of Great Britain and Northern Ireland,Faroe Islands,Portugal,New Zealand,France,Mexico,Japan,Chile,unknown or invalid,Iceland,Spain,Ireland,China,Thailand,Indonesia,New Caledonia,Greece,Saudi Arabia,Sudan,South Sudan,Congo, Democratic Republic of the,Libya,Egypt,TVºrkiye,Madagascar,Chinese Taipei,Iraq,Iran (Islamic Republic of),India,Ecuador,Venezuela (Bolivarian Republic of),Italy,Benin,Togo,Antarctica,Kiribati,French Polynesia,Norway,Marshall Islands,Fiji,Tonga,Norfolk Island,Somalia,Maldives,Bermuda,Micronesia (Federated States of),Northern Mariana Islands,Ghana,Liberia,Cabo Verde,Philippines	13234	TRUE	NA,SOVIET UNION,Mexico,Portugal,Venezuela,GREAT BRITAIN,Australia,UNITED STATES,Lebanon,Chile,New Zealand,United States,Japan,Brazil,India,Ecuador,JAPAN,FRANCE,Northern Mariana Islands,Bermuda,Spain,Commonwealth of Australia,Philippines,Canada,Italy,Republic of the Marshall Islands
Arthropoda	Metridinidae	Pleuromamma borealis	9348	TRUE	Australia,unknown or invalid,Namibia,NA,Suriname,France,United Kingdom of Great Britain and Northern Ireland,Canada,United States of America,Ireland,Iceland,Saint Pierre and Miquelon,Portugal,Spain,New Zealand,Norway,Faroe Islands,Chinese Taipei,Ecuador,South Georgia and the South Sandwich Islands,Mexico,Guernsey,Greenland,Denmark,Venezuela (Bolivarian Republic of),Brazil,Guyana,Indonesia,Philippines	13655	TRUE	NA,SOVIET UNION,GREAT BRITAIN,Brazil,Australia,UNITED STATES,France,Ecuador,Venezuela,New Zealand,Spain,Canada,Philippines
Arthropoda	Metridinidae	Pleuromamma gracilis	9964	TRUE	Australia,unknown or invalid,South Africa,Namibia,NA,Suriname,Brazil,Canada,New Zealand,United Kingdom of Great Britain and Northern Ireland,France,Italy,Ireland,Colombia,Iceland,Korea, Republic of,Spain,United States of America,Portugal,Mexico,Japan,Norway,Chile,Chinese Taipei,Madagascar,Denmark,China,Ecuador,Antarctica,Faroe Islands,Marshall Islands,Tonga,Venezuela (Bolivarian Republic of),Norfolk Island,Bermuda,Greenland,Somalia,Maldives,Christmas Island,Indonesia,Micronesia (Federated States of),Northern Mariana Islands	16275	TRUE	NA,SOVIET UNION,Venezuela,Australia,New Zealand,Lebanon,Spain,Portugal,GREAT BRITAIN,JAPAN,United States,UNITED STATES,Northern Mariana Islands,Chile,Colombia,Brazil,Italy,Commonwealth of Australia,Mexico,Japan,Philippines,Ecuador,Republic of the Marshall Islands,India,Micronesia,Russia,Panama,South Africa,Bermuda
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Paracalanidae	NA	NA	NA	NA	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Arthropoda	Paracalanidae	Paracalanus nanus	155	FALSE	Italy,Chile,Australia,Chinese Taipei,unknown or invalid,Portugal,NA,Bermuda,Philippines	1393	FALSE	NA,SOVIET UNION,Chile,Lebanon,Italy,Australia,Spain,Philippines
Arthropoda	Paracalanidae	Paracalanus quasimodo	462	FALSE	Italy,Colombia,United States of America,Venezuela (Bolivarian Republic of),Algeria,Greece,Brazil,unknown or invalid,Spain,France,Mauritania,Tunisia,Mexico,Japan,Bermuda	793	FALSE	UNITED STATES,Brazil,NA,Venezuela,Colombia,United States,Japan
Arthropoda	Paracalanidae	Paracalanus tropicus	NA	NA	NA	NA	NA	NA
Arthropoda	Paracalanidae	Parvocalanus crassirostris	NA	NA	NA	NA	NA	NA
Arthropoda	Pontellidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Pseudodiaptomidae	Pseudodiaptomus forbesi	79	TRUE	China,United States of America	5	TRUE	United States,NA
Arthropoda	Pseudodiaptomidae	Pseudodiaptomus marinus	NA	NA	NA	NA	NA	NA
Arthropoda	Scolecitrichidae	Scolecithrix danae	2081	FALSE	Australia,Namibia,Suriname,Korea, Republic of,NA,Brazil,United States of America,Canada,Japan,Portugal,Venezuela (Bolivarian Republic of),France,Mexico,Philippines,New Zealand,Chinese Taipei,Spain,Viet Nam,China,Ecuador,Saint Pierre and Miquelon,CV¥te d,Âôlvoire,Liberia,Benin,Nigeria,Togo,Marshall Islands,Kiribati,Norfolk Island,Chile,Maldives,Christmas Island,Micronesia (Federated States of),United States Minor Outlying Islands,French Polynesia,Indonesia,Nauru,Northern Mariana Islands,Mauritania,Bahamas,Peru,Trinidad and Tobago,Mayotte,Madagascar,unknown or invalid,Kenya	5681	FALSE	NA,SOVIET UNION,Brazil,Kenya,Kiribati,JAPAN,Venezuela,Republic of the Marshall Islands,Philippines,Australia,Portugal,Colombia,Indonesia,United States,GREAT BRITAIN,South Africa,Ecuador,New Zealand,Spain,Micronesia,Korea, Republic of,India,Vietnam,Japan,Peru,Nauru,Mexico,Commonwealth of Australia,Chile,Northern Mariana Islands
Arthropoda	Temoridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Temoridae	Temora discaudata	NA	NA	NA	NA	NA	NA
Arthropoda	Tortanidae	Tortanus derjugini	NA	NA	NA	NA	NA	NA
Arthropoda	Tortanidae	Tortanus dextrilobatus	NA	NA	NA	NA	NA	NA
Arthropoda	Tortanidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	Acanthocyclops americanus	273	TRUE	Russian Federation,United States of America,Spain,Canada,Mexico,Ukraine,Germany,France,Bolivia (Plurinational State of)	NA	NA	NA
Arthropoda	Cyclopidae	Acanthocyclops brevispinosus	6	FALSE	United States of America,Canada	NA	NA	NA
Arthropoda	Cyclopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopidae	Thermocyclops crassus	389	FALSE	Sweden,Russian Federation,Norway,India,Nigeria,United States of America,Canada,Korea, Republic of,Netherlands,Mexico,Belgium,Estonia,France,United Kingdom of Great Britain and Northern Ireland,Malaysia,Germany	NA	NA	NA
Arthropoda	Mytilicolidae	Mytilicola orientalis	69	TRUE	United States of America,Sweden,France,Canada,Korea, Republic of,Germany	50	TRUE	US,CA,NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cyclopettidae	Limnoithona sinensis	41	TRUE	China,Korea, Republic of,United States of America	4	TRUE	US,United States
Arthropoda	Cyclopettidae	Limnoithona tetraspina	24	TRUE	United States of America	NA	NA	NA
Arthropoda	Oithonidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Oithonidae	Oithona similis	10000	FALSE	Norway,NA,Canada,United States of America,Korea, Republic of,Sweden,Australia,Svalbard and Jan Mayen,Denmark,Antarctica,Brazil,United Kingdom of Great Britain and Northern Ireland,New Zealand,Latvia,Indonesia,Romania,Ukraine,Russian Federation,Georgia	136525	FALSE	NA,Germany,Poland,SOVIET UNION,UNITED STATES,Denmark,Sweden,GERMANY,Romania,Chile,Australia,Canada,Korea, Republic of,JAPAN,Antarctica,Italy,United States of America,Ukraine,Finland,Ross Dependency,CANADA,Venezuela,Vietnam,Malaysia,USA,Spain,BELGIUM,Philippines,Lithuania,New Zealand,Lebanon,GB,Antv"rtida,India,Brazil,Indonesia,United States,Ecuador
Arthropoda	Ameiridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cletodidae	Geehydrosoma intermedia	NA	NA	NA	NA	NA	NA
Arthropoda	Dactylopusiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Dactylopusiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ectinosomatidae	Ectinosoma melaniceps	84	TRUE	Norway,United States of America,Russian Federation,Ukraine,United Kingdom of Great Britain and Northern Ireland,Netherlands,Germany,Denmark,Belgium,Saint Helena, Ascension and Tristan da Cunha,Ecuador,Canada,Argentina,India	116	FALSE	NA,Ukraine,USA,Russia,GB,United States
Arthropoda	Ectinosomatidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Harpacticidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Laophontidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Miraciidae	Amonardia perturbata	9	TRUE	United States of America,Canada,New Zealand	7	FALSE	NA,USA,New Zealand,Canada
Arthropoda	Miraciidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Miraciidae	Amphiascopsis cinctus	44	TRUE	Norway,unknown or invalid,United States of America,Sweden,France,Belgium,Saint Helena, Ascension and Tristan da Cunha,Argentina,Indonesia,New Zealand,India,NA,Australia,Canada,Bermuda	29	FALSE	USA,United States,NA,New Zealand,India,Bermuda
Arthropoda	Miraciidae	Diosaccus spinatus	NA	NA	NA	NA	NA	NA
Arthropoda	Miraciidae	Itostenhelia polyhymnia	NA	NA	NA	NA	NA	NA
Arthropoda	Miraciidae	Sarsamphiascus kawamurai	96	FALSE	Korea, Republic of,Japan	NA	NA	NA
Arthropoda	Miraciidae	Sarsamphiascus undosus	9	TRUE	United States of America	5	FALSE	NA,USA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Porcellidiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Thalestridae	Rhynchothalestris helgolandica	4	FALSE	United States of America,Canada	9	FALSE	USA,SOVIET UNION
Arthropoda	Tisbidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Bomolochidae	Bomolochus cuneatus	NA	NA	NA	NA	NA	NA
Arthropoda	Lichomolgidae	Modiolicola bifida	55	FALSE	Korea, Republic of	14	FALSE	Australia
Arthropoda	Myicolidae	Pseudomyicola spinosus	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Oncaeidae	Oncaea scottodicarloi	NA	NA	NA	NA	NA	NA
Arthropoda	Sapphirinidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Caligidae	Caligus clemensi	3637	TRUE	Canada,United States of America	3643	FALSE	NA,Canada
Arthropoda	Cecidomyiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ceratopogonidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ceratopogonidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Chironomidae	Clunio tsushimensis	43	FALSE	United States of America	NA	NA	NA
Arthropoda	Chironomidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Chironomidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Chironomidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ephydridae	Lamproscatella quadrisetosa	81	FALSE	Norway,Canada	NA	NA	NA
Arthropoda	Ephydridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Sciaridae	Bradysia urticae	1320	FALSE	Norway,United Kingdom of Great Britain and Northern Ireland,Canada,Germany,Ukraine,United States of America,New Zealand,Bulgaria	NA	NA	NA
Arthropoda	Sciaridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Sciaridae	NA	NA	NA	NA	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Arthropoda	Aphalaridae	Ctenarytaina spatulata	NA	NA	NA	NA	NA	NA
Arthropoda	Aphididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Aphididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Aphididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Belostomatidae	Appasus major	130	FALSE	Russian Federation,Japan,Korea, Republic of	NA	NA	NA
Arthropoda	Coccidae	Ceroplastes cirripediformis	26	TRUE	United States of America,Mexico,Jamaica,Antigua and Barbuda,Martinique,Guadeloupe	NA	NA	NA
Arthropoda	Diaspididae	Aspidiotus nerii	503	TRUE	Spain,Greece,Finland,Netherlands,United States of America,Luxembourg,Norway,Chile,New Zealand,South Africa,Portugal,France,Australia,Mexico,Guadeloupe,Italy	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Aphididae	Euthoracaphis heterotricha	NA	NA	NA	NA	NA	NA
Arthropoda	Phylloxeridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Apidae	Amegilla bombiformis	926	FALSE	Australia	NA	NA	NA
Arthropoda	Formicidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Formicidae	Linepithema humile	9670	TRUE	United States of America,Chile,Spain,Australia,South Africa,Mexico,France,New Zealand,Portugal,Argentina,Italy,Ecuador,Bermuda,Guatemala,Honduras,Morocco,Algeria,Japan,Greece,Peru,Belgium,Uruguay,Canada,Korea, Republic of,Germany,Bolivia (Plurinational State of),Colombia,Tunisia,Panama,Brazil,Malta,United Kingdom of Great Britain and Northern Ireland,Norway	NA	NA	NA
Arthropoda	Formicidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Elachistidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Calopterygidae	Calopteryx maculata	9976	FALSE	United States of America,Canada	NA	NA	NA
Arthropoda	Liposcelididae	Liposcelis decolor	68	FALSE	Estonia,Greece,South Africa,Belarus,Mexico,Luxembourg,United States of America,Spain,Finland,France,United Kingdom of Great Britain and Northern Ireland	NA	NA	NA
Arthropoda	Liposcelididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Trichopsocidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Thripidae	Frankliniella occidentalis	2437	TRUE	Canada,United States of America,Germany,Mexico,Finland,China,India,South Africa,Sweden,Kenya,Norway,RV©union,Portugal,Australia,Croatia,Greece,New Zealand,Ecuador,Martinique,Guadeloupe,French Guiana,Serbia,United Kingdom of Great Britain and Northern Ireland,Korea, Republic of	NA	NA	NA
Arthropoda	Ampeliscidae	Ampelisca abdita	NA	NA	NA	NA	NA	NA
Arthropoda	Ampithoidae	Ampithoe lacertosa	NA	NA	NA	NA	NA	NA
Arthropoda	Ampithoidae	Ampithoe plumulosa	38	TRUE	United States of America,unknown or invalid,Mexico,Ecuador	7	TRUE	NA,United States of America
Arthropoda	Ampithoidae	Ampithoe sectimana	62	TRUE	United States of America,Canada	9	TRUE	Canada,USA,NA,United States,United States of America
Arthropoda	Ampithoidae	Ampithoe valida	NA	NA	NA	NA	NA	NA
Arthropoda	Ampithoidae	Ampithoe koreana	90	FALSE	Korea, Republic of	NA	NA	NA
Arthropoda	Aoridae	Aoroides columbiae	NA	NA	NA	NA	NA	NA
Arthropoda	Aoridae	Aoroides intermedius	64	TRUE	United States of America,Canada	57	TRUE	Canada,NA,USA
Arthropoda	Aoridae	Aoroides secunda	NA	NA	NA	NA	NA	NA
Arthropoda	Calliopiidae	Paracalliopiella pratti	61	FALSE	Canada,United States of America	34	FALSE	USA,Canada,NA,United States
Arthropoda	Caprellidae	Caprella acanthogaster	485	TRUE	Korea, Republic of,Australia,United States of America	8	FALSE	Australia
Arthropoda	Caprellidae	Caprella californica	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	Caprella equilibra	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	Caprella laeviuscula	258	TRUE	Canada,United States of America,NA	47	TRUE	NA,United States,USA,Canada
Arthropoda	Caprellidae	Caprella mutica	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	Caprella scaura	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	Caprella simia	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	Deutella californica	NA	NA	NA	NA	NA	NA
Arthropoda	Caprellidae	Metacaprella kennerlyi	167	TRUE	Canada,United States of America,NA	16	FALSE	Canada,NA,USA
Arthropoda	Caprellidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Aoridae	Grandidierella japonica	NA	NA	NA	NA	NA	NA
Arthropoda	Corophiidae	Laticorophium baconi	133	TRUE	France,United States of America,New Caledonia,Mexico,Australia,Brazil,Canada,Spain	74	TRUE	NA,Hawaiian Islands,US,BRASIL,United States of America,Canada,USA,Australia,Mexico
Arthropoda	Corophiidae	Monocorophium acherusicum	NA	NA	NA	NA	NA	NA
Arthropoda	Corophiidae	Monocorophium insidiosum	NA	NA	NA	NA	NA	NA
Arthropoda	Corophiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Corophiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Dexaminidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Dexaminidae	Polycheria osborni	NA	NA	NA	NA	NA	NA
Arthropoda	Hyalidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Hyperiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Hyperiidae	Themisto pacifica	1508	TRUE	United States of America,Canada,NA,Korea, Republic of,Russian Federation,Japan	3060	FALSE	NA,Canada,United States
Arthropoda	Ischyroceridae	Ericthonius brasiliensis	1044	TRUE	Chile,United States of America,Greece,Mexico,Spain,Canada,unknown or invalid,France,Italy,Bermuda,Sweden,Brazil,Portugal,Venezuela (Bolivarian Republic of),Colombia,South Africa,Western Sahara,Egypt,United Kingdom of Great Britain and Northern Ireland,India,NA,United States Minor Outlying Islands,RV©union,Ireland,Monaco	1768	TRUE	Venezuela,NA,United States,Brazil,USA,Spain,Hawaiian Islands,US,United States of America,Portugal,South Africa,Western Sahara,Denmark,Greece,Mexico,Canada,Italy,Ireland,Northwestern Hawaiian Islands,Colombia,Korea, Republic of,Johnston Atoll,Belgium
Arthropoda	Ischyroceridae	Ischyrocerus anguipes	NA	NA	NA	NA	NA	NA
Arthropoda	Ischyroceridae	Jassa marmorata	1692	TRUE	United States of America,Chile,Canada,Germany,Norway,Netherlands,Korea, Republic of,Sweden,United Kingdom of Great Britain and Northern Ireland,France,Italy,Greece,Argentina,Spain,unknown or invalid,Russian Federation,Portugal,TVºrkiye,Australia,NA,Svalbard and Jan Mayen,Greenland,South Africa,New Zealand,Cuba,Uruguay,Ireland,Iceland,Peru	687	TRUE	NA,Namibia,South Africa,Italy,United States,USA,United States of America,US,Sweden,Canada,GB,Spain,Korea, Republic of,Belgium,Greece,Australia,Antarctica,DE,Netherlands,Germany,Uruguay
Arthropoda	Ischyroceridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ischyroceridae	Jassa slatteryi	NA	NA	NA	NA	NA	NA
Arthropoda	Ischyroceridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ischyroceridae	Jassa staudei	NA	NA	NA	NA	NA	NA
Arthropoda	Ischyroceridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ischyroceridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Liljeborgiidae	Liljeborgia geminata	NA	NA	NA	NA	NA	NA
Arthropoda	Liljeborgiidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Lysianassidae	Aruga holmesi	NA	NA	NA	NA	NA	NA
Arthropoda	Maeridae	Elasmopus bampo	13	TRUE	United States of America,Venezuela (Bolivarian Republic of),Mexico,Belize	15	TRUE	NA,Venezuela,United States of America
Arthropoda	Melitidae	Megamoera subtener	119	FALSE	United States of America,Canada	25	TRUE	USA,Canada,NA
Arthropoda	Melitidae	Melita nitida	382	TRUE	United States of America,Belgium,Netherlands,Mexico,Norway,India,Canada,Brazil,Cuba,France	477	TRUE	United States,NA,US,USA,CA,United States of America,Netherlands
Arthropoda	Melitidae	Melita rylovae	513	TRUE	Korea, Republic of,United States of America,Japan	5	TRUE	United States

