

**Southern California Bight  
1998 Regional Marine Monitoring Survey  
(Bight'98)**

# **Information Management Manual**

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Prepared for:  
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## I. INTRODUCTION

The Southern California Bight (SCB), an open embayment in the coast between Point Conception and Cabo Colnett (south of Ensenada), Baja California, is an important ecological and recreational resource. The SCB has a complex topography, with offshore islands, submarine canyons, ridges and basins, that provide a variety of habitats for more than 500 species of fish and 1,500 species of invertebrates. World renowned for its recreational waters, more than 100 million people visit Southern California beaches and coastal areas annually to sunbathe, surf, swim, skin- and SCUBA-dive.

Southern California is also one of the most densely populated coastal regions in the country, which creates stress upon these resources. Nearly 20 million people inhabit coastal Southern California, a number that is expected to increase another 20% by 2010 (NRC 1990). Population growth generally results in conversion of open land into non-permeable surfaces. This “hardening of the coast” increases the rate of runoff and can impact water quality through addition of sediment, toxic chemicals, microbial pathogens and nutrients to the ocean. Besides the impacts of land conversion, the SCB is home to fifteen municipal wastewater treatment facilities, eight power generating stations, 10 industrial treatment facilities, and 18 oil platforms that discharge to the open coast.

Each year, local, state, and federal agencies spend in excess of \$10M to monitor the environmental quality of the SCB. Most of this monitoring is associated with National Pollutant Discharge Elimination System (NPDES) permits and is intended to assess compliance of waste discharge with the California Ocean Plan and the Federal Clean Water Act, which set water quality standards for effluent and receiving waters. While these monitoring programs have provided important information, they were designed to evaluate impacts near individual discharges. Today, resource managers are being encouraged to develop management strategies for the entire SCB. To accomplish this task, they need regionally-based information to assess cumulative impacts of contaminant inputs and to evaluate relative risk among different types of stresses. It is difficult to use existing data to evaluate regional issues because the monitoring was designed to be site-specific and is limited to specific geographic areas. The monitoring provides substantial data for some areas, but there is little or no data for the areas in between. Beyond the spatial limitations, data from these programs are not easily merged to examine relative risk. The parameters measured often differ among programs. Even when the same parameters are measured, the methodologies used to collect the data often differ and interlaboratory quality assurance (QA) exercises to assess data comparability are rare.

To begin addressing these concerns, twelve agencies joined in a cooperative sampling effort in 1994, called the Southern California Bight Pilot Project (SCBPP). The SCBPP involved sampling 261 sites, using common methods, along the continental shelf between Point Conception and the United States/Mexico border. Assessments were made of water quality, sediment contamination, the status of biological resources and species diversity, and the presence of marine debris. The SCBPP provided a much-needed first “snapshot” of the state of the SCB.

The proposed Southern California Bight 1998 Regional Monitoring Project (Bight’98) is a continuation of the successful cooperative regional-scale monitoring begun in southern California in 1994 during the SCBPP. Bight’98 expands on the 1994 survey by including more participants,

sampling more habitats, and measuring more parameters. Fifty-five organizations, including international and volunteer organizations, have agreed to participate (Table I-1).

### **Information Management Challenges**

The inclusion of new participants in cooperative regional monitoring provides several benefits, but it also provides additional challenges, one of which is information management. Bight'98 involves the simultaneous sampling of a wide range of biological, chemical and physical parameters by many project participants. Each organization will use its own equipment to collect and analyze the samples (using standardized methods), and most will use their own information management systems to record, process and report the data they collect. A cooperative information management system is necessary to meet the goal of sharing data among participants in order to conduct a regional assessment.

Information management within Bight'98 must occur on several levels. First, a process must be developed to ensure the quality, compatibility, and timeliness of the data each organization collects. Once the information has been collected and organized, it must be readily available to the project scientists for review, analysis and interpretation. Eventually this information will be made available to other interested organizations and the general public. Perhaps most important, the information collected during Bight'98 must persist in a usable form for future analyses of the long-term, broad-scale processes occurring in the Bight.

This document describes the information management system (IMS) that will support Bight'98. The document focuses on four major functions of the Bight'98 IMS:

- The standard protocols each participating agency will use to transfer the measurement and supporting data from their IMS to the Bight'98 IMS.
- The process by which data will be submitted to the Bight'98 data manager (SCCWRP), including the path and quality control procedures the data will follow until it has been accepted.
- The technical specification of how the data will be organized in the Bight'98 database.
- The milestones and mechanisms by which the data in the Bight'98 database will be made accessible to project participants, other organizations, and the general public.

Additional details about Bight'98 are available in work plans that describe the technical aspects of the three study components: 1) Coastal ecology, 2) Shoreline microbiology, and 3) Water quality. The Coastal Ecology component is also supported by companion documents detailing Field Methods and Logistics, Quality Assurance (QA), Benthic Laboratory Procedures.

**TABLE I-1. Participants in the Bight'98 Regional Monitoring Program.**

AES Corporation  
Algalita Marine Research Foundation  
Aliso Water Management Authority (AWMA)  
Aquatic Bioassay and Consulting Laboratories (ABCL)  
Center for Environmental Cooperation (CEC)  
Central Coast Regional Water Quality Control Board  
Channel Islands National Marine Sanctuary (CINMS)  
Chevron USA Products Company  
City of Long Beach  
City of Los Angeles Environmental Monitoring Division (CLAEMD)  
City of Los Angeles Stormwater Division  
City of Oceanside  
City of Oxnard  
City of San Diego  
City of Santa Barbara  
City of Ventura  
Columbia Analytical Services  
Divers Involved Voluntarily in Environmental Rehabilitation & Safety (DIVERS)  
Encina Wastewater Authority  
Goleta Sanitation District  
Granite Canyon Marine Pollution Studies Lab  
Houston Industries, Inc.  
Instituto de Investigacione, Oceanologicas (UABC)  
Los Angeles Department of Water and Power (LADWP)  
Los Angeles County Dept. of Beaches & Harbors  
Los Angeles County Dept. of Health Services  
Los Angeles Regional Water Quality Control Board  
Los Angeles County Sanitation Districts (LACSD)  
Marine Corps Base - Camp Pendleton  
National Fisheries Institute of Mexico (SEMARNAP)  
NOAA International Programs Office  
NRG Energy, Inc.  
Orange County Environmental Health Division  
Orange County Public Facilities and Resources (OCPFRD)  
Orange County Sanitation District (OCSD)  
San Diego County Dept. of Environmental Health  
San Diego Interagency Water Quality Panel (Bay Panel)  
San Diego Regional Water Quality Control Board (SDRWQCB)  
San Elijo Joint Powers Authority  
Santa Ana Regional Water Quality Control Board  
Santa Barbara County Health Service  
Santa Monica Bay Restoration Project  
Secretaria de Marina (Mexican Navy)

**TABLE I-1 (continued). Participants in the Bight'98 Regional Monitoring Program.**

Southeast Regional Reclamation Authority (SERRA)  
Southern California Coastal Water Research Project (SCCWRP)  
Southern California Edison (SCE)  
Southern California Marine Institute (SCMI)  
State Water Resources Control Board (SWRCB)  
Surfrider Foundation  
University of California, Santa Barbara  
USC Wrigley Institute for Environmental Studies (WIES)  
US EPA Region IX  
US EPA Office of Research and Development  
US Geological Survey  
US Navy, Space & Naval Warfare Systems Center, San Diego (USN)



## **II. APPROACH TO INFORMATION MANAGEMENT**

The Information Management System (IMS) has several purposes, the primary of which is to provide a mechanism for sharing of data collected within a single project (Bight'98) among project participants; data sharing is required if the Bight'98 goal of producing an integrated regional assessment of the condition of southern California's coastal waters is to be achieved. While this is the primary focus, the IMS has been developed in recognition that Bight'98 represents an unprecedented level of data standardization among the many monitoring organizations in the SCB and there is a possibility that the protocols adopted here may be later used for other purposes or future regional surveys. Thus, the system was designed to be flexible to future adaptation. In addition, while the system was constructed primarily to serve the project scientists, the system was also designed in recognition that the data produced will provide a significant baseline for comparing future conditions in the SCB. Therefore, the IMS needs to include a mechanism for transmitting data to non-project scientists and the interested public.

The Bight'98 IMS will be based on a centralized data storage system. A centralized system was selected because Bight'98 is an integrated project and the typical data user will be interested in obtaining the whole data set (or large parts thereof), rather than the smaller units of data (individual parameters, subset of the geographic range) that would reside at individual participating laboratories. The centralized system was selected over the alternative of a distributed system linked through a series of FTP sites because of an inconsistent level of computer and internet sophistication among the participating organizations, plus the difficulty of maintaining a linked-distributed system over an extended number of years.

Standardized data transfer protocols (SDTP) will be used for inputting data into the centralized data storage system (Appendix A). SDTP detail the information to be submitted with each sample collection or processing element, the units and allowable values for each parameter, and the order in which that information will be submitted. They are necessary to ensure that data submitted by the many participants are comparable and easily merged, without significant effort or assumptions by the organization responsible for maintaining the centralized data system. Use of SDTP allows each participating organization to retain their existing data management system, yet output the data in a format that allows sharing among organizations.

### **Role of Information Management Committee**

The IMS was developed and will be administered by the Information Management Committee (IMC; Table II-1), which is one of eight technical committees supporting the Bight'98 Steering Committee. Membership on the IMC is open to all Bight'98 participating organizations through appointment by a Steering Committee member (Table II-2). Open membership is intended to provide a framework of communication and consensus. The IMC makes recommendations and presents draft documents to the Steering Committee. The Steering Committee is responsible for assessing whether these recommendations and documents are consistent with the project objectives, and for assessing whether the costs of the recommendations are consistent with the resources available for conducting the project.

The IMC will implement its activities primarily through an Information Management Officer (IMO), who will also serve as the chairperson of the Committee. The IMO will be responsible for

checking data as it is submitted, concatenating data from participating organizations, and serving as the focal point for data distribution. Larry Cooper of the Southern California Coastal Water Research Project (SCCWRP) will serve as the IMO at the project's outset and the data base will be housed at SCCWRP.

### **III. STANDARDIZED DATA TRANSFER PROTOCOLS**

The SDTP used in Bight'98 represent an extension of the formats developed for the SCBPP and in previous efforts by the Santa Monica Bay Restoration Program. The number of SDTP were expanded for Bight'98 to incorporate new data types, such as those collected in the Shoreline Microbiology survey. Existing protocols were modified to add parameter fields that scientists felt were necessary (e.g. latitude and longitude for every sampling event, rather than a single latitude/longitude for the site) and to delete fields that were found to be superfluous or repetitive.

The SDTP were constructed to capture data at the level of individual replicate, rather than in a summarized format. This level was selected because the primary clients for the data are the project scientists, who need individual replicate information in order to conduct statistical analyses. In some cases, data summarization is desirable to achieve inter-laboratory comparability. For instance, sediment grain size analysis will be conducted by laser technology that provides approximately 100 different size fractions, but the number of size fractions differs among machines; the project scientists recommended that the raw data be summarized into 40 size categories that allow comparison among machine outputs. All decisions about data summarization were made by project scientists through the project's Technical Committees, rather than by information managers. When the SDTP call for summarized data, the original data will be archived in machine output format by each participating laboratory.

The SDTP include fields for summary quality assurance (QA) information, though routine laboratory QA procedure data (e.g. blanks, spikes) will be retained at the individual laboratory. Our objective in selecting which QA data to carry within the IMS was to provide the user enough information to evaluate the data.

The SDTP also include fields for sampling design information, which will be populated by the project designers, rather than by the field or laboratory crews. A stratified random sampling design was used to select sample sites for the Coastal Ecology and Shoreline Microbiology components of Bight'98; this means that the data are not equally weighted in their contribution to an overall project mean. The inclusion probability for each sample type at each sample site will be included to ensure that samples are properly weighted in data analysis.

#### **Relational Model Structure**

The IMS is based on a relational structure in which 25 data tables (Appendix A), each containing different types of data, are linked by one or more common fields. Use of multiple data tables allows data created at different times (e.g., lab vs. field data) to be entered at the time of data production, minimizing the possibility of data loss. Linking tables that contain data recorded at different frequencies also minimizes redundant data entry.

The relational structure is based on a four-level model. The first level is a station table, which contains a single data record for each site that is sampled in the survey. The table includes station descriptors, such as latitude, longitude and landmarks, that can be used to locate the site, as well as sample design information, such as sampling strata and inclusion probability.

The second level is the station occupation table, which contains a record for each visit to a sampling site. This level includes data describing sampling date, time, and environment descriptors such as weather and sea state. The station occupation table is linked to the station table by a StationID field.

The third level is the sampling event table, which contains a record for each sampling activity during a visit to a site. This level exists only within the Coastal Ecology portion of Bight'98, in which multiple trawls or benthic grabs may be conducted on a site visit. This level is used to record information about each of these events (e.g. trawl duration, observations about sediment type in the grab). For the Shoreline Microbiology and Water Quality components, event information is merged into the station occupation level because each visit to a site involves a single sampling event.

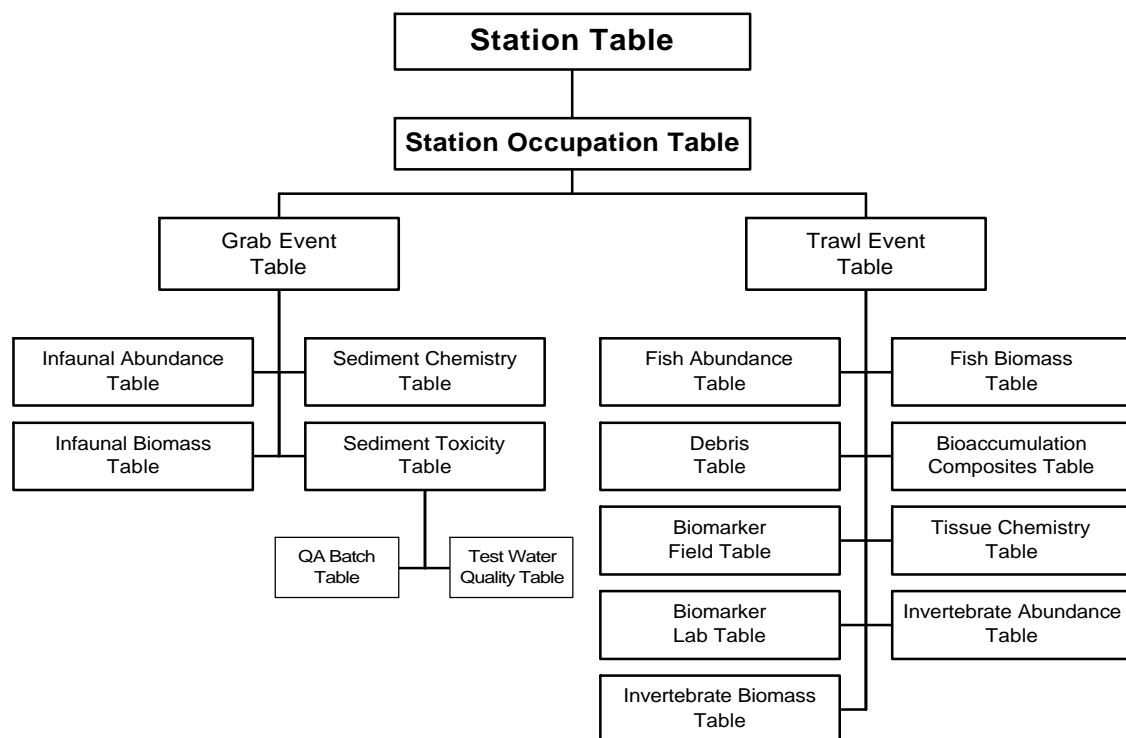
The fourth level includes a series of results tables, which contain a record for every laboratory result. There are multiple results tables corresponding to the different types of laboratory analyses. The results tables are linked to the sampling events tables by StationID and Date.

While the same basic structure is used across all three of the Bight'98 project components (Coastal Ecology, Shoreline Microbiology, and Water Quality), each component will have their own relational structure. The three project components are treated separately because each contains data of different types and is based on its own sampling design. Each component has a unique geographical set of sampling stations and the Water Quality component has a distinct temporal schedule, offset by several months from the others.

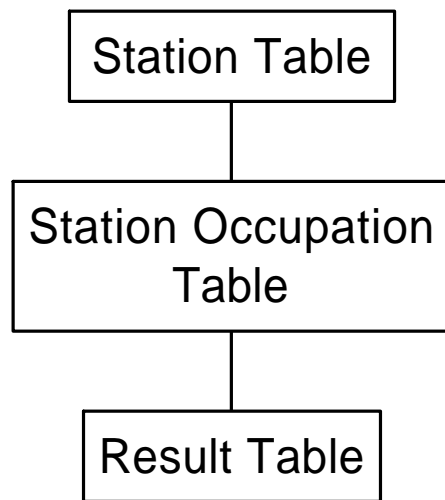
Figures III-1 through III-3 show the table structure for each of the three components. The station table is shown at the highest level, while the lower levels appear as “children” of the “parent” levels. While the relational model is not truly hierarchical, as chemistry data and fish chemistry data can be linked directly, a hierarchical model is presented to illustrate relationships between the tables.

Appendix A of this document contains the particulars of the standard table formats. Each table structure is defined in terms of field name, field order, and field data type. There is also additional description of the intent of each table and a definition of a record in that table. Appendix B contains the values for each of the constrained lists where specified in the table structures. There are 18 tables in the Coastal Ecology component, three in the Microbiology component, and four in the Water Quality component.

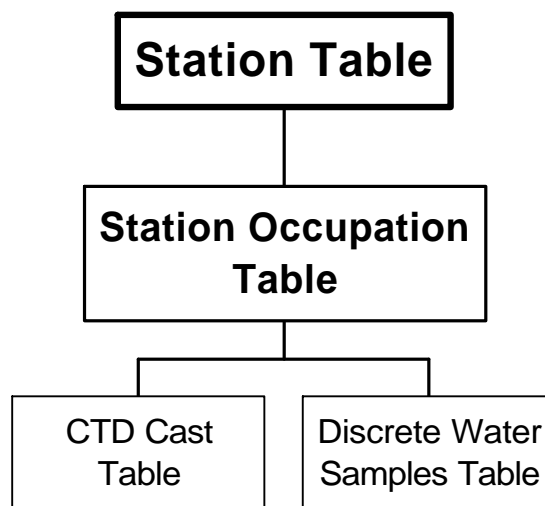
**Figure III-1. Coastal Ecology table structure.**



**Figure III-2. Shoreline microbiology table structure.**



**Figure III-3. Water Quality table structure.**



#### **IV. DATA FLOW AND QUALITY ASSURANCE**

Each field crew or laboratory generating data will initially enter it into their own data management system and subject it to their internal QA/QC procedures. Recommended QA will include double entry of data and range checks. Data will next be reformatted following the SDTP and submitted to the Information Management Officer in comma-delimited, ASCII format. Submission protocols are detailed in Table IV-1.