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phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Photidae	Gammaropsis thompsoni	51	TRUE	United States of America,Canada,unknown or invalid,Mexico	59	TRUE	Brazil,NA,Canada,USA,United States of America,United States
Arthropoda	Photidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Photidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Podoceridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Podoceridae	Podocerus brasiliensis	NA	NA	NA	NA	NA	NA
Arthropoda	Podoceridae	Podocerus cristatus	NA	NA	NA	NA	NA	NA
Arthropoda	Pontogeneiidae	Nasageneia quinsana	3	FALSE	Mexico	NA	NA	NA
Arthropoda	Stenothoidae	Metopa cistella	45	TRUE	Canada,United States of America,Ecuador	36	FALSE	NA
Arthropoda	Stenothoidae	Stenothoe estacola	2	TRUE	United States of America	2	TRUE	United States of America,NA
Arthropoda	Stenothoidae	Stenothoe valida	484	TRUE	Norway,Korea, Republic of,unknown or invalid,Greece,Mexico,United States of America,Martinique,United Kingdom of Great Britain and Northern Ireland,French Polynesia,Brazil,Australia,Guernsey,Colombia,Papua New Guinea,Japan,South Africa,New Zealand,Italy,India,China,Portugal	159	TRUE	US,NA,New Zealand,Korea, Republic of,Mexico,GB,Northwestern Hawaiian Islands,Hawaiian Islands,Brazil,BRASIL,Netherland Antilles,Australia,USA,Greece,United States,French Polynesia,South Africa,Colombia,United States of America,Japan
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cancridae	Romaleon antennarium	3890	TRUE	United States of America,Canada,Mexico,unknown or invalid,Colombia	42	TRUE	NA,United States of America,United States,Canada,USA
Arthropoda	Cancridae	Cancer productus	NA	NA	NA	NA	NA	NA
Arthropoda	Cancridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Cancridae	Metacarcinus gracilis	NA	NA	NA	NA	NA	NA
Arthropoda	Cancridae	Metacarcinus magister	6595	TRUE	United States of America,Canada,unknown or invalid,Philippines	34122	TRUE	NA,Canada,United States,UNITED STATES,United States of America,USA,US
Arthropoda	Carcinidae	Carcinus maenas	NA	NA	NA	NA	NA	NA
Arthropoda	Crangonidae	Crangon crangon	NA	NA	NA	NA	NA	NA
Arthropoda	Crangonidae	Crangon franciscorum	278	TRUE	United States of America,Canada	238	TRUE	NA,United States,UNITED STATES,USA,Canada
Arthropoda	Epialtidae	Pugettia dalli	117	TRUE	United States of America,unknown or invalid,Mexico	8	TRUE	United States of America,USA,United States
Arthropoda	Epialtidae	Pugettia producta	NA	NA	NA	NA	NA	NA
Arthropoda	Grapsidae	Pachygrapsus crassipes	NA	NA	NA	NA	NA	NA
Arthropoda	Hippidae	Emerita analoga	NA	NA	NA	NA	NA	NA
Arthropoda	Hippolytidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Hippolytidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Inachoididae	Pyromaia tuberculata	595	TRUE	New Zealand,United States of America,Korea, Republic of,Australia,unknown or invalid,Japan,Costa Rica,Brazil,Argentina,Mexico,Colombia,Guatemala,Nicaragua,Panama,Ecuador	234	TRUE	United States,Australia,Brazil,NA,New Zealand,Japan,United States of America,Mexico
Arthropoda	Palaemonidae	Palaemon macrodactylus	NA	NA	NA	NA	NA	NA
Arthropoda	Panopeidae	Lophopanopeus bellus	968	TRUE	United States of America,Canada,Mexico,unknown or invalid,Costa Rica,Virgin Islands (U.S.)	178	TRUE	Canada,NA,USA,United States,United States of America
Arthropoda	Panopeidae	Rhithropanopeus harrisii	NA	NA	NA	NA	NA	NA
Arthropoda	Penaeidae	Penaeus californiensis	217	TRUE	United States of America,Mexico,Colombia,Costa Rica,Peru,Panama	23	TRUE	Mexico,Costa Rica,Panama,Colombia,United States,United States of America
Arthropoda	Pinnotheridae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Pinnotheridae	Scleroplax faba	NA	NA	NA	NA	NA	NA
Arthropoda	Pinnotheridae	Scleroplax franciscana	110	TRUE	United States of America,Mexico	42	TRUE	United States,NA
Arthropoda	Epialtidae	Scyra acutifrons	794	TRUE	Canada,United States of America,unknown or invalid,Mexico	76	TRUE	USA,Canada,United States of America,NA,United States
Arthropoda	Porcellanidae	Pachycheles pubescens	88	TRUE	United States of America,Canada,Mexico,unknown or invalid	25	TRUE	United States of America,United States,Canada,USA,NA
Arthropoda	Upogebiidae	Upogebia major	712	TRUE	Japan,United States of America,Korea, Republic of,Indonesia,South Africa	129	TRUE	Japan,NA,Korea, Republic of,Indonesia,United States
Arthropoda	Varunidae	Hemigrapsus estellinensis	NA	NA	NA	NA	NA	NA
Arthropoda	Varunidae	Hemigrapsus oregonensis	NA	NA	NA	NA	NA	NA
Arthropoda	Varunidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Euphausiidae	Euphausia eximia	129	FALSE	Chile,Ghana,unknown or invalid,NA,Mexico,Ecuador,Costa Rica,Guatemala,Panama,Peru,Argentina,Spain	123	FALSE	NA,Peru
Arthropoda	Euphausiidae	Hansarsia difficilis	231	TRUE	NA,United States of America,Ghana,unknown or invalid,Canada,Portugal,Mexico	197	TRUE	NA,UNITED STATES,Portugal,USA,United States
Arthropoda	Euphausiidae	Nyctiphanes simplex	NA	NA	NA	NA	NA	NA
Arthropoda	Euphausiidae	Thysanoessa gregaria	2478	TRUE	Australia,NA,Antarctica,United States of America,South Africa,New Zealand,Ghana,unknown or invalid,Chile,Portugal,Mexico,Japan,Argentina,Falkland Islands (Malvinas),Mauritius,Namibia,Canada,Russian Federation,Bermuda	2776	FALSE	NA,Chile,Australia,Portugal,New Zealand,United States,USA,Spain
Arthropoda	Euphausiidae	Thysanoessa spinifera	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Bopyridae	Orthione mesoamericana	2	FALSE	United States of America,Colombia	1	FALSE	USA
Arthropoda	Cymothoidae	Elthusa californica	85	TRUE	United States of America,Mexico,Canada	30	TRUE	United States,USA
Arthropoda	Entoniscidae	Portunion conformis	10	TRUE	Canada,United States of America	3	TRUE	United States
Arthropoda	Idoteidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Idoteidae	Synidotea laticauda	310	TRUE	United States of America,Belgium,Netherlands,Spain,France,Philippines	239	TRUE	United States,NA,US
Arthropoda	Limnoriidae	Limnoria quadripunctata	184	TRUE	United Kingdom of Great Britain and Northern Ireland,Ireland,France,Chile,United States of America,Australia,New Zealand,Belize,French Southern Territories,Netherlands	124	TRUE	US,Australia,NA,GB,United States,Netherlands,Belize
Arthropoda	Munnidae	Munna japonica	NA	NA	NA	NA	NA	NA
Arthropoda	Munnidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Paranthuridae	Paranthura japonica	252	TRUE	United States of America,Korea, Republic of,France,Tunisia,unknown or invalid,Japan,Russian Federation	32	TRUE	NA,Japan,United States,Korea, Republic of,Russia,United States of America
Arthropoda	Sphaeromatidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Sphaeromatidae	Paracerceis cordata	NA	NA	NA	NA	NA	NA
Arthropoda	Sphaeromatidae	Paracerceis sculpta	289	TRUE	United States of America,France,Mexico,Hong Kong,Argentina,unknown or invalid,Italy,Brazil,Australia,Japan,Grenada,Ecuador,Barbados	122	TRUE	Hawaiian Islands,Japan,Australia,Mexico,United States,Italy,NA,Brazil,China,United States of America,US,BRASIL
Arthropoda	Mysidae	Inusitatomysis insolita	35	TRUE	Korea, Republic of,United States of America,Canada,China,Russian Federation	18	TRUE	United States of America,USA,NA,Canada,Russia
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Tanaididae	Hexapleomera sasuke	3	FALSE	Australia	NA	NA	NA
Arthropoda	Tanaididae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Tanaididae	Zeuxo ezoensis	NA	NA	NA	NA	NA	NA
Arthropoda	Loxoconchidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Fujientomidae	Fujientomon dicestum	NA	NA	NA	NA	NA	NA
Arthropoda	NA	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Ammotheidae	Ammothea hilgendorfi	230	TRUE	France,United States of America,Netherlands,Belgium,Korea, Republic of,United Kingdom of Great Britain and Northern Ireland,unknown or invalid,Japan,Russian Federation,China,Mexico	88	TRUE	NA,Mexico,United States,United States of America,Japan
Arthropoda	Phoxichilidiidae	Anoplodactylus viridintestinalis	39	TRUE	United States of America,Mexico,Panama	21	TRUE	United States,NA,USA,Mexico
Arthropoda	Pycnogonidae	Pycnogonum stearnsi	146	TRUE	United States of America,Canada,unknown or invalid,Mexico,Costa Rica	9	TRUE	United States,Canada,USA
Arthropoda	Balanidae	Amphibalanus amphitrite	NA	NA	NA	NA	NA	NA
Arthropoda	Balanidae	Amphibalanus eburneus	NA	NA	NA	NA	NA	NA
Arthropoda	Balanidae	Amphibalanus improvisus	NA	NA	NA	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Arthropoda	Balanidae	Amphibalanus subalbidus	196	TRUE	United States of America,Mexico,Iran (Islamic Republic of),Brazil	33	FALSE	United States,NA,Iran,BRASIL
Arthropoda	Balanidae	Balanus crenatus	NA	NA	NA	NA	NA	NA
Arthropoda	Balanidae	Balanus glandula	NA	NA	NA	NA	NA	NA
Arthropoda	Balanidae	Balanus nubilus	810	TRUE	United States of America,Canada,Mexico	129	TRUE	NA,Canada,United States of America,United States,USA
Arthropoda	Balanidae	Balanus trigonus	NA	NA	NA	NA	NA	NA
Arthropoda	Balanidae	Fistulobalanus kondakovi	183	FALSE	Japan,Australia,Korea, Republic of,New Zealand	47	FALSE	New Zealand,United States,Japan,NA
Arthropoda	Balanidae	Megabalanus californicus	514	TRUE	United States of America,Mexico,Canada	59	TRUE	United States,NA,United States of America,USA
Arthropoda	Balanidae	Megabalanus coccopoma	262	TRUE	Brazil,Ecuador,United States of America,Netherlands,Australia,New Zealand,Costa Rica,Peru,Japan,Mexico,Iran (Islamic Republic of),Portugal,Panama,Philippines	164	TRUE	Brazil,NA,BRASIL,USA,United States,US,Panama,Australia,Mexico,Ecuador
Arthropoda	Balanidae	Megabalanus rosa	343	TRUE	Korea, Republic of,United States of America,unknown or invalid,Japan,Australia,Guam	33	FALSE	Japan,Australia
Arthropoda	Balanidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Archaeobalanidae	Semibalanus cariosus	NA	NA	NA	NA	NA	NA
Arthropoda	Archaeobalanidae	Solidobalanus engbergi	35	TRUE	United States of America,Canada	12	TRUE	USA,United States,Canada
Arthropoda	Chthamalidae	Chthamalus anisopoma	26	FALSE	Mexico,Panama,NA	4	FALSE	Mexico
Arthropoda	Chthamalidae	Chthamalus dalli	NA	NA	NA	NA	NA	NA
Arthropoda	Chthamalidae	Chthamalus fissus	184	TRUE	United States of America,Mexico,Spain	8	TRUE	United States,Mexico
Arthropoda	Chthamalidae	Chthamalus panamensis	NA	NA	NA	NA	NA	NA
Arthropoda	Chthamalidae	Chthamalus sinensis	NA	NA	NA	NA	NA	NA
Arthropoda	Chthamalidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Chthamalidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Tetraclitidae	NA	NA	NA	NA	NA	NA	NA
Arthropoda	Tetraclitidae	Tetraclita rubescens	3033	TRUE	United States of America,Mexico,unknown or invalid	46	TRUE	United States,USA,Mexico,United States of America
Arthropoda	Lepadidae	Lepas testudinata	127	FALSE	Australia,New Zealand,Namibia,South Africa,Guam,United States of America	NA	NA	NA
Arthropoda	Lernaeodiscidae	Lernaeodiscus porcellanae	19	TRUE	United States of America,Mexico,Brazil	4	TRUE	United States,Mexico,BRASIL
Arthropoda	Peltogastridae	Peltogaster boschmai	7	FALSE	United States of America	2	FALSE	USA
Arthropoda	Pollicipedidae	Pollicipes polymerus	NA	NA	NA	NA	NA	NA
Bryozoa	Bugulidae	Bugula neritina	NA	NA	NA	NA	NA	NA
Bryozoa	Bugulidae	Bugula tsunamiensis	3	FALSE	United States of America,Korea, Republic of	NA	NA	NA
Bryozoa	Bugulidae	Bugulina longirostrata	NA	NA	NA	NA	NA	NA
Bryozoa	Bugulidae	Bugulina stolonifera	NA	NA	NA	NA	NA	NA
Bryozoa	Bugulidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Candidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Candidae	Pomocellaria californica	62	TRUE	United States of America,Canada	8	TRUE	United States,Canada,USA
Bryozoa	Candidae	Tricellaria inopinata	569	FALSE	Morocco,France,Italy,Korea, Republic of,Netherlands,Belgium,United States of America,United Kingdom of Great Britain and Northern Ireland,Norway,Ireland	88	FALSE	NA
Bryozoa	Cryptosulidae	Cryptosula pallasiana	NA	NA	NA	NA	NA	NA
Bryozoa	Electridae	Aspidelectra melolontha	263	TRUE	Netherlands,Germany,United Kingdom of Great Britain and Northern Ireland,Belgium,Korea, Republic of,United States of America	915	TRUE	NA,GB,United Kingdom,United States
Bryozoa	Electridae	Conopeum chesapeakensis	NA	NA	NA	NA	NA	NA
Bryozoa	Electridae	Conopeum reticulum	1939	TRUE	Portugal,Netherlands,Germany,France,Croatia,Belgium,United Kingdom of Great Britain and Northern Ireland,Korea, Republic of,Jersey,Ireland,Ukraine,Estonia,Isle of Man,Denmark,Canada,United States of America,unknown or invalid,Mexico,South Africa,Norway,Indonesia,Uruguay,Spain,Seychelles	5031	FALSE	NA,Brazil,GB,Denmark,United Kingdom,USA,IE,United States,Uruguay,India,Seychelles
Bryozoa	Electridae	Conopeum tenuissimum	NA	NA	NA	NA	NA	NA
Bryozoa	Electridae	Einhornia crustulenta	8680	TRUE	Sweden,Netherlands,Germany,Finland,Norway,United States of America,Canada,Estonia,Denmark,Russian Federation,United Kingdom of Great Britain and Northern Ireland,Ireland,France,Mexico,vÕland Islands,Svalbard and Jan Mayen	9074	TRUE	Sweden,Poland,NA,United States of America,Denmark,United States,Finland,Germany,Lithuania,USA,GB,Canada,Russia
Bryozoa	Electridae	Electra monostachys	350	FALSE	France,United States of America,Netherlands,United Kingdom of Great Britain and Northern Ireland,Ireland,unknown or invalid,Belgium,Canada,Norway,Russian Federation,Argentina,Portugal,Spain,Italy	1648	FALSE	NA,GB,Denmark,IE,United States,USA,Argentina,United Kingdom
Bryozoa	Hippothoidae	Celleporella hyalina	NA	NA	NA	NA	NA	NA
Bryozoa	Celleporidae	Celleporaria brunnea	NA	NA	NA	NA	NA	NA
Bryozoa	Membraniporidae	Membranipora membranacea	NA	NA	NA	NA	NA	NA
Bryozoa	Membraniporidae	Membranipora villosa	297	TRUE	United States of America,Canada,Korea, Republic of,Mexico	8	TRUE	NA,United States,Canada,United States of America
Bryozoa	Membraniporidae	Membranipora villosa	297	TRUE	United States of America,Canada,Korea, Republic of,Mexico	8	TRUE	NA,United States,Canada,United States of America
Bryozoa	Fenestrulinidae	Fenestrulina delicia	NA	NA	NA	NA	NA	NA
Bryozoa	Microporidae	Micropora coriacea	173	TRUE	United Kingdom of Great Britain and Northern Ireland,Spain,Ireland,Colombia,Isle of Man,Canada,Costa Rica,Croatia,United States of America,Greece,New Zealand,Mexico,Aruba,Ecuador,Antarctica,Portugal,French Southern Territories,Guernsey,Panama	1	FALSE	NA
Bryozoa	Schizoporellidae	Schizoporella japonica	NA	NA	NA	NA	NA	NA
Bryozoa	Schizoporellidae	Schizoporella occidentalae	4	FALSE	Mexico	NA	NA	NA
Bryozoa	Schizoporellidae	Schizoporella variabilis	31	FALSE	United States of America	1	FALSE	USA
Bryozoa	Scruparilidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Smittinidae	Smittoidea prolifica	61	TRUE	Korea, Republic of,Netherlands,United States of America,Germany,Japan,Mexico,Ireland	9	TRUE	United States
Bryozoa	Watersiporidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Watersiporidae	Watersipora arcuata	NA	NA	NA	NA	NA	NA
Bryozoa	Watersiporidae	Watersipora subatra	NA	NA	NA	NA	NA	NA
Bryozoa	Watersiporidae	Watersipora subtorquata	NA	NA	NA	NA	NA	NA
Bryozoa	Alcyonidiidae	Alcyonidium verrilli	37	FALSE	United States of America	5	FALSE	United States of America,NA,USA
Bryozoa	Alcyonidiidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Buskiidae	Buskia seriata	NA	NA	NA	NA	NA	NA
Bryozoa	Nolellidae	Anguinella palmata	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	Amathia brasiliensis	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	Amathia gracilis	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	Amathia tertia	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	Amathia verticillata	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	Amathia vidovici	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Vesiculariidae	NA	NA	NA	NA	NA	NA	NA
Bryozoa	Crisiidae	Crisia occidentalis	NA	NA	NA	NA	NA	NA
Bryozoa	Crisiidae	Filicrisia franciscana	98	TRUE	United States of America,Canada,NA,Mexico,Ecuador,Costa Rica	12	TRUE	United States,Canada,USA,NA,United States of America
Bryozoa	Diaperoeciidae	Nevianipora floridana	138	TRUE	United States of America,Mexico,Venezuela (Bolivarian Republic of),Aruba,Colombia	136	FALSE	NA,United States,USA
Bryozoa	Lichenoporidae	Disporella novaehollandiae	74	TRUE	New Zealand,Korea, Republic of,Canada,Australia,Japan,United States of America,Mexico,Ecuador,Colombia	15	FALSE	New Zealand,Canada,Australia
Chaetognatha	Sagittidae	Flaccisagitta enflata	5515	TRUE	Australia,Brazil,France,NA,Colombia,Ghana,Italy,United States of America,unknown or invalid,Venezuela (Bolivarian Republic of),Korea, Republic of,Viet Nam,Mexico,Indonesia,Philippines,Japan,Micronesia (Federated States of),China,Papua New Guinea,Chinese Taipei,Portugal,Palau,Russian Federation,Cuba,Niue,Fiji,Bahamas,United States Minor Outlying Islands,Marshall Islands,Kiribati,Nauru,Northern Mariana Islands,India,Belize,New Zealand,Cabo Verde,Mayotte,Madagascar,Malta,Seychelles,Myanmar	10455	FALSE	NA,JAPAN,Brazil,Australia,Korea, Republic of,Lebanon,Venezuela,Philippines,Spain,Republic of the Marshall Islands,Indonesia,Japan,United States Minor Outlying Islands,USA,Micronesia,Portugal,Vietnam,Kenya,India,New Zealand,Myanmar,GREAT BRITAIN,Kiribati,Niue,Northern Mariana Islands,Colombia,Mexico,Nauru,Republic of the Fiji Islands