Standardized data files will be submitted to the IMO by diskette, e-mail, or FTP. Each file will be named using the conventions described in Appendix A. Each submitting agency will retain a copy of each ASCII file it submits as a back-up at least until the central database is declared complete by the IMO.

Upon receipt, the IMO will update a data submission log to document the data received from each submitting agency. The IMO will then create a temporary data table and initiate a series of error checks to ensure the data: 1) are within specified ranges appropriate to each parameter measured, 2) contain all required fields, 3) have encoded valid values from constrained look-up lists where specified, and 4) are in correct format (text in text fields, values in numeric fields, etc.).

If the data emerge from the error check routine with no errors or suspected outliers, the IMO will append the temporary table to the appropriate table for that data type. If there are only a few, easily correctable errors, the IMO will make the changes, with the consent of the submitting agency, and send a list documenting the changes back to the submitting agency. If there are numerous errors or the corrections are difficult to implement, the IMO will send the data file back to the submitting agency with a list of necessary corrections. The submitting agency will make the corrections and resubmit the file within one week to the IMO, who will subject the file to error checking again. Each of these paths will be documented by the IMO as part of the submittal tracking process.

When all data of a particular type (e.g. sediment toxicity) have been submitted, error checked, and corrected, the IMO will certify that the file is consistent with the SDTP format requirements and complete. The IMO will then notify the chairperson of the Technical Committee responsible for that data type that the data are ready for technical review. The IMO will distribute the file to the chairperson as a comma-delimited ASCII file in the SDTP format. The Technical Committee Chair (TCC), with assistance of their Technical Committee, will review the data with respect to scientific content. This review will involve plotting of data and examining interrelationships among individual parameter responses and will address more extensive data quality issues than can be accomplished by range checking alone. Any further corrections resulting from this review process will be documented by the Committee and returned to the IMO, who will determine whether he can make the changes or if the data must be returned to the submitting agency for correction and resubmittal. The IMO will continue to include any data correction paths resulting from Technical Committee review in his documentation of submittal tracking.

As data updates become necessary after the initial submittal and review process, project participants can initiate a request for changing data by notifying the IMO, who will contact the IMC to assess the degree to which the change may impact prior data analysis. If the change is minor, the IMO will have authority to make it; if major, the IMO will make a proposal for review by the Steering Committee. Any changes will be documented on a Request for Change form (Table IV-2). No

attempt will be made as part of Bight'98 data maintenance to update species names in order to keep the taxonomy current with future name changes.

All corrections to the data will be made by the IMO; access to the database for other users will be in read-only form. Prior to making any changes, the IMO will document the changes and receive (written or electronic) concurrence from the organization that originated the data. The IMO will only make changes in the centralized data base; originating organizations will be responsible for making corresponding changes in their own internal data storage systems. All changes to the data will be documented in a computerized file available to all data users.

### **Data Entry Templates**

Not all organizations participating in Bight'98 have sophisticated computer capability. To assist these organizations and improve the efficiency of data input for others, the IMC has created a series of computerized data entry templates that automatically output the data in SDTP. These templates provide drop-down lists for station designation, fish and invertebrate species, sea surface, weather, sediment quality observations, and most other data types. They reduce errors through the elimination of hand entry and the reentry of hand entered data into the database. The templates also eliminate spelling errors, ensure that the data entered is appropriate for that field, and that the data are complete.

Data entry templates are available for the coastal ecology (fish trawling and benthic sampling) field sampling effort, in which the system links to a shipboard global positioning system to automatically download date, time, location and trawl direction/speed. They are also available for the Shoreline Microbiology component, the water quality field component and for toxicology laboratory data. Updated versions of these templates will be maintained for download at [www.sccwrp.org](http://www.sccwrp.org).

### **Data storage**

Project data will be stored in Microsoft Access at the Southern California Coastal Water Research Project (SCCWRP). Original data submissions that pass initial QC will be stored in the Bight'98 database and will also be archived onto another media type such as a CD-ROM which has a higher degree of temporal stability than other storage media such as tape and floppy disks. A copy will be stored in a fireproof safe at SCCWRP and an additional copy will be stored off-site.

Any other information collected, including summary datasets generated during scientific analysis, will not be stored in the database. Satellite imagery, archival data files, GIS maps, CADD drawings, and voucher sheets will be stored as hard copies and computer files and perhaps cross-referenced from the database. Similarly, any textual information, including reports, project documents, etc. will be stored in digital form and made available on-line to project members and eventually other users. It is envisioned that this information will be made available to the public on an interactive Web site that can be queried.



#### **Table IV-1. ASCII Submission Protocols**

The first line in the ASCII file will be the entire string of Field Names in the order specified by the for the particular data type (refer to Appendix A for these lists). Data in any text or character field will be in quotes. Because all the Field Names are text, each will appear bounded by quotation marks and separated by commas.

Example: For a TrawlFishBiomass file, the first line would be:

“StationID”, “Species”, “Qualifier”, “NetWeight”, “Units”, “Comments”

The next line following the Field Names will be the first data record. If a field is null or blank, it will be represented by successive commas with no text, values, or spaces between them (unless the null field is last in the order). Required fields by definition are not null and will never appear in this manner; instead they will always have the appropriate type text, number, or date/time information filled in. Only character fields will have bounding quotes; numeric and date/time information will not appear with quotes.

Example: For a TrawlFishBiomass file, the second line may be:

“StationID”, “Microstomus pacificus”, ,1.2, “kg”, “None”

The double comma after “Microstomus pacificus” indicates absence of a qualifier for this record.

**Table IV-2. Data Change Request Form**

**BIGHT'98 DATABASE CHANGE DOCUMENTATION FORM**

PARENT DATABASE    TRAWL   CTD    BENTHIC   MICRO  
**circle one**

TABLE IN DATABASE \_\_\_\_\_  
Debris, Inverts, etc.

GLOBAL    Y/N    Do we need to change the entire database?  
**circle one**

DATA \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

REQUESTOR: \_\_\_\_\_

CHANGER: \_\_\_\_\_

STATIONID: \_\_\_\_\_

REQUESTING AGENCY: \_\_\_\_\_

STATION: \_\_\_\_\_

ORIGINAL DATA: \_\_\_\_\_

CHANGED DATA: \_\_\_\_\_

**COMMENTS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **V. DATA ACCESS**

All measurement and supporting data gathered during Bight'98 will be made available to all participating agencies and the general public, though the schedule of availability will vary by user class. The different schedules recognize the differing levels of quality assurance and data documentation that will have been completed at various stages in the project. Four classes of user have been identified:

- **Information Management Officer:** All organizations will submit their data in accordance with the SDTP to the IMO within one month of completing their assigned sample collection or laboratory processing tasks. The schedule for this initial submission of data to the IMO is summarized in Table V-1. Upon receipt of an organization's data, the IMO will subject the data to the review procedures outlined in Section III. Once the IMO has certified the data meet the SDTP criteria, the data will be available for release to the Technical Committees. It is anticipated that the review and certification process by the IMO will take approximately one month.
- **Technical Committee Members:** The Technical Committee Chairs will be provided data of the type for which they are responsible immediately following certification by the IMO that the data is complete. The TCCs will work with their technical committee members to review the scientific content of the data.
- **Steering Committee Members:** All project participants will have access to data once the TCC has conducted initial scientific review for data quality. TCCs will be asked to complete this review within three months.
- **General Public:** Data will be released to the general public once the TCC has conducted initial data analysis and the Steering Committee has accepted an oral report from the TCC that summarizes the major project results for that data type. TCCs will be asked to make this presentation, and provide summary results tables from the presentation, within six months of releasing data to the Steering Committee.

The primary method of data release will occur by way of the SDTP, but the SDTP contain data at the level of individual replicate, which may not be the most appropriate way to transmit data to the general public. In addition, there may be many calculated variables not contained in the SDTP that are of value to the public. The Technical Committees will have the opportunity to define alternate data sets that may be made available to the public once the committee's analysis and reports are finished. Release of alternative data sets will be accompanied by documentation detailing the manipulations that have been performed.

While the SDTP will be the primary mechanism for data distribution, the data will be distributed as a group of files relevant to a particular project data type. For instance, one group of files providing trawl data will include comma delimited ASCII files for the trawl event, fish abundance, fish biomass, trawl inverts, trawl debris and station tables. Because of the relational structure, these files will be of limited value alone. Users will have the opportunity to download groups of files for: trawls, benthic infauna, toxicity, chemistry, water quality or microbiology.

## **Metadata**

Each release of data will include comprehensive documentation about Bight'98 and the accompanying data sets. Referred to as metadata, this documentation will include lookup tables used to populate specific fields in specific tables, access control, and database table structures (including table relationships). It will also include quality assurance classifications of the data and documentation of the methodologies by which the data were collected.

A second type of metadata will document changes that are made to the data over time. As the data are used, we anticipate that errors will be found. As changes to the data are made, they will be documented in a file organized by date and data table. Including this file with each data download will allow users to reconcile potential differences in analysis output that result from using different versions of the data.

Metadata will be automatically included with each data retrieval. The related data files, including an ASCII narrative text file of the metadata, will be distributed through download of single compressed (zipped) file. In this manner, the data user must receive the accompanying metadata file, maximizing the likelihood that the data will be used properly.

**Table V-1. Expected elapsed time between the end of sampling and the transfer of data to the Information Management Officer (IMO), including the time required for sample processing, internal QC checks, and data entry using the SDTP.**

<b><u>Data Type</u></b>	<b>Transfer to IMO</b>
Benthic infauna	12 mo.
Grain size	6 mo.
Total organic carbon	6 mo.
Mineralogy	9 mo.
Sediment organics	12 mo.
Sediment metals	6 mo.
Sediment acid volatile sulfides	6 mo.
Interstitial water metals	6 mo.
Amphipod survival	3 mo.
Microtox	6 mo.
QwikLite	3 mo.
RGS 450	12 mo.
Fish biomarkers	6 mo.
Fish and megabenthic invertebrate assemblages	3 mo.
Fish pathology	3 mo.
Fish tissue chemistry	12 mo.
Debris	3 mo.

## APPENDIX A. TABLE STRUCTURES

Many agencies are participating in this project and each one has a unique way of storing and distributing data. In order to facilitate data exchange all participating agencies have agreed to submit and exchange data in Standardized Data Transfer Protocol formats (STDP). These formats include tables with fields arranged in specific order as well as specific values allowable for each field where only a constrained list of values is allowed. These values come from a source list in Appendix B of this document.

There are three distinct portions of the project: Coastal Ecology, Microbiology, and Water Quality. The Coastal Ecology portion includes data collected using otter trawls and grabs and the resulting chemistry data. The Microbiology component includes shoreline sampling of bacteriological samples and shoreline trash surveys. The Water Quality component includes samples taken with remote sensing gear and discrete water samples.

All tables will be submitted to the Information Management Officer (IMO) in comma delimited ASCII format and all text fields will be further delimited by quotation marks to indicate that the field contains text type data. This format lends itself to use by virtually all existing commercial database management and spreadsheet software. The following table definitions specify the format for each of the data types collected in the Bight'98 project.

### A. Coastal Ecology Tables

#### Station Table

The station table is created by SCCWRP and is central to data relations in the Bight'98 database. Each record represents a description of a geographical location including a label and latitude and longitude data. Each record also contains information necessary to determine the analysis sub-population to which the station belongs and accompanying inclusion probabilities and area weight for the various sub-populations.

Name	Type	Required	Description
StationID	Text	Y	A geographic location label
Strata	Text	Y	The subpopulation to which the sample belongs
Lat	Number	Y	Degrees of Latitude (NAD 83)
LatMin	Number	Y	Decimal Degrees of Latitude (NAD 83)
Lon	Number	Y	Degrees of Longitude (NAD 83)
LonMin	Number	Y	Decimal Degrees of Longitude (NAD 83)
Level1IP	Number	Y	Inclusion Probability
Level1AW	Number	Y	Area Weight
Level2IP	Number	Y	Inclusion Probability
Level2AW	Number	Y	Area Weight
Level3IP	Number	Y	Inclusion Probability
Level3AW	Number	Y	Area Weight
Level4IP	Number	Y	Inclusion Probability
Level4AW	Number	Y	Area Weight

Level5IP	Number	Y	Inclusion Probability
Level5AW	Number	Y	Area Weight
Level6IP	Number	Y	Inclusion Probability
Level6AW	Number	Y	Area Weight

### **Station Occupation**

There is one file that is used for both benthic and trawl sampling regimes to describe occupation of a station for sampling. Each agency will submit a copy of the station occupation file to SCCWRP.

The station occupation table holds data that is descriptive of station occupation during sampling events. Each record contains a characterization of the station at the time of sampling in terms of the weather, sea state, sample type, vessel name, agency, and quality of the GPS signal at the time of sampling. A record can also contain information about station sampling failures where the station is abandoned due to one of the acceptable reasons for station abandonment. The NavType field allows the collecting agency to record the loss of the differential GPS signal. Additional comments may be included as well with up to 80 characters. This file will be provided to the IMO with the name STATION.MST by each agency.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Date	Date/Time	Y	The date the sample was collected dd/mm/yyyy
Time	Date/Time	Y	The time the sample was collected expressed in 24 hour time
SampleType	Text	Y	The type of sample (Grab, Trawl)
AgencyCode	Text	Y	A two letter agency code from list 1
Vessel	Text	Y	Vessel Name
NavType	Text	Y	DGPS for differential / GPS for non-differential
WeatherCode	Text	Y	Predetermined weather codes from list 8
WindSpeed	Number	Y	Meters/second
WindDirection	Text	Y	N,NE,E,SE,S,SW,W,NW
SwellHeight	Number	Y	Meters
SwellPeriod	Number	Y	Seconds
SwellDirection	Text	Y	N,NE,E,SE,S,SW,W,NW
SeaState	Text	Y	Description from calm, choppy, or rough
StationFailCode	Text		Acceptable failure codes from list 9
Comments	Text		Additional remarks

### **Grab Event**

This table carries records of each grab taken at a station. Each record contains data used to describe the characteristics of the sediment collected in terms of composition, odor, penetration and the presence or absence of shell hash as well as the time and latitude and longitude of the sampling event. Each record can also represent a failed sampling attempt. The yes/no fields indicate whether or not the individual grab provided an infaunal, chemical, toxicity or TOC sample. Additional comments may be recorded in the comments field. This file will be provided to the IMO with the name GRAB.MST.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Depth	Number	Y	The sample depth expressed in meters
Date	Date/Time	Y	The date the sample was collected dd/mm/yyyy
Time	Date/Time	Y	The time the sample was collected expressed in 24 hour time
LatDegrees	Number	Y	Degrees (0 decimal places)
LatMin	Number	Y	Decimal Minutes (3 places)
LonDegrees	Number	Y	Degrees (0 decimal places)
LonMin	Number	Y	Decimal Minutes (3 places)
Penetration	Number	Y	The penetration of the grab expressed in cm
Color	Text	Y	The color of the sediment from list 26
Composition	Text	Y	The composition of the sediment from list 6
Odor	Text	Y	The odor of the sediment from list 7
ShellHash	Yes/No	Y	Is shell hash present in the sediment?
BenthicInfauna	Yes/No	Y	Was this grab used for benthic infauna?
SedimentChemistry	Yes/No	Y	Was this grab used for sediment chemistry?
Toxicity	Yes/No	Y	Was this grab used for sediment toxicity?
Interstitial	Yes/No	Y	Was this grab used for Interstitial AVS-SEM?
GrabFailCode	Text		If the grab failed record a code from List 9,
FailCodes			
Comments	Text		Additional comments

### **Infaunal Abundance**

The infaunal abundance table carries information about benthic infauna species abundance collected from the grab samples. Each record represents the abundance of a particular infaunal species at an individual station and the agency that collected the species. The "Exclude" field is used to flag species that should be excluded from the certain analyses based upon the guidelines set forth in the Benthic QA document. Additional remarks can be carried in the comments field. This file will be transmitted by each agency to the IMO with the file name INFAUNA.ABN.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	The species of infauna collected from luList_10_SpeciesList
Abundance	Number	Y	Number of animals
Exclude	Yes/No		Flag to exclude from analysis
LabCode	Text	Y	A two letter agency code from list 1
Comments	Text		Additional comments



**Infaunal Biomass**

This table contains infaunal phyla biomass data for each phyla group collected at each station. Each record represents the total biomass of each phyla collected at a station. A record may also represent a biomass outlier species where an individual or several individuals were collected but have higher than acceptable biomass due to a shell or an individual that is not strictly considered infauna such as a sea star or sea cucumber. The units field will contain a "g" for grams and is carried for historical documentation of the mass units in this table. The Qualifier field carries information pertaining to special circumstances where the biomass is less than a certain value or greater than a certain value. If the outlier flag is "yes", then the remaining fields must be filled out, while a "no" value will cause all of the outlier fields to be left blank. The species identification of the outlier, the number of individuals of that species, and the total biomass of those individuals will be recorded for outlier species. Additional remarks may be carried in the comments field. The file will be transmitted to the IMO with the file name INFAUNA.BMS.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
Station Id	Text	Y	A geographic location label from the station table
GroupCode	Text	Y	Phyla group code from luList_11_BenthicSpeciesGroups
Qualifier	Text		Any applicable qualifier from luList_13_QualifierCodes
Biomass	Number	Y	The collective biomass of the group in GroupCode
Units	Text	Y	Default "g" for grams
OutlierFlag	Text		Is this an individual biomass outlier?
LabCode	Text	Y	The two digit labcode from list 1
OutlierSpecies	Text		The species name of the outlier from list10
NumIndividOut	Number		Number of individuals in outlier species
OutlierBioMass	Number		Biomass of individuals
Comments	Text		Additional comments

**Sediment Toxicity Data**

The Sediment Toxicity table carries data relevant to sediment toxicity tests and their replicates. Each record represents the results of an individual replicate for an individual species processed in a batch of replicates. The QA Batch field refers to the batch processing of samples and will be the same identifier for all samples processed in the same batch. Species/TestType refers to the species used for the test (*e.g.*, *Eohaustorius*) or the type of test (*e.g.*, qwiklite, microtox). Dilution is the factor by which the test material was diluted. The Concentration field is used only for reference toxicant test sample records. EndPoint refers to the type of end result of a particular test. For example the Microtox Luminescence value for a particular sample. Units are entered for the appropriate test. The Value is the numerical value for the end point of the test. The QAcode describes the confidence in the test result. Additional remarks may be entered in the Comment field. The file will be submitted to the IMO with the file name SEDTOX.DAT in comma delimited ASCII format.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
SampleType	Text	Y	Sample Type from list 4
QABatch	Text	Y	Batch number for batch processed samples
Labcode	Text	Y	The two digit labcode from list 1

Species/TestType	Text	Y	From list 20
Dilution	Number		The dilution factor expressed as a proportion
Concentration	Number		Concentration in mg/L
Endpoint	Text	Y	The type of end point for the test from list 23
Units	Text	Y	The units for the endpoint
LabRep	Number		Count
Value	Number	Y	The numerical result of the test
QACode	Text	Y	The quality assurance code from list 19 QACodes
Comment	Text		Additional comments

### **Sediment Toxicity Test**

This table is used to record information specific to each test batch processed in the laboratory and is used as supporting documentation for the Toxicity Test data. Each record represents specific information common to a group of samples processed at the same time and is pertinent to all replicates processed. This is QA/QC data needed to document the test results. The QABatch field is used to create the relationship with the Sediment Toxicity Data table. LabCode is the two digit code for the processing lab. Species is the species name of the test animal. Protocol is the protocol from list 21. Test date is the date the test started. Matrix refers to the material being tested (*e.g.* sediment or pore water). Test duration is the length of the test expressed in days. Temperature is the temperature at which the test was conducted and is expressed in degrees Centigrade. TestAcceptability describes the confidence in the test results from a constrained list of descriptors (list 25). The file will be submitted to the IMO with the name SEDTOX.TST in comma delimited ASCII format.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
QABatch	Text	Y	The batch code for the sample processing batch
Labcode	Text	Y	A two digit code form list 1
Species	Text	Y	The species from list 20
Protocol	Text	Y	The test protocol from list 21
Testdate	Date/Time	Y	The date of the text expressed as dd/mm/yyyy
Matrix	Text	Y	The test matrix from list 22
Testduration	Number	Y	The duration of the test expressed in days
Temperature	Number	Y	The temperature at which the test was conducted expressed in degrees C
TestAcceptability	Text	Y	Evaluation of test results from list 25

### **Sediment Toxicity Water Quality**

This table is used to document water quality during the course of a toxicity test. Each record represents a measurement of an individual water quality parameter at a specific time interval during the course of the test batch. The Parameter field describes the water quality parameter for the record (*e.g.* pH, NH<sub>3</sub>, etc.). The Matrix field describes the test matrix used in the test. The Dilution field is the number describing the degree of dilution in the water sample. The Concentration field is used only for reference toxicant test sample records. The TimePoint field documents the time point from the beginning of the test at which the parameter was measured in terms of days. The value field is the numerical result of the parameter being measured. The file will be submitted to the IMO with

the file name SEDTOX.WQ in comma delimited ASCII format.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
LabCode	Text	Y	A two digit code from list 1
QABatch	Number	Y	The batch code for the sample processing batch
StationID	Text	Y	A geographic location label from the station table
Parameter	Text	Y	The water quality parameter from list 24
Matrix	Text	Y	The test matrix from list 22
Dilution	Number		The dilution factor expressed as a proportion
Concentration	Number		Concentration in mg/L
Timepoint	Number		The number of days from the start of the test
Qualifier	Text		From list 13
Value	Number	Y	The numerical result for the parameter

### **Biomarker and Comet Field Data**

The Biomarker and Comet Field Data table contains data documenting samples collected in the field for analysis. Each record represents the results of an individual tissue dissected from an individual fish at a particular station.. The Species field documents the species of fish from which the sample was dissected. Replicate samples are numbered in the "Replicate" field. The Size field contains the length of the fish in millimeters. The TissueType field describes the tissue type from which the sample was taken (i.e. blood, etc. from list 17). SampleID is a 12 digit code used to create a unique record in the database. The SampleID is represented in the form SSXXXXTTSP00 where SS is the two digit agency code, XXXX is the station number, TT is the tissue type and 00 is the number. The gender of the fish will be recorded in the "Sex" field as Male, Female, or Indeterminate. The "maturity" field is an estimate of the fish's reproductive maturity and is described by the values in list 27. The DissectionTime field documents the time of dissection. The "condition" field describes the fish's condition at time of dissection. Additional remarks may be carried in the "Comment" field. The file will be submitted to the IMO with the file name BIOMARKER.FLD in comma delimited ASCII format.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	The species from list 12
Replicate	Number	Y	Count
Size	Number	Y	The size of the fish expressed in mm standard length
TissueType	Text	Y	The type of tissue dissected from the fish from List 17 Fish BioaccumulationTest Material
SampleID	Text	Y	12 digit code
Sex	Text	Y	M (male), F (female), or I (indeterminate)
Maturity	Text	Y	Estimated from list 27
DissectionTime	Date/Time	Y	The time the dissection was performed expressed in 24 hour time hh:mm
Condition	Text	Y	Condition of the fish at the time of dissection (Dead/Alive)
Comment	Text		Additional comments

### **Biomarker and Comet Lab Data**

The Biomarker and Comet Lab Data table contains data documenting samples analyzed in the laboratory. Each record represents the results of a measurement on a specific parameter in a tissue type. The SampleID is represented in the form SSXXXXTTSP00 where SS is the two digit agency

code, XXXX is the station number, TT is the tissue type and 00 is the number. The “LabCode” field contains the two digit laboratory code from list 1 for the laboratory processing the samples. The “AnalysisDate” field contains the date the analysis was performed where dd is the day, mmm is the abbreviation for the month and yyyy is the year expressed in 4 digits. The “parameter” field contains a valid parameter code from list 29. The “Value” field is the numerical result for the measured parameter. Each parameter has a particular unit associated with it and is included in the “Units” field using values from list 30. The “Dilution” field documents the degree of dilution for the sample. The “CellType” field contains the cell type of the sample. The “CellNumber” field documents the number of cells in the sample. The “QA field” describes the level of confidence for the measured parameter using a code from list 19. Additional remarks may be included in the Comments field. The file will be submitted to the IMO with the file name BIOMARKER.LAB in comma delimited ASCII format.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	Species from list 12
SampleID	Text	Y	12 digit code
LabCode	Text	Y	Two digit agency code from list1
AnalysisMethod	Text	Y	Method from list 28 BiomarkerAnalysisMethodCodes
AnalysisDate	Date/Time	Y	The date of the analysis expressed as dd/mmm/yyyy
Parameter	Text	Y	The measured parameter from list 29
Value	Number	Y	A numerical value for the parameter result
Units	Text	Y	Units from list 30
Dilution	Number		Dilution factor
CellType	Text		The type of cell
CellNumber	Number		The number of cells
QA	Text		Quality assurance code form list 19
Comments	Text		Additional comments

### **Trawl Event**

The trawl data table carries station identification, date, and trawl position data. Each record represents a record of a particular trawl track. A record may represent either a successful or failed trawl. There are four positions recorded during a trawl, net over, net on the bottom, end of trawl, and net on deck. The time is recorded for each of these positions. The latitude and longitude are recorded for the net over position in terms of degrees and decimal minutes. All of the other positions latitude and longitude are reported only in decimal minutes. This reporting procedure is based on the assumption that trawls are short distances and it is unlikely that any degree lines of latitude or longitude will be crossed in the course of a trawl. Depth is recorded at the net on the bottom position and at the end of trawl position. The amount of wire paid out for the trawl is recorded and expressed in meters. The fields “Assemblage”, “Bioaccumulation”, and “Biomarker” are all yes/no fields that indicate if an individual trawl produced samples of any of those three types. The “TrawlFailCode” field allows for documentation of failed trawls. A constrained list of trawl failure codes is included in list nine of the appendix. Additional remarks may be recorded in the “Comments” field. The file will be transmitted to the IMO with the file name TRAWL.MST.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Date	Date/Time	Y	The date sample taken expressed as dd/mmm/yyyy
TrawlNumber	Number	Y	Number of trawl taken at station

OverTime	Date/Time	Y	the time the net was deployed 24 hour time hh:mm
OverLatDegree	Number	Y	degrees (0 decimal places)
OverLatMin	Number	Y	decimal minutes (3 decimal places)
OverLonDegree	Number	Y	degrees (0 decimal places)
OverLonMin	Number	Y	decimal minutes (3 decimal places)
BeginTime	Date/Time	Y	hh:mm
BeginLatMin	Number	Y	Decimal minutes (3 decimal places)
BeginLonMin	Number	Y	Decimal minutes (3 decimal places)
StartDepth	Number	Y	The depth at the start of trawl expressed in meters
WireOut	Number	Y	The amount of wire deployed for the trawl expressed in meters
EndTime	Date/Time	Y	The time at the end of the trawl expressed in 24 hour time hh:mm
EndLatMin	Number	Y	Decimal minutes (3 decimal places)
EndLonMin	Number	Y	Decimal minutes (3 decimal places)
EndDepth	Number	Y	The depth at the end of the trawl expressed in meters
DeckTime	Date/Time	Y	The time the net is back on deck expressed in 24 hour time hh:mm
DeckLatMin	Number	Y	Decimal minutes (3 decimal places)
DeckLonMin	Number	Y	Decimal minutes (3 decimal places)
Assemblage	Yes/No	Y	Was this trawl used for assemblage?
Bioaccumulation	Yes/No	Y	Was this trawl used for Bioaccumulation?
Biomarker	Yes/No	Y	Was this trawl used for biomarker?
TrawlFailCode	Text		Failure code from list 9
Comments	Text		Additional comments

### **Trawl Fish Abundance**

The trawl fish abundance table carries information about fish abundance and fish anomalies collected in the trawls. Each record represents the number of individual fish of a particular species in a specific size class at a particular station and a record of any anomalies observed on fish within that size class. Each fish is measured individually and examined for anomalies. The fish abundance table includes station identification, species, size information in terms of size class (described in the field manual), a qualifier code numerical abundance within each size class and encountered anomalies (from list 31 of the appendix). Although this table is simple in structure, the actual application is sometimes confusing and so an example is included to clarify the use of this table. This file will be transmitted by each agency to the IMO with the file name FISH.ABN.

In this example the collected species will be *Paralabrax nebulifer*. There will be five fish in size class 10, one of which has a lesion. There will be 2 fish in size class 11, both of which have no anomalies.

StationID	Species	SizeClass	Qualifier	Abundance	Anomaly	Comments
2500	Paralabrax nebulifer	10		4		
2500	Paralabrax nebulifer	10		1	L	
2500	Paralabrax nebulifer	11		2		

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	The species being measured from list 10
SizeClass	Number	Y	The size class into which the fish falls expressed in cm
Qualifier	Text		Any necessary qualifier from list 13
Abundance	Number	Y	The number of fish in the size class
Anomaly	Text		Any present anomalies from list 31
Comments	Text		Additional comments

### **Trawl Fish Biomass**

The trawl fish biomass table contains biomass of fish collected at a particular station. Each record represents the collective biomass of all fish of a single species collected at a particular station. The species names are expressed using the scientific name. The “units” field default value is kg and is carried to document the units used in this survey for historical purposes. Additional remarks may be carried in the comments field. This file will be transmitted by each agency to the IMO with the file name FISH.BMS.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	The species measured from list 10
Qualifier	Text		Any necessary qualifier from list 13
NetWeight	Number	Y	The weight of the collected members of the species in kg
Units	Text	Y	kg
Comments	Text		Additional comments

### **Trawl Invertebrates Abundance**

The trawl invertebrate Abundance table is used to document information about megabenthic invertebrates collected in trawls. Each record represents the abundance, and occurrence of anomalies in an individual species. The abundance qualifier field may carry an “A” indicating that the abundance was estimated by aliquot. In the case of certain species like urchins, where very large numbers of individuals may be encountered, a number (100 or 200) may be weighed and the total haul number is estimated from the total weight. Additional remarks may be carried in the comments field. This file will be transmitted by each agency to the IMO with the file name INVERT.ABN.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	The species being counted from list 10
Qualifier	Text		Any necessary qualifier from list 13
Abundance	Number	Y	The number of individuals collected
Anomaly	Text		Any present anomalies from list 32
Comments	Text		Additional comments

### **Trawl Invertebrates Biomass**

The trawl invertebrate Biomass table is used to document information about megabenthic invertebrates collected in trawls. Each record represents the biomass of an individual species. Additional

remarks may be carried in the comments field. This file will be transmitted by each agency to the IMO with the file name INVERT.BMS.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	The species measured from list 10
Qualifier	Text		Any necessary qualifier from list 13
NetWeight	Number	Y	The weight of the collected members of the species in kg
Units	Text	Y	kg
Comments	Text		Additional comments

### **Trawl Debris Data**

The trawl debris table carries data concerning debris collected in the trawl. Each record represents the presence of a particular debris type and estimates of its weight and abundance. The debris descriptions are included in list 14 of the appendix. Codes for abundance and weight estimates are carried in lists 15 and 16 of the appendix. Additional remarks may be carried in the comments field. This file will be transmitted by each agency to the IMO with the file name DEBRIS.DAT.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
DebrisType	Text	Y	Debris type from List 14 DebrisType
AbunEstimate	Text	Y	Estimated numerical abundance from list 15
WtEstimate	Text	Y	Estimated weight of debris from list 16
Comments	Text		Additional comments

### **Whole Fish Composites**

This table contains fish size and weight data. Each record represents an individual fish that was included in a composite sample on a certain date. Species names are expressed as scientific names. The units of weight are expressed in grams and are carried to document the units used for historical purposes. Composite ID is the sample identifier into which a number of individuals are placed for chemical analysis. This file will be transmitted by each agency to the IMO with the file name COMPOSIT.DAT.

<u>Name</u>	<u>Type</u>	<u>Required</u>	<u>Description</u>
StationID	Text	Y	A geographic location label from the station table
Species	Text	Y	Collected species name from list 12
SizeClass	Number	Y	Size class into which the individual falls expressed in cm
Weight	Number	Y	Weight of the individual expressed in grams
Units	Text	Y	g (grams)
CompositeID	Text	Y	A four digit code assigned by SCCWRP
HomogenizationDate	Date/Time	Y	The date the fish was homogenized expressed as dd/mm/yyyy

## **Chemistry**

The chemistry table will hold all of the chemical data from sediment chemistry, fish tissue analysis, Mineralogy, Acid Volatile Sulfides, and sediment grain size analysis. Each record represents a result from a specific analysis for a particular parameter at a single station. Some of the fields may not be relevant to sediment grain size and need not be completed (MDL, RL, Preparation code, and dilution). The "units" field is important because different compounds and analysis types produce values with various units associated with the method or result. Dilution is intended to document the whole fish composite chemistry data where water is added in the homogenization process. To distinguish the dates of sample processing, preparation date and analysis date are included. The field QA Type is used to distinguish QA and blank data from actual sample results. This file will be transmitted by each agency to the IMO with the file name CHEM.DAT.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
TestMaterial	Text	Y	Sediment/Tissue
ParameterCode	Text	Y	The measured parameter from list 18
QA Batch	Text	Y	The code for all of the samples processed in the same batch
QA Type	Text	Y	The type of result from list 19
Lab Rep	Text	Y	Count
Qualifier	Text	Y	Any necessary qualifier from list 13
Result	Number	Y	The numerical result expressed in dry wt.
Units	Text	Y	Units for result
True Value	Number		QA samples only
MDL	Number	Y	Method detection limit
RL	Number	Y	Reporting limit
Dilution	Number		Dilution factor
PreparationCode	Text	Y	Preparation code from List 34
PreparationDate	Date/Time	Y	The date the sample was extracted expressed as dd/mm/yyyy
AnalysisMethod	Text	Y	The analysis method from list 33
Analysis Date	Date/Time	Y	The date the sample was processed by the instrument expressed as dd/mm/yyyy
QACode	Text		Any necessary qualiffier from list 13
LabCode	Text	Y	The two digit agency code from List 1
Comments	Text		Additional comments

## **B. Microbiology Tables**

The following three tables are used in the Microbiology component of the project.

### **Microbiology Stations**

The Microbiology Station table contains the location and description of the sampling stations for this component of the project. Each record represents the station identifier, location, and description of an individual station. Additional stations may be assigned when results exceed a specified threshold as called for in the Microbiology Work Plan. The file will be submitted to the IMO in comma delimited ASCII format with the filename STATIONS.DAT



<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label
StationDesc	Text		Physical description of the location
Lat	Number	Y	2 digit degree (NAD 83)
LatMin	Number	Y	Decimal minutes (NAD 83) 3 decimal places
Lon	Number	Y	2 digit degree (NAD 83)
LonMin	Number	Y	Decimal minutes (NAD 83) 3 decimal places
Comments	Text		Additional comments

### **Microbiology Station Occupation**

The Microbiology Samples table contains data collected when a sample is taken. Each record represents the conditions at the station where the sample was collected. It may also represent a failure to collect a sample. If the "EvidenceOfSewage" field contains a "Yes" value it must be accompanied by a comment. The "WaterOutletFl" field records whether or not water was flowing from a water outlet at the station. The file will be submitted to the IMO in comma delimited ASCII format with the file name SAMPLES.DAT

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
SampleDate	Date	Y	The date the sample was collected expressed as dd/mmm/yy
SampleTime	Time	Y	The time the sample was collected expressed as 24 hour time hh:mm
AgencyCode	Text	Y	The two digit agency code from list 1
WeatherCode	Text	Y	The weather code from list 8
Surf	Text	Y	The surf conditions list 38
SeaState	Text	Y	The sea state conditions list 39
EvidenceOfSewage	Yes/No	Y	Odor or floatables
WaterOutletFl	Yes/No	Y	If the station is a water outlet is water flowing?
PeopleInWater	Number	Y	Count of people in the water
StationFailCode	Text		Was the station abandoned for any reason?
Comments	Text	Y	if yes to EvidenceOfSewage

## **Microbiology Results**

The Microbiology results table contains bacteriological results data. Each record represents the results of an individual sample including collected samples, QA samples and QA check samples. Lab code is carried in both the results table and the samples table because one agency may collect samples that are analyzed by another laboratory. The file will be submitted to the IMO in comma delimited ASCII with the file name RESULTS.DAT.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
SampleDate	Date	Y	the date the sample was collected dd/mm/yyyy
ParameterCode	Text	Y	Parameter from list 36
Qualifier	Text	Y	any qualifier necessary from List 13
Result	Number	Y	the numerical result of the measurement
Units	Text	Y	Units for parameter
LabCode	Text	Y	a two digit code from List 1
AnalysisMethod	Text	Y	analysis method from list 35
StartTime	Time	Y	the time the analysis started expressed in 24 hour time hh:mm
SampleType	Text	Y	the type of sample from list 37
Comments	Text		Additional comments

## **C. Water Quality Tables**

The following four tables are used in the Water Quality component of the project.