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Chaetognatha	NA	NA	NA	NA	NA	NA	NA	NA
Chordata	Clupeidae	NA	NA	NA	NA	NA	NA	NA
Chordata	Gobiidae	NA	NA	NA	NA	NA	NA	NA
Chordata	Gobiidae	NA	NA	NA	NA	NA	NA	NA
Chordata	Didemnidae	Didemnum vexillum	469	TRUE	United States of America,Norway,Netherlands,Sweden,France,New Zealand,Canada,Monaco,United Kingdom of Great Britain and Northern Ireland,unknown or invalid,Australia,Mexico,Korea, Republic of,Ireland,Russian Federation	292	TRUE	US,USA,NA,New Zealand,United States of America
Chordata	Didemnidae	Diplosoma listerianum	NA	NA	NA	NA	NA	NA
Chordata	NA	NA	NA	NA	NA	NA	NA	NA
Chordata	Polyclinidae	NA	NA	NA	NA	NA	NA	NA
Chordata	Ascidiidae	Ascidia ahodori	NA	NA	NA	NA	NA	NA
Chordata	Ascidiidae	Ascidia ceratodes	NA	NA	NA	NA	NA	NA
Chordata	Ascidiidae	Ascidia malaca	6	FALSE	Italy	NA	NA	NA
Chordata	Ascidiidae	Ascidia zara	NA	NA	NA	NA	NA	NA
Chordata	Ascidiidae	NA	NA	NA	NA	NA	NA	NA
Chordata	Ascidiidae	Ascidiella aspersa	8539	TRUE	United Kingdom of Great Britain and Northern Ireland,France,Korea, Republic of,Australia,United States of America,Norway,Argentina,Sweden,Ireland,Netherlands,Canada,Greece,Croatia,Italy,Isle of Man,Jersey,Spain,Denmark,New Zealand,Ukraine,Guernsey,Germany,unknown or invalid,South Africa,Morocco,Tunisia,Egypt,India	8384	FALSE	NA,USA,GB,IE,Romania,Australia,DK,Netherlands,Italy,Ukraine,Greece,ARGENTINA,Sweden,Spain,New Zealand,Ireland,Ukraina,DE,Argentina,Denmark,United States of America
Chordata	Cionidae	Ciona intestinalis	NA	NA	NA	NA	NA	NA
Chordata	Cionidae	Ciona robusta	267	TRUE	Australia,France,Chile,Morocco,United States of America,Croatia,Korea, Republic of,South Africa,Italy,Spain,Argentina,Portugal,United Kingdom of Great Britain and Northern Ireland,Israel,Brazil,Japan	18	TRUE	ARGENTINA,United States of America,USA
Chordata	Cionidae	NA	NA	NA	NA	NA	NA	NA
Chordata	Cionidae	Ciona savignyi	NA	NA	NA	NA	NA	NA
Chordata	Corellidae	Corella inflata	NA	NA	NA	NA	NA	NA
Chordata	Perophoridae	Perophora annectens	121	TRUE	United States of America,Canada,New Zealand	71	TRUE	Canada,United States,USA,NA,New Zealand
Chordata	Perophoridae	Perophora japonica	NA	NA	NA	NA	NA	NA
Chordata	Perophoridae	Perophora viridis	NA	NA	NA	NA	NA	NA
Chordata	Molgulidae	Molgula manhattensis	NA	NA	NA	NA	NA	NA
Chordata	Pyuridae	Microcosmus squamiger	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Botrylloides diegensis	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Botrylloides giganteus	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Botrylloides violaceus	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Botryllus schlosseri	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Cnemidocarpa finmarkiensis	786	TRUE	Canada,United States of America,Norway,Russian Federation,Svalbard and Jan Mayen,Japan	91	TRUE	Canada,USA,United States,NA
Chordata	Styelidae	Polyandrocarpa zorritensis	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Styela canopus	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Styela clava	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Styela plicata	NA	NA	NA	NA	NA	NA
Chordata	Styelidae	Symplegma brakenhielmi	417	FALSE	New Zealand,Australia,Brazil,Morocco,United States of America,Bermuda,Hong Kong,New Caledonia,Cabo Verde,Angola,India,Senegal,Korea, Republic of,Panama,Venezuela (Bolivarian Republic of),Italy,French Polynesia,Palau,unknown or invalid,Belize,Fiji,Somalia,Indonesia,Guadeloupe,French Guiana,Martinique,NA	178	FALSE	Australia,USA,Venezuela,French Polynesia,NA,Mariana Islands,New Zealand,US,Hawaiian Islands,Brasil,Nouvelle Caledonie,India,Panama,Somalia
Chordata	Styelidae	Symplegma reptans	70	TRUE	United States of America,Korea, Republic of,Japan,unknown or invalid,Australia,Mexico,India,NA	39	TRUE	US,USA,United States of America,Japan
Chordata	Myliobatidae	Myliobatis californica	1527	TRUE	United States of America,Mexico,Maldives,Panama,Indonesia	292	TRUE	United States,NA,Mexico,USA,Maldives,Indonesia,etats-unis,Etats-Unis
Chordata	Rajidae	Beringraja rhina	115	TRUE	United States of America,Canada	13530	TRUE	NA,Canada,United States,USA,Mexico,U.S.A.,ditto
Chordata	Myxinidae	Eptatretus stoutii	519	TRUE	United States of America,Canada,Mexico	451	TRUE	USA,United States,NA,Mexico,Canada,U.S.A.
Chordata	Doliolidae	Doliolum nationalis	501	TRUE	Australia,Brazil,Japan,United States of America,United Kingdom of Great Britain and Northern Ireland,Spain,Sweden,France,Portugal,Chinese Taipei,Indonesia,Nigeria,India	2601	TRUE	NA,Australia,JAPAN,Japan,Portugal,United States
Cnidaria	Actiniidae	Anthopleura hermaphroditica*	517	TRUE	New Zealand,Australia,Chile,United States of America,NA	279	FALSE	Australia,NA,New Zealand
Cnidaria	Actiniidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Actinostolidae	Paranthus rapiformis	207	TRUE	United States of America,Brazil	92	FALSE	NA,United States,Brasil,Brazil,USA
Cnidaria	Aiptasiidae	Aiptasiogeton eruptaurantia	50	TRUE	United States of America,New Zealand	6	FALSE	NA,USA
Cnidaria	Aiptasiidae	Exaiptasia diaphana	1473	TRUE	United States of America,Brazil,Norfolk Island,Australia,Belize,Morocco,South Africa,Ecuador,Cayman Islands,Spain,Bermuda,Thailand,Panama,Mexico,Colombia,Costa Rica,Chinese Taipei,Fiji,Hong Kong,Honduras,India,Saint Kitts and Nevis,France,CuravÃ§ao,Guam,Bahamas,TVºrkiye,Malaysia,Syrian Arab Republic,Rv©union,Greece,Cyprus,Trinidad and Tobago,Israel,Bonaire, Sint Eustatius and Saba,Egypt,Guadeloupe,United States Minor Outlying Islands,New Caledonia,Sint Maarten (Dutch part),Puerto Rico,Palau,Portugal,Kenya,Senegal,Japan,Venezuela (Bolivarian Republic of),Marshall Islands,Chile,Martinique,Italy,Jamaica,Saint Martin (French part),Virgin Islands (U.S.),Haiti,Cuba,Montserrat	231	TRUE	Mexico,Brasil,Venezuela,NA,Ecuador,Brazil,United States,China,CuravÃ§ao,Italy,Hawaiian Islands,Trinidad and Tobago,USA,MV©xico,Cuba
Cnidaria	Diadumenidae	Diadumene franciscana	NA	NA	NA	NA	NA	NA
Cnidaria	Diadumenidae	Diadumene leucolena	NA	NA	NA	NA	NA	NA
Cnidaria	Diadumenidae	Diadumene lineata	NA	NA	NA	NA	NA	NA
Cnidaria	Edwardsiidae	Edwardsia elegans	105	FALSE	United States of America,Canada,New Zealand	311	FALSE	United States,NA,Canada,United States of America
Cnidaria	Edwardsiidae	Edwardsia longicornis	143	FALSE	Germany,Sweden,Norway,Denmark	235	FALSE	NA,Sweden,Denmark
Cnidaria	Halcampidae	Halcampa chrysanthellum	699	FALSE	United Kingdom of Great Britain and Northern Ireland,France,Norway,Guernsey,Ireland,Isle of Man,Canada,Jersey,Sweden,Germany,Spain	949	FALSE	NA,GB
Cnidaria	Metridiidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Cerveridae	Cervera atlantica	9	FALSE	Spain	NA	NA	NA
Cnidaria	Plexauridae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	NA	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Virgulariidae	Stylatula elegans	935	FALSE	Norway,Sweden,Canada,United States of America,Portugal,Mexico,Japan,Italy,Iceland	377	FALSE	NA,United States,Venezuela
Cnidaria	Botrucnidiferidae	Botruanthus benedeni	24	TRUE	Ecuador,United States of America,Mexico	12	TRUE	NA,Ecuador
Cnidaria	Bougainvilliidae	Bougainvillia carolinensis	23	FALSE	United States of America,Brazil,Canada,Virgin Islands (British),Chile	61	FALSE	NA,Brazil,United States,Puerto Rico
Cnidaria	Bougainvilliidae	Bougainvillia muscus	NA	NA	NA	NA	NA	NA
Cnidaria	Bougainvilliidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Bougainvilliidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Bougainvilliidae	Rhizorhagium arenosum	2	FALSE	France	1	FALSE	NA
Cnidaria	Cladonematidae	Cladonema pacificum	3	TRUE	United States of America,Japan	NA	NA	NA
Cnidaria	Corymorphidae	Corymorpha bigelowi	NA	NA	NA	NA	NA	NA
Cnidaria	Corynidae	Coryne eximia	461	TRUE	United Kingdom of Great Britain and Northern Ireland,Norway,United States of America,Canada,Guernsey,Ireland,Isle of Man,Portugal,Chile,Mexico,South Africa,New Zealand,Australia,Papua New Guinea,Netherlands,Namibia,France,Cook Islands,American Samoa,Russian Federation,Argentina	412	TRUE	NA,Papua New Guinea,Australia,Lebanon,France,Canada,New Zealand,Brazil,GB,Russia,United Kingdom,United States
Cnidaria	Corynidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Corynidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Corynidae	Sarsia tubulosa	862	TRUE	Sweden,Norway,Russian Federation,Canada,Netherlands,unknown or invalid,Germany,United Kingdom of Great Britain and Northern Ireland,China,United States of America,Belgium,France,Greenland,Italy,Svalbard and Jan Mayen,Ecuador,Chile,Argentina,Antarctica,Denmark	837	FALSE	NA,Germany,Belgium,Canada,United States,Lebanon,GB,Romania,UNITED STATES,Denmark,SOVIET UNION,France,United States of America,Italy,USA

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phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Cnidaria	Corynidae	Stauridiosarsia cliffordi	9	FALSE	United States of America,Canada	3	FALSE	USA,Canada
Cnidaria	NA	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Moerisiidae	Moerisia inkermanica	NA	NA	NA	NA	NA	NA
Cnidaria	Oceaniidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Oceaniidae	Turritopsis nutricula	104	FALSE	France,China,Mexico,United States of America,Brazil,unknown or invalid,New Zealand,Papua New Guinea,Morocco,Seychelles,Italy,Malaysia,United Kingdom of Great Britain and Northern Ireland,Belgium,Guernsey,Congo, Democratic Republic of the,Nigeria,Senegal,Canada,Ecuador,Costa Rica,Japan,Bermuda,Colombia,Mayotte,Martinique,NA,Spain,Panama,Philippines	135	FALSE	Lebanon,Brazil,United States of America,NA,Seychelles,New Zealand,USA,United States,Papua New Guinea,Italy,Canada,Mariana Islands,US,GB,Belize,Senegal,Japan,France
Cnidaria	Pandeidae	Amphinema dinema	38	TRUE	New Zealand,United Kingdom of Great Britain and Northern Ireland,United States of America,France,Belgium,Portugal,Australia,Mexico,Papua New Guinea,Canada,Guernsey,NA	78	TRUE	NA,Lebanon,Romania,New Zealand,United States of America,Papua New Guinea,Turkey,Brazil,France,Canada,United States,Bulgaria,United Kingdom
Cnidaria	Pandeidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Pandeidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Pandeidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Pandeidae	Pandeopsis ikarii	32	FALSE	United States of America,Australia,Papua New Guinea,Thailand,New Zealand,India,NA,Japan	18	FALSE	Australia,Papua New Guinea,USA,NA
Cnidaria	Tubulariidae	Ectopleura crocea	NA	NA	NA	NA	NA	NA
Cnidaria	Tubulariidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Aequoreidae	Aequorea australis	51	FALSE	Australia,Papua New Guinea,Mozambique,Japan,French Southern Territories,Madagascar,South Africa,Indonesia,Philippines,Sri Lanka,Seychelles,Tanzania, United Republic of,French Polynesia,American Samoa,Samoa,Fiji,New Caledonia	41	FALSE	NA,Australia,Papua New Guinea,Mozambique
Cnidaria	Aequoreidae	Aequorea macrodactyla	NA	NA	NA	NA	NA	NA
Cnidaria	Aequoreidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Blackfordiidae	Blackfordia virginica	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulinidae	Calycella syringa	543	TRUE	United States of America,Sweden,Korea, Republic of,Russian Federation,Canada,United Kingdom of Great Britain and Northern Ireland,Isle of Man,Ireland,Greenland,NA,Ghana,Papua New Guinea,Svalbard and Jan Mayen,Norway,Japan,Iceland,Mexico,Viet Nam,Falkland Islands (Malvinas)	1565	TRUE	NA,IE,GB,United States,USA,Canada,Vietnam,United States of America,Ireland,Papua New Guinea,Norway
Cnidaria	Campanulariidae	Campanularia hincksii	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Campanularia volubilis	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Lovenellidae	Eucheilota maculata	36	FALSE	Sweden,Belgium,United Kingdom of Great Britain and Northern Ireland,Brazil,France,Netherlands,Norway,Germany,Viet Nam,unknown or invalid	77	FALSE	NA,Brazil,Netherlands,Belgium,Vietnam
Cnidaria	Lovenellidae	Eucheilota menoni	27	FALSE	Mexico,New Zealand,Papua New Guinea,Ecuador,NA	12	FALSE	Papua New Guinea,NA
Cnidaria	Campanulariidae	Gonothyraea loveni	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Orthopyxis caliculata	80	FALSE	Korea, Republic of,New Zealand,United States of America,Brazil,Australia,Svalbard and Jan Mayen,Congo,Peru,Canada,Japan,Sweden,Norway	22	FALSE	Australia,Congo,USA,Canada,New Zealand,Japan
Cnidaria	Campanulariidae	Orthopyxis crenata	100	FALSE	Brazil,New Zealand,Korea, Republic of,Mexico,Australia,Mayotte	37	FALSE	NA,New Zealand,Australia,Mexico
Cnidaria	Campanulariidae	Orthopyxis integra	221	TRUE	Russian Federation,Svalbard and Jan Mayen,United States of America,United Kingdom of Great Britain and Northern Ireland,Portugal,Ireland,Brazil,Norway,France,Papua New Guinea,NA,Namibia,South Africa,Canada,Japan,Australia,Bermuda,Greenland,Sweden,Madagascar,Iceland,Morocco,Argentina,Cambodia,Italy,Viet Nam,New Zealand,unknown or invalid	286	FALSE	United States of America,NA,IE,Canada,Australia,GB,Vietnam,Argentina,Brazil,USA,Russia,Svalbard and Jan Mayen Islands,Cambodia,Italy,Papua New Guinea,France
Cnidaria	Campanulariidae	Clytia elsaeoswaldae	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Clytia gracilis	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Clytia gregaria	162	FALSE	Canada,United States of America,Iceland	350	FALSE	NA,UNITED STATES,Canada,United States of America,USA
Cnidaria	Clytiidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Clytia noliformis	102	FALSE	Brazil,RV©union,French Polynesia,Spain,unknown or invalid,NA,United States of America,Chile,India,Pakistan,French Guiana,Ecuador,Saudi Arabia,Barbados,Jordan,Iran (Islamic Republic of),Romania,TV°rkiye,Afghanistan,Madagascar,Falkland Islands (Malvinas),Argentina,Martinique,French Southern Territories,Panama,Gabon	68	FALSE	Brazil,NA,French Guiana,French Polynesia,India,Barbados,United States,Australia,Gabon,Netherlands Antilles,Belize,Mariana Islands
Cnidaria	Clytiidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Eirenidae	Eirene brevistylus	8	FALSE	Australia	932	FALSE	Australia
Cnidaria	Eirenidae	Eutonina indicans	NA	NA	NA	NA	NA	NA
Cnidaria	Eirenidae	Tima nigroannulata	1	FALSE	Japan	1	FALSE	NA
Cnidaria	Kirchenpaueriidae	Kirchenpaueria halecioides	148	FALSE	Netherlands,Guadeloupe,United Kingdom of Great Britain and Northern Ireland,Bermuda,Australia,New Zealand,Peru,United States of America,New Caledonia,Spain,Mexico,France,Portugal,Korea, Republic of,Brazil,Bahamas,Ecuador,Aruba,Croatia,Martinique,Yemen,Italy,Japan,Panama,Belize	97	TRUE	NA,Brazil,Mexico,GB,Aruba,Portugal,Belize,France,United States,US,New Zealand,United Kingdom,Italy
Cnidaria	Laodiceidae	Laodicea undulata	176	FALSE	Norway,Canada,Sweden,United States of America,United Kingdom of Great Britain and Northern Ireland,France,Australia,Mexico,Papua New Guinea,NA,Puerto Rico,Ireland,New Zealand,Congo, Democratic Republic of the,Egypt,Angola,Guinea,Venezuela (Bolivarian Republic of),Chad,Western Sahara,Panama,Brazil,South Africa,Indonesia,Anguilla,Bermuda,Cabo Verde,Belgium,Ghana,Viet Nam	162	FALSE	NA,Lebanon,Australia,Angola,United States,Guinea,USA,France,Bermuda,Spain,Egypt,Western Sahara,New Zealand,Nouvelle Caledonie,Puerto Rico,India,Belgium,Vietnam,Ireland,Papua New Guinea
Cnidaria	Malagazziidae	Malagazzia taeniogonia	NA	NA	NA	NA	NA	NA
Cnidaria	Mitrocomidae	Mitrocoma cellularia	212	TRUE	United States of America,Canada	4845	TRUE	United States,NA,United States of America,Canada
Cnidaria	Mitrocomidae	Mitrocomella brownei	17	FALSE	France,United Kingdom of Great Britain and Northern Ireland,Guernsey	4	FALSE	NA
Cnidaria	NA	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Obeliidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Obeliidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Obelia bidentata	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Obelia dichotoma	NA	NA	NA	NA	NA	NA
Cnidaria	Campanulariidae	Obelia geniculata	7727	TRUE	Ireland,Australia,New Zealand,Norway,United Kingdom of Great Britain and Northern Ireland,France,Spain,Canada,Netherlands,Germany,Bermuda,Sweden,Isle of Man,Peru,United States of America,Chile,Jersey,Guernsey,Korea, Republic of,Denmark,Russian Federation,unknown or invalid,Mexico,Portugal,Bulgaria,Brazil,Slovenia,Greece,South Africa,NA,Mozambique,Italy,Svalbard and Jan Mayen,Congo,Iceland,Ecuador,Egypt,Namibia,Faroe Islands,Greenland,French Southern Territories,Falkland Islands (Malvinas),Argentina,Croatia,Philippines,Japan,Malta,Saint Helena, Ascension and Tristan da Cunha	6541	FALSE	NA,USA,GB,SOVIET UNION,United States of America,KOREA; REPUBLIC OF,United States,Germany,Brazil,Greece,New Zealand,France,Italy,Spain,Canada,Portugal,IE,US,Namibia,Ireland,Australia,Chile,Argentina,Sweden,Netherlands,Congo,DE,Norway,Denmark,Ukraine,Mozambique,Mexico
Cnidaria	Plumulariidae	Plumularia setacea	3938	TRUE	United Kingdom of Great Britain and Northern Ireland,Canada,United States of America,Jersey,New Zealand,Korea, Republic of,unknown or invalid,Isle of Man,Mexico,France,RV©union,Chile,Guernsey,New Caledonia,Norway,French Guiana,Ireland,Martinique,French Southern Territories,Mauritania,Italy,Portugal,French Polynesia,Argentina,Spain,South Africa,Australia,Netherlands,Bahamas,Morocco,Namibia,NA,Eritrea,Yemen,Saudi Arabia,Belgium,Congo, Democratic Republic of the,Ecuador,Sweden,Croatia,Egypt,Mozambique,Kiribati,Indonesia,Mayotte,Guadeloupe,India,Brazil,Angola,Cambodia,Viet Nam,Japan,Panama,Belize,South Georgia and the South Sandwich Islands,Philippines	4162	TRUE	NA,GB,Canada,New Zealand,United States,Angola,Mexico,French Polynesia,USA,Australia,IE,Brazil,Chile,Portugal,Belgium,Argentina,United Kingdom,Bahamas,Mariana Islands,Cambodia,India,Namibia,Vietnam
Cnidaria	Sugiuridae	Sugiura chengshanense	2702	FALSE	United Kingdom of Great Britain and Northern Ireland,Papua New Guinea	2701	FALSE	NA,Papua New Guinea
Cnidaria	Olindiidae	Gonionemus vertens	287	TRUE	France,United States of America,Canada,Netherlands,Sweden,Norway,Australia,Belgium,Russian Federation,NA,China,Japan	44	FALSE	United States of America,NA,Canada,France,United States,UNITED STATES,Russia,US,USA
Cnidaria	Olindiidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Olindiidae	Maeotias marginata	23	TRUE	United States of America,Finland,Japan,Estonia	16	TRUE	US,NA,Japan
Cnidaria	NA	NA	NA	NA	NA	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Cnidaria	Agalmatidae	Agalma elegans	NA	NA	NA	NA	NA	NA
Cnidaria	Diphyidae	Chelophyes appendiculata	2493	TRUE	New Zealand,France,Canada,NA,United States of America,Italy,unknown or invalid,Spain,Australia,Portugal,Japan,Iran (Islamic Republic of),Viet Nam,Mexico,Costa Rica,Martinique,Seychelles,Sri Lanka,India,Maldives,Congo, Democratic Republic of the,Yemen,Ireland,French Polynesia,Guinea-Bissau,Bermuda,Bahamas,Cuba,Philippines,Malaysia,Indonesia,Ecuador,Peru,Chile,Colombia,Virgin Islands (U.S.)	3027	TRUE	Australia,NA,Portugal,Brazil,Indonesia,United States of America,Colombia,Spain,Bermuda,Bahamas,Lebanon,India,Cuba,United States,Mexico,Japan,Peru,Chile,Philippines,Vietnam,Malaysia,Ecuador,Sri Lanka,Virgin Islands of the United States,Maldives,French Polynesia,Seychelles
Cnidaria	Diphyidae	Lensia campanella	NA	NA	NA	NA	NA	NA
Cnidaria	Prayidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	NA	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Geryoniidae	Liriope tetraphylla	1952	TRUE	Guadeloupe,Slovenia,United States of America,Spain,Hong Kong,China,Korea, Republic of,Australia,United Kingdom of Great Britain and Northern Ireland,Mexico,Tanzania, United Republic of,Colombia,unknown or invalid,New Caledonia,Chile,Argentina,Japan,Venezuela (Bolivarian Republic of),Iran (Islamic Republic of),Brazil,Panama,France,Indonesia,Philippines,Papua New Guinea,Portugal,NA,Costa Rica,Gambia,Belize,South Africa,Peru,Ecuador,Italy,India,Maldives,Malaysia,Singapore,Cambodia,Thailand,Marshall Islands,Angola,Gabon,Congo, Democratic Republic of the,Congo,Sierra Leone,Liberia,Viet Nam,Chinese Taipei,French Southern Territories,Somalia,Senegal,Cabo Verde,Mozambique,Kenya,Madagascar,New Zealand,Palau,Cocos (Keeling) Islands,Sri Lanka,Seychelles,Comoros,French Polynesia,Cook Islands,American Samoa,Samoa,Tonga,Fiji,Equatorial Guinea,Bermuda,Bahamas,Cuba,Guatemala,British Indian Ocean Territory,Cameroon,Mauritius	2053	TRUE	NA,Venezuela,Brazil,South Africa,Lebanon,Italy,Bahamas,Angola,Korea, Republic of,Mexico,France,United States,Peru,Australia,Indonesia,Spain,Cuba,Papua New Guinea,South Korea,JAPAN,United States of America,Kenya,Congo,New Caledonia,Japan,Belize,Colombia,India,Ecuador,Philippines,Guatemala,Bermuda,Portugal,Senegal,Costa Rica,Chile
Cnidaria	Mastigiidae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Pelagiidae	Chrysaora fuscescens	2198	TRUE	Canada,United States of America,Russian Federation,Spain,Chile,NA	408	TRUE	United States,NA,USA,UNITED STATES
Cnidaria	Pelagiidae	Sanderia malayensis	28	FALSE	Egypt,United Arab Emirates,New Caledonia,Philippines,Japan,Saudi Arabia,Kuwait,NA,United States of America	9	FALSE	Japan,Philippines
Cnidaria	Ulmaridae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Ulmaridae	Aurelia labiata	NA	NA	NA	NA	NA	NA
Cnidaria	Ulmaridae	NA	NA	NA	NA	NA	NA	NA
Cnidaria	Phacellophoridae	Phacellophora camtschatica	2111	TRUE	United States of America,Canada,NA,Mexico,Spain,Portugal,Japan,Angola,Brazil	710	TRUE	United States,NA,Australia,Japan,UNITED STATES,USA,United States of America
Cnidaria	Haliclystidae	Haliclystus inabai	29	FALSE	Japan,Canada,Australia	6	FALSE	Australia
Cnidaria	Haliclystidae	Haliclystus tenuis	29	FALSE	United States of America,Japan,unknown or invalid	5	FALSE	Japan,United States of America,NA
Ctenophora	Haeckeliidae	Haeckelia beehleri	NA	NA	NA	NA	NA	NA
Ctenophora	Pleurobrachiidae	Pleurobrachia bachei	374	TRUE	United States of America,Canada,Mexico,Chile	232	TRUE	NA,Canada,United States,USA
Ctenophora	Bolinopsidae	Bolinopsis microptera	273	TRUE	United States of America,Canada	NA	NA	NA
Ctenophora	Bolinopsidae	Mnemiopsis leidyi	3723	FALSE	United States of America,Brazil,Netherlands,Sweden,Germany,Panama,France,Belgium,Greece,Belize,Uruguay,Italy,Georgia,Norway,Croatia,Spain,TV°rkiye,Argentina,Jersey,Cuba,Israel,Denmark,Ukraine,Mexico,Slovenia,Canada,Colombia,Martinique,Guadeloupe,Russian Federation,Virgin Islands (British),United Kingdom of Great Britain and Northern Ireland,Dominican Republic,Trinidad and Tobago,Bonaire, Sint Eustatius and Saba,Iran (Islamic Republic of),French Guiana,NA,Saint BarthV©lemy	3165	FALSE	Ukraine,NA,Italy,Romania,USA,Sweden,Spain,United States,France,United States of America,Netherlands,Denmark
Echinodermata	Asteriidae	Evasterias troschelii	4602	TRUE	United States of America,Canada	354	TRUE	NA,United States,USA,Canada,United States of America
Echinodermata	Asteriidae	Pisaster ochraceus	NA	NA	NA	NA	NA	NA
Echinodermata	Asterinidae	Patiria miniata	NA	NA	NA	NA	NA	NA
Echinodermata	Strongylocentrotida	NA	NA	NA	NA	NA	NA	NA
Echinodermata	Strongylocentrotida	Strongylocentrotus purpuratus	9993	TRUE	Canada,United States of America,Mexico,NA,unknown or invalid	4809	TRUE	NA,Canada,United States,United States of America,USA,Estados Unidos,Mexico
Echinodermata	Dendrasteridae	Dendraster excentricus	NA	NA	NA	NA	NA	NA
Echinodermata	Diadematidae	Centrostephanus coronatus	2827	TRUE	United States of America,Ecuador,Mexico,Costa Rica,Colombia,Panama,France,Chile,Haiti	2193	TRUE	Ecuador,Colombia,NA,Mexico,United States,Chile,USA,Ecuadorian Exclusive Economic Zone
Echinodermata	Sclerodactylidae	Eupentacta quinquesemita	715	TRUE	United States of America,Canada,Korea, Republic of,unknown or invalid,Japan,Mexico,Colombia,NA	84	TRUE	Canada,NA,United States,USA,United States of America,Japan
Echinodermata	Sclerodactylidae	NA	NA	NA	NA	NA	NA	NA
Echinodermata	Caudinidae	Paracaudina chilensis	362	TRUE	Canada,New Zealand,United States of America,Australia,Chile,Argentina,Panama,Antarctica,Bahamas,Mexico,Costa Rica,Uruguay,NA	315	TRUE	New Zealand,USA,United States,Australia,NA,Uruguay,Canada,Ross Dependency,Argentina
Echinodermata	Amphiuridae	Amphipholis squamata	NA	NA	NA	NA	NA	NA
Echinodermata	Amphiuridae	NA	NA	NA	NA	NA	NA	NA
Echinodermata	Amphiuridae	NA	NA	NA	NA	NA	NA	NA
Echinodermata	Ophiactidae	NA	NA	NA	NA	NA	NA	NA
Echinodermata	NA	NA	NA	NA	NA	NA	NA	NA
Hemichordata	NA	NA	NA	NA	NA	NA	NA	NA
Kinorhyncha	Echinoderidae	Echinoderes kozloffi	21	FALSE	Canada,United States of America	8	FALSE	United States,NA
Mollusca	Pharidae	Siliqua patula	1080	TRUE	United States of America,Canada,Japan,Mexico	88	TRUE	NA,Canada,United States,USA
Mollusca	Arcidae	Barbatia reeveana	293	TRUE	Mexico,Ecuador,Panama,France,Colombia,Costa Rica,United States of America,Peru,El Salvador	54	FALSE	Colombia,Costa Rica,Ecuador,Mexico,Panama
Mollusca	Cardiidae	Clinocardium nuttallii	NA	NA	NA	NA	NA	NA
Mollusca	Tellinidae	Macoma nasuta	NA	NA	NA	NA	NA	NA
Mollusca	Tellinidae	Tellina nuculoides	NA	NA	NA	NA	NA	NA
Mollusca	Lasaeidae	Kellia suborbicularis	NA	NA	NA	NA	NA	NA
Mollusca	Lasaeidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Lasaeidae	Neaeromya rugifera	46	TRUE	United States of America,Mexico,Canada	8	FALSE	Canada,United States of America,USA,Mexico
Mollusca	Corbulidae	Potamocorbula amurensis	NA	NA	NA	NA	NA	NA
Mollusca	Teredinidae	Lyrodus pedicellatus	1179	TRUE	Sweden,United States of America,France,Philippines,Chile,Bermuda,United Kingdom of Great Britain and Northern Ireland,Indonesia,Japan,Portugal,Australia,Costa Rica,New Zealand,Spain,Mexico,Malaysia,Bahamas,Brazil,India,Uruguay,Ghana,Fiji,Papua New Guinea,Argentina,Puerto Rico,Canada,South Africa,Grenada,Netherlands,Singapore,Kenya,Seychelles,Italy,Honduras,Venezuela (Bolivarian Republic of),Colombia,Guernsey,Virgin Islands (U.S.),Haiti,Dominican Republic,Cuba,Panama,Israel,American Samoa,Morocco,United States Minor Outlying Islands,Guatemala,Madagascar,Yemen,China,Trinidad and Tobago,Micronesia (Federated States of),Kiribati,Thailand,Norfolk Island,Ecuador	316	TRUE	Australia,United States of America,NA,Bermuda,US,Uruguay,South Africa,United States,Mexico,Indonesia,USA
Mollusca	Teredinidae	Teredo bartschi	496	TRUE	United States of America,Australia,Colombia,Mexico,Bermuda,Argentina,Bahamas,Uruguay,French Guiana,NA,Guadeloupe,Dominican Republic,Panama,Cuba,Virgin Islands (U.S.),Honduras,Venezuela (Bolivarian Republic of),Kenya,South Africa,Israel,Brazil,Ghana,Madagascar,Iraq,Egypt,Barbados,Puerto Rico,Spain,Fiji,Japan	205	TRUE	Australia,NA,Uruguay,Brazil,United States of America,US
Mollusca	Teredinidae	Teredo navalis	1494	TRUE	United Kingdom of Great Britain and Northern Ireland,Netherlands,United States of America,Canada,Portugal,France,Norway,Greece,Sweden,Spain,Chile,Denmark,Germany,Australia,Japan,Tunisia,Italy,Malta,Mexico,Brazil,Uruguay,TV°rkiye,Belgium,South Africa,Congo, Democratic Republic of the,Iceland,Croatia,Guadeloupe,Indonesia,Cuba,Israel,China,Palau,unknown or invalid,Korea, Republic of	407	TRUE	NA,Australia,USA,GB,Norway,US,Mexico,United States of America,Canada,Uruguay,DE,United States
Mollusca	Mytilidae	Adula californiensis	85	TRUE	United States of America,Canada,Mexico	13	FALSE	USA,Canada,United States,NA
Mollusca	Mytilidae	Arcuatula papyria	406	FALSE	United States of America,Brazil,South Africa	532	FALSE	United States,NA,USA,United States of America,Brazil
Mollusca	Mytilidae	Arcuatula senhousia	NA	NA	NA	NA	NA	NA
Mollusca	Mytilidae	Geukensia demissa	NA	NA	NA	NA	NA	NA
Mollusca	Mytilidae	Mytilus californianus	NA	NA	NA	NA	NA	NA