### **Water Quality Stations**

This table contains the nominal station location for the sampling stations in the Water Quality portion of the project. Each record represents the station position, the collecting agency, and expected depth of the station. The table will be submitted to the IMO in ASCII comma delimited format with the file name STATIONS.DAT.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label
AgencyCode	Text	Y	Two digit code from list 1
LatDegrees	Number	Y	Two digit degree (NAD 83)
LatMin	Number	Y	Decimal minutes (NAD 83) three places
LonDegrees	Number	Y	Three digit degree (NAD 83)
LonMin	Number	Y	Decimal minutes (NAD 83) three places
ExpectedDepth	Number	Y	meters

**Water Quality Station Occupation**

The master sample table holds data that is descriptive of station occupation during sampling events. Each record contains a characterization of the station at the time of sampling in terms of the weather, sea state, sample type, vessel name, agency, and quality of the GPS signal at the time of sampling. The NavType field allows the collecting agency to record the loss of the differential GPS signal. Additional comments may be included as well with up to 80 characters. This file will be provided to the IMO with the name STATION.MST by each agency.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Date	Date	Y	dd/mm/yy
LatDegrees	Number	Y	Two digit degree (NAD 83)
LatMin	Text	Y	Decimal minutes (NAD 83) three places
LonDegrees	Text	Y	Three digit degree (NAD 83)
LonMin	Text	Y	Decimal minutes (NAD 83) three places
StartTime	Date/Time	Y	hh:mm
AgencyCode	Text	Y	Two digit code from list 1
Vessel	Text	Y	Name of the vessel
NavType	Text	Y	DGPS, GPS
WeatherCode	Text	Y	Predetermined weather codes from list 8
WindSpeed	Number	Y	Meters/second
WindDirection	Text	Y	Degrees
SeaSwellHeight	Number	Y	Meters
SwellPeriod	Number	Y	Seconds
SeaSwellDirection	Text	Y	Degrees
SeaState	Text	Y	Calm, rough, choppy
StationFailureCode	Text		From list 9
ChlorophyllVolume	Text		ml
Comments	Text		Additional comments

**Water Quality Cast Data**

This table contains the raw qualified cast data as collected by an instrument. Each record represents a discrete set of measurements taken by the instrument during its descent throughout the water column. The "CastPortion" field flags the record as Equilibration, Downcast, or Upcast referring to its position in the cast. The "QAFlag" will be added by the Water Quality Technical Committee after a review of the data.

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
Date	Date	Y	dd/mm/yy
Seconds	Number	Y	From the instrument
DescentRate	Number	Y	Meters per second

Depth	Number	Y	meters
Temperature	Number	Y	Degrees centigrade
Conductivity	Number	Y	Siemens/m
Salinity	Number	Y	PSS
OxygenMgL	Number	Y	Mg/L
Oxygen% saturation	Number	Y	%Saturation
Transmissivity	Number	Y	%light
pH	Number	Y	Hydrogen ion concentration
Density	Number	Y	Theta
Fluorescence	Number		From the instrument
CastPortion	Text	Y	E (equilibration) ,D (downcast) ,U (upcast)
QAFlag	Text	Y	000000000

### **Water Quality Discrete Water Samples Table**

This table contains chemical and particulate data collected at a subset of stations. Each record represents the result of an individual analysis for an individual parameter. This table will be submitted to the IMO in comma delimited ASCII format with the file name DISWTR.DAT.

### **Columns**

<b><u>Name</u></b>	<b><u>Type</u></b>	<b><u>Required</u></b>	<b><u>Description</u></b>
StationID	Text	Y	A geographic location label from the station table
TestMaterial	Text	Y	Sediment/Tissue
ParameterCode	Text	Y	From list 18
QA Batch	Text	Y	batch number
QAType	Text	Y	From list 19
Lab Rep	Text	Y	count
Qualifier	Text	Y	From list 13
Result	Number	Y	(dry wt.)
Units	Text	Y	Units for result
True Value	Number		QA samples only
MDL	Number	Y	method detection limit
RL	Number	Y	reporting limit
Dilution	Number	Y	Dilution factor
PreparationCode	Text	Y	From list 34
PreparationDate	Date/Time	Y	dd/mm/yyyy
AnalysisMethod	Text	Y	From list 33
Analysis Date	Date/Time	Y	dd/mm/yyyy
QACode	Text	Y	From list 13
LabCode	Text	Y	From list 1
Comments	Text		Additional comments

## APPENDIX B. LOOK UP TABLES

### List 1. Agency Codes

AgencyCode	AgencyName
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AB	Aquatic Bioassay and Consulting (ABCL)*
AM	Algalita Marine Research Foundation*
AW	Aliso Water Management Authority (AWMA)*
BC	Santa Barbara County Health Service
BH	Los Angeles County Dept. of Beaches & Harbors*
CC	Center for Environmental Cooperation (CEC)*
CE	Southern California Edison (SCE)*
CH	Chevron USA Products Company*
CI	Channel Islands National Marine Sanctuary (CINMS)*
CM	Cabrillo Marine Aquarium
CP	Marine Corps Base - Camp Pendleton
CS	Columbia Analytical Services*
CV	City of Ventura
DC	San Diego Regional Water Quality Control Board (SDRWQCB)*
DW	Los Angeles Department of Water and Power (LADWP)*
EH	Orange County Environmental Health Division
EW	Encina Wastewater Authority*
GC	Granite Canyon Marine Pollution Studies Lab*
GS	Goleta Sanitation District
HS	Los Angeles County Dept. of Health Services
HY	City of Los Angeles Environmental Monitoring Division (CLAEMD)*
IP	San Diego Interagency Water Quality Panel (Bay Panel)*
IX	US EPA Region IX*
LA	Los Angeles County Sanitation Districts (LACSD)*
LB	City of Long Beach
ME	MEC Analytical Systems Inc.
MI	Southern California Marine Institute(SCMI)
MX	National Fisheries Institute of Mexico (SEMARNAP)*
NV	US Navy, Space & Naval Warfare Systems Center, San Diego (USN)*
OC	Orange County Sanitation Districts (OCSD)*
OS	City of Oceanside*
OX	City of Oxnard*
PF	Orange County Public Facilities and Resources (OCPFRD)*
RA	Southeast Regional Reclamation Authority (SERRA)*
RB	Los Angeles County Regional Water Quality Control Board*
RD	US EPA Office of Research and Development*
RP	Santa Monica Bay Restoration Project*
SA	Santa Ana Regional Water Quality Control Board*
SB	City of Santa Barbara
SC	Southern California Coastal Water Research Project(SCCWRP)*
SD	City of San Diego*
SE	San Elijo Joint Powers Authority*

SF	Surfrider Foundation
SH	San Diego County Dept. of Environmental Health
SR	State Water Resources Control Board (SWRCB)*
UA	University Autonomos de Baja California*
UB	University of California, Santa Barbara
WI	USC Wrigley Institute for Environmental Studies (WIES)*

**List 2. Analysis Type Codes**

AnalysisCode	AnalysisType
WQ	Water Quality
BE	Benthic Infauna
GS	Grain Size
TO	Organic Carbon and Nitrogen
MT	Metals
OR	Organics
ST	Sediment Toxicity
LS	Longfin Sanddab
PS	Pacific Sanddab
HT	Hornyhead Turbot
CS	California Scorpionfish
DS	Dover Sole
SS	Speckled Sanddab
WC	White Croaker
ES	English Sole

**List 3 has been deleted.**

**List 4. Sample Codes**

SampleCode	SampleType
S	Sample
B	Laboratory Blank
R	Laboratory Control Material (LCM) or Certified Reference Material (CRM)
M	Matrix spike and matrix spike duplicate
Result	Numerical Result
QA	Quality Assurance Value
RFCD	Cadmium Reference Toxicant
RFCU	Copper Reference Toxicant
RFPH	Phenol Reference Toxicant
CNEG	Negative Control

**List 5. Sampling Equipment**

EquipCode	EquipType
103	Van Veen Grab
26	Marinovich Otter trawl w. 7.62 m head rope

**List 6. Sediment Composition Codes**

**SedComp**

Coarse Sand  
Fine Sand  
Silt/Clay  
Gravel  
Mixed

**List 7. Sediment Odor Codes**

OdorCode	OdorDescription
N	None
P	Petroleum
H	Hydrogen Sulfide
X	Other

**List 8. Weather Codes**

**WeatherCode**

Clear  
Overcast  
Partly Cloudy  
Blowing Sand  
Thunderstorm  
Rain  
Drizzle  
Fog  
Continuous layers of Clouds

**List 9. Failure Codes**

FailCode	FailureReason
A	Canted
B	Washed
C	Poor Closure
D	Disturbed Surface
E	< 5 cm penetration
F	>5 & < 8 cm penetration
G	Fouled Net
H	Torn Net
I	No contact w/ bottom

J	improper distance/Time
K	Irregular Bottom
L	Beyond Border
M	Kelp Bed
N	Obstructions
O	<3m (bay)
P	<6M (Ocean)
Q	> 200m
R	Abandoned
S	Rocky Bottom

**List 10. Species List** (This list may be amended as new species are encountered)

<b>Species</b>	<b>Common Name</b>
Abarenicola pacifica	
Abietinaria sp	
Acanthodoris brunnea	
Acanthodoris lutea	
Acanthodoris rhodoceras	
Acanthodoris sp	
Acanthomysis brunnea	
Acanthomysis californica	
Acanthomysis sp	
Acanthoptilum sp	
Acarina	
Aciconula acanthosoma	
Aciconula sp	
Acidostoma hancocki	
Acidostoma sp	
Acila castrensis	
Acila sp	
Acmaea mitra	
Acmaea sp	
Acmaeidae	
Acmaeoidea	
Acoetes mortenseni	
Acoetes pacifica	
Acoetes sp	
Acoetidae	
Acotylea	
Acrocirridae	
Acrocirrus sp	
Acteocina culcitella	
Acteocina eximia	
Acteocina harpa	
Acteocina inculta	



Acteocina sp  
Acteon sp  
Acteon traskii  
Acteonidae  
Acteonoidea  
Actiniaria  
Actiniidae  
Aculifera  
Acuminodeutopus heteruropus  
Acuminodeutopus sp  
Adelogorgia phyllosclera  
Adelogorgia sp  
Adeorbidae  
Admete gracilior  
Admete sp  
Adontorhina cyclia  
Adontorhina sp  
Adontorhina sphaerica  
Adula sp  
Aegidae  
Aegires albopunctatus  
Aegires sp  
Aeolidia papillosa  
Aeolidia sp  
Aeolidiella sp  
Aeolidiidae  
Aeolidioidea  
Aeolidoida  
Aesophus eurytoideus  
Aesophus sp  
Aglaja ocelligera  
Aglaja sp  
Aglajidae  
Aglaphamus erectans  
Aglaphamus eugeniae  
Aglaphamus paucilamellata  
Aglaphamus sp  
Aglaphamus verrilli  
Aglaphenia sp  
Aglapheniidae  
Agnezia septentrionalis  
Agnezia sp  
Agneziidae  
Alaba sp  
Albuneidae  
Alcyonacea  
Alcyonaria

Alcyonidiidae  
Alcyonidioidea  
Alcyonidium sp  
Alcyonidium sp A  
Alderia modesta  
Alderia sp  
Alia carinata  
Alia sp  
Alia tuberosa  
Alienacanthomysis macropsis  
Alienacanthomysis sp  
Allocentrotus fragilis  
Allocentrotus sp  
Alpheidae  
Alpheoidea  
Alpheopsis equidactylus  
Alpheopsis sp  
Alpheus bellimanus  
Alpheus californiensis  
Alpheus clamator  
Alpheus sp  
Alvania acutelirata  
Alvania rosana  
Alvania sp  
Alvania tumida  
Amaeana occidentalis  
Amaeana sp  
Amage anops  
Amage sp  
Amakusanthura californiensis  
Amakusanthura sp  
Amathia distans  
Amathia sp  
Amathimysis sp  
Amathimysis trigibba  
Americardia biangulata  
Americardia sp  
Ammotheidae  
Ammothella setosa  
Ammothella sp  
Ampelisca agassizi  
Ampelisca brachycladus  
Ampelisca brevisimulata  
Ampelisca careyi  
Ampelisca cf. brevisimulata  
Ampelisca cristata cristata  
Ampelisca cristata microdentata

Ampelisca hancocki Cmplx  
Ampelisca indentata  
Ampelisca lobata  
Ampelisca milleri  
Ampelisca pacifica  
Ampelisca pugetica  
Ampelisca romigi  
Ampelisca shoemakeri  
Ampelisca sp  
Ampelisca unsocalae  
Ampeliscidae  
Ampelisciphotis podophthalma  
Ampelisciphotis sp  
Ampeliscoidea  
Ampharete acutifrons  
Ampharete arctica  
Ampharete labrops  
Ampharete sp  
Ampharetidae  
Ampharetidae sp 1  
Amphianthus californicus  
Amphianthus sp  
Amphichondrius granulatus  
Amphichondrius sp  
Amphicteis glabra  
Amphicteis mucronata  
Amphicteis scaphobranchiata  
Amphicteis sp  
Amphideutopus oculatus  
Amphideutopus sp  
Amphiduros pacificus  
Amphiduros sp  
Amphilochidae  
Amphilochus litoralis  
Amphilochus neapolitanus Cmplx  
Amphilochus picadurus  
Amphilochus sp  
Amphinemertes caeca  
Amphinemertes sp  
Amphinomida  
Amphinomidae  
Amphiodia digitata  
Amphiodia psara  
Amphiodia sp  
Amphiodia urtica  
Amphioplus sp  
Amphioplus strongyloplax

Amphipholis pugetana  
Amphipholis sp  
Amphipholis squamata  
Amphipoda  
Amphiporidae  
Amphiporidae sp B  
Amphiporus bimaculatus  
Amphiporus californicus  
Amphiporus cruentatus  
Amphiporus flavescens  
Amphiporus imparispinosus  
Amphiporus rubellus  
Amphiporus sp  
Amphiporus sp A  
Amphiporus sp B  
Amphissa bicolor  
Amphissa reticulata  
Amphissa sp  
Amphissa undata  
Amphissa versicolor  
Amphitrite robusta  
Amphitrite sp  
Amphiura arcystata  
Amphiura diomedae  
Amphiura sp  
Amphiuridae  
Amphoriscidae  
Ampithoe plumulosa  
Ampithoe raymondi  
Ampithoe sp  
Ampithoe valida  
Ampithoidae  
Amygdalum politum  
Amygdalum sp  
Anarthruridae  
Anasca  
Anaspidea  
Anatoma crispata  
Anatoma sp  
Anchicolurus occidentalis  
Anchicolurus sp  
Ancinidae  
Ancinus granulatus  
Ancinus sp  
Ancistrostylis breviceps  
Ancistrostylis groenlandica  
Ancistrostylis hamata

Ancistrosyllis sp  
Ancula lentiginosa  
Ancula pacifica  
Ancula sp  
Anemonactis sp  
Anguinella palmata  
Anguinella sp  
Anisodoris nobilis  
Anisodoris sp  
Annectocymidae  
Annelida  
Anobothrus gracilis  
Anobothrus sp  
Anomalodesmata  
Anomia peruviana  
Anomia sp  
Anomiidae  
Anomioidea  
Anomura  
Anonyx lilljeborgi  
Anonyx sp  
Anopla  
Anopla sp A  
Anopla sp B  
Anopla sp C  
Anopla sp D  
Anoplodactylida  
Anoplodactylus californicus  
Anoplodactylus erectus  
Anoplodactylus nodosus  
Anoplodactylus oculospinus  
Anoplodactylus pacificus  
Anoplodactylus sp  
Anoropallene palpida  
Anoropallene sp  
Anotomastus gordiodes  
Anotomastus sp  
Antedonidae  
Antedonoidea  
Anthozoa  
Anthozoa #49  
Anthozoa #76  
Anthuridae  
Anthuridea  
Antiplanes catalinae  
Antiplanes sp  
Antiplanes thalea

Antropora sp  
Antropora tineta  
Aonides sp  
Aoridae  
Aoroides columbiae  
Aoroides exilis  
Aoroides inermis  
Aoroides intermedia  
Aoroides sp  
Aoroides sp A  
Aoroides spinosa  
Aphelochaeta glandaria  
Aphelochaeta monilaris  
Aphelochaeta petersenae  
Aphelochaeta phillipsi  
Aphelochaeta sp  
Aphelochaeta sp A  
Aphelochaeta tigrina  
Aphelochaeta williamsae  
Aphrocallistes sp  
Aphrocallistes vastus  
Aphrocallistidae  
Aphrodita armifera  
Aphrodita brevitentaculata  
Aphrodita castanea  
Aphrodita japonica  
Aphrodita negligens  
Aphrodita refulgida  
Aphrodita sp  
Aphroditidae  
Aphroditiformia  
Aphroditoidea  
Apionsoma misakianum  
Apionsoma sp  
Apostobranchidae  
Apostobranchus ornatus  
Apostobranchus sp  
Aplacophora  
Aplousobranchiata  
Aplysia californica  
Aplysia sp  
Aplysiidae  
Aplysioidea  
Apodacea  
Apodida  
Apoprionospio pygmaea  
Apoprionospio sp

Arabella endonata  
Arabella iricolor  
Arabella sp  
Arachnanthus sp  
Arachnanthus sp A  
Arachnida  
Arachnidiidae  
Arachnidioidea  
Araphura breviaria  
Araphura cuspirostris  
Araphura sp  
Archaeobalanidae  
Archaeogastropoda  
Archidorididae  
Archidoris montereyensis  
Archidoris sp  
Archinemertea  
Architectibranchia  
Arcoida  
Arcteobia cf. anticostiensis  
Arcteobia sp  
Arctonoe pulchra  
Arctonoe sp  
Arcturidae  
Arenicola cristata  
Arenicola sp  
Arenicolidae  
Argissa hamatipes  
Argissa sp  
Argissidae  
Argopecten sp  
Argopecten ventricosus  
Arhynchite californicus  
Arhynchite sp  
Aricidea (Acmira) catherinae  
Aricidea (Acmira) cerrutii  
Aricidea (Acmira) horikoshii  
Aricidea (Acmira) lopezi  
Aricidea (Acmira) rubra  
Aricidea (Acmira) simplex  
Aricidea (Aedicira) pacifica  
Aricidea (Allia) antennata  
Aricidea (Allia) hartleyi  
Aricidea (Allia) monicae  
Aricidea (Allia) quadrilobata  
Aricidea (Allia) sp A  
Aricidea (Aricidea) pseudoarticulata

Aricidea (Aricidea) wassi  
Aricidea sp  
Aristeidae  
Aristias sp  
Aristias sp A  
Armandia brevis  
Armandia sp  
Armina californica  
Armina sp  
Arminidae  
Arminoidea  
Arminoidea  
Artacama coniferi  
Artacama sp  
Artacamella hancocki  
Artacamella sp  
Arthropoda  
Articulata  
Articulata  
Articulata  
Aruga holmesi  
Aruga oculata  
Aruga sp  
Asabellides lineata  
Asabellides sp  
Ascidacea  
Asclerocheilus californicus  
Asclerocheilus sp  
Ascophora  
Asellota  
Aspidochirotida  
Aspidochotacea  
Aspidosiphon (Paraspidosiphon) sp  
Aspidosiphonidae  
Asteriagina  
Asteriidae  
Asterina miniata  
Asterina sp  
Asterinidae  
Asteroidea  
Asteropella slatteryi  
Asteropella sp  
Asterozoa  
Asthenothaerus diegensis  
Asthenothaerus sp  
Astrometis sertulifera  
Astrometis sp



Astropecten armatus  
Astropecten ornatissimus  
Astropecten sp  
Astropecten verrilli  
Astropectinidae  
Astyris aurantiaca  
Astyris sp  
Atelostomata  
Athecatae  
Atylus sp  
Atylus tridens  
Atyoidea  
Austrotrophon catalinensis  
Austrotrophon sp  
Autolytus sp  
Automate sp  
Automate sp A  
Axiidae  
Axinella sp  
Axinellida  
Axinellidae  
Axinodon redondoensis  
Axinodon sp  
Axinopsida serricata  
Axinopsida sp  
Axiothella rubrocincta  
Axiothella sp  
Babelomurex oldroydi  
Babelomurex sp  
Balanidae  
Balanoglossus sp  
Balanoidea  
Balanomorpha  
Balanus crenatus  
Balanus nubilus  
Balanus pacificus  
Balanus sp  
Balanus trigonus  
Balcis berryi  
Balcis compacta  
Balcis micans  
Balcis oldroydae  
Balcis sp  
Barentsia benedeni  
Barentsia discreta  
Barentsia parva  
Barentsia sp

Barentsiidae  
Barleeia californica  
Barleeia sp  
Barleeia subtenuis  
Barleeidae  
Baseodiscus sp  
Batea sp  
Batea transversa  
Bateidae  
Bathyrilus litoreus  
Bathyrilus parkeri  
Bathyrilus sp  
Bathyleberis garthi  
Bathyleberis hancocki  
Bathyleberis sp  
Bathymedon kassites  
Bathymedon pumilus  
Bathymedon roquedo  
Bathymedon sp  
Bathymedon vulpeculus  
Bathypera feminalba  
Bathypera ovoida  
Bathypera sp  
Belonectes sp  
Belonectes sp A  
Bemlos audbetti  
Bemlos concavus  
Bemlos sp  
Bentheogennema burkenroadi  
Bentheogennema sp  
Bernardinidae  
Berthella californica  
Berthella sp  
Betaeus ensenadensis  
Betaeus harfordi  
Betaeus harrimani  
Betaeus longidactylus  
Betaeus sp  
Bimeria sp  
Bispira sp  
Bivalvia  
Blepharipoda occidentalis  
Blepharipoda sp  
Boccardia basilaria  
Boccardia pugettensis  
Boccardia sp  
Boccardiella hamata

Boccardiella sp  
Bodotriidae  
Boltenia sp  
Boltenia villosa  
Bonelliidae  
Bonelloinea  
Bopyridae  
Bopyroidea  
Boreotrophon bentleyi  
Boreotrophon eucymatus  
Boreotrophon sp  
Bougainvilliidae  
Bowerbankia gracilis  
Bowerbankia sp  
Brachiopoda  
Brachyura  
Brada pluribranchiata  
Brada sp  
Brada villosa  
Branchiostoma californiense  
Branchiostoma sp  
Branchiostomatidae  
Brania californiensis  
Brania sp  
Brisaster latifrons  
Brisaster sp  
Brissidae  
Brissopsis pacifica  
Brissopsis sp  
Bruzelia sp  
Bruzelia tuberculata  
Buccinidae  
Bugula longirostata  
Bugula neritina  
Bugula pacifica  
Bugula sp  
Bugulidae  
Bulla gouldiana  
Bulla sp  
Bullidae  
Bulloidea  
Bullomorpha sp A  
Bursidae  
Byblis millsii  
Byblis sp  
Byblis veleronis  
Cactosoma arenaria

Cactosoma sp  
Cadlina flavomaculata  
Cadlina modesta  
Cadlina sp  
Cadlina sparsa  
Cadlinidae  
Caecianiropsis psammophila  
Caecianiropsis sp  
Caecidae  
Caecum californicum  
Caecum crebricinctum  
Caecum dalli  
Caecum sp  
Caenogastropoda  
Calappidae  
Calcaronea  
Calcerea  
Calcinea  
Califanthura sp  
Califanthura squamosissima  
Calinaticina oldroydii  
Calinaticina sp  
Callianassidae  
Callioplanidae  
Calliostoma canaliculatum  
Calliostoma gloriosum  
Calliostoma keenae  
Calliostoma sp  
Calliostoma supragranosum  
Calliostoma tricolor  
Calliostoma turbinum  
Calliostoma variegatum  
Callipallene pacifica  
Callipallene sp  
Callipallenidae  
Callistochiton decoratus  
Callistochiton palmulatus  
Callistochiton sp  
Calloporidae  
Calocarides quinqueseriatus  
Calocarides sp  
Calocarides spinulicauda  
Calycella sp  
Calycella syringa  
Calycellidae  
Calyptraea contorta  
Calyptraea fastigiata

Calyptrea sp  
Calyptreaeidae  
Calyptraeoidea  
Campanularia sp  
Campanularia volubilis  
Campanulariidae  
Campanulina sp  
Campanulinidae  
Campylaspis biplicata  
Campylaspis blakei  
Campylaspis canaliculata  
Campylaspis hartae  
Campylaspis maculinodulosa  
Campylaspis rubromaculata  
Campylaspis rufa  
Campylaspis sp  
Campylaspis sp A  
Campylaspis sp C  
Cancellaria cooperii  
Cancellaria crawfordiana  
Cancellaria decussata  
Cancellaria sp  
Cancellariidae  
Cancellaroidea  
Cancellothyrididae  
Cancellothyridoidea  
Cancer amphioetus  
Cancer antennarius  
Cancer anthonyi  
Cancer branneri  
Cancer gracilis  
Cancer jordani  
Cancer oregonensis  
Cancer productus  
Cancer sp  
Cancridae  
Candidae  
Capitata  
Capitella capitata Cmplx  
Capitella sp  
Capitellida  
Capitellidae  
Caprella californica  
Caprella equilibra  
Caprella gracilior  
Caprella mendax  
Caprella natalensis

Caprella penantis  
Caprella sp  
Caprella sp E  
Caprella verrucosa  
Caprellidae  
Caprellidea  
Caprelloidea  
Carazziella sp  
Carazziella sp A  
Cardiidae  
Cardioidea  
Cardiomya pectinata  
Cardiomya planetica  
Cardiomya sp  
Carditidae  
Carditoidea  
Caridea  
Carinoma mutabilis  
Carinoma sp  
Carinomella lactea  
Carinomella sp  
Carinomidae  
Caryocorbula porcella  
Caryocorbula sp  
Caryophylliidae  
Caryophylliina  
Caryophyllioidea  
Caudina arenicola  
Caudina sp  
Caudinidae  
Caulibugula californica  
Caulibugula sp  
Caulleriella alata  
Caulleriella apicula  
Caulleriella hamata  
Caulleriella sp  
Cauloramphus echinus  
Cauloramphus sp  
Cecina sp  
Cellaria diffusa  
Cellaria mandibulata  
Cellaria sp  
Cellariidae  
Celleporaria brunnea  
Celleporaria sp  
Celleporella hyalina  
Celleporella sp

Celleporidae  
Celleporina souleae  
Celleporina sp  
Celloporariidae  
Cellularoidea  
Cephalaspidea  
Cephalochordata  
Cephalophoxoides homilis  
Cephalophoxoides sp  
Cephalopoda  
Cephalothricidae  
Ceractinomorpha  
Ceradocus sp  
Ceradocus spinicaudus  
Cerapus sp  
Cerapus tubularis Cmplx  
Ceratonereis mirabilis  
Ceratonereis sp  
Ceratostoma nuttalli  
Ceratostoma sp  
Cerberilla mosslandica  
Cerberilla sp  
Cerberilla sp 1  
Cerebratulus albifrons  
Cerebratulus californiensis  
Cerebratulus lineolatus  
Cerebratulus marginatus  
Cerebratulus montgomeryi  
Cerebratulus sp  
Ceriantharia  
Ceriantharia sp C  
Ceriantharia sp D  
Cerianthidae  
Ceriantipatharia  
Cerithiidae  
Cerithioidea  
Cerithiopsidae  
Cerithiopsis sp  
Cestoplanoidea  
Chaetoderma hancocki  
Chaetoderma pacificum  
Chaetoderma sp  
Chaetodermatida  
Chaetodermatidae  
Chaetodermatimorpha  
Chaetodermomorpha  
Chaetopteridae

Chaetopteriformia  
Chaetopterus sp  
Chaetopterus variopedatus Cmplx  
Chaetozone armata  
Chaetozone columbiana  
Chaetozone corona  
Chaetozone hartmanae  
Chaetozone hedgpethi  
Chaetozone setosa Cmplx  
Chaetozone sp  
Chaetozone spinosa  
Chama arcana  
Chama sp  
Chamidae  
Chamoidea  
Chapperiidae  
Chapperiopsis californica  
Chapperiopsis patula  
Chapperiopsis sp  
Chauliopleona dentata  
Chauliopleona sp  
Cheilostomata  
Cheliceriformia  
Chelyosoma productum  
Chelyosoma sp  
Chevalia inaequalis  
Chevalia sp  
Chilophiurina  
Chione californiensis  
Chione sp  
Chione undatella  
Chionoecetes sp  
Chionoecetes tanneri  
Chiridota sp  
Chiridotidae  
Chitinopoma groenlandica  
Chitinopoma sp  
Chlamys hastata  
Chlamys sp  
Chloeia pinnata  
Chloeia sp  
Chone albocincta  
Chone minuta  
Chone mollis  
Chone sp  
Chone sp B  
Chone sp C



Chone sp SD1  
Chone veleronis  
Chordata  
Chorilia longipes  
Chorilia sp  
Choristida  
Chromopleustes sp  
Chrysopetalidae  
Chrysopetaloidea  
Cidarina cidaris  
Cidarina sp  
Cingulopsidoidea  
Ciona intestinalis  
Ciona sp  
Cionidae  
Circulus sp  
Cirolana diminuta  
Cirolana sp  
Cirolanidae  
Cirolanoidea  
Cirrata  
Cirratulidae  
Cirratuliformia  
Cirrattulus cirratus  
Cirrattulus sp  
Cirriiformia sp  
Cirriiformia spirabrancha  
Cirriiformia tentaculata  
Cirriipedia  
Cirrophorus branchiatus  
Cirrophorus furcatus  
Cirrophorus sp  
Cladocarpus sp  
Cladocarpus sp A  
Clathriidae  
Clathrina sp  
Clathrinida  
Clathrinidae  
Clausidiidae  
Clausidium sp  
Clausidium vancouverense  
Clavopora occidentalis  
Clavopora sp  
Clavoporidae  
Clavularia sp  
Clavularia sp H  
Clavulariidae

Clinocardium nuttallii  
Clinocardium sp  
Clymenella complanata  
Clymenella sp  
Clymenella sp A  
Clymenura gracilis  
Clymenura sp  
Clypeasteroidea  
Clytia sp  
Clytia universitatis  
Cnemidocarpa rhizopus  
Cnemidocarpa sp  
Cnidaria  
Coboldus hedgpethi  
Coboldus sp  
Coenocyathus bowersi  
Coenocyathus sp  
Coilostegoidea  
Coleoidea  
Coloniales  
Columbaora cyclocoxa  
Columbaora sp  
Columbellidae  
Comatulida  
Compsomyx sp  
Compsomyx subdiaphana  
Conchifera  
Conidae  
Conoidea  
Conopea galeata  
Conopea sp  
Conopeum commensale  
Conopeum sp  
Conualevia alba  
Conualevia sp  
Conualeviidae  
Conus californicus  
Conus sp  
Cooperella sp  
Cooperella subdiaphana  
Copepoda  
Corallanidae  
Corallimorpharia  
Corallimorphidae  
Coralliophilidae  
Corambidae  
Corbulidae

Corella sp  
Corella willmeriana  
Corellidae  
Corophiidae  
Corophioidea  
Corymorpha bigelowi  
Corymorpha palma  
Corymorpha sp  
Corymorpha sp A  
Corymorphidae  
Corynactis californica  
Corynactis sp  
Coryphelloidea  
Cossura candida  
Cossura pygodactylata  
Cossura sp  
Cossura sp A  
Cossurida  
Cossuridae  
Cotylea  
Crangon alaskensis  
Crangon alba  
Crangon handi  
Crangon holmesi  
Crangon nigricauda  
Crangon nigromaculata  
Crangon sp  
Crangonidae  
Crangonoidea  
Cranopsis multistriata  
Cranopsis sp  
Crassadoma gigantea  
Crassadoma sp  
Crassispira semiinflata  
Crassispira sp  
Crenella decussata  
Crenella sp  
Crepidula aculeata  
Crepidula adunca  
Crepidula glottidiarum  
Crepidula naticarum  
Crepidula norrisiarum  
Crepidula onyx  
Crepidula perforans  
Crepidula sp  
Crepipatella dorsata  
Crepipatella orbiculata

Crepidatella sp  
Crinoidea  
Crinozoa  
Crisia occidentalis  
Crisia sp  
Crisiidae  
Crockerella eriphyle  
Crockerella evadne  
Crockerella sp  
Crossata californica  
Crossata sp  
Crucibulum sp  
Crucibulum spinosum  
Crustacea  
Cryptocelididae  
Cryptocelis occidentalis  
Cryptocelis sp  
Cryptodromiopsis larraburei  
Cryptodromiopsis sp  
Cryptomya californica  
Cryptomya sp  
Cryptonemertes actinophila  
Cryptonemertes sp  
Ctenodrilida  
Ctenodrilidae  
Ctenostomata  
Cubanomysis mysteriosa  
Cubanomysis sp  
Cucumaria piperata  
Cucumaria salma  
Cucumaria sp  
Cucumariidae  
Cumacea  
Cumanotidae  
Cumanotus fernaldi  
Cumanotus sp  
Cumella californica  
Cumella sp  
Cumella sp B  
Cumingia californica  
Cumingia sp  
Cuspidaria parapodema  
Cuspidaria sp  
Cuspidariidae  
Cuspidarioidea  
Cuthona divae  
Cuthona sp

Cyamon neon  
Cyamon sp  
Cyamonidae  
Cyathodonta pedroana  
Cyathodonta sp  
Cyathura munda  
Cyathura sp  
Cyclaspis nubila  
Cyclaspis sp  
Cyclaspis sp A  
Cyclaspis sp B  
Cyclaspis sp C  
Cyclocardia barbarenaensis  
Cyclocardia crassidens  
Cyclocardia sp  
Cyclocardia ventricosa  
Cyclodorippidae  
Cyclopecten benthalis  
Cyclopecten catalinensis  
Cyclopecten sp  
Cyclostomata  
Cyclostremella californica  
Cyclostremella coronadoensis  
Cyclostremella sp  
Cylichna attonsa  
Cylichna diegensis  
Cylichna sp  
Cylichnidae  
Cylindroleberididae  
Cymadusa sp  
Cymadusa uncinata  
Cymatioa electilis  
Cymatioa sp  
Cymatioidea  
Cymothoidae  
Cypraeoidea  
Cyprideis sp  
Cyprideis stewarti  
Cyprididae  
Cypridinidae  
Cypridinoidea  
Cypridoidea  
Cystodytes lobatus  
Cystodytes sp  
Dactylopleustes sp  
Dactylopleustes sp A  
Daphnella clathrata

Daphnella sp  
Dasybranchus glabrus  
Dasybranchus sp  
Decabrachia  
Decamastus gracilis  
Decamastus sp  
Decapoda  
Deflexilodes norvegicus  
Deflexilodes sp  
Deilocerus decorus  
Deilocerus planus  
Deilocerus sp  
Delectopecten sp  
Delectopecten vancouverensis  
Demonax sp  
Demonax sp 1  
Demospongiae  
Dendraster excentricus  
Dendraster sp  
Dendrasteridae  
Dendrochirotida  
Dendrodorididae  
Dendrodoridoidea  
Dendrodoris fulva  
Dendrodoris sp  
Dendronotidae  
Dendronotoidea  
Dendronotus albus  
Dendronotus diversicolor  
Dendronotus frondosus  
Dendronotus iris  
Dendronotus sp  
Dendronotus subramosus  
Dentaliida  
Dentaliidae  
Dentalium neohectagonum  
Dentalium sp  
Dentalium vallicolens  
Dermatomya sp  
Dermatomya tenuiconcha  
Desdimelita desdichada  
Desdimelita sp  
Desmophyllum dianthus  
Desmophyllum sp  
Deutella californica  
Deutella sp  
Dexaminidae

Dexaminoidea  
Diadumene sp  
Diadumenidae  
Diaperoforma californica  
Diaperoforma sp  
Diaphana californica  
Diaphana sp  
Diaphanidae  
Diaphanoidea  
Diaphorodoris lirulatocauda  
Diaphorodoris sp  
Diastylidae  
Diastylis californica  
Diastylis crenellata  
Diastylis pellucida  
Diastylis santamariensis  
Diastylis sentosa  
Diastylis sp  
Diastylis sp C  
Diastylopsis sp  
Diastylopsis tenuis  
Diaulula sandiegensis  
Diaulula sp  
Dichonemertes hartmanae  
Dichonemertes sp  
Diogenidae  
Diopatra ornata  
Diopatra sp  
Diopatra splendidissima  
Diopatra tridentata  
Diplocheilus allmani  
Diplocheilus sp  
Diplodonta sericata  
Diplodonta sp  
Dipolydora akaina  
Dipolydora armata  
Dipolydora bidentata  
Dipolydora caulleryi  
Dipolydora cf. armata  
Dipolydora commensalis  
Dipolydora giardi  
Dipolydora socialis  
Dipolydora sp  
Dirona picta  
Dirona sp  
Dironidae  
Dironoidea