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phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Mollusca	Mytilidae	Mytilus galloprovincialis	NA	NA	NA	NA	NA	NA
Mollusca	Mytilidae	Mytilus trossulus	NA	NA	NA	NA	NA	NA
Mollusca	Mytilidae	Xenostrobus securis	NA	NA	NA	NA	NA	NA
Mollusca	NA	NA	NA	NA	NA	NA	NA	NA
Mollusca	Ostreidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Ostreidae	Ostrea lurida	NA	NA	NA	NA	NA	NA
Mollusca	Pectinidae	Argopecten ventricosus	2008	TRUE	United States of America,Panama,Mexico,Ecuador,Costa Rica,Peru,El Salvador,Colombia,Guatemala,Malaysia,unknown or invalid,Venezuela (Bolivarian Republic of),Chile	374	TRUE	Mexico,Panama,USA,United States,Colombia,NA,Peru,Ecuador,Costa Rica,United States of America
Mollusca	Mactridae	Tresus capax	NA	NA	NA	NA	NA	NA
Mollusca	Veneridae	Callithaca tenerrima	487	TRUE	United States of America,Canada,Mexico,Haiti	14	TRUE	USA,Canada,United States,Mexico
Mollusca	Veneridae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Veneridae	Nutricola tantilla	853	TRUE	United States of America,Canada,Mexico	147	TRUE	NA,United States,Canada,USA,United States of America
Mollusca	Veneridae	Ruditapes philippinarum	NA	NA	NA	NA	NA	NA
Mollusca	Veneridae	Saxidomus gigantea	1122	TRUE	Canada,United States of America,Russian Federation	110	TRUE	USA,Canada,NA,United States
Mollusca	Veneridae	Tivela stultorum	NA	NA	NA	NA	NA	NA
Mollusca	Aplysiidae	Aplysia californica	NA	NA	NA	NA	NA	NA
Mollusca	Aplysiidae	Aplysia vaccaria	NA	NA	NA	NA	NA	NA
Mollusca	Aplysiidae	Phyllaplysia taylori	NA	NA	NA	NA	NA	NA
Mollusca	Aglajidae	Aglaja ocelligera	NA	NA	NA	NA	NA	NA
Mollusca	Aglajidae	Melanochlamys diomedea	NA	NA	NA	NA	NA	NA
Mollusca	Aglajidae	Navanax inermis	NA	NA	NA	NA	NA	NA
Mollusca	Aglajidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Bullidae	Bulla gouldiana	NA	NA	NA	NA	NA	NA
Mollusca	Gastropteridae	Gastropteron pacificum	NA	NA	NA	NA	NA	NA
Mollusca	Haminoeidae	Haloa japonica	NA	NA	NA	NA	NA	NA
Mollusca	Haminoeidae	Haminoea vesicula	NA	NA	NA	NA	NA	NA
Mollusca	Haminoeidae	Haminoea virescens	NA	NA	NA	NA	NA	NA
Mollusca	Philinidae	Philine kinglipini	6	FALSE	China	18	FALSE	NA
Mollusca	Trimusculidae	Trimusculus reticulatus	251	TRUE	United States of America,Mexico	18	TRUE	USA,United States,Mexico,NA
Mollusca	Fissurellidae	Fissurella volcano	2257	TRUE	United States of America,Mexico,Panama,unknown or invalid,Costa Rica,Ecuador	120	TRUE	United States,USA,NA,Mexico,United States of America,Panama
Mollusca	Fissurellidae	Fissurellidea bimaculata	784	TRUE	United States of America,Canada,Mexico	26	TRUE	USA,Canada,United States
Mollusca	Haliotidae	Haliotis fulgens	1104	TRUE	United States of America,Mexico,unknown or invalid,Japan	297	TRUE	Mexico,NA,USA,United States
Mollusca	Haliotidae	Haliotis rufescens	2969	TRUE	United States of America,Mexico,Chile,China,Iceland,Bahamas	1596	TRUE	NA,USA,United States,Mexico,Japan,India
Mollusca	Atlantidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Calyptraeidae	Crepidula convexa	1150	TRUE	United States of America,Mexico,Colombia,Canada,Saint Martin (French part),Venezuela (Bolivarian Republic of),Puerto Rico,Costa Rica,Panama,Belize,Grenada,Bahamas,Cuba,Trinidad and Tobago,Martinique,Guadeloupe,Guatemala,Jamaica,unknown or invalid	435	TRUE	United States of America,United States,USA,Venezuela,NA,Colombia,French Antilles,US,Mexico,Belize,MV©xico,CA
Mollusca	Calyptraeidae	Crepidula onyx	NA	NA	NA	NA	NA	NA
Mollusca	Calyptraeidae	Crepidula plana	NA	NA	NA	NA	NA	NA
Mollusca	Calyptraeidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Calyptraeidae	Crepipatella lingulata	NA	NA	NA	NA	NA	NA
Mollusca	Calyptraeidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Cochliopidae	Spurwinkia salsa	NA	NA	NA	NA	NA	NA
Mollusca	Littorinidae	Lacuna variegata	138	TRUE	United States of America,Canada,Mexico	41	TRUE	USA,Canada,NA
Mollusca	Littorinidae	Lacuna vincta	6423	TRUE	United States of America,Ireland,United Kingdom of Great Britain and Northern Ireland,Netherlands,Norway,Iceland,Canada,Sweden,France,Greenland,Denmark,Svalbard and Jan Mayen,Belgium,unknown or invalid,Russian Federation,Germany,Isle of Man,Jersey,Guernsey,Faroe Islands,Maldives,Mexico,Spain,Saint Pierre and Miquelon,Croatia,Greece,Korea, Republic of,Falkland Islands (Malvinas)	3019	TRUE	Sweden,NA,GB,Norway,Canada,USA,United States of America,United States,Iceland,US,Greenland,France,United Kingdom,Denmark,DE,IE
Mollusca	Littorinidae	Littorina plena	NA	NA	NA	NA	NA	NA
Mollusca	Littorinidae	Littorina scutulata	NA	NA	NA	NA	NA	NA
Mollusca	Pterotracheidae	Firoloida desmarestia	NA	NA	NA	NA	NA	NA
Mollusca	Velutinidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Vermetidae	Thylacodes squamigerus	1726	TRUE	United States of America,Mexico,unknown or invalid,Costa Rica,Japan,Ecuador	97	TRUE	NA,United States,United States of America,USA
Mollusca	Limapontiidae	Alderia willowi	45	TRUE	United States of America	NA	NA	NA
Mollusca	Limapontiidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Limapontiidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Limapontiidae	Placida dendritica	432	TRUE	France,Norway,Canada,Australia,United States of America,Denmark,Russian Federation,Sweden,Spain,Algeria,South Africa,Korea, Republic of,United Kingdom of Great Britain and Northern Ireland,Argentina,Italy,Netherlands,Isle of Man,Guernsey,unknown or invalid,Mexico,Jersey,Ireland	67	TRUE	Australia,NA,Mascarene Islands,South Africa,United States,USA,Canada
Mollusca	Limapontiidae	Stiliger fuscovittatus	NA	NA	NA	NA	NA	NA
Mollusca	Lottiidae	Lottia limatula	1111	TRUE	United States of America,India,Mexico,South Africa,Guatemala,Canada,Panama	134	TRUE	Mexico,NA,USA,United States,United States of America
Mollusca	Lottiidae	Lottia paradigitalis	191	TRUE	United States of America,Canada,Mexico	21	TRUE	USA,Canada,United States
Mollusca	Lottiidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Lottiidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Pyramidellidae	Boonea impressa	450	TRUE	United States of America,Mexico	225	FALSE	USA,NA,United States of America,United States,Brazil,MV©xico,Mexico
Mollusca	Pyramidellidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Pyramidellidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Pyramidellidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Pyramidellidae	Odostomia tenuisculpta	98	TRUE	United States of America,Canada	14	TRUE	United States of America,Canada,USA,United States
Mollusca	Columbellidae	Alia carinata	NA	NA	NA	NA	NA	NA
Mollusca	Columbellidae	Columbella aureomexicana	141	TRUE	Mexico,United States of America,Panama,El Salvador	14	FALSE	Mexico,Panama,NA
Mollusca	Columbellidae	Mitrella gausapata	NA	NA	NA	NA	NA	NA
Mollusca	Columbellidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Conidae	Californiconus californicus	NA	NA	NA	NA	NA	NA
Mollusca	Nassariidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Nassariidae	Nassarius mendicus	NA	NA	NA	NA	NA	NA
Mollusca	Nassariidae	Ilyanassa obsoleta	NA	NA	NA	NA	NA	NA
Mollusca	Olividae	Callianax biplicata	3553	TRUE	United States of America,Canada,Mexico,Dominican Republic,unknown or invalid,Panama,Greece,Ecuador	87	TRUE	USA,NA,United States,United States of America,Canada,Mexico
Mollusca	Aeolidiidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Aeolidiidae	Anteaeolidiella oliviae	NA	NA	NA	NA	NA	NA
Mollusca	Apataidae	Apata pricei	152	TRUE	United States of America,Korea, Republic of,Canada,Mexico	7	TRUE	USA,United States of America,Canada
Mollusca	Arminidae	Armina californica	598	TRUE	United States of America,Canada,Panama,Costa Rica,Mexico,unknown or invalid	257	TRUE	United States,NA,USA,Canada,India,Panama,United States of America
Mollusca	Chromodorididae	Felimare californiensis	634	TRUE	United States of America,Mexico,France	15	TRUE	USA,United States of America,Mexico,NA,United States
Mollusca	Dorididae	Conualevia alba	NA	NA	NA	NA	NA	NA
Mollusca	NA	NA	NA	NA	NA	NA	NA	NA
Mollusca	Coryphellidae	Coryphella trilineata	NA	NA	NA	NA	NA	NA

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Mollusca	Coryphellidae	Coryphella trophina	169	FALSE	Canada,United States of America	5	FALSE	Canada,United States
Mollusca	Coryphellidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Dendrodorididae	Doriopsilla albopunctata	1635	TRUE	United States of America,Mexico,unknown or invalid	16	TRUE	United States of America,United States,USA,Mexico
Mollusca	Dendrodorididae	Doriopsilla davebehrensi	NA	NA	NA	NA	NA	NA
Mollusca	Dendrodorididae	Doriopsilla gemela	NA	NA	NA	NA	NA	NA
Mollusca	Dendronotidae	Dendronotus albus	412	TRUE	United States of America,Canada,Russian Federation,Mexico	12	TRUE	Canada,USA,United States
Mollusca	Dendronotidae	Dendronotus iris	NA	NA	NA	NA	NA	NA
Mollusca	Dendronotidae	Dendronotus subramosus	1031	TRUE	United States of America,Canada	18	TRUE	USA,Canada,United States,United States of America
Mollusca	Dendronotidae	Dendronotus venustus	NA	NA	NA	NA	NA	NA
Mollusca	Tethydidae	Melibe leonina	1007	TRUE	United States of America,Canada,Mexico,Vanuatu	18	TRUE	USA,Canada,NA,United States
Mollusca	Dironidae	Dirona picta	NA	NA	NA	NA	NA	NA
Mollusca	Dironidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Discodorididae	Diaulula sandiegensis	NA	NA	NA	NA	NA	NA
Mollusca	Discodorididae	Peltodoris nobilis	NA	NA	NA	NA	NA	NA
Mollusca	NA	NA	NA	NA	NA	NA	NA	NA
Mollusca	Doridiidae	Doris montereyensis	NA	NA	NA	NA	NA	NA
Mollusca	Discodorididae	Geitodoris heathi	NA	NA	NA	NA	NA	NA
Mollusca	Dotidae	Doto lancei	77	TRUE	United States of America,Mexico	3	FALSE	Mexico,United States
Mollusca	Dotidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Eubranchidae	Eubranchus alexei	NA	NA	NA	NA	NA	NA
Mollusca	Eubranchidae	Eubranchus olivaceus	220	TRUE	United States of America,Canada	6	FALSE	USA
Mollusca	Eubranchidae	Eubranchus rustyus	NA	NA	NA	NA	NA	NA
Mollusca	Eubranchidae	Leostyletus misakiensis	52	TRUE	United States of America	16	TRUE	United States,US
Mollusca	NA	NA	NA	NA	NA	NA	NA	NA
Mollusca	Abronicidae	Abronica abronia	367	TRUE	United States of America	2	TRUE	United States,USA
Mollusca	Myrrhinidae	Hermissenda opalescens	6456	TRUE	United States of America,Mexico,Canada,unknown or invalid	18	TRUE	United States of America,USA,United States
Mollusca	Facelinidae	Sakuraeolis enosimensis	NA	NA	NA	NA	NA	NA
Mollusca	Goniodorididae	Ancula gibbosa	550	TRUE	United Kingdom of Great Britain and Northern Ireland,Denmark,United States of America,Norway,Sweden,Canada,France,Russian Federation,Jersey,Netherlands,Faroe Islands,Isle of Man,Ireland,Guernsey	188	TRUE	NA,Norway,USA,Germany,GB,United States,United States of America
Mollusca	Goniodorididae	Okenia angelensis	29	TRUE	United States of America,Mexico	5	FALSE	Mexico
Mollusca	Goniodorididae	Trapania velox	30	TRUE	United States of America,Mexico	NA	NA	NA
Mollusca	Janolidae	Antiopella barbarensis	672	TRUE	United States of America,Mexico,Costa Rica,Canada	2	TRUE	United States of America,United States
Mollusca	Janolidae	Antiopella fusca	621	TRUE	United States of America,Canada,Korea, Republic of,Russian Federation	26	TRUE	USA,Canada,United States,United States of America
Mollusca	Polyceridae	Triopha maculata	NA	NA	NA	NA	NA	NA
Mollusca	Onchidoridae	Acanthodoris rhodoceras	NA	NA	NA	NA	NA	NA
Mollusca	Corambidae	Corambe pacifica	NA	NA	NA	NA	NA	NA
Mollusca	Corambidae	Corambe steinbergae	NA	NA	NA	NA	NA	NA
Mollusca	Calycidoridae	Diaphorodoris lirulatocauda	NA	NA	NA	NA	NA	NA
Mollusca	Onchidoridae	Onchidoris bilamellata	NA	NA	NA	NA	NA	NA
Mollusca	Onchidoridae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Polyceridae	Polycera atra	NA	NA	NA	NA	NA	NA
Mollusca	Polyceridae	Polycera hedgpethi	NA	NA	NA	NA	NA	NA
Mollusca	Trinchesiidae	Catriona columbiana	NA	NA	NA	NA	NA	NA
Mollusca	Trinchesiidae	Diaphoreolis lagunae	445	TRUE	United States of America,Mexico	1	FALSE	USA
Mollusca	Trinchesiidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Trinchesiidae	Tenellia adspersa	191	TRUE	United States of America,Finland,Netherlands,Sweden,Norway,Canada,Denmark,United Kingdom of Great Britain and Northern Ireland,Estonia,Germany,Belgium	210	TRUE	NA,USA,US,Estonia,United States,United States of America,Sweden
Mollusca	Trinchesiidae	Trinchesia albocrusta	476	TRUE	United States of America,Canada,Mexico	9	TRUE	USA,NA,United States of America,Mexico
Mollusca	Tritoniidae	Tritonia exsulans	67	TRUE	United States of America,Canada,Mexico	3	TRUE	United States
Mollusca	Tritoniidae	Tritonia festiva	641	TRUE	United States of America,Canada,Mexico,Korea, Republic of	25	TRUE	United States,NA,USA,United States of America,Canada
Mollusca	Tritoniidae	Tritonia tetraquetra	428	TRUE	Canada,United States of America,Japan,Russian Federation	337	TRUE	United States,NA,Canada,United States of America
Mollusca	Janolidae	Janolus anulatus	24	TRUE	United States of America	NA	NA	NA
Mollusca	Pleurobranchidae	Berthella strongi	8	TRUE	United States of America,Mexico	4	TRUE	Mexico,United States,United States of America
Mollusca	Creseidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Creseidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Creseidae	Creseis conica	293	FALSE	France,Spain,Italy,Saudi Arabia,Mexico,Belize,Chile,NA,French Polynesia,Portugal,unknown or invalid,Bahamas,Malta,TVºrkiye,Equatorial Guinea,Brazil,United States of America,Haiti	93	FALSE	Mediterranean Region,NA,United States of America,BAHAMAS
Mollusca	Creseidae	Creseis virgula	NA	NA	NA	NA	NA	NA
Mollusca	Cymbuliidae	Corolla spectabilis	NA	NA	NA	NA	NA	NA
Mollusca	Limacinidae	Limacina helicina	5907	TRUE	Norway,Canada,Russian Federation,Greenland,United States of America,NA,Svalbard and Jan Mayen,Sweden,Colombia,Australia,Japan,unknown or invalid,Chile,Mexico,Antarctica,Puerto Rico,South Georgia and the South Sandwich Islands,New Zealand	9093	FALSE	NA,Canada,UNITED STATES,SOVIET UNION,Antarctica,Australia,POLAND,BELGIUM,United States,Colombia,United States of America,Brazil,Mexico,Japan
Mollusca	Siphonariidae	Williamia peltoides	158	TRUE	United States of America,Mexico,Costa Rica,Chile,Panama,Ecuador,Canada	17	TRUE	United States,Canada,Mexico,USA
Mollusca	Calliostomatidae	Calliostoma ligatum	NA	NA	NA	NA	NA	NA
Mollusca	Margaritidae	NA	NA	NA	NA	NA	NA	NA
Mollusca	Tegulidae	Norrisia norrisii	NA	NA	NA	NA	NA	NA
Mollusca	Tegulidae	Tegula aureotincta	NA	NA	NA	NA	NA	NA
Mollusca	Tegulidae	Tegula brunnea	1608	TRUE	United States of America,Mexico,Canada,France	48	TRUE	United States,USA,NA
Mollusca	Tegulidae	Tegula eiseni	NA	NA	NA	NA	NA	NA
Mollusca	Tegulidae	Tegula funebralis	NA	NA	NA	NA	NA	NA
Mollusca	Tegulidae	Tegula gallina	NA	NA	NA	NA	NA	NA
Mollusca	Trochidae	Lirularia succincta	251	TRUE	United States of America,Canada,Mexico	57	TRUE	USA,United States,Canada
Mollusca	NA	NA	NA	NA	NA	NA	NA	NA
Mollusca	Tylodinidae	Tylodina fungina	563	TRUE	United States of America,Mexico,Ecuador,South Africa,Costa Rica,Panama,Colombia,France	11	TRUE	Mexico,Ecuador,United States,USA,Colombia
Mollusca	Acanthochitonidae	Acanthochitona avicula	NA	NA	NA	NA	NA	NA
Mollusca	Chaetopleuridae	Chaetopleura lanuginosa	151	TRUE	Mexico,United States of America	31	FALSE	Mexico
Mollusca	Ischnochitonidae	Stenoplax conspicua	766	TRUE	United States of America,Mexico,Panama	23	TRUE	USA,United States of America,Panama,Mexico,United States
Mollusca	Mopaliidae	Dendrochiton gothicus	7	TRUE	United States of America,Mexico	NA	NA	NA
Mollusca	Mopaliidae	Mopalia hindsii	645	TRUE	United States of America,Canada,Mexico	39	TRUE	United States,USA,Canada,Mexico
Mollusca	Mopaliidae	Mopalia muscosa	5147	TRUE	Canada,United States of America,Mexico,unknown or invalid,Greenland,Panama	103	TRUE	Canada,United States,United States of America,USA,Denmark
Mollusca	Tonicellidae	Cyanoplax hartwegii	1158	TRUE	United States of America,Canada,unknown or invalid,Mexico	92	TRUE	United States,NA,Canada,Mexico,USA,United States of America
Nematoda	Linhomoeidae	Terschellingia longicaudata	NA	NA	NA	NA	NA	NA
Nematoda	Diplogastridae	Parapristionchus giblindavisi	NA	NA	NA	NA	NA	NA
Nematoda	Rhabditidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Amphiporidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Zygonemertidae	Zygonemertes virescens	63	TRUE	United States of America,Colombia,Canada	71	TRUE	NA,USA,Colombia,United States of America,United States

Appendix 2-2. Geographic distribution of species found by metabarcoding

phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Nemertea	Carcinonemertidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Emplectonematidae	Emplectonema gracile	NA	NA	NA	NA	NA	NA
Nemertea	Emplectonematidae	Emplectonema viride	44	FALSE	United States of America,Canada	NA	NA	NA
Nemertea	Emplectonematidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Emplectonematidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Neesiidae	Paranemertes californica	60	TRUE	United States of America	129	TRUE	NA
Nemertea	NA	NA	NA	NA	NA	NA	NA	NA
Nemertea	NA	Quasitetrastemma nigrifrons	40	TRUE	United States of America,Canada,Japan,Mexico,Costa Rica	26	TRUE	NA,USA,Japan,United States of America,Canada
Nemertea	Ototyphlonemertid	NA	NA	NA	NA	NA	NA	NA
Nemertea	Ototyphlonemertid	Ototyphlonemertes parmula	65	FALSE	United States of America,Panama,Puerto Rico,Belize	NA	NA	NA
Nemertea	Ototyphlonemertid	Ototyphlonemertes lactea	199	FALSE	Panama,Colombia,Belize,Chile,Puerto Rico,Brazil,United States of America	NA	NA	NA
Nemertea	Poseidonemertidae	Poseidonemertes collaris	9	TRUE	United States of America	NA	NA	NA
Nemertea	Tetrastemmatidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Tetrastemmatidae	Tetrastemma reticulatum	4	TRUE	United States of America,United Kingdom of Great Britain and Northern Ireland	1	TRUE	United States of America
Nemertea	Cephalotrichidae	Cephalothrix spiralis	NA	NA	NA	NA	NA	NA
Nemertea	Cephalotrichidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Carinomidae	Carinoma hamanako	1	FALSE	Japan	NA	NA	NA
Nemertea	Carinomidae	Carinoma mutabilis	42	TRUE	United States of America,Mexico	120	TRUE	NA,United States of America,United States
Nemertea	Carinomidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Tubulanidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Tubulanidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Valenciniidae	Baseodiscus punnetti	14	TRUE	United States of America,Mexico	NA	NA	NA
Nemertea	Baseodiscidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Lineidae	Cerebratulus californiensis	95	TRUE	United States of America,Canada,Peru,Mexico	9	TRUE	Canada,United States,NA,USA
Nemertea	Lineidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Lineidae	Lineus flavescens	57	TRUE	United States of America,unknown or invalid,Mexico	2	TRUE	USA
Nemertea	Lineidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	Lineidae	Maculaura alaskensis	NA	NA	NA	NA	NA	NA
Nemertea	Lineidae	Maculaura oregonensis	NA	NA	NA	NA	NA	NA
Nemertea	Lineidae	Micrura wilsoni	28	TRUE	Canada,United States of America	10	FALSE	USA,Canada
Nemertea	Lineidae	NA	NA	NA	NA	NA	NA	NA
Nemertea	NA	NA	NA	NA	NA	NA	NA	NA
Nemertea	Riseriellidae	NA	NA	NA	NA	NA	NA	NA
Placozoa	Hoilungidae	NA	NA	NA	NA	NA	NA	NA
Platyhelminthes	NA	NA	NA	NA	NA	NA	NA	NA
Platyhelminthes	Callioplanidae	Kaburakia excelsa	71	TRUE	United States of America,Canada	10	TRUE	United States,Canada,USA,United States of America
Platyhelminthes	Callioplanidae	Koinostylochus elongatus	NA	NA	NA	NA	NA	NA
Platyhelminthes	Callioplanidae	NA	NA	NA	NA	NA	NA	NA
Platyhelminthes	Euplanidae	Euplana gracilis	41	FALSE	United States of America	24	FALSE	USA,NA,United States,United States of America
Platyhelminthes	Gnesiocerotidae	Echinoplana celerrima	137	FALSE	Australia,New Zealand,Tunisia	14	FALSE	Australia,New Zealand
Platyhelminthes	Ilyplanidae	Postenterogonia orbicularis	21	FALSE	Australia,New Zealand	5	FALSE	New Zealand,Australia
Platyhelminthes	NA	NA	NA	NA	NA	NA	NA	NA
Platyhelminthes	Notocomplanidae	NA	NA	NA	NA	NA	NA	NA
Platyhelminthes	Pseudocerotidae	NA	NA	NA	NA	NA	NA	NA
Platyhelminthes	Stylochidae	Stylochus ellipticus	88	FALSE	United States of America,Germany,Canada	36	FALSE	USA,NA,United States of America,United States
Porifera	Desmoxyidae	Desmoxya pelagiae	6	FALSE	NA,Ireland	2	FALSE	NA
Porifera	NA	NA	NA	NA	NA	NA	NA	NA
Porifera	Chondrillidae	Thymosiopsis conglomerans	4	FALSE	Israel,France	12	FALSE	Australia,NA
Porifera	Clionaidae	Cliona celata	NA	NA	NA	NA	NA	NA
Porifera	Clionaidae	Cliona chilensis	294	FALSE	Ecuador,Argentina,Chile,Peru,Canada,Uruguay	231	FALSE	Ecuador,NA,Argentina
Porifera	Clionaidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Clionaidae	Clionaopsis platei	22	FALSE	Chile,Australia,Argentina	7	FALSE	NA
Porifera	Clionaidae	Pione velans	19	FALSE	Australia,Seychelles	20	FALSE	Australia,NA
Porifera	Dictyodendrillidae	Igernella notabilis	NA	NA	NA	NA	NA	NA
Porifera	Dysideidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Dysideidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Chalinidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Chalinidae	Haliclona stilensis	47	FALSE	South Africa	NA	NA	NA
Porifera	Chalinidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Chalinidae	NA	NA	NA	NA	NA	NA	NA
Porifera	NA	NA	NA	NA	NA	NA	NA	NA
Porifera	NA	NA	NA	NA	NA	NA	NA	NA
Porifera	Niphatidae	Pachychalina tenera	1	FALSE	Chile	3	FALSE	NA
Porifera	Microcionidae	Ophlitaspongia papilla	799	FALSE	France,Jersey,Ireland,United Kingdom of Great Britain and Northern Ireland,Guernsey,Portugal,South Africa,New Zealand	640	FALSE	GB,NA,IE,South Africa,New Zealand
Porifera	Microcionidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Mycalidae	Mycale cecilia	161	FALSE	Australia,Panama,Ecuador,Mexico,United States of America,Marshall Islands	NA	NA	NA
Porifera	Mycalidae	Mycale fibrexilis	NA	NA	NA	NA	NA	NA
Porifera	Myxillidae	Myxilla incrustans	3507	TRUE	United States of America,United Kingdom of Great Britain and Northern Ireland,Canada,Isle of Man,France,Jersey,Norway,Ireland,Portugal,Korea, Republic of,Guernsey,Spain,Svalbard and Jan Mayen,Saint Pierre and Miquelon,Sweden,Mexico,Japan,Antarctica,French Southern Territories,Iceland,Greenland,South Africa,Australia,Russian Federation,Mauritania	NA	NA	NA
Porifera	Acarnidae	Acarnus levii	2	FALSE	France	2	FALSE	NA
Porifera	Spongillidae	Ephydatia cooperensis	NA	NA	NA	NA	NA	NA
Porifera	Halichondriidae	Halichondria bowerbanki	2099	TRUE	France,Korea, Republic of,Netherlands,Norway,United States of America,Canada,United Kingdom of Great Britain and Northern Ireland,Jersey,Germany,Kyrgyzstan,Isle of Man,Portugal,Ireland,Sweden,Belgium,Iceland,Italy,Greenland,Mauritania	NA	NA	NA
Porifera	Halichondriidae	Halichondria panicea	NA	NA	NA	NA	NA	NA
Porifera	Halichondriidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Halichondriidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Halichondriidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Suberitidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Suberitidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Suberitidae	Protosuberites mereui	NA	NA	NA	NA	NA	NA
Porifera	Tethyidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Tethyidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Tetillidae	Tetilla dactyloidea	16	FALSE	Australia,India,Oman,Madagascar,Iran (Islamic Republic of)	36	FALSE	NA,Australia,Philippines
Porifera	Tetillidae	NA	NA	NA	NA	NA	NA	NA

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phylum	family	species	Records in GBIF	GBIF: CA present	GBIF: countries	Records in OBIS	OBIS: CA present	OBIS: countries
Porifera	Oscarellidae	NA	NA	NA	NA	NA	NA	NA
Porifera	Oscarellidae	Oscarella carmela	20	TRUE	United States of America,France	3	TRUE	NA,USA
Rotifera	Philodinidae	Rotaria rotatoria	983	TRUE	France,United States of America,Russian Federation,Cameroon,Sweden,Algeria,Italy,United Kingdom of Great Britain and Northern Ireland,Spain,Chad,Nigeria,Norway,Egypt,Netherlands,Tanzania, United Republic of,Bolivia (Plurinational State of),Namibia,Sudan,Australia,Senegal,Congo, Democratic Republic of the,Belgium,Malawi,Thailand,Switzerland,Mexico,South Africa,Antarctica,Heard Island and McDonald Islands,South Georgia and the South Sandwich Islands	27	FALSE	NA,Brazil,Romania,Lithuania
Rotifera	Philodinidae	NA	NA	NA	NA	NA	NA	NA
Rotifera	Euchlanidae	Euchlanis dilatata	1999	TRUE	Sweden,Spain,Russian Federation,Kenya,Nigeria,Ukraine,South Africa,Egypt,Algeria,Italy,Ethiopia,Benin,Chad,Colombia,Cameroon,Mali,Zimbabwe,United States of America,Botswana,China,Virgin Islands (U.S.),Mexico,Seychelles,Austria,United Kingdom of Great Britain and Northern Ireland,Australia,Netherlands,Lesotho,Brazil,Bolivia (Plurinational State of),Burundi,Estonia,Belgium,Madagascar,Comoros,Mauritania,Sudan,Tanzania, United Republic of,Guinea,Norway,France,Senegal,CV¥ted,Âôlvoire,South Sudan,Zambia,Congo, Democratic Republic of the,Western Sahara,Antarctica,Uganda,Gambia,Malawi,South Georgia and the South Sandwich Islands	NA	NA	NA
Rotifera	Brachionidae	Keratella cochlearis	NA	NA	NA	NA	NA	NA
Rotifera	Synchaetidae	NA	NA	NA	NA	NA	NA	NA
Rotifera	Synchaetidae	NA	NA	NA	NA	NA	NA	NA
Rotifera	Synchaetidae	Polyarthra dolichoptera	1274	FALSE	Sweden,Russian Federation,Algeria,Australia,Norway,Spain,Canada,Nigeria,Italy,France,Benin,Germany,Colombia,Cameroon,Zimbabwe,Netherlands,Mexico,United Kingdom of Great Britain and Northern Ireland,Austria,Switzerland,Ethiopia,Guatemala,Denmark,Bolivia (Plurinational State of),Burundi,Belgium,Estonia,Mali,Congo, Democratic Republic of the,Sudan,Tanzania, United Republic of,South Sudan,Senegal,Uganda,Egypt,Japan	NA	NA	NA
Rotifera	Synchaetidae	NA	NA	NA	NA	NA	NA	NA
Rotifera	Synchaetidae	Synchaeta grimpei	6	FALSE	Egypt,Korea, Republic of	2	FALSE	Denmark
Rotifera	Synchaetidae	Synchaeta hutchingsi	NA	NA	NA	NA	NA	NA
Rotifera	Synchaetidae	Synchaeta pectinata	901	FALSE	South Africa,United States of America,Russian Federation,Germany,Nigeria,Austria,Norway,Algeria,Italy,Uganda,Sweden,Egypt,Mali,Canada,Botswana,Cameroon,Spain,Zimbabwe,Ethiopia,United Kingdom of Great Britain and Northern Ireland,Morocco,Libya,France,Australia,Netherlands,Venezuela (Bolivarian Republic of),Brazil,Mexico,Burundi,Estonia,Congo, Democratic Republic of the,Senegal,Chad,Malawi	16	FALSE	NA,Venezuela,United States
Rotifera	Synchaetidae	Synchaeta triophthalma	36	FALSE	Netherlands,Egypt,Belgium,France,United Kingdom of Great Britain and Northern Ireland,French Southern Territories	36	FALSE	NA
Rotifera	Synchaetidae	Synchaeta vorax	25	FALSE	Egypt,Italy,Sweden,Belgium,France,Korea, Republic of	34	FALSE	NA
		Binomials: 47						
		Not binomial: 213						
		Total taxa: 920						

Sampling and Taxonomic Analyses for Marine Invasive Species in California Estuaries

Part 3: Species-specific PCR compared to metabarcoding to detect NIS in environmental samples.

DNA metabarcoding has become a popular method to determine the genetic diversity of environmental samples (see, for example, the journal *Metabarcoding and Metagenomics*). Metabarcoding, also called metagenetics, involves isolation of total DNA from mixed-species communities, using the polymerase chain reaction.[1] (PCR) to select and amplify a target locus, and using high-throughput sequencing technologies to obtain DNA sequences for the constituent species. In the work described in Part 2, we used this method to generate lists of species from plankton samples, sediment samples, and from environmental DNA[2] (eDNA) or biomass from settlement plates, with the ultimate aim of detecting non-indigenous species and describing their distribution in California's coastal waters. Metabarcoding has shown to typically describe far more species than visual morphology-based methods (and also provides population genetic level material, useful for understanding sources, pathways, and effects of biological invasions), there are limitations to the method. However, it is difficult to assess the sensitivity of metabarcoding or estimate the rate of false negatives: if the DNA from a species is present in a bulk DNA extraction[3], will it yield at least one DNA read? Stated differently, if no reads from a given species are found, what is the probability that that species was actually present?