Discerceis granulosa  
Discerceis sp  
Discodorididae  
Discopoda  
Discoporella sp  
Discoporella umbellata  
Discosolenia burchami  
Discosolenia sp  
Dispio sp  
Dispio uncinata  
Dissiminassa dissimilis  
Dissiminassa sp  
Distaplia occidentalis  
Distaplia sp  
Dodecaceria concharum  
Dodecaceria sp  
Dodecaseta oraria  
Dodecaseta sp  
Doridoida  
Doridoidea  
Doriopsilla albopunctata  
Doriopsilla sp  
Dorvillea (Dorvillea) sp  
Dorvillea (Schistomeringos) annulata  
Dorvillea (Schistomeringos) longicornis  
Dorvillea sp  
Dorvilleidae  
Doto amyra  
Doto columbiana  
Doto kya  
Doto sp  
Dotoidae  
Dougaloplus amphacanthus  
Dougaloplus sp  
Drilonereis falcata  
Drilonereis filum  
Drilonereis mexicana  
Drilonereis nuda  
Drilonereis sp  
Drilonereis sp A  
Dromalia alexandri  
Dromalia sp  
Dromiidae  
Dulichella sp  
Dulichella spinosa  
Dynamena sp  
Dyopedos monacanthus



Dyopedos sp  
Echinacea  
Echinasteridae  
Echinodermata  
Echinoida  
Echinoidea  
Echinozoa  
Echiura  
Echiurida  
Echiuroinea  
Eclysippe sp  
Eclysippe trilobata  
Ectoprocta  
Edotia sp  
Edotia sp B  
Edotia sublittoralis  
Edwardsia californica  
Edwardsia sipunculoides  
Edwardsia sp  
Edwardsia sp A  
Edwardsia sp G  
Edwardsiidae  
Elaeocyma empyrosia  
Elaeocyma sp  
Elasipodida  
Elasmopus bampo  
Elasmopus mutatus  
Elasmopus sp  
Emerita analoga  
Emerita sp  
Emplectonema sp  
Emplectonematidae  
Emprostopharyngidae  
Emprostopharynx gracilis  
Emprostopharynx sp  
Enallopaguropsis guatemoci  
Enallopaguropsis sp  
Ennucula sp  
Ennucula tenuis  
Enopla  
Enopla sp A  
Ensis myrae  
Ensis sp  
Enteropneusta  
Entodesma navicula  
Entodesma pictum  
Entodesma sp

Entoprocta  
Eobrolgus sp  
Eobrolgus spinosus  
Eohaustorius barnardi  
Eohaustorius sp  
Ephesiella brevicapitis  
Ephesiella sp  
Epiactis prolifera  
Epiactis sp  
Epicaridea  
Epilucina californica  
Epilucina sp  
Epistomiidae  
Epitoniidae  
Epitonium bellastriatum  
Epitonium hindsii  
Epitonium indianorum  
Epitonium lowei  
Epitonium politum  
Epitonium sawinae  
Epitonium sp  
Epitonium tinctum  
Epizoanthidae  
Epizoanthus induratus  
Epizoanthus leptoderma  
Epizoanthus sp  
Eranno bicirrata  
Eranno lagunae  
Eranno sp  
Erato columbella  
Erato sp  
Ericthonius brasiliensis  
Ericthonius rubricornis  
Ericthonius sp  
Erileptus sp  
Erileptus spinosus  
Eteone fauchaldi  
Eteone leptotes  
Eteone pigmentata  
Eteone sp  
Eualus herdmani  
Eualus lineatus  
Eualus sp  
Euborlasia nigrocincta  
Euborlasia sp  
Eucarida  
Euchone arenae

Euchone hancocki  
Euchone incolor  
Euchone limnicola  
Euchone sp  
Euchone sp A  
Euchone velifera  
Euclymene campanula  
Euclymene delineata  
Euclymene sp  
Euclymeninae sp A  
Eudendriidae  
Eudendrium sp  
Eudistylia sp  
Eudistylia vancouveri  
Eudorella pacifica  
Eudorella sp  
Eudorellopsis longirostris  
Eudorellopsis sp  
Eugorgia rubens  
Eugorgia sp  
Eugyra arenosa californica  
Eugyra sp  
Eulalia californiensis  
Eulalia levicornuta  
Eulalia quadrioculata  
Eulalia sp  
Eulima almo  
Eulima raymondi  
Eulima sp  
Eulimidae  
Eulimoidea  
Eulithidium compta  
Eulithidium pulloides  
Eulithidium rubrilineata  
Eulithidium sp  
Eulithidium substriata  
Eumalacostraca  
Eumida longicornuta  
Eumida sp  
Eunice americana  
Eunice multicylindri  
Eunice multipectinata  
Eunice sp  
Eunicida  
Eunicidae  
Eunicoidea  
Eupantopodida

Euphilomedes carcharodonta  
Euphilomedes longiseta  
Euphilomedes producta  
Euphilomedes sp  
Euphrosine arctia  
Euphrosine sp  
Euphrosinidae  
Euphysa sp  
Euphysa sp A  
Eupolymnia heterobranchia  
Eupolymnia sp  
Eupyrgidae  
Euryalina  
Eurycyde sp  
Eurycyde spinosa  
Eurydice caudata  
Eurydice sp  
Eurylepta sp  
Euryleptidae  
Euryleptoidea  
Eusarsiella sp  
Eusarsiella sp A  
Eusarsiella thominx  
Eusiridae  
Eusiroides monoculoides  
Eusiroides sp  
Eusirus sp  
Eusyllis habei  
Eusyllis sp  
Eusyllis transecta  
Euthyneura  
Euvola diegensis  
Euvola sp  
Exacanthomysis davisii  
Exacanthomysis sp  
Excorallana sp  
Excorallana truncata  
Exogone breviseta  
Exogone cf. verugera  
Exogone dwisula  
Exogone lourei  
Exogone molesta  
Exogone sp  
Exogone uniformis  
Exogonella brunnea  
Exogonella sp  
Exosphaeroma rhomburum

Exosphaeroma sp  
Eyakia robusta  
Eyakia sp  
Fabia concharum  
Fabia sp  
Fabia subquadrata  
Fabricinuda limnicola  
Fabricinuda sp  
Fabriciola sp  
Fabrisabella sp  
Fabrisabella sp A  
Facelinidae  
Falcidens hartmanae  
Falcidens sp  
Falcidens sp A  
Falcidens sp B  
Fartulum occidentale  
Fartulum sp  
Fasciolariidae  
Fauveliopsida  
Fauveliopsidae  
Fauveliopsis armata  
Fauveliopsis glabra  
Fauveliopsis magna  
Fauveliopsis sp  
Filifera  
Filiformia  
Finella sp  
Fissurellidae  
Fissurelloidea  
Flabellifera  
Flabelligera infundibularis  
Flabelligera sp  
Flabelligerida  
Flabelligeridae  
Flabellina iodinea  
Flabellina pricei  
Flabellina sp  
Flabellina trilineata  
Flabellinidae  
Florometra serratissima  
Florometra sp  
Forcipulatida  
Forreria belcheri  
Forreria sp  
Foxiphalus cognatus  
Foxiphalus golfensis

Foxiphalus obtusidens  
 Foxiphalus similis  
 Foxiphalus sp  
 Fusinus barbarendis  
 Fusinus luteopictus  
 Fusinus sp  
 Gadila aberrans  
 Gadila sp  
 Gadilida  
 Gadilidae  
 Galathea californiensis  
 Galathea sp  
 Galatheididae  
 Galeommatidae  
 Galeommatidae sp A  
 Galeommatoidea  
 Gammaridea  
 Gammaropsis barnardi  
 Gammaropsis mamola  
 Gammaropsis martesia  
 Gammaropsis ociosa  
 Gammaropsis sp  
 Gammaropsis thompsoni  
 Gari californica  
 Gari fucata  
 Gari sp  
 Garosyrrhoë bigarra Cmplx  
 Garosyrrhoë sp  
 Garveia formosa  
 Garveia sp  
 Gastropoda  
 Gastropteridae  
 Gastropteron pacificum  
 Gastropteron sp  
 Geitodoris heathi  
 Geitodoris sp  
 Gibberosus myersi  
 Gibberosus sp  
 Gitana calitemplado  
 Gitana sp  
 Globivenus fordii  
 Globivenus sp  
 Glottidia albida  
 Glottidia sp  
 Glycera americana  
 Glycera convoluta  
 Glycera nana

Glycera oxycephala  
Glycera robusta  
Glycera sp  
Glycera tenuis  
Glycera tessellata  
Glyceridae  
Glyceriformia  
Glycinde armigera  
Glycinde sp  
Glycymerididae  
Glycymeridoidea  
Glycymeris septentrionalis  
Glycymeris sp  
Glyphocuma sp  
Glyphocuma sp A  
Glyptolithodes cristatipes  
Glyptolithodes sp  
Gnathia crenulatifrons  
Gnathia productatridens  
Gnathia sanctaecrucis  
Gnathia sp  
Gnathia tridens  
Gnathia trilobata  
Gnathiidae  
Gnathiidea  
Gnathophiurina  
Gnathostomata  
Golfingia margaritacea  
Golfingia sp  
Golfingiidae  
Golfingiiiformes  
Goniada acicula  
Goniada annulata  
Goniada brunnea  
Goniada littorea  
Goniada maculata  
Goniada sp  
Goniadidae  
Goniasteridae  
Goniodorididae  
Gonodactyloidea  
Gorgoniidae  
Gorgonocephalidae  
Gorgonocephalus eucnemis  
Gorgonocephalus sp  
Grandidierella japonica  
Grandidierella sp

Grantiidae  
Granulina margaritula  
Granulina sp  
Granulosina  
Grapsidae  
Gregariella coarctata  
Gregariella sp  
Guernea reduncans  
Guernea sp  
Gymnolaemata  
Gymnonereis crosslandi  
Gymnonereis sp  
Gyptis brunnea  
Gyptis sp  
Hadromerida  
Haigia diegensis  
Haigia sp  
Halcompa decemtentaculata  
Halcompa sp  
Halcompidae  
Halcompoididae  
Halianthella sp  
Halianthella sp A  
Haliclona sp  
Haliclonidae  
Halicoides sp  
Halicoides synopiae  
Haliophasma geminatum  
Haliophasma sp  
Halistylus pupoideus  
Halistylus sp  
Haloclavidae  
Halocynthia igaboja  
Halocynthia sp  
Halodakra salmonea  
Halodakra sp  
Halodakra subtrigona  
Halosydna brevisetosa  
Halosydna johnsoni  
Halosydna latior  
Halosydna sp  
Hamatoscalpellum californicum  
Hamatoscalpellum sp  
Haminaea sp  
Haminaea vesicula  
Haminaea virescens  
Haminaeidae



Hanleyella oldroydi  
Hanleyella sp  
Haplosclerida  
Haplosyllis sp  
Haplosyllis spongicola  
Harbansus bradmyersi  
Harbansus sp  
Harmothoe fragilis  
Harmothoe hirsuta  
Harmothoe imbricata  
Harmothoe multisetosa  
Harmothoe sp  
Harpacticoida  
Harpiniopsis epistomata  
Harpiniopsis fulgens  
Harpiniopsis galera  
Harpiniopsis sp  
Harrimaniidae  
Hartmanodes hartmanae  
Hartmanodes sp  
Haustoriidae  
Havelockia benti  
Havelockia sp  
Hebellidae  
Hebelloopsis expansa  
Hebelloopsis sp  
Hemectyon hyle  
Hemectyon sp  
Hemiasterina  
Hemichordata  
Hemicyclops sp  
Hemicyclops thysanotus  
Hemigrapsus nudus  
Hemigrapsus oregonensis  
Hemigrapsus sp  
Hemilamprops californicus  
Hemilamprops sp  
Hemipodus borealis  
Hemipodus sp  
Hemiproto sp  
Hemiproto sp A  
Hemisquilla ensigera californiensis  
Hemisquilla sp  
Hemisquillidae  
Henricia leviuscula  
Henricia sp  
Heptacarpus brevirostris

Heptacarpus decorus  
Heptacarpus flexus  
Heptacarpus fuscimaculatus  
Heptacarpus palpator  
Heptacarpus sitchensis  
Heptacarpus sp  
Heptacarpus stimpsoni  
Heptacarpus taylori  
Heptacarpus tenuissimus  
Heptacarpus tridens  
Hermaeidae  
Hermisenda crassicornis  
Hermisenda sp  
Hesionella mccullochae  
Hesionella sp  
Hesionidae  
Hesionura coineaui difficilis  
Hesionura sp  
Hesperonoe complanata  
Hesperonoe laevis  
Hesperonoe sp  
Heterobranchia  
Heterobranchia  
Heterocrypta occidentalis  
Heterocrypta sp  
Heterodonta  
Heterogorgia sp  
Heterogorgia tortuosa  
Heteromastus filiformis  
Heteromastus filobranchus  
Heteromastus sp  
Heteromysis odontops  
Heteromysis sp  
Heteronemertea  
Heterophoxus affinis  
Heterophoxus ellisi  
Heterophoxus oculatus  
Heterophoxus sp  
Heteropodarke heteromorpha  
Heteropodarke sp  
Heteroserolis carinata  
Heteroserolis sp  
Heterospio catalinensis  
Heterospio sp  
Heterostropha  
Hexactinellida  
Hexactinosa

Hexasterophora  
Hiatella arctica  
Hiatella sp  
Hiatellidae  
Hiatelloidea  
Hincksinidae  
Hippasteria sp  
Hippasteria spinosa  
Hippidae  
Hippolyte californiensis  
Hippolyte clarki  
Hippolyte sp  
Hippolytidae  
Hippomedon columbianus  
Hippomedon sp  
Hippomedon sp A  
Hippomedon subrobustus  
Hippomedon tenax  
Hippomedon zetesimus  
Hipponicidae  
Hipponix antiquatus  
Hipponix sp  
Hippothoidae  
Hirudinea  
Histiotteuthidae  
Histiotteuthis heteropsis  
Histiotteuthis sp  
Holaxonia  
Holmesiella anomala  
Holmesiella sp  
Holmesimysis costata  
Holmesimysis sp  
Hololepida magna  
Hololepida sp  
Holothuroidea  
Homolidae  
Hoplocarida  
Hoplonemertea  
Hoplonemertea sp A  
Hoplonemertea sp B  
Hoploplana sp  
Hoploplana sp A  
Hoploplanidae  
Hormathiidae  
Hornellia occidentalis  
Hornellia sp  
Huxleyia munita

Huxleyia sp  
Hyale sp  
Hyalidae  
Hyalinoecia juvenalis  
Hyalinoecia sp  
Hyalopomatus biformis  
Hyalopomatus sp  
Hydatinidae  
Hydractinia sp  
Hydractiniidae  
Hydroides pacificus  
Hydroides sp  
Hydrozoa  
Idarcturus allelomorphus  
Idarcturus sp  
Idotea montereyensis  
Idotea resecata  
Idotea sp  
Idoteidae  
Ilyarachna acarina  
Ilyarachna sp  
Imogine exiguus  
Imogine sp  
Inarticulata  
Incirrata  
Incisocalliope bairdi  
Incisocalliope sp  
Inusitatomysis insolita  
Inusitatomysis sp  
Iothia lindbergi  
Iothia sp  
Iphimediidae  
Irusella lamellifera  
Irusella sp  
Isaeidae  
Isanthidae  
Isanthidae sp A  
Ischnochiton sp  
Ischnochitonidae  
Ischnochitonina  
Ischyroceridae  
Ischyrocerus anguipes  
Ischyrocerus pelagops  
Ischyrocerus sp  
Ischyrocerus sp B  
Ischyrocerus sp C  
Iselica ovoidea

Iselica sp  
Isocheles pilosus  
Isocheles sp  
Isocirrus longiceps  
Isocirrus sp  
Isopoda  
Isorobitella sp  
Isorobitella trigonalis  
Juventivellendoidea  
Janiralata occidentalis  
Janiralata solasteri  
Janiralata sp  
Janiridae  
Janiroidea  
Janthinoidea  
Jasmineira sp  
Jasmineira sp B  
Jassa slatteryi  
Jassa sp  
Joeropsididae  
Joeropsis concava  
Joeropsis dubia  
Joeropsis sp  
Juliacorbula luteola  
Juliacorbula sp  
Kaburakia excelsa  
Kaburakia sp  
Kelletia kelletii  
Kelletia sp  
Kellia sp  
Kellia suborbicularis  
Kurtzia arteaga  
Kurtzia sp  
Kurtziella plumbea  
Kurtziella sp  
Kurtzina beta  
Kurtzina sp  
Kylix halocyane  
Kylix sp  
Lacuna sp  
Lacuna unifasciata  
Lacunidae  
Lacydonia sp  
Lacydoniidae  
Laemophiurina  
Laetmogonidae  
Laevicardium sp

Laevicardium substriatum  
Laevidentaliidae  
Lagenipora sp  
Lagisca extenuata  
Lagisca sp  
Lamellaria diegoensis  
Lamellaria sp  
Lamellariidae  
Lamellaroidea  
Lampropidae  
Lamprops carinatus  
Lamprops quadriplicatus  
Lamprops sp  
Lanassa gracilis  
Lanassa sp  
Lanassa sp D  
Lanassa venusta venusta  
Lanice conchilega  
Lanice sp  
Laomediidae  
Laonice cirrata  
Laonice nuchala  
Laonice sp  
Laphania sp  
Laqueidae  
Laqueus californianus  
Laqueus sp  
Lasaea adansoni  
Lasaea sp  
Lasaeidae  
Laticorophium baconi  
Laticorophium sp  
Latocestidae  
Leitoscoloplos panamensis  
Leitoscoloplos pugettensis  
Leitoscoloplos sp  
Lepadomorpha  
Lepetidae  
Lepidasthenia berkeleyae  
Lepidasthenia longicirrata  
Lepidasthenia sp  
Lepidepecreum garthi  
Lepidepecreum gurjanovae  
Lepidepecreum sp  
Lepidepecreum sp A  
Lepidonotus sp  
Lepidonotus spiculus