The failure to detect a sequence from a species that is present could arise due to rarity in the DNA extraction or PCR product. That would be a simple effect of sampling. In this case, we predict (and in practice do find) more rare sequences in metabarcoding libraries[4] that are sequenced more deeply. Indeed, for statistically valid comparison of metabarcoding samples, a standard method is to normalize[5] the number of reads. For detecting rare species, however, we might want to include all data. Another reason that some species might be over or under represented in a metabarcoding result is that there appears to be bias toward, or against, some species at the molecular level. It is generally assumed that this bias occurs at the PCR step, in several possible ways. For example, primers[6] may find and bind less efficiently to templates due to nucleotide mismatches in the primer region. Too, different templates may denature[7] at

[1] PCR is the exponential amplification of a targeted region of a DNA molecule (template) achieved through multiple cycles of *in vitro* enzymatic replication.
[2] DNA in the environment outside of intact and live organisms.
[3] DNA extracted from biomass containing multiple organisms or species.
[4] A library is the PCR product from a bulk extraction that has been prepared for sequencing by addition of DNA adaptors necessary for the sequencing process.
[5] Resample original data to a prescribed sample size.
[6] Short synthetic single-stranded DNA molecules that complement single-stranded DNA flanking the targeted genetic locus, which are then extended by a DNA polymerase to copy the target
[7] Separate from double-stranded DNA (to which primers cannot bind) to single-stranded DNA (which are accessible to primers)

different temperatures, due to differences in GC content[8], affecting primer binding. Sequential runs of G and C within templates facilitate folding of denatured single-stranded DNA; if templates are not fully melted or folded upon themselves, DNA polymerase will be obstructed. We can imagine bias for and against species at the level of DNA extraction.

In short, biases that exist at the molecular level potentially influence the ultimate number of DNA reads from any one template molecule. In principle, those biases might be corrected in statistical models, but a general model for DNA extractions of a priori unknown composition has not been achieved. Fortunately, improvements in DNA sequencing technology now allow sequencing of complex DNA extractions without a PCR step, eliminating the most concerning source of bias. Although currently expensive, the cost of these latest technologies will soon be low enough to apply to routine environmental monitoring. In the meantime, in the present work, we asked whether species-specific PCR would detect species in a given sample not found by metabarcoding? The premise for this question is that the PCR biases mentioned above would be reduced or absent when primers are specifically designed for a single species, rather designed for all species (as in metabarcoding).

The use of species-specific primers in PCR is decades old, and is one of the earliest methods used in molecular ecology. In species-specific PCR, a single or pair of primers is designed that is thought to bind only to DNA the targeted species (Jarman, 2004). PCR using those primers produces a binary result: presence of an amplification product (amplicon) indicates the species is present; absence of an amplicon indicates the absence of that species. Detection is usually done through gel electrophoresis, although various methods are available for real-time PCR (detection of amplification during PCR by specialized thermocyclers). The search term “species-specific PCR” returned about 24,800 results from Google Scholar in March 2025, though these results appear to inflated by related methods. Adding the search term “metabarcoding”, we found one study that directly compared species-specific PCR to metabarcoding of natural samples. Yu et al. (2002) found species-specific PCR, targeting six fish species, to have a higher detection rate than metabarcoding, attributing false negatives in metabarcoding to primer dynamics.

Here, we have tried to scale up a comparison of species-specific PCR and metabarcoding from single or few species to many by using the software PRIMER-BLAST to find unique sequences for a list of NIS known in California waters. The goal was to design species-specific PCR assays for ten NIS in the following categories: three species found (to current knowledge) only in southern California, three found only in northern California, two species found throughout California, and two species not known in California but considered an ecological threat should they become established. For primer sets that yield positive results, comparison would be made to matched results from metagenetic analysis of plate scrapes, plate soak eDNA, seawater eDNA, and plankton.

[8] It takes more energy to melt a G-C nucleotide pairs than A-T pairs due to different numbers of hydrogen bonds.

Methods

Species selection.

The following persons with extensive field experience in collecting and identifying NIS in California were polled to create a list of species for PCR primer design.

James Carlton, Williams College
Andy Chang, SERC
Paul Fofonoff, SERC
Stacey Havard, SERC
Natasha Hitchcock, SERC
Krisen Larson, SERC
Linda McCann, SERC
Katherine Newcomer, SERC

Primer design.

Our goal was to design a set of at least ten species-specific primers that could be used with standardized PCR conditions to minimize preliminary PCR optimization. We used Primer-BLAST (Ye et al. 2012) to design PCR primers that were expected to be species-specific. Primer-BLAST uses the algorithm of PRIMER3 (Untergasser et al. 2012) to select short (typically 20-30 bp) DNA sequences within a longer sequence that fulfill user-selected parameters including product length, melting temperature (Tm), and avoidance of self-complementarity or intra-pair complementarity that could cause primer dimerization or folding in the temperature and salt environment of the PCR reaction. Primer-BLAST then checks Genbank to determine if potential primers are likely to generate PCR products from taxa (in this case, species) other than the intended taxon.

We designed primers predominantly for mitochondrial Cytochrome c oxidase subunit I (COI), but also in some cases we selected nuclear 18S ribosomal RNA (18S), nuclear 28S ribosomal RNA (28S), and nuclear Histone 3 (H3) because of better representation in Genbank. We chose primers that were expected to generate PCR products in a size range between 150 and 550 bp, but the majority were between 200 and 350 bp. Primers were designed to have a nominal Tm of about 60^{o} C. Primers were synthesized in 96-well format by Integrated DNA Technologies (Coralville,IA).

PCR

PCR for all primers was conducted using a standardized PCR cocktail and thermocycler settings. We Green GoTaq 2X master mix (Promega) to make individual 25 µL reactions that contains 200 µM of each dNTP, 1.5 mM of magnesium chloride ($MgCl_2$), 100 pM of forward and reverse primers, *Taq* DNA polymerase, 5 ng of DNA template, and water. For some templates, we set up separate PCR reactions that used KAPA HiFi DNA polymerase (Roche). Thermocycler settings were 95^{o}C for 30 sec, followed by 30 cycles of 94 ^{o}C for 60 sec, 53 ^{o}C for 60 sec, 72 ^{o}C

for 40 sec. PCR products were visualized using 1.2% agarose in TAE buffer [40 mM **T**ris (2-Amino-2-(hydroxymethyl) propane-1,3-diol), 20 mM **A**cetic acid, 1 mM-**E**DTA (Ethylenediaminetetracetic Acid) disodium salt] and stained with Ethidium bromide.

For initial testing, we chose one primer pair for each species and tested against a selection of DNA extractions from metabarcoding samples (from Part 2). If PCR results were strong for a given primer set (single bright DNA electrophoretic band of expected size), we did not further test primers for the targeted species. If bands were absent or faint, we selected another primer set for the targeted species for subsequent testing. However, faint bands were scored as positive if they were of expected size. Successful PCR assays were compared to metabarcoding results for the presence or absence of the targeted species.

Results

Species selection

Although our final target was ten assays, we initially chose 33 species: 16 species that the expert panel expected to be present in all California bays, nine that were expected in Northern California bays (San Francisco Bay to Humboldt Bay), and eight expected in Southern California bays (Morro Bay to San Diego Bay). We limited the list to species with planktonic larvae so that they might be expected in at least some plankton samples, with the exception of *Ocenebrellus inornatu*s, which has direct development. Most of these species are epifaunal and sessile. *Corbula amurensis* is infaunal, and *Carcinus maenas, Ocenebrellus inornatus* and *Palaeomon macrodactylus* are motile.

Table 1: Species chosen for inclusion in primer development, testing, and assays. For present purposes, Southern California was San Diego Bay to Morro Bay and Northern California was San Francisco Bay to Humboldt Bay. "Alert List" species were not known in California at the project onset but have been collected in southern California since.

All California	**Northern California**	**Southern California**
Amphiblanus subalbidus	*Amphibalanus improvisus*	*Amathia verticillata*
Anguinella palmata	*Aspidelectra melolontha*	*Amphibalanus amphitrite*
Botrylloides diegensis	*Carcinus maenas*	*Amphibalanus eburneus*
Botrylloides violaceus	*Conopeum chesapeakensis*	*Ascidiella aspersa*
Bugula neritina	*Corbula amurensis*	*Branchiomma bairdi*
Bugulina stolonifera	*Corella inflata*	*Phyllorhiza punctata*
Ciona robusta	*Molgula citrina*	*Symplegma reptans*
Crassostrea gigas	*Mya arenaria*	*Watersipora arcuata*
Cryptosula pallasiana	*Ocinebrellus inornatus*	
Diadumena lineata		
Didemnum vexillum		
Dplosoma listerianum		
Molgula manhatttensis		**Alert List Species**
Arcuatula senhousia		*Xenostrobus securis*
Palaemon macrodactylus		*Ascidiella aspera*
Polydora cornuta		

Primers designed and synthesized.

Three hundred primers comprising 150 primer pairs were designed and synthesized for the 35 targeted species using Primer-BLAST. All primers sequences are listed in Appendix 3-1, showing the intended pairing of forward and reverse primers.

PCR Assays:

Table 2 shows PCR primer sets that had a positive result (presence of a faint or strong PCR product visualized on agarose gels). Primers for *Amphibalanus amphitrite*, *Diadumene lineata*, *Arcuatula senhousia*, *Molgula citrina*, and *Phyllorhiza punctata* were not tested for lack of time. One or more primers pair designed for *Amphibalanus eburneus, Aspidelectra melolontha, Conopeum chesapeanensis, Crassostrea gigas, Mya arenaria, Polydora cornuta*, and *Symplegma reptans* were tested but not successful on any template. Controls PCR reactions (no DNA template added) were always negative (no PCR product), indicating positive results were not due to contamination of PCR reagents.

Table 2. PCR primer sets yielding PCR product from at least one sample (DNA extractions from settling plate scrape homogenates, plate soak eDNA, or plankton). Primers sets are identified by the abbreviated species name in the primer name prefix, and their pairing corresponds to the F or R in their suffix. For example, jgAmVert_COIF1 is paired with jgAmVert_COIR1, and targets the species Amathia verticillata.

Species	**Primer name**
Amathia verticillata	jgAmVert_COIF1
	jgAmVert_COIR1
	jgAmVert_COIF2
	jgAmVert_COIR2
Amphibalanus improvisus	jgAmImpr_COIF1
	jgAmImpr_COIR1
	jgAmImpr_COIF2
	jgAmImpr_COIR2
	jgAmImpr_16SF1
	jgAmImpr_16SR1
Amphibalanus subalbidus	jgAmSuba_COIF3
	jgAmSuba_COIR3
Anguinella palmata	jgAnPalm_COIF3
	jgAnPalm_COIR3
Ascidiella aspersa	jgAsAspe_COIF9
	jgAsAspe_COIR9
Botrylloides diegensis	jgBoDieg_COIF3
	jgBoDieg_COIR3
Botrylloides violaceus	jgBoViol_COIF3
	jgBoViol_COIR3
Branchiomma bairdi	jgBrBard_COIF3
	jgBrBard_COIR3
Bugula neritina	jgBuNeri_COIF1
	jgBuNeri_COIR1
	jgBuNeri_COIF2
	jgBuNeri_COIR2
Bugulina stolonifera	jgBuStol_COIF3
	jgBuStol_COIR3
Carcinus maenas	jgCaMaen_COIF3
	jgCaMaen_COIR3
Ciona robusta	jgCiRobu_COIF1
	jgCiRobu_COIR1
Corbula amurensis	jgCoAmur_COIF1
	jgCoAmur_COIR1
Corella inflata	jgCoInfl_COIF1

Species	Primer name
	jgCoInfl_COIR1
Cryptosula pallasiana	jgCrPall_COIF1
	jgCrPall_COIR1
	jgCrPall_COIF2
	jgCrPall_COIR2
Didemnum vexillum	jgDiVexi_COIF1
	jgDiVexi_COIR1
Diplosoma listerianum	jgDiList_COIF1
	jgDiList_COIR1
Molgula manhattensis	jgMoManh_COIF1
	jgMoManh_COIR1
Ocinebrellus inornatus	jgOcInor_COIF1
	jgOcInor_COIR1
Palaeomon macrodactylus	jgPaMacr_18SF1
	jgPaMacr_18SR1
Watersipora_arcuata	jgWaArcu_COIF1
	jgWaArcu_COIR1
Xenostrobus_secura	jgXeSecu_COIF1
	jgXeSecu_COIR1

PCR was done using standard conditions, without optimization on a case by case basis. Results were strong for some primer sets, with high yields of single PCR products of expected size (Figure 1, bands labeled with “A”). Other primer sets produced faint PCR products that were nonetheless discrete and of the expected size. The most common other results were no amplification, smears of high molecular weight PCR products larger than expected, or extra bands (Figure 2).

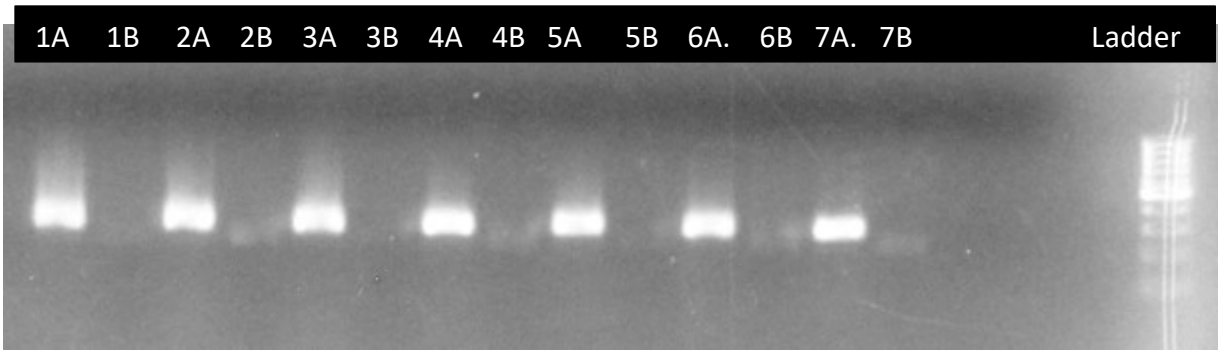


Figure 1. Examples of strong and faint electrophoretic bands. "A" bands are strong PCR products from the primer set jgDiVexi_COIF1 and jgDiVexi_COIR1, targeting the ascidian Didemnum vexillum. "B" bands are faint PCR products from the primer set jgAmSuba_COIF3 and jgAmSuba_COIR3, targeting the barnacle Amphibalanus subalbidus. Samples were plankton from Catalina (1), Long Beach (2), San Diego (3), Mission Bay (4), Humboldt Bay (5), Bodega Bay (6), and San Francisco Bay (7). Ladder is a 100 bp DNA size ladder.

For some PCR assays, we replaced the GoTaq polymerase master mix with KAPA HiFi DNA polymerase master mix. KAPA HiFi DNA polymerase resulted in amplification from some templates yielding faint or no PCR products (Compare Figures 1 and 2). However, KAPA HiFi reactions often appeared over-amplified, in which nonspecific PCR products become prominent as smears or extra bands (Figure 2).

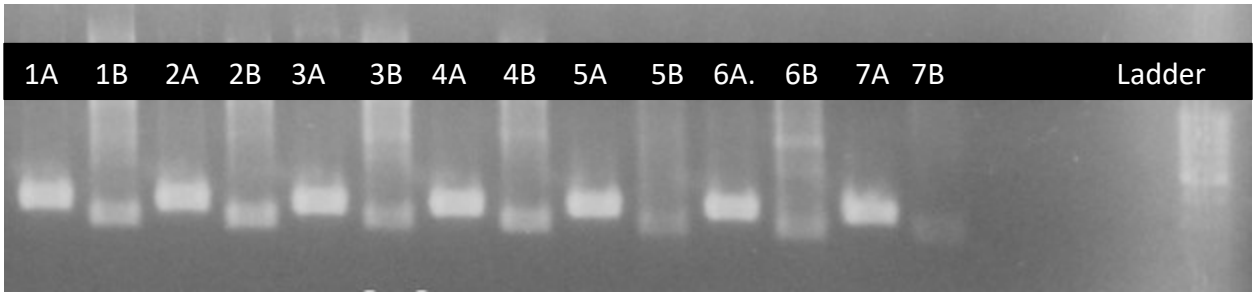


Figure 2. KAPA DNA polymerase resulted in stronger bands for some templates, but also non-specific smears or bands of higher molecular weight DNA. Compare strength of "B" bands here and in Figure 1. DNA smears extending upward are evidence of overamplification. Labels are the same as in Figure 1.

Performance of species-specific primers

Results of all primer tests are shown in Appendix 3-2. The use of Primer-BLAST was effective for the design of functional PCR primers. We achieved successful PCR for 22 species in at least one bay (Table 2), and at least one species successfully PCR amplified in each bay. *Crassostrea gigas*, *Molgula citrina* and *Mya arenaria* were not detected in any bay by metagenetics, thus the negative PCR result for these may be true negatives. However, we did not test every primer designed, so we cannot estimate a probability of success on a per primer basis. Broadly, we had success for 22 of 29 species (76%), or 22 of 26 (85%) if negative results for species also without metagenetic detection are omitted.

In the preceding paragraphs, we mentioned variability in the PCR success. In some cases, PCR was unsuccessful with GoTaq DNA polymerase and successful with KAPA HiFi DNA polymerase. For example, *Branchioma bairdi* was not amplified in San Diego 2021 eDNA using GoTaq DNA polymerase but was with KAPA HiFi DNA polymerase, yet both polymerases yielded results from plate scrapes from San Diego 2021 (Appendix 3-2). *Botrylloides diegensis* is another example where use of KAPA Hi Fi DNA polymerase generated a positive result not seen with GoTaq DNA polymerase (Appendix 3-2).

Detection in community DNA by species-specific PCR and Metagenetics

We compared detection of target species in PCR assays and in metagenetic analyses of the same DNA extractions (Figure 3). Overall, we found 54% agreement wherein both methods detected a given species or both failed to detect that species. Of the 46% of cases where only one method detected a species, 33% were PCR only and 13% were metagenetics only. (These calculations bin successful PCR by more than one set of primers. That is, successful detection is counted once regardless of how many primers sets were tested). Predictions of species distribution based on expert opinion were not well supported, with putatively northern and southern species found beyond expected geographic boundaries.

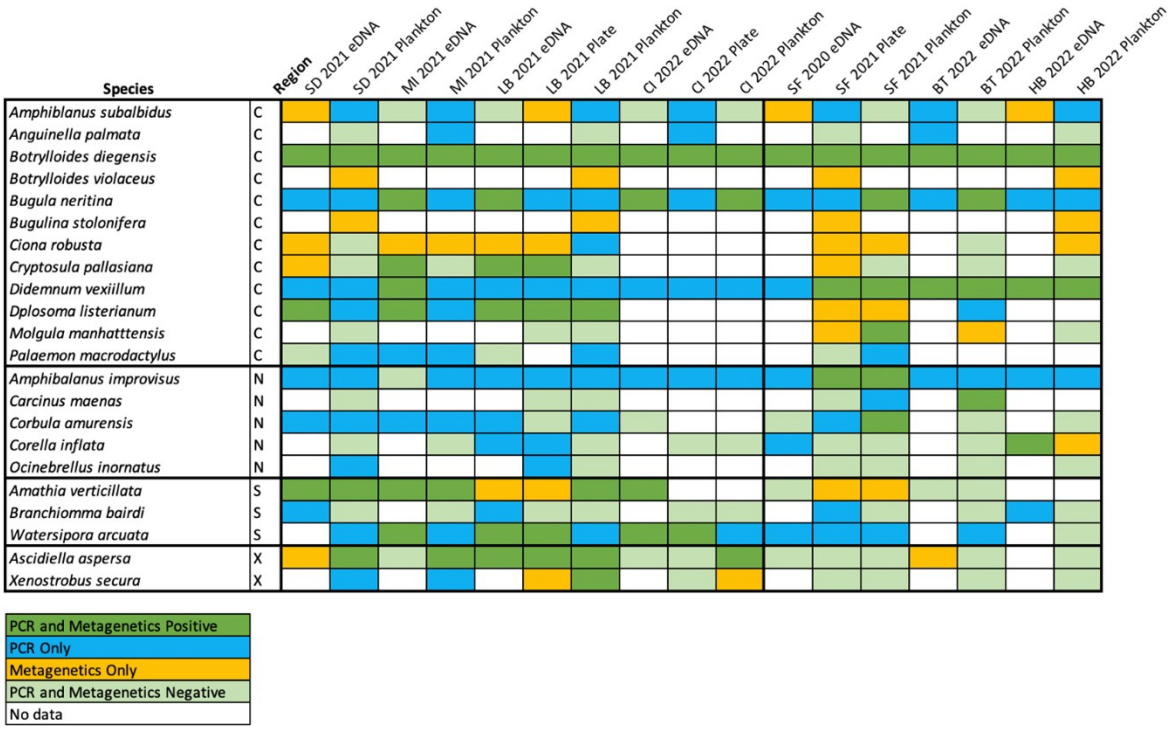


Figure 3. Presence and absence of targeted species in bulk DNA extractions. Sample types tested were plankton (Plankton), plate soaks (eDNA), plate scrapes (Plate). Sites were San Diego Bay (SD), Mission Bay (MI), Long Beach (LB), Catalina Island (CI), San Francisco Bay (SF), Bodega and Tomales Bays (BT), and Humboldt Bay (HB). Expected regions of occurrence were: all of California bays (C), northern bays (N), and southern bays (S). Species unknown in California prior to this study are denoted by region "X".

Discussion

In this study, we explored a scaled-up application of species-specific PCR, in which we used Primer-BLAST to design hundreds of putatively species-specific PCR primers. Although not fully achieved here (as discussed below), the objective was to create an adjunct to metabarcoding to test for the presence of species potentially missed by metabarcoding. In metabarcoding, species are detected through high throughput sequencing of mixed-species PCR products generated from a single pair of broad-spectrum PCR primers (Geller et al. 2013). Species-specific PCR uses primers meant to amplify one species alone in the background of a complex multi-species DNA extractions and thereby circumvent competition between DNA from different species. We were successful in generating primers that amplified DNA products from at least 76% of species tested.