Lepidopa californica  
Lepidopa sp  
Lepidopleurina  
Lepidozona interstincta  
Lepidozona mertensii  
Lepidozona retiporosa  
Lepidozona scabricostata  
Lepidozona sinudentata  
Lepidozona sp  
Leporimetis obesa  
Leporimetis sp  
Leptasterias hexactis  
Leptasterias sp  
Leptochelia dubia  
Leptochelia sp  
Leptocheliidae  
Leptochiton nexus  
Leptochiton rugatus  
Leptochiton sp  
Leptochitonidae  
Leptocuma forsmanni  
Leptocuma sp  
Leptognathina  
Leptopecten latiauratus  
Leptopecten sp  
Leptoplanidae  
Leptoplanidae sp A  
Leptostraca  
Leptostylis abditus  
Leptostylis calva  
Leptostylis sp  
Leptostylis sp B  
Leptosynapta sp  
Leucandra heathi  
Leucandra sp  
Leucilla nuttingi  
Leucilla sp  
Leucon bishopi  
Leucon falcicosta  
Leucon sp  
Leucon subnasica  
Leuconidae  
Leucosiidae  
Leucosolenia sp  
Leucosoleniida  
Leucosoleniidae  
Leucothoe sp

Leucothoe spinicarpa  
Leucothoidae  
Leucothoidea  
Leuroleberis sharpei  
Leuroleberis sp  
Levinsenia gracilis  
Levinsenia multibranchiata  
Levinsenia oculata  
Levinsenia sp  
Liljeborgia geminata  
Liljeborgia sp  
Liljeborgiidae  
Liljeborgioidea  
Limaria hemphilli  
Limaria sp  
Limatula saturna  
Limatula sp  
Limidae  
Limifossor fratula  
Limifossor sp  
Limifossorida  
Limifossoridae  
Limifossorimorpha  
Limnactiniidae  
Limnactiniidae sp A  
Limnodriloides barnardi  
Limnodriloides monothecus  
Limnodriloides sp  
Limnoria algarum  
Limnoria sp  
Limnoriidae  
Limoida  
Limoidea  
Lineidae  
Lineidae sp A  
Lineus bilineatus  
Lineus flavescens  
Lineus ruber  
Lineus rubescens  
Lineus sp  
Lineus sp A  
Lingulida  
Lingulidae  
Linguloidea  
Lirobarleeia kelseyi  
Lirobarleeia sp  
Lirobittium fetellum



Lirobittium larum  
Lirobittium quadrifilatum  
Lirobittium rugatum  
Lirobittium sp  
Lirularia acuticostata  
Lirularia parcipicta  
Lirularia sp  
Listriella albina  
Listriella diffusa  
Listriella eriopisa  
Listriella goleta  
Listriella melanica  
Listriella sp  
Listriella sp A  
Listriolobus pelodes  
Listriolobus sp  
Lithodidae  
Lithophaga plumula  
Lithophaga sp  
Lithopoma sp  
Lithopoma undosum  
Litiopidae  
Littorinoidea  
Livoneca californica  
Livoneca convexa  
Livoneca sp  
Livoneca vulgaris  
Loimia medusa  
Loimia sp  
Loliginiidae  
Loligo opalescens  
Loligo sp  
Longosomatidae  
Lophelia pertusa  
Lophelia sp  
Lophogorgia chilensis  
Lophogorgia sp  
Lopholithodes foraminatus  
Lopholithodes sp  
Lophopanopeus bellus  
Lophopanopeus frontalis  
Lophopanopeus leucomanus  
Lophopanopeus sp  
Lottia sp  
Lottia strigatella  
Lottiidae  
Lovenella nodosa

Lovenella sp  
Lovenellidae  
Lovenia cordiformis  
Lovenia sp  
Loveniidae  
Loxorhynchus crispatus  
Loxorhynchus grandis  
Loxorhynchus sp  
Loxosomatidae  
Lucinidae  
Lucinisca nuttalli  
Lucinisca sp  
Lucinoidea  
Lucinoma annulatum  
Lucinoma sp  
Lugia sp  
Lugia uschakovi  
Luidia armata  
Luidia asthenosoma  
Luidia foliolata  
Luidia sp  
Luidiidae  
Lumbrineridae  
Lumbrinerides platypygus  
Lumbrinerides sp  
Lumbrineris californiensis  
Lumbrineris cruzensis  
Lumbrineris index  
Lumbrineris japonica  
Lumbrineris latreilli  
Lumbrineris limicola  
Lumbrineris sp  
Lunulariidae  
Lyonsia californica  
Lyonsia sp  
Lyonsiidae  
Lysianassidae  
Lysianassoidea  
Lysippe sp  
Lysippe sp A  
Lysippe sp B  
Lysmata californica  
Lysmata sp  
Lyssacinosa  
Lytechinus pictus  
Lytechinus sp  
Macoma carlottensis

Macoma indentata  
Macoma nasuta  
Macoma secta  
Macoma sp  
Macoma yoldiformis  
Macrocyprididae  
Macrocyprina pacifica  
Macrocyprina sp  
Macromeris hemphilli  
Macromeris sp  
Mactridae  
Mactroidea  
Mactromeris catilliformis  
Mactromeris sp  
Mactrotoma californica  
Mactrotoma sp  
Maera simile  
Maera sp  
Maera vigota  
Magelona berkeleyi  
Magelona hartmanae  
Magelona hobsonae  
Magelona longicornis  
Magelona pitelkai  
Magelona riojai  
Magelona sacculata  
Magelona sp  
Magelona sp A  
Magelona sp SD10  
Magelonidae  
Majidae  
Majoxiphalus major  
Majoxiphalus sp  
Malacoceros punctata  
Malacoceros sp  
Malacoplax californiensis  
Malacoplax sp  
Malacostegoidea  
Malacostraca  
Maldane sarsi  
Maldane sp  
Maldanidae  
Malmgreniella bansei  
Malmgreniella baschi  
Malmgreniella liei  
Malmgreniella macginitiei  
Malmgreniella nigralba

Malmgreniella sanpedroensis  
Malmgreniella scriptoria  
Malmgreniella sp  
Malmgreniella sp A  
Mandibulophoxus gilesi  
Mandibulophoxus sp  
Mangelia hexagona  
Mangelia sp  
Marginellidae  
Mariansabellaria harrisae  
Mariansabellaria sp  
Marphysa conferta  
Marphysa disjuncta  
Marphysa sp  
Marphysa sp A  
Maxwellia santarosana  
Maxwellia sp  
Mayerella banksia  
Mayerella sp  
Mediaster aequalis  
Mediaster sp  
Mediomastus acutus  
Mediomastus ambiseta  
Mediomastus californiensis  
Mediomastus sp  
Megabalanus californicus  
Megabalanus sp  
Megalomma pigmentum  
Megalomma sp  
Megalomma splendida  
Megalomphalus californicus  
Megalomphalus sp  
Megaluropidae  
Megaluropidae sp A  
Megamoera sp  
Megamoera subtener  
Megasurcula carpenteriana  
Megasurcula sp  
Megasurcula stearnsiana  
Meiodorvillea sp  
Melanochlamys diomedea  
Melanochlamys sp  
Melibe leonina  
Melibe sp  
Melinna heterodonta  
Melinna oculata  
Melinna sp

Melitidae  
Melphidippidae  
Melphidippoidea  
Melphisana bola Cmplx  
Melphisana sp  
Membranipora savarti  
Membranipora sp  
Membranipora tenuis  
Membranipora tuberculata  
Membraniporidae  
Mesochaetopterus sp  
Mesochaetopterus sp  
Mesocrangon munitella  
Mesocrangon sp  
Mesolamprops bispinosus  
Mesolamprops sp  
Metacaprella kennerlyi  
Metacaprella sp  
Metacrangon sp  
Metacrangon spinosissima  
Metamysidopsis elongata  
Metamysidopsis sp  
Metapenaeopsis mineri  
Metapenaeopsis sp  
Metaphoxus frequens  
Metaphoxus sp  
Metasychis disparidentatus  
Metasychis sp  
Metedwardsia sp  
Metedwardsia sp A  
Metharpinia coronadoi  
Metharpinia jonesi  
Metharpinia sp  
Metopa dawsoni  
Metopa sp  
Metopella aporpis  
Metopella sp  
Metridiidae  
Metridium senile Cmplx  
Metridium sp  
Metzgeria sp  
Mexamage longibranchiata  
Mexamage sp  
Micrasterina  
Microciona parthena  
Microciona sp  
Microcosmus sp

Microcosmus squamiger  
Microglyphis brevicula  
Microglyphis sp  
Microjassa litotes  
Microjassa sp  
Microphthalmus hystrix  
Microphthalmus sp  
Micropleustes nautilus  
Micropleustes sp  
Micropodarke dubia  
Micropodarke sp  
Micropora sp  
Microporella sp  
Microporellidae  
Microporidae  
Microspio pigmentata  
Microspio sp  
Micrura alaskensis  
Micrura olivaris  
Micrura pardalis  
Micrura sp  
Micrura wilsoni  
Mitra idae  
Mitra sp  
Mitridae  
Modiolus capax  
Modiolus neglectus  
Modiolus rectus  
Modiolus sacculifer  
Modiolus sp  
Molgula napiformis  
Molgula pugetiensis  
Molgula regularis  
Molgula sp  
Molgulidae  
Mollusca  
Moloha faxoni  
Moloha sp  
Molpadia intermedia  
Molpadia sp  
Molpadida  
Molpadiidae  
Monobrachiidae  
Monobrachium parasitum  
Monobrachium sp  
Monocorophium acherusicum  
Monocorophium insidiosum

Monocorophium sp  
Monoculodes emarginatus  
Monoculodes latissimanus  
Monoculodes sp  
Monostylifera sp A  
Monostylifera sp B  
Monostylifera sp C  
Monostyliferoidea  
Monstrilloida  
Monticellina cryptica  
Monticellina serratiseta  
Monticellina siblina  
Monticellina sp  
Monticellina tessellata  
Mooreonuphis exigua  
Mooreonuphis litoralis  
Mooreonuphis nebulosa  
Mooreonuphis segmentispadix  
Mooreonuphis sp  
Mooreonuphis stigmatis  
Mooresamytha bioculata  
Mooresamytha sp  
Mopalia phorminx  
Mopalia sp  
Mopaliidae  
Munida hispida  
Munida sp  
Munna sp  
Munna spinifrons  
Munna stephenseni  
Munnidae  
Munnogonium sp  
Munnogonium tillerae  
Munnopsidae  
Munnopsurus sp  
Munnopsurus sp A  
Muricea californica  
Muricea sp  
Muriceidae  
Muricidae  
Muricoidea  
Musculista senhousia  
Musculista sp  
Musculus sp  
Mya arenaria  
Mya sp  
Myscale psila

Mycale sp  
Mycalidae  
Myidae  
Myina  
Myodocopa  
Myodocopida  
Myodocopina  
Myoida  
Myoidea  
Myopsida  
Myriaporidae  
Myriochele gracilis  
Myriochele pygidialis  
Myriochele sp  
Myriochele sp M  
Myriowenia californiensis  
Myriowenia sp  
Myrizoum sp  
Mysella pedroana  
Mysella planata  
Mysella sp  
Mysella sp C  
Mysella sp E  
Mysida  
Mysidacea  
Mysidae  
Mysidella americana  
Mysidella sp  
Mysidopsis brattegardi  
Mysidopsis californica  
Mysidopsis cathengela  
Mysidopsis intii  
Mysidopsis onofrensis  
Mysidopsis sp  
Mystides sp  
Mytilidae  
Mytiloida  
Mytiloidea  
Mytilus californianus  
Mytilus galloprovincialis  
Mytilus sp  
Myxicola sp  
Myxilla incrustans  
Myxilla sp  
Myxillidae  
Nacellina  
Naineris dendritica



Naineris sp  
Naineris uncinata  
Nannastacidae  
Nassariidae  
Nassarina penicillata  
Nassarina sp  
Nassarius delosi  
Nassarius fossatus  
Nassarius insculptus  
Nassarius mendicus  
Nassarius perpinguis  
Nassarius sp  
Naticidae  
Naticoidea  
Naushonia macginitiei  
Naushonia sp  
Navanax inermis  
Navanax sp  
Neaeromya compressa  
Neaeromya rugifera  
Neaeromya sp  
Neaeromya stearnsii  
Neanthes acuminata  
Neanthes sp  
Neastacilla californica  
Neastacilla sp  
Nebalia daytoni  
Nebalia pugettensis Cmplx  
Nebalia sp  
Nebaliidae  
Nellobia eusoma  
Nellobia sp  
Nemertea  
Nemertea sp A  
Nemocardium centifilosum  
Nemocardium sp  
Neocrangon communis  
Neocrangon resima  
Neocrangon sp  
Neocrangon zaca  
Neogastropoda  
Neoschyrocerus claustris  
Neoschyrocerus sp  
Neoleprea japonica  
Neoleprea sp  
Neoleprea spiralis  
Neoloricata

Neomysis kadiakensis  
Neomysis rayi  
Neomysis sp  
Neosabellaria cementarium  
Neosabellaria sp  
Neosimnia aequalis  
Neosimnia barbarensis  
Neosimnia loebbeckeana  
Neosimnia sp  
Neotaenioglossa  
Neotrypaea affinis  
Neotrypaea californiensis  
Neotrypaea sp  
Nephasoma diaphanes  
Nephasoma eremita  
Nephasoma sp  
Nephtyidae  
Nephtys assignis  
Nephtys caecoides  
Nephtys californiensis  
Nephtys cornuta  
Nephtys ferruginea  
Nephtys punctata  
Nephtys simoni  
Nephtys sp  
Neptunea sp  
Neptunea tabulata  
Nereididae  
Nereidiformia  
Nereiphylla castanea  
Nereiphylla sp  
Nereis latescens  
Nereis procera  
Nereis sp  
Nerocila acuminata  
Nerocila sp  
Netastoma rostratum  
Netastoma sp  
Neverita reclusiana  
Neverita sp  
Nicippe sp  
Nicippe tumida  
Nicomache lumbricalis  
Nicomache personata  
Nicomache sp  
Nicon moniloceras  
Nicon sp

Ninoe sp  
Ninoe tridentata  
Nodiscala sp  
Nodiscala spongiosa  
Nolella sp  
Norrisia norrisi  
Norrisia sp  
not recognized  
Notaspidea  
Nothria occidentalis  
Nothria sp  
Notocirrus californiensis  
Notocirrus sp  
Notodorididae  
Notomastus latericeus  
Notomastus lineatus  
Notomastus magnus  
Notomastus sp  
Notomastus tenuis  
Notoplana sp  
Notoproctus pacificus  
Notoproctus sp  
Novafabricia sp  
Nucinellidae  
Nucinelloidea  
Nuculana conceptionis  
Nuculana elenensis  
Nuculana hamata  
Nuculana penderi  
Nuculana sp  
Nuculana taphria  
Nuculanidae  
Nuculanoidea  
Nuculidae  
Nuculoida  
Nuculoidea  
Nudibranchia  
Nutricola cymata  
Nutricola lordi  
Nutricola ovalis  
Nutricola sp  
Nutricola tantilla  
Nuttallia nuttallii  
Nuttallia sp  
Nymphon heterodenticulatum  
Nymphon pixellae  
Nymphon sp

Nymphonidae  
Nymphonoidea  
Nynantheae  
Obelia geniculata  
Obelia sp  
Obelia sp A  
Ocinebrina beta  
Ocinebrina foveolata  
Ocinebrina sp  
Octobrachia  
Octopoda  
Octopodidae  
Octopus bimaculoides  
Octopus californicus  
Octopus rubescens  
Octopus sp  
Octopus veligero  
Odontosyllis phosphorea  
Odontosyllis sp  
Odostomia astricta  
Odostomia canfieldi  
Odostomia clementina  
Odostomia columbiana  
Odostomia eucosmia  
Odostomia eugena  
Odostomia gravida  
Odostomia laxa  
Odostomia ritteri  
Odostomia sp  
Odostomia sp D  
Odostomia tenuisculpta  
Odostomia virginalis  
Oedicerotidae  
Oedicerotoidea  
Oegopsida  
Oenonidae  
Oenopota regulus  
Oenopota sp  
Oerstedia dorsalis  
Oerstedia sp  
Ogyrides sp  
Ogyrides sp A  
Ogyrididae  
Okenia angelensis  
Okenia sp  
Okenia sp A  
Olea hansineensis

Olea sp  
Oleidae  
Oligochaeta  
Olivella baetica  
Olivella biplicata  
Olivella pycna  
Olivella sp  
Olividae  
Onchidorididae  
Onchidoris sp  
Onuphidae  
Onuphis elegans  
Onuphis eremita parva  
Onuphis geophiliformis  
Onuphis iridescent  
Onuphis multiannulata  
Onuphis pallida  
Onuphis sp  
Onuphis sp 1  
Opalia borealis  
Opalia funiculata  
Opalia montereyensis  
Opalia sp  
Ophelia pulchella  
Ophelia sp  
Opheliida  
Opheliidae  
Ophelina acuminata  
Ophelina sp  
Ophelina sp SD1  
Ophiacantha diplasia  
Ophiacantha phragma  
Ophiacantha sp  
Ophiacanthidae  
Ophiactidae  
Ophiactis sp  
Ophiocomidae  
Ophiocten sp  
Ophioderma panamense  
Ophioderma sp  
Ophiodermatidae  
Ophiodermella cancellata  
Ophiodermella fancherae  
Ophiodermella inermis  
Ophiodermella sp  
Ophionereidae  
Ophionereis annulata

Ophionereis eurybrachioplax  
Ophionereis sp  
Ophiopholis bakeri  
Ophiopholis sp  
Ophiopsila californica  
Ophiopsila sp  
Ophiopteris papillosa  
Ophiopteris sp  
Ophiosphalma jolliense  
Ophiosphalma sp  
Ophiothrix sp  
Ophiothrix spiculata  
Ophiotricidae  
Ophiura leptoctenia  
Ophiura luetkenii  
Ophiura sarsi  
Ophiura sp  
Ophiurida  
Ophiuridae  
Ophiuroconis bispinosa  
Ophiuroconis sp  
Ophiuroidea  
Ophryotrocha sp  
Ophryotrocha sp A  
Ophryotrocha sp B  
Ophryotrocha sp C  
Opiliones  
Opilionoidea  
Opisa sp  
Opisa tridentata  
Opisthobranchia  
Opisthodonta mitchelli  
Opisthodonta sp  
Opisthopus sp  
Opisthopus transversus  
Opisthosyllis sp  
Opisthoteuthidae  
Opisthoteuthis sp  
Opisthoteuthis sp A  
Oplophoridae  
Oplorhiza gracilis  
Oplorhiza sp  
Oradarea longimana  
Oradarea sp  
Orbinia johnsoni  
Orbinia sp  
Orbiniida

Orbiniidae  
Orchomene anaquelus  
Orchomene decipiens  
Orchomene pacificus  
Orchomene pinguis  
Orchomene sp  
Orobitella californica  
Orobitella sp  
Orthopagurus minimus  
Orthopagurus sp  
Orthopyxis everta  
Orthopyxis sp  
Ostracoda  
Ostreoida  
Ototyphlonemertes sp  
Ototyphlonemertes spiralis  
Ototyphlonemertidae  
Ovulidae  
Owenia fusiformis  
Owenia sp  
Oweniida  
Oweniidae  
Oxyurostylis pacifica  
Oxyurostylis sp  
Pachastrellidae  
Pachycerianthus fimbriatus  
Pachycerianthus sp  
Pachycheles pubescens  
Pachycheles sp  
Pachygrapsus crassipes  
Pachygrapsus sp  
Pachynus barnardi  
Pachynus sp  
Pachythyone rubra  
Pachythyone sp  
Pacifacanthomysis nephrophthalma  
Pacifacanthomysis sp  
Paguridae  
Paguristes bakeri  
Paguristes parvus  
Paguristes sp  
Paguristes turgidus  
Paguristes ulreyi  
Pagurus armatus  
Pagurus granosimanus  
Pagurus quaylei  
Pagurus redondoensis

Pagurus retrorsimanus  
Pagurus samuelis  
Pagurus sp  
Pagurus sp 4  
Pagurus spilocarpus  
Palaemonidae  
Palaemonoidea  
Palaemonemerte  
Palaemonemerte sp A  
Palaemonemerte sp B  
Palaemonemerte sp C  
Paleanotus bellis  
Paleanotus sp  
Palicidae  
Palicus lucasii  
Palicus sp  
Palinura  
Palinuridae  
Pandalidae  
Pandaloida  
Pandalopsis ampla  
Pandalopsis sp  
Pandalus danae  
Pandalus jordani  
Pandalus platyceros  
Pandalus sp  
Pandora bilirata  
Pandora filosa  
Pandora punctata  
Pandora sp  
Pandoridae  
Pandoroidea  
Pannychia moseleyi  
Pannychia sp  
Panopea abrupta  
Panopea sp  
Pantomus affinis  
Pantomus sp  
Panulirus interruptus  
Panulirus sp  
Paracaudina chilensis  
Paracaudina sp  
Paracerceis cordata  
Paracerceis sculpta  
Paracerceis sp  
Paracyathus sp  
Paracyathus stearnsii



Paradiopatra parva  
Paradiopatra sp  
Paradoneis eliasoni  
Paradoneis lyra  
Paradoneis sp  
Paradoneis spinifera  
Paralithodes californiensis  
Paralithodes rathbuni  
Paralithodes sp  
Paramage scutata  
Paramage sp  
Parametaphoxus quaylei  
Parametaphoxus sp  
Parametopella ninis  
Parametopella sp  
Paramicrodeutopus schmitti  
Paramicrodeutopus sp  
Paramunnidae  
Paranaitis polynoides  
Paranaitis sp  
Parandalia fauveli  
Parandalia ocularis  
Parandalia sp  
Paranemertes californica  
Paranemertes peregrina  
Paranemertes sp  
Paraninoe fusca  
Paraninoe sp  
Paranthura elegans  
Paranthura sp  
Paranthuridae  
Paraonidae  
Parapaguridae  
Parapagurodes laurentae  
Parapagurodes makarovi  
Parapagurodes sp  
Paraphoxus sp  
Paraphoxus sp 1  
Paraplanocera oligoglana  
Paraplanocera sp  
Paraprionospio pinnata  
Paraprionospio sp  
Parasmittina sp  
Parasmittina trispinosa  
Parasterope hulingsi  
Parasterope sp  
Parastichopus californicus

Parastichopus parvimensis  
Parastichopus sp  
Paratanaidae  
Paratanais intermedius  
Paratanais sp  
Paratanaoidea  
Paraxanthias sp  
Paraxanthias taylori  
Pardalisca sp  
Pardalisca tenuipes  
Pardaliscella sp  
Pardaliscella symmetrica  
Pardaliscidae  
Pardaliscoidea  
Pareurythoe californica  
Pareurythoe sp  
Parhyalella sp  
Pariambidae  
Pariphinotus escabrosus  
Pariphinotus sp  
Parougia caeca  
Parougia sp  
Parthenopidae  
Parvaplustrum sp  
Parvaplustrum sp A  
Parvaplustrum sp B  
Parvilucina sp  
Parvilucina tenuisculpta  
Parviplana californica  
Parviplana sp  
Pasiphaea pacifica  
Pasiphaea sp  
Pasiphaeidae  
Pasiphaeoidea  
Patellogastropoda  
Paxillosida  
Pectinaria californiensis  
Pectinaria sp  
Pectinariidae  
Pectinidae  
Pectinina  
Pectinoidea  
Pegmata  
Pelia sp  
Pelia tumida  
Penaeidae  
Penaeidea

Penaeoidea  
Penaeus californiensis  
Penaeus sp  
Pennariidae  
Pennatula phosphorea  
Pennatula sp  
Pennatulacea  
Pennatulidae  
Pentactinia californica  
Pentactinia sp  
Pentamera lissoplaca  
Pentamera populifera  
Pentamera pseudocalcigera  
Pentamera pseudopopulifera  
Pentamera sp  
Peracarida  
Peramphithoe humeralis  
Peramphithoe lindbergi  
Peramphithoe mea  
Peramphithoe plea  
Peramphithoe sp  
Peramphithoe tea  
Perigonimus serpens Cmplx  
Perigonimus sp  
Perigonimus sp A  
Perigonimus yoldiarcticae  
Periploma discus  
Periploma sp  
Periplomatidae  
Perischoechinoidea  
Perotripus brevis  
Perotripus sp  
Petaloclymene pacifica  
Petaloclymene sp  
Petaloconchus sp  
Petaloproctus borealis  
Petaloproctus neoborealis  
Petaloproctus sp  
Petaloproctus tenuis  
Petricola carditoides  
Petricola hertzana  
Petricola sp  
Petricolidae  
Petrolisthes cinctipes  
Petrolisthes sp  
Pettiboneia sp  
Pharidae

Phascolion sp  
Phascolion sp A  
Phascolionidae  
Phascolosomatidae  
Phascolosomatidea  
Phascolosomatiformes  
Pherusa capulata  
Pherusa inflata  
Pherusa negligens  
Pherusa neopapillata  
Pherusa sp  
Phidiana sp  
Philine alba  
Philine auriformis  
Philine bakeri  
Philine californica  
Philine sp  
Philine sp A  
Philinidae  
Philinoidea  
Philomedes dentata  
Philomedes sp  
Philomedes sp A  
Philomedidae  
Phimochirus californiensis  
Phimochirus sp  
Phlebobranchiata  
Phliantidae  
Pholadidae  
Pholadina  
Pholadoidea  
Pholadomyoida  
Pholoe glabra  
Pholoe sp  
Pholoidae  
Pholoides asperus  
Pholoides sp  
Phorona  
Phoronida  
Phoronidae  
Phoronis sp  
Phoronopsis sp  
Photis bifurcata  
Photis brevipes  
Photis californica  
Photis conchicola  
Photis lacia

Photis linearmanus  
Photis macinerneyi  
Photis macrotica  
Photis parvidons  
Photis sp  
Photis sp A  
Photis sp B  
Photis sp C  
Photis sp E  
Photis viuda  
Phoxichilidiidae  
Phoxocephalidae  
Phoxocephaloidea  
Phragmatopoma californica  
Phragmatopoma sp  
Phrynophiurida  
Phtiscidae  
Phtisicoidea  
Phylactellidae  
Phyllocarida  
Phyllochaetopterus limicolus  
Phyllochaetopterus prolifica  
Phyllochaetopterus sp  
Phyllodoce cuspidata  
Phyllodoce groenlandica  
Phyllodoce hartmanae  
Phyllodoce longipes  
Phyllodoce medipapillata  
Phyllodoce pettiboneae  
Phyllodoce sp  
Phyllodocida  
Phyllodocidae  
Phyllodociformia  
Phyllodurus abdominalis  
Phyllodurus sp  
Phyllophoridae  
Phylo felix  
Phylo sp  
Physonectae  
Pilargidae  
Pilargis berkeleyae  
Pilargis sp  
Pilumnoides rotundus  
Pilumnoides sp  
Pilumnus sp  
Pilumnus spinohirsutus  
Pinnixa barnharti

Pinnixa forficulimanus  
Pinnixa franciscana  
Pinnixa hiatus  
Pinnixa longipes  
Pinnixa minuscula  
Pinnixa occidentalis  
Pinnixa scamit  
Pinnixa schmitti  
Pinnixa sp  
Pinnixa tomentosa  
Pinnixa tubicola  
Pinnotheres pugettensis  
Pinnotheres sp  
Pinnotheridae  
Pionosyllis articulata  
Pionosyllis sp  
Pionosyllis uraga  
Piromis hospitis  
Piromis sp  
Piromis sp A  
Pisaster brevispinis  
Pisaster giganteus capitatus  
Pisaster ochraceus  
Pisaster sp  
Pisione remota  
Pisione sp  
Pisionidae  
Pisionoidea  
Pista alata  
Pista disjuncta  
Pista elongata  
Pista moorei  
Pista sp  
Pista sp B  
Pitar newcombianus  
Pitar sp  
Placiphorella mirabilis  
Placiphorella sp  
Placostegus californicus  
Placostegus sp  
Planoceridae  
Planoceroidea  
Platonea sp  
Platyasteracea  
Platydorididae  
Platydoris macfarlandi  
Platydoris sp

Platyhelminthes  
Platyischnopidae  
Platymera gaudichaudii  
Platymera sp  
Platynereis bicanaliculata  
Platynereis dumerilii  
Platynereis sp  
Platyodon cancellatus  
Platyodon sp  
Plectodon scaber  
Plectodon sp  
Plehnia caeca  
Plehnia sp  
Plehniidae  
Pleioplana inquieta  
Pleioplana sp  
Plesionika beebei  
Plesionika sp  
Plesionika trispinus  
Pleurobranchaea californica  
Pleurobranchaea sp  
Pleurobranchidae  
Pleurobranchoidea  
Pleurogonium californiense  
Pleurogonium sp  
Pleurogonium sp A  
Pleuroncodes planipes  
Pleuroncodes sp  
Pleusirus secorrus  
Pleusirus sp  
Pleustidae  
Pleusymtes sp  
Pleusymtes subglaber  
Plexauridae  
Plumularia corrugata  
Plumularia integra  
Plumularia plumularioides  
Plumularia sp  
Plumulariidae  
Podarke pugettensis  
Podarke sp  
Podarkeopsis glabra  
Podarkeopsis sp  
Podarkeopsis sp A  
Podoceridae  
Podocerus brasiliensis  
Podocerus cristatus

Podocerus fulanus  
Podocerus sp  
Podochela hemphillii  
Podochela lobifrons  
Podochela sp  
Podocopida  
Podocopina  
Pododesmus macrochisma  
Pododesmus sp  
Poecillastra sp  
Poecillastra tenuilaminaris  
Poecilochaetidae  
Poecilochaetus johnsoni  
Poecilochaetus sp  
Poecilochaetus sp A  
Poecilosclerida  
Poecilostomatoida  
Polinices draconis  
Polinices lewisii  
Polinices sp  
Polyandrocarpa sp  
Polyandrocarpa zorritensis  
Polycera sp  
Polycera tricolor  
Polyceratidae  
Polychaeta  
Polycirrus californicus  
Polycirrus sp  
Polycirrus sp A  
Polycirrus sp I  
Polycirrus sp III  
Polycirrus sp V  
Polycitoridae  
Polycladida  
Polycladida sp 27  
Polycladida sp 43  
Polycladida sp A  
Polycladida sp P  
Polycladida sp R  
Polyclinidae  
Polyclinum planum  
Polyclinum sp  
Polydora biocipitalis  
Polydora cirrosa  
Polydora cornuta  
Polydora heterochaeta  
Polydora limicola



Polydora narica  
Polydora nuchalis  
Polydora sp  
Polygireulima rutila  
Polygireulima sp  
Polygordiidae  
Polygordius sp  
Polynoidae  
Polyodontes panamensis  
Polyodontes sp  
Polyonyx quadriungulatus  
Polyonyx sp  
Polyopthalmus pictus  
Polyopthalmus sp  
Polyplacophora  
Polyschides californicus  
Polyschides sp  
Polyschides tolmiei  
Pontogeneia inermis  
Pontogeneia rostrata  
Pontogeneia sp  
Pontogeneioidea  
Pontoporeioidea  
Poraniidae  
Poraniopsis inflata  
Poraniopsis sp  
Porcellanidae  
Porifera  
Poromyidae  
Poromyoidea  
Portunidae  
Portunus sp  
Portunus xantusii  
Postasterope barnesi  
Postasterope sp  
Potamethus sp  
Potamethus sp A  
Prachynella lodo  
Prachynella sp  
Praxillella gracilis  
Praxillella pacifica  
Praxillella sp  
Praxillura maculata  
Praxillura sp  
Prionospio (Minuspio) lighti  
Prionospio (Minuspio) multibranchiata  
Prionospio (Prionospio) dubia

Prionospio (Prionospio) ehlersi  
Prionospio (Prionospio) heterobranchia  
Prionospio (Prionospio) jubata  
Prionospio sp  
Procampylaspis caenosa  
Procampylaspis sp  
Proceraea sp  
Procerastea sp  
Processa peruviana  
Processa sp  
Processidae  
Proclea sp  
Proclea sp A  
Proneomysis sp  
Proneomysis wailesi  
Propeamussidae  
Prosobranchia  
Prosorhochmidae  
Prosorhochmus albidus  
Prosorhochmus sp  
Prothiostomum latocelis  
Prothiostomum sp  
Prothiostomidae  
Protellidae  
Protobranchia  
Protocirrineris sp  
Protocirrineris sp A  
Protocirrineris sp B  
Protoctenostomata  
Protodorvillea gracilis  
Protodorvillea sp  
Protomedeia articulata  
Protomedeia prudens  
Protomedeia sp  
Protomystides sp  
Protothaca laciniata  
Protothaca sp  
Protothaca staminea  
Protothaca tenerrima  
Prototrygaeus jordanae  
Prototrygaeus sp  
Protula sp  
Protula superba  
Psammobiidae  
Psammodoris sp  
Psammodoris thompsoni  
Pseudarchaster pusillus

Pseudarchaster sp  
Pseudatherospio fauchaldi  
Pseudatherospio sp  
Pseudoceros sp  
Pseudocerotidae  
Pseudocerotoidea  
Pseudochama exogyra  
Pseudochama granti  
Pseudochama sp  
Pseudocnus lubricus  
Pseudocnus sp  
Pseudocoutierea elegans  
Pseudocoutierea sp  
Pseudodoridoidea  
Pseudofabriciola californica  
Pseudofabriciola sp  
Pseudomelatoma penicillata  
Pseudomelatoma sp  
Pseudomelatomidae  
Pseudomma berkeleyi  
Pseudomma californica  
Pseudomma sp  
Pseudopolydora paucibranchiata  
Pseudopolydora sp  
Pseudopotamilla socialis  
Pseudopotamilla sp  
Pseudopotamilla sp 1  
Pseudosabinella bakeri  
Pseudosabinella sp  
Pseudosquillidae  
Pseudosquillopsis marmorata  
Pseudosquillopsis sp  
Pseudostegoidea  
Pseudotanaidae  
Pseudotanais makrothrix  
Pseudotanais sp  
Psolidae  
Psolus chitonoides  
Psolus sp  
Pteriomorphia  
Pterocirrus californiensis  
Pterocirrus montereyensis  
Pterocirrus sp  
Pterocirrus sp A  
Pteropurpura festiva  
Pteropurpura macroptera  
Pteropurpura sp

Pteropurpura trialata  
Pteropurpura vokesae  
Ptilosarcus gurneyi  
Ptilosarcus sp  
Ptychoderidae  
Pugettia dalli  
Pugettia producta  
Pugettia richii  
Pugettia sp  
Pugettia venetiae  
Puncturella cooperi  
Puncturella sp  
Pycnogonida  
Pycnogonidae  
Pycnogonomorpha  
Pycnogonum rickettsi  
Pycnogonum sp  
Pycnogonum stearnsi  
Pycnopodia helianthoides  
Pycnopodia sp  
Pylopagurus holmesi  
Pylopagurus sp  
Pyramidellidae  
Pyramidelloidea  
Pyromaia sp  
Pyromaia tuberculata  
Pyura haustor  
Pyura lignosa  
Pyura mirabilis  
Pyura sp  
Pyuridae  
Randallia bulligera  
Randallia ornata  
Randallia sp  
Raricirrus maculatus  
Raricirrus sp  
Raspailiidae  
Rathbunaster californicus  
Rathbunaster sp  
Renilla kollikeri  
Renilla sp  
Renillidae  
Reptantia  
Retusidae  
Rhabdocoela  
Rhabdocoela sp A  
Rhabdus rectius

Rhabdus sp  
Rhachotropis bernardi  
Rhachotropis distincta  
Rhachotropis sp  
Rhachotropis sp A  
Rhamphidonta retifera  
Rhamphidonta sp  
Rhamphobrachium longisetosum  
Rhamphobrachium sp  
Rhamphostomella sp  
Rhamphostomellidae  
Rhepoxynius abronius  
Rhepoxynius bicuspidatus  
Rhepoxynius daboius  
Rhepoxynius fatigans  
Rhepoxynius heterocuspidatus  
Rhepoxynius lucubrans  
Rhepoxynius menziesi  
Rhepoxynius sp  
Rhepoxynius sp A  
Rhepoxynius stenodes  
Rhepoxynius variatus  
Rhizocaulus sp  
Rhizocaulus verticillatus  
Rhodaliidae  
Rhodine bitorquata  
Rhodine sp  
Rhynchospio glutaea  
Rhynchospio sp  
Rhynocrangon alata  
Rhynocrangon sp  
Rictaxis painei  
Rictaxis punctocaelatus  
Rictaxis sp  
Rimakoroga rima  
Rimakoroga sp  
Rissoidae  
Rochefortia grippi  
Rochefortia sp  
Rochefortia sp A  
Rochefortia sp B  
Rochefortia tumida  
Rocinela angustata  
Rocinela belliceps  
Rocinela sp  
Rossellidae  
Rossia pacifica

Rossia sp  
Rudilemboides sp  
Rudilemboides stenopropodus  
Rutiderma lomae  
Rutiderma rostratum  
Rutiderma rotundum  
Rutiderma sp  
Rutidermatidae  
Sabellariidae  
Sabellida