Before discussing patterns of species presence and absence, some limitations of this study need to be considered. First, a positive result here was a PCR product of the sequence length predicted by Primer-BLAST. However, additional evidence of specificity is desirable. For example, it is possible that DNA from species not present in DNA databases might share the binding region and be amplified. Also, some primers might bind to more than the intended target due to stable mismatches in the primer binding region (despite the predictions of Primer-BLAST). Evidence for the specificity of PCR can be come from an internal probe[9] such as used in the Taqman™ (Thermo Fisher) approach, or from DNA sequencing of the putatively specific PCR products. PCR optimization, Taqman™ or DNA sequencing were beyond the scope of the present study, but are recommended if this approach is further pursued. Loss of specificity due to primer mismatch can be minimized by PCR optimization (adjustments of thermocycler parameters and changes to the PCR reaction mix, for example).

We noticed that some templates that produced faint electrophoretic bands, or no visible PCR product at all, under our standard PCR condition were robustly amplified when we changed the DNA polymerase (Figures 1 and 2). This suggests that some PCR reactions that appear to fail are false negatives. Accounting for false negatives requires positive controls, such as spike-in DNA (Mackie and Geller, 2010), adding complexity to the PCR assays. For present purposes, it is best to think of a negative result as lack of evidence for presence rather than evidence of absence.

Comparison to metagenetics

PCR alone detected species in 33% of assays, suggesting that metagenetics might miss many species actually present. However, as noted above, some of these could be false positives due to non-specific amplification. On the other hand, metagenetics detected species missed by PCR in 13% of cases, providing a minimum estimate of false negatives for PCR.

[9] A short fDNA fragment designed for a third region within the PCR product and thought to be species-specific.

If PCR results are taken at face value, there are several cases where the geographic distribution was a surprise. *Watersipora arcuata* was found in San Francisco Bay and Bodega Bay, whereas past studies (Mackie et al., 2012) found it only in southern California, which was also the prediction of the expert panel. *Amphibalanus improvisus* was considered a northern species, yet it occurred in all the southern samples except eDNA from Mission Bay. *Corbula amurensis* was found in southern bays, except Catalina, but was thought to be primarily in San Francisco Bay. Notably, *Corbula amurensis* was best amplified using 18S rRNA primers, while only in San Francisco Bay was it amplified by COI primers (Appendix 3-2). This might suggest that the 18S primers, while specific to *C. amurensis* within Genbank, might be matching some other bivalves in nature. We recommend further testing of these primers before accepting these results, however it is reasonable to look for these species in unexpected locations in course of ongoing monitoring.

Both of the species included as "watchlist" species, *Ascidiella aspera* and *Xenostrobus securis*, were detected using PCR. The sea squirt *A. aspera* was found by both PCR and metagenetics in San Diego, Mission Bay, Long Beach, and Catalina Island. The mussel *Xenostrobus securis* was found in San Diego and Mission Bay by PCR and in Long Beach by both methods. These findings are consistent with recent field observations and slightly expand their known geographic extent.

This study shows that species-specific PCR can detect species in community DNA missed by metabarcoding. However, it also can miss species found by metabarcoding. Therefore, both methods are best treated as providing evidence of presence rather than evidence of absence. We found the batch approach to assay design using Primer-BLAST to be insufficient without case-by-case optimization of PCR conditions. Although PCR conditions are input to the Primer-BLAST software, unaccounted factors appear to also influence PCR success. The effort required for such optimization is unrealistic given the large number of species that might be represented in a metagenetic sample. However, PCR could might be used as a check of metagenetic sequencing for a subset of common and expected species. Similarly, it would be a low cost method for potential early detection of unwanted species, as demonstrated here for *Ascidiella* and *Xenostrobus*).

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APPENDIX CAPTIONS.

Appendix 3-1. List of all primers designed and synthesized.

Appendix 3-2. Results of primer testing. Primers yielding PCR products are identified by locus (COI, Cytochrome c oxidase subunit 1; 18S, nuclear 18S ribosomal RNA; 16S, mitochondrial 16S ribosomal RNA) and primer set number for the given locus (e.g., “COI: 1” is set one for COI for the given species). For reactions using KAPA DNA polymerase, a “k” is added to the primer name (e.g., “COI: 1k” is set one for COI for the given species in a reaction with KAPA DNA polymerase). Tests where no primer was successful are marked “n”. No data (nd) signifies that the rest was not performed.

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	Primer name	Primer sequence,5'->3"	Product length
Amathia verticillata	jgAmVert_COIF1	CTTGTAGAAAGGGGAGCGGG	273
Amathia verticillata	jgAmVert_COIR1	AGTAATGGCTCCGGCCAAAA	273
Amathia verticillata	jgAmVert_COIF2	TACATCTCGCTGGGGTTTCG	238
Amathia verticillata	jgAmVert_COIR2	ATAGGATCTCCTCCTCCCGC	238
Amathia verticillata	jgAmVert_COIF3	AGGTTTTGGTTGCTCCCTCC	319
Amathia verticillata	jgAmVert_COIR3	TAATGGCTCCGGCCAAAACA	319
Amathia verticillata	jgAmVert_COIF4	GCCTTTCCGCGGTTAAACAA	338
Amathia verticillata	jgAmVert_COIR4	GCTCCGGCCAAAACAGGTAA	338
Amphibalanus amphitrite	jgAmAmph_COIF1	ATTCTGGCTTCTTCCTCCAGC	174
Amphibalanus amphitrite	jgAmAmph_COIR1	AAAATTGACGAAGCACCCGC	174
Amphibalanus amphitrite	jgAmAmph_COIF2	ATTTAGCGGGTGCTTCGTCA	229
Amphibalanus amphitrite	jgAmAmph_COIR2	TCTCCACCTCCTGTTGGATCA	229
Amphibalanus amphitrite	jgAmAmph_COIF3	GCACCAGATATGGCTTTCCCT	208
Amphibalanus amphitrite	jgAmAmph_COIR3	TTGACGAAGCACCCGCTAAA	208
Amphibalanus amphitrite	jgAmAmph_COIF4	AGGAGCACCAGATATGGCTTT	214
Amphibalanus amphitrite	jgAmAmph_COIR4	AATTGACGAAGCACCCGCT	214
Amphibalanus amphitrite	jgAmAmph_COIF5	ATTTAGCGGGTGCTTCGTCA	229
Amphibalanus amphitrite	jgAmAmph_COIR5	TCTCCACCTCCTGTTGGATCA	229
Amphibalanus amphitrite	jgAmAmph_COIF6	GCACCAGATATGGCTTTCCCT	208
Amphibalanus amphitrite	jgAmAmph_COIR6	TTGACGAAGCACCCGCTAAA	208
Amphibalanus amphitrite	jgAmAmph_COIF7	TGGTTCTTTGGTAGAGGCGG	341
Amphibalanus amphitrite	jgAmAmph_COIR7	GATCTCCACCTCCTGTTGGAT	341
Amphibalanus amphitrite	jgAmAmph_COIF8	GCCTGATCAGCTATAGTTGGGA	294
Amphibalanus amphitrite	jgAmAmph_COIR8	CCCCGCCTCTACCAAAGAAC	294
Amphibalanus eburneus	jgAmEbur_COIF1	TTTCTCGCTTCAYCTAGCCG	238
Amphibalanus eburneus	jgAmEbur_COIR1	TCCACCTCCTGTGGGATCAA	238
Amphibalanus eburneus	jgAmEbur_COIF2	GACTTCTYCCRCCAGCTTTA	153
Amphibalanus eburneus	jgAmEbur_COIR2	CGGCTAGRTGAAGCGAGAAA	153
Amphibalanus eburneus	jgAmEbur_COIF3	GGTGGATTYGGAAAYTGRCT	245
Amphibalanus eburneus	jgAmEbur_COIR3	GAAGATGCYCCGGCTAGRTG	245

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	Primer name	Primer sequence,5'->3"	Product length
Amphibalanus eburneus	jgAmEbur_COIF4	GRGCCCCAGATATRGCCTTT	210
Amphibalanus eburneus	jgAmEbur_COIR4	TTGAAGATGCYCCGGCTAGR	210
Amphibalanus improvisus	jgAmImpr_COIF1	CCTGATATGGCCTTCCCTCG	200
Amphibalanus improvisus	jgAmImpr_COIR1	GATGCCCCGGCTAAGTGTAA	200
Amphibalanus improvisus	jgAmImpr_COIF2	GAGCCCCTGATATGGCCTTC	203
Amphibalanus improvisus	jgAmImpr_COIR2	TGCCCCGGCTAAGTGTAAAG	203
Amphibalanus improvisus	jgAmImpr_16SF1	TGGAGACTGGTATGAATGGCT	345
Amphibalanus improvisus	jgAmImpr_16SR1	TCCAACATCGAGGTCGCAAA	345
Amphibalanus improvisus	jgAmImpr_16SF2	TCAGAAAGACGAGAAGACCCT	255
Amphibalanus improvisus	jgAmImpr_16SR2	CCAACATCGAGGTCGCAAAC	255
Amphibalanus improvisus	jgAmSuba_COIF1	AGAAGCAGGAGCAGGAACTG	330
Amphibalanus improvisus	jgAmSuba_COIR1	GGATCTCCACCTCCTGTTGG	330
Amphibalanus improvisus	jgAmSuba_COIF2	GCCCCAGACATAGCTTTCCC	350
Amphibalanus improvisus	jgAmSuba_COIR2	GCACCAGCTAAAACAGGCAA	350
Amphibalanus improvisus	jgAmSuba_COIF3	TTGTTACAGCCCACGCTTTT	204
Amphibalanus improvisus	jgAmSuba_COIR3	CAGTTCCTGCTCCTGCTTCT	204
Amphibalanus improvisus	jgAmSuba_COIF4	AGCTGGGGCATCATCAATCT	224
Amphibalanus improvisus	jgAmSuba_COIR4	CTCCACCTCCTGTTGGATCA	224
Amphibalanus improvises	jgAnPalm_COIF1	AGGGGCTTCAGTTGACATGG	272
Amphibalanus improvises	jgAnPalm_COIR1	GAATAGGGTCTCCCCCTCCA	272
Amphibalanus improvisus	jgAnPalm_COIF2	TTGGTTATTGCCTCCTGCCC	382
Amphibalanus improvisus	jgAnPalm_COIR2	AATAGGGTCTCCCCCTCCAG	382
Amphibalanus improvisus	jgAnPalm_COIF3	TTGCTCATAGAGGGGCTTCAG	209
Amphibalanus improvisus	jgAnPalm_COIR3	AGCTCCTGCTAACACAGGTA	209
Amphibalanus improvisus	jgAnPalm_18SF1	CATTCGTACTCGGACGGGAG	179
Amphibalanus improvisus	jgAnPalm_18SR1	GGTACGAGTACCCCATTGCC	179
Ascidiella aspersa	jgAsAspe_18S_F1	GGCCGTTCTTAGTTGGTGGA	308
Ascidiella aspersa	jgAsAspe_18S_R	TGGGAATTCCTCGTTCAAGGG	308
Ascidiella aspersa	jgAsAspe_18S_F2	GAACGAGACTCTGGCTTGCT	261
Ascidiella aspersa	jgAsAspe_18S_F3	GTTTTACGACCTCTCCGGCA	528

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	Primer name	Primer sequence,5'->3"	Product length
Ascidiella aspersa	jgAsAspe_18S_F4	ATCGGTCGGCGTCTAACTTC	223
Ascidiella aspersa	jgAsAspe_18S_F5	GGAGCCTGCGGCTTAATTTG	416
Ascidiella aspersa	jgAsAspe_18S_F6	AGAGTGTTCAAAGCAGGCGA	825
Ascidiella aspersa	jgAsAspe_18S_F7	CACTGACCGGATCAGCATGT	115
Ascidiella aspersa	jgAsAspe_18S_F8	TTTTCGGAGCGCGAGGTAAT	747
Ascidiella aspersa	jgAsAspe_18S_F9	CGGTCGGCGTCTAACTTCTT	221
Ascidiella aspersa	jgAsAspe_18S_F10	TGATTCTGTGGGTGGTGGTG	331
Ascidiella aspersa	jgAsAsci_COI_F1	TTTTGGCGGGGGTTATTGGT	604
Ascidiella aspersa	jgAsAsci_COI_R1	CTCCCACCGGGATCAAAGAA	604
Ascidiella aspersa	jgAsAsci_COI_F2	TTTGGCGGGGGTTATTGGTA	601
Ascidiella aspersa	jgAsAsci_COI_R2	CCCACCGGGATCAAAGAAAC	601
Ascidiella aspersa	jgAsAsci_COI_F3	GAGTTATCTCAGCCTGGGCA	558
Ascidiella aspersa	jgAsAsci_COI_R3	CCTCCCACCGGGATCAAAGA	558
Ascidiella aspersa	jgAsAsci_COI_F4	GACGGCCCATGCTTTTGTTA	499
Ascidiella aspersa	jgAsAsci_COI_R4	CCCACCGGGATCAAAGAAACT	499
Ascidiella aspersa	jgAsAsci_COI_F5	TTAGAATTTTGGCGGGGGTT	539
Ascidiella aspersa	jgAsAsci_COI_R5	CACCGGAAGAGAAAGCACCA	539
Ascidiella aspersa	jgAsAsci_COI_F6	TTTAGAATTTTGGCGGGGGT	547
Ascidiella aspersa	jgAsAsci_COI_R6	CAGCCAACACCGGAAGAGAA	547
Ascidiella aspersa	jgAsAsci_COI_F7	TTTAGAATTTTGGCGGGGGTT	541
Ascidiella aspersa	jgAsAsci_COI_R7	ACACCGGAAGAGAAAGCACC	541
Ascidiella aspersa	jgAsAsci_COI_F8	TTTTAGAATTTTGGCGGGGGT	540
Ascidiella aspersa	jgAsAsci_COI_R8	ACCGGAAGAGAAAGCACCAA	540
Ascidiella aspersa	jgAsAsci_COI_F9	TTGGGGACGGCCAAGTCTAT	534
Ascidiella aspersa	jgAsAsci_COI_R9	CCCTCCCACCGGGATCAAAG	534
Ascidiella aspersa	jgAsAsci_COI_F10	ATTGGGGACGGCCAAGTCTA	533
Ascidiella aspersa	jgAsAsci_COI_R10	CTCCCACCGGGATCAAAGA	533
Aspidelectra melolontha	jgAsMelo_12SF1	TTTTGTAAGACCAGGATTAG	212

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	Primer name	Primer sequence, 5'->3"	`Product Length
Aspidelectra melolontha	jgAsMelo_12SR1	CCTTTTAGGGTTAACTTGTA	212
Aspidelectra melolontha	jgAsMelo_12SF2	CGGTTAATTTGATAATCCAC	155
Aspidelectra melolontha	jgAsMelo_12SR2	TAAGCCCTTCTCATAAATTG	155
Aspidelectra melolontha	jgAsMelo_12SF3	GTGGTTATTTTTGCTTAGAA	243
Aspidelectra melolontha	jgAsMelo_12SR3	GTGGATTATCAAATTAACCG	243
Aspidelectra melolontha	jgAsMelo_28SF1	ATGAATGGATTAACGAGATT	210
Aspidelectra melolontha	jgAsMelo_28SR1	AAGTAAAGAAACTACGAGAG	210
Botrylloides diegensis	jgBoDieg_COIF1	TGGTCAAGATTTATTGGAACTGGG	254
Botrylloides diegensis	jgBoDieg_COIR1	AGTGCAGGAGGCAATAACCA	254
Botrylloides diegensis	jgBoDieg_COIF2	GATTTATTGGAACTGGGATAAGTGT	293
Botrylloides diegensis	jgBoDieg_COIR2	CGTTCCCACCCCACTTTCA	293
Botrylloides diegensis	jgBoDieg_COIF3	GGTCAAGATTTATTGGAACTGGGA	355
Botrylloides diegensis	jgBoDieg_COIR3	AATGCAGCCCCAGAATGAGC	355
Botrylloides violaceus	jgBoViol_COIF1	GGAGATTTGGGAATTGGCTA	494
Botrylloides violaceus	jgBoViol_COIR1	ATGGCCGAAGAATCAAAATA	494
Botrylloides violaceus	jgBoViol_COIF2	GAGAGCAGAGTTAGGACAAG	366
Botrylloides violaceus	jgBoViol_COIR2	ATGGCCGAAGAATCAAAATA	366
Botrylloides violaceus	jgBoViol_COIF3	CCTCCTTTGTCGAGGAATTT	353
Botrylloides violaceus	jgBoViol_COIR3	ATGGCCGAAGAATCAAAATA	353
Botrylloides violaceus	jgBoViol_COIF4	AGTTAGGACAAGGTGAACTG	358
Botrylloides violaceus	jgBoViol_COIR4	ATGGCCGAAGAATCAAAATA	358
Branchiomma bairdi	jgBrBard_COIF1	GTTGGGGAGGGATCAGCTTT	244
Branchiomma bairdi	jgBrBard_COIR1	CACTGTCCATCCCGTACCAG	244
Branchiomma bairdi	jgBrBard_COIF2	TGTTGGGGAGGGATCAGCTT	326
Branchiomma bairdi	jgBrBard_COIR2	CGCACCCGCCAAATGTAAAG	326
Branchiomma bairdi	jgBrBard_COIF3	CTTTACATTTGGCGGGTGCG	166
Branchiomma bairdi	jgBrBard_COIR3	GCAGCCAATACCGGCAAAG	166
Branchiomma bairdi	jgBrBard_COIF4	GGCGGGTGCGTCTTCTATT	157
Branchiomma bairdi	jgBrBard_COIR4	AGCAGCCAATACCGGCAAA	157

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	Primer name	Primer sequence, 5'->3"	`Product Length
Bugula neritina	jgBuNeri_COIF1	AGTAATTGCAGTCCCCACAGG	258
Bugula neritina	jgBuNeri_COIR1	CAGTACCTCAGGCCAGCAAA	258
Bugula neritina	jgBuNeri_COIF2	CCGCGCATACTTTACTTCAGC	284
Bugula neritina	jgBuNeri_COIR2	AGTACCTCAGGCCAGCAAAC	284
Bugula neritina	jgBuNeri_COIF3	TGCAGTCCCCACAGGTGTTA	250
Bugula neritina	jgBuNeri_COIR3	GTACCTCAGGCCAGCAAACA	250
Bugula neritina	jgBuNeri_COIF4	TGCTGGCCTGAGGTACTGAT	163
Bugula neritina	jgBuNeri_COIR4	AGGGTTTTCAGAGTATCGGCG	163
Bugulina stolonifera	jgBuStol_COIF1	TGGCCTATGAGCTGGTATAGT	267
Bugulina stolonifera	jgBuStol_COIR1	AGAGCTAGTGCAGGTGGTAA	267
Bugulina stolonifera	jgBuStol_COIF2	AGTTGGAAGAGGATTAAGTGCC	298
Bugulina stolonifera	jgBuStol_COIR2	TGTTCATCCTGTACCTGCTCC	298
Bugulina stolonifera	jgBuStol_COIF3	CGAGTAGAACTTAGTCAACCAGGA	267
Bugulina stolonifera	jgBuStol_COIR3	TCATCCTGTACCTGCTCCTCT	267
Bugulina stolonifera	jgBuStol_COIF4	TGAGCTGGTATAGTTGGAAGAGG	257
Bugulina stolonifera	jgBuStol_COIR4	GCTAGTGCAGGTGGTAAAAGTC	257
Carcinus maenas	jgCaMaen_COIF1	ATTGGAGGGCAAGTCTGGTG	270
Carcinus maenas	jgCaMaen_COIR1	ATAGGCATTCAGGCCGTCAG	270
Carcinus maenas	jgCaMaen_COIF2	GATGCGAGACTCATCCGAGG	337
Carcinus maenas	jgCaMaen_COIR2	CATAGGCATTCAGGCCGTCA	337
Carcinus maenas	jgCaMaen_COIF3	TACTGTCACGCTCCGAACAG	197
Carcinus maenas	jgCaMaen_COIR3	TCGGGTTCAGAAAACCGACA	197
Carcinus maenas	jgCaMaen_COIF4	ACGGGGAGGTAGTGACGAAA	348
Carcinus maenas	jgCaMaen_COIR4	CGTCAGTGTAGCCTGCTTTG	348
Ciona robusta	jgCiRobu_COIF1	TCGTTGTTACTTCTCATGCATTTGT	220
Ciona robusta	jgCiRobu_COIR1	ACTGTTCACCCAGTTCTTACTCT	220
Ciona robusta	jgCiRobu_COIF2	TGTCGTTGTTACTTCTCATGCATTT	220
Ciona robusta	jgCiRobu_COIR2	TGTTCACCCAGTTCTTACTCTAGC	220
Ciona robusta	jgCiRobu_COIF3	AGCTCCTGATATAGCTTTTCCTCG	150

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	Primer name	Primer sequence, 5'->3"	`Product Length
Ciona robusta	jgCiRobu_COIR3	CTGATATTTGCAGATAAAGGAGGGT	150
Ciona robusta	jgCiRobu_COIF4	GGAGCTCCTGATATAGCTTTTCCT	151
Ciona robusta	jgCiRobu_COIR4	TGATATTTGCAGATAAAGGAGGGT	151
Conopeum chesapeakensis	jgCoChes_COIF1	AGGGGCTTCGGTTGATCTTG	270
Conopeum chesapeakensis	jgCoChes_COIR1	ATAGGATCCCCACCTCCAGC	270
Conopeum chesapeakensis	jgCoChes_COIF2	GGCCTATGAGCCGGAATAGT	308
Conopeum chesapeakensis	jgCoChes_COIR2	CCCGTTCCAGCTCCAGATTC	308
Conopeum chesapeakensis	jgCoChes_COIF3	TGTGATTGTTACGGCTCATGC	272
Conopeum chesapeakensis	jgCoChes_COIR3	CAAGATCAACCGAAGCCCCT	272
Conopeum chesapeakensis	jgCoChes_COIF4	ACATTTGGCTGGTGTGTCCT	239
Conopeum chesapeakensis	jgCoChes_COIR4	GAATAGGATCCCCACCTCCAG	239
Corbula amurensis	jgCoAmur_COIF1	TGGTTTTGGTGGTGGGTGRA	255
Corbula amurensis	jgCoAmur_COIR1	GCACCCGCAAGAACTGGYAT	255
Corbula amurensis	jgCoAmur_COIF2	GCAGGTTTGGTRGGWACAGGT	299
Corbula amurensis	jgCoAmur_COIR2	CCACCACCAAAWCCRCCTTC	299
Corbula amurensis	jgCoAmur_16SF1	AAAAACATGGCCTTTTGAAT	231
Corbula amurensis	jgCoAmur_16SFR1	GCTCGATAGGGTCTTCT	231
Corbula amurensis	jgCoAmur_18SF1	TCGATGGTACGTGCTATGCC	325
Corbula amurensis	jgCoAmur_18SR1	CCCGAGATCCAACTACGAGC	325
Corbula amurensis	jgCoAmur_18SF2	GAGGGAGCATGAGATACGGC	263
Corbula amurensis	jgCoAmur_18SR2	TGCACCCGAGATCCAACTAC	263
Corbula amurensis	jgCoAmur_18SF3	CGCGGTAATTCCAGCTCCA	286
Corbula amurensis	jgCoAmur_18SR3	AGCTCCGAGAGCCAACAAAA	286
Corella inflata	jgCoInfl_COIF1	AACCCATTCAAGACCTTCTGT	277
Corella inflata	jgCoInfl_COIR1	AGGATCTCTACCTCTTCTAGGATCA	277
Corella inflata	jgCoInfl_18SF1	AACGGCTACCACATCCAAGG	329
Corella inflata	jgCoInfl_18SR1	ACACTCAGTCAAGAGCACCG	329

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	***Primer Name***	***Primer sequence, 5'->3"***	***Product Length***
Corella inflata	jgCoInfl_18SF2	GCAAAACTGCGAATGGCTCA	349
Corella inflata	jgCoInfl_18SR2	CTGCCTTCCTTGGATGTGGT	349
Corella inflata	jgCoInfl_18SF3	GGAGCCTGCGGCTTAATTTG	211
Corella inflata	jgCoInfl_18SR3	AGTTAAACGCCGGCTGAGAA	211
Crassostrea gigas	jgCrGiga_COIF1	TTTGCCAGGGTCTCTTTATC	279
Crassostrea gigas	jgCrGiga_COIR1	GGGAGAGTAGTCAAAAGCAA	279
Crassostrea gigas	jgCrGiga_COIF2	TTTGGTAACTGGCTTATCCC	216
Crassostrea gigas	jgCrGiga_COIR2	AAGGCTTAGAATTGCAAGGT	216
Crassostrea gigas	jgCrGiga_COIF3	AGACATGCAATTTCCTCGAT	272
Crassostrea gigas	jgCrGiga_COIR3	ATAGTGCTAGTAAATGGCCC	272
Crassostrea gigas	jgCrGiga_COIF4	ACTGGCTTATCCCTTTGATG	284
Crassostrea gigas	jgCrGiga_COIR4	CCCAACAGATCGCATATTTC	284
Cryptosula pallasiana	jgCrPall_COIF1	AGGGCTCCTAGGATCAGCTA	294
Cryptosula pallasiana	jgCrPall_COIR1	ATTGTGATGGCTCCCGCTAA	294
Cryptosula pallasiana	jgCrPall_COIF2	CCCCAGCATTATTAGGGCTCC	294
Cryptosula pallasiana	jgCrPall_COIR2	CCGCTAATACCGGTAGGGAT	294
Cryptosula pallasiana	jgCrPall_COIF3	AGAAAGAGGGGCAGGAACCG	267
Cryptosula pallasiana	jgCrPall_COIR3	GTGATGGCTCCCGCTAATACC	267
Cryptosula pallasiana	jgCrPall_COIF4	TCCCTTCACTTAGCCGGAGTC	233
Cryptosula pallasiana	jgCrPall_COIR4	CCACCCCCTGAAGGGTCAAA	233
Diadumene lineata	jgDiLine_ND4F1	ACGGCGGTGAGAGAATCAAAT	266
Diadumene lineata	jgDiLine_ND4R1	CTCTCAGGAGCGGTCATGTAT	266
Diadumene lineata	jgDiLine_ND4F2	ATCTGAGTCCAACCATCGCC	218
Diadumene lineata	jgDiLine_ND4R2	TCTCAGGAGCGGTCATGTATATC	218
Diadumene lineata	jgDiLine_18SF1	CAGTTGGGGGCATCCGTATT	316
Diadumene lineata	jgDiLine_18SF2	AATTAAGCCGCAGGCTCCAC	316
Diadumene lineata	jgDiLine_18SF3	CCCTTCGCAGCCTGAATACAT	312
Diadumene lineata	jgDiLine_18SF4	TCCCGTAAGGTGCCAAAGAG	312
Didemnum vexillum	jgDiVexi_COIF1	TCTTTACCAGTTTTAGCCGCAG	331

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	***Primer Name***	***Primer sequence, 5'->3"***	***Product Length***
Didemnum vexillum	jgDiVexi_COIR1	CAGCTGTAAAATAAGCTCGCGT	331
Didemnum vexillum	jgDiVexi_COIF2	GATCCTATAAGAGGTGGTGATCC	268
Didemnum vexillum	jgDiVexi_COIR2	TAGTAGCAGCTGTAAAATAAGCTCG	268
Didemnum vexillum	jgDiVexi_18SF1	CAGGGTTCGATTCCGGAGAG	314
Didemnum vexillum	jgDiVexi_18SR1	ACGAGCTTTTCAACCGCAAC	314
Didemnum vexillum	jgDiVexi_18SF2	CACTGATGTCGTTCCTCGCT	227
Didemnum vexillum	jgDiVexi_18SR2	CCATCTTTCGTTTCGGTCGC	227
Didemnum vexillum	jgDiVexi_18SF3	ACTTCCAAGGAAGGCAGCAG	243
Didemnum vexillum	jgDiVexi_18SR3	TACGCTTTCGGAGCTGGAAT	243
Diplosoma listerianum	jgDiList_COIF1	TTTGGTGCTCATCCGTCTAGC	323
Diplosoma listerianum	jgDiList_COIR1	TCAGGATGCCTGAAAAACCAG	323
Diplosoma listerianum	jgDiList_18SF1	GGCCGTTCTTAGTTCGTGGA	272
Diplosoma listerianum	jgDiList_18SR1	AAGCGGAGCCGTCTCTTTTC	272
Diplosoma listerianum	jgDiList_18SF2	CGGACGAGACTCGAACGATG	224
Diplosoma listerianum	jgDiList_18SR2	GCGGAGCCGTCTCTTTTCA	224
Diplosoma listerianum	jwDllist18S_R1	CGAGGCGAACCGAAACTTTGTAAACTTG	206
Diplosoma listerianum	jwDllist18S_F2	GGGGAACGGTCTACCAGTATGAAC	206
Molgula citrina	jgMoCitr_28SF1	GGTTGGGCGGGAACTAGAAA	265
Molgula citrina	jgMoCitr_28SR1	AAGACGGGTCAGAAAGGTGG	265
Molgula citrina	jgMoCitr_28SF2	GCTTCTGGCTCGAAGAGTGT	230
Molgula citrina	jgMoCitr_28SR2	CCGTGTTTCAAGACGGGTCA	230
Molgula citrina	jgMoCitr_18SF1	AACGGCTACCACATCCAAGG	230
Molgula citrina	jgMoCitr_18SR1	CGAGCTTTTCAACCGCAACA	230
Molgula citrina	jgMoCitr_18SF2	GGCCGTTCTTAGTTGGTGGA	232
Molgula citrina	jgMoCitr_18SR2	TCGGCCAAGGTAACAGACAC	232
Molgula manhattensis	jgMoManh_COIF1	TCCTAGAATTCAGATGGATTTTGCT	275
Molgula manhattensis	jgMoManh_COIR1	AGATTGGATCTCCCCCTCCT	275
Molgula manhattensis	jgMoManh_COIF2	TGCTATTTTTAGTCTACATTTGGCT	255
Molgula manhattensis	jgMoManh_COIR2	AAGATTGGATCTCCCCCTCC	255

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	*Primer Name*	*Primer sequence, 5'->3"*	*Product Length*
Molgula manhattensis	jgMoManh_18SF1	TGTTGCGGTTGAAAAGCTCG	291
Molgula manhattensis	jgMoManh_18SR1	TAACGGCAGAGTACGGATGC	291
Molgula manhattensis	jgMoManh_18SF2	CGGTCGGCGTTTTGAAACTT	274
Molgula manhattensis	jgMoManh_18SR2	TGTGTACAAAGGGCAGGGAC	274
Molgula manhattensis	jgMuSenh_LUR2F1	TCTTTTATGCTGTGCTGAGAGC	287
Arcuatula senhousia	jgMuSenh_LUR2R1	TCTTGCATGGCAAGTGCTTC	287
Arcuatula senhousia	jgMuSenh_LUR2F2	GCTGAGAGCTATATTAGACTGCGT	271
Arcuatula senhousia	jgMuSenh_LUR2R2	TGCATGGCAAGTGCTTCTTAG	271
Arcuatula senhousia	jgMuSenh_H3F1	CGTCGCCCTCAGAGAAATCA	197
Arcuatula senhousia	jgMuSenh_H3R1	CGCACAAGTTGGTGTCTTCG	197
Arcuatula senhousia	jgMuSenh_H3F2	ACCGGTGGAGTCAAGAAACC	184
Arcuatula senhousia	jgMuSenh_H3R2	GGAGAGCCATGACTGCAGAG	184
Mya arenaria	jgMyAren_COIF1	GTACCTGACATGGCCTTCCC	287
Mya arenaria	jgMyAren_COIR1	AGAGGAACTCGCTGAAACGG	287
Mya arenaria	jgMyAren_COIF2	GGTTCGGAAATTGGCTGGTG	213
Mya arenaria	jgMyAren_COIR2	TTAAAAAGTCTCCCGCCGCA	213
Mya arenaria	jgMyAren_COIF3	TAATGGGCGGGTTCGGAAAT	307
Mya arenaria	jgMyAren_COIR3	CATCCTGCACGCATGTTACC	307
Mya arenaria	jgMyAren_COIF4	GTTGGGACTGGGCTTAGTGT	201
Mya arenaria	jgMyAren_COIR4	AGGGAAGGCCATGTCAGGTA	201
Mya arenaria	jgOcInor_COIF1	CGAGCTGAACTAGGGCAACC	257
Ocinebrellus inornatus	jgOcInor_COIR1	CCCGCCCCACTCTCTACT	257
Ocinebrellus inornatus	jgOcInor_COIF2	AGTAGAGAGTGGGGCGGG	204
Ocinebrellus inornatus	jgOcInor_COIR2	ACAAATAGAGGAAGGCGCTCA	204
Ocinebrellus inornatus	jgOcInor_COIF3	TGACAGCACACGCTTTTGTTA	197
Ocinebrellus inornatus	jgOcInor_COIR3	CCCCGCCCCACTCTCTAC	197
Ocinebrellus inornatus	jgOcInor_COIF4	CAACCGGGAGCTTTGCTTGG	244
Ocinebrellus inornatus	jgOcInor_COIR4	TCCCCGCCCCACTCTCTA	244
Ocinebrellus inornatus	jgPaMacr_18SF1	TGCCCGAATGTTACCTGCAT	244

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	***Primer Name***	***Primer sequence, 5'->3"***	***Product Length***
Palaeomon macrodactylus	jgPaMacr_18SR1	AGGGTTAGAACTAGGGCGGT	244
Palaeomon macrodactylus	jgPaMacr_18SF2	ACCGCCCTAGTTCTAACCCT	267
Palaeomon macrodactylus	jgPaMacr_18SR2	CACCACCCACCAAATCGAGA	267
Palaeomon macrodactylus	jgPaMacr_18SF3	ACCGTCGTAGGACGAACAAC	275
Palaeomon macrodactylus	jgPaMacr_18SR3	CAAATTAAGCCGCAGGCTCC	275
Palaeomon macrodactylus	jgPaMacr_18SF4	GAACAGCTTCCGTGAGTGGA	290
Palaeomon macrodactylus	jgPaMacr_18SR4	TGCTTTCGCTGTTGTTCGTC	290
Palaeomon macrodactylus	jgPhPunc_18SF1	GTACTGTGAAACTGCGAATG	267
Palaeomon macrodactylus	jgPhPunc_18SR1	GACAGTTGATAGGGCAGAAA	267
Phyllorhiza_punctata	jgPhPunc_18SF2	AACCGTGGTAATTCTAGAGC	213
Phyllorhiza_punctata	jgPhPunc_18SR2	CACTACCTTACCATCGACAG	213
Phyllorhiza_punctata	jgPhPunc_18SF3	TAACCGTGGTAATTCTAGAGC	258
Phyllorhiza_punctata	jgPhPunc_18SR3	AATCGAACCCTAATTCTCCG	258
Phyllorhiza_punctata	jgPhPunc_18SF4	ACTGCGAATGGCTCATTAAA	269
Phyllorhiza_punctata	jgPhPunc_18SR4	TACCTTACCATCGACAGTTG	269
Polydora_cornuta	jgPoCorn_COIF1	TGTGAGTAGAAGATGGGGCA	263
Polydora_cornuta	jgPoCorn_COIR1	CGCCAGAACAGGTAGAGCAA	263
Polydora_cornuta	jgPoCorn_COIF2	ATGTGAGTAGAAGATGGGGCA	282
Polydora_cornuta	jgPoCorn_COIR2	TAGCATTGTTAAGGCCCCCG	282
Polydora_cornuta	jgPoCorn_COIF3	GGGGTATGTGAGTAGAAGATGGG	194
Polydora_cornuta	jgPoCorn_COIR3	TGTTGGCATGCCCCCTAATC	194
Polydora_cornuta	jgPoCorn_COIF4	GGTATGTGAGTAGAAGATGGGGC	346
Polydora_cornuta	jgPoCorn_COIR4	AAATTGGGTCTCCCCCTCCA	346
Polydora_cornuta	jgSyRept_COIF1	CATTACCAGTGCTAGCTGCG	183
Symplegma_reptans	JGSyRept_COIR1	CAACCACATGACTGATCATTCTAAA	183
Symplegma_reptans	jgSyRept_COIF2	TGCTAGCTGCGGCTATTACT	172
Symplegma_reptans	jgSyRept_COIR2	ACCACATGACTGATCATTCTAAATC	172
Symplegma_reptans	jgWaArcu_COIF1	AGAAAGAGGTGCAGGGACAG	334
Watersipora_arcuata	jgWaArcu_COIR1	GATAGGATCCCCTCCCCCAG	334

Appendix 3-1. Putatively species-specific primers designed with Primer-BLAST

Species	***Primer Name***	***Primer sequence, 5'->3"***	***Product Length***
Watersipora_arcuata	jgWaArcu_COIF2	CGCTCTTCACTTAGCAGGAGT	244
Watersipora_arcuata	jgWaArcu_COIR2	GATAGGATCCCCTCCCCCAG	244
Watersipora_arcuata	jgXeSecu_COIF1	CATAGTGGGCCAGCAGTTGA	307
Xenostrobus_secura	jgXeSecu_COIR	GGCCGAAGAATCAAAATAGATGT	307
Xenostrobus_secura	jgXeSecu_COIF2	TGGCTGGACTCTTTATCCGC	347
Xenostrobus_secura	jgXeSecu_COIR	GGCCGAAGAATCAAAATAGATGT	347
Xenostrobus_secura	jgXeSecu_COIF3	ATGACTGTAACTGCCGTGCT	157
Xenostrobus_secura	jgXeSecu_COIR	GGCCGAAGAATCAAAATAGATGT	157
Xenostrobus_secura	jgXeSecu_COIF4	TGGGCCAGCAGTTGATATGT	302
Xenostrobus_secura	jgXeSecu_COIR	GGCCGAAGAATCAAAATAGATGT	302

Appendix 3-2 Primer Performance

SPECIES	REGION	SD 2021 eDNA	SD 2021 Plate	SD 2021 Plankton	MI 2021 eDNA	MI 2021 Plate	MI 2021 Plankton	LB 2021 eDNA	LB 2021 Plate	LB 2021 Plankton	CI 2022 eDNA	CI 2022 Plate	CI 2022 Plankton	SF 2020 eDNA	SF 2021 Plate	SF 2021 Plankton	BT 2022 eDNA	BT 2022 Plankton	HB 2022 eDNA	HB 2022 Plankton
Amphiblanus subalbidus	C	n	COI:3,3k	COI: 3k	n	n	COI:3	n	COI:3	COI:3,3k	n	COI:3, 3k	COI:3k	n	n	COI:3,3k	n	COI:3k	nd	COI:3k
Anguinella palmata	C	nd	COI:3	n	nd	n	COI:3k	nd	n	COI:3k	nd	n	n	nd	n	n	nd	COI:3k	nd	n
Botrylloides diegensis	C	COI:3, 3k	COI:3,3k	COI: 3,3k	COI: 3,3k	COI: 3,3k	COI: 3k	COI: 3,3k	COI: 3,3k	COI: 3,3k	COI: 3,3k	COI: 3,3k	n	COI:3,3k	COI:3	n	COI:3,3k	COI:3,3k	COI:3,3k	n
Botrylloides violaceus	C	nd	n	n	nd	nd	nd	nd	n	COI:3	nd	nd	n	nd	n	COI:3	nd	COI:3	nd	n
Bugula neritina	C	COI:2	COI:1,2	COI:2k	COI:2K	COI:2	COI:2k	COI:2,2k	n	COI:2k	COI:2k	COI:2k	n	COI:2,2k	n	n	nd	COI:2k	nd	COI:2k
Bugulina stolonifera	C	nd	n	n	nd	nd	nd	nd	COI:3	n	nd	nd	nd	nd	n	n	nd	n	nd	n
Ciona robusta	C	n	COI:1	n	n	COI:1	n	n	n	COI:1:1	nd	nd	nd	nd	n	n	nd	n	nd	n
Cryptosula pallasiana	C	n	COI:2	n	COI:1	COI:1	n	COI:1	COI:2	n	nd	nd	nd	nd	n	n	nd	n	nd	n
Didemnum vexiillum	C	COI:1,1k	COI:1,1k	COI:1,1kk	COI:1,1k	COI:1	COI:1,1k	COI:1,1k	COI:1,1k	COI:1,1kk	COI:1,1k	COI:1,1k	COI:1,1k	COI:1,1k	COI:1	COI:1,1k	COI:1,1k	COI:1,1k	COI:1,1k	COI:1,1kk
Dplosoma listerianum	C	COI:1,1k	COI:1	COI:1	COI:1	COI:1	COI:1	16S:1	COI:1	COI:1	nd	nd	nd	nd	n	n	nd	nd	nd	nd
Molgula manhatttensis	C	nd	COI:1	n	nd	nd	nd	nd	n	n	nd	nd	nd	nd	n	COI:1	nd	n	nd	n
Palaemon macrodactylu	C	n	n	18S:1	n	n	18S:1	n	nd	18S:1	nd	nd	nd	nd	n	18S:1	nd	nd	nd	nd
Amphibalanus improvisu	N	16S:1k	COI:1;16S	16S:1,1k	n	16S:1,1k	16S:1,1k	16S:1,1k	16S:1k	COI:1;16S:1,1k	COI:2;16S:1	16S:1,1k	16S:1,1k	16S:1,1k	16S:1k	COI:1;16S:1	16S:1,1k	16S:1,1k	16S:1,1k	16S:1,1k
Carcinus maenas	N	ns	n	n	nd	nd	nd	nd	ns	n	nd	nd	nd	nd	n	COI:3	nd	COI:3	nd	nd
Corbula amurensis	N	18S:1	18S:1	18S:1	18S:1	18S:1	18S:1	18S:1	n	18S:1	n	nd	nd	n	18S:1	COI:3;18S:1	nd	n	nd	n
Corella inflata	N	nd	COI:3	n	nd	n	n	COI:3	COI:3	n	nd	n	n	COI:1	n	n	nd	n	COI:1	n
Ocinebrellus inornatus	N	nd	n	COI:1	nd	nd	nd	nd	COI:1	n	nd	nd	nd	nd	n	n	nd	n	nd	n
Amathia verticillata	S	COI:2	COI:1,2	COI:1	COI:1,2	COI:1,2	COI:1,2	n	n	COI:1,2	COI:2,2:1	nd	nd	n	n	n	n	n	nd	n
Branchiomma bairdi	S	COI:3k	COI:3,3k	n	nd	n	n	COI:3k	n	n	nd	n	n	nd	COI:3	n	nd	n	COI:3k	n
Watersipora arcuata	S	nd	COI:1	COI:1	COI:1k	n	COI:1	COI:1k	COI:1	COI:1	COI:1k	COI:1	COI:1	COI:1k	COI:1	COI:1	nd	COI:1	nd	n
Ascidiella aspersa	X	n	COI:9,9k	COI:9k	n	n	COI:9k	COI:9,9k	COI:9,9k	COI:90,9k	n	n	COI:9k	n	n	n	n	n	nd	n
Xenostrobus secura	X	nd	COI:1k	COI:1,1kk	nd	n	COI:1,1k	nd	n	COI:1,1k	nd	n	n	nd	n	n	nd	n	nd	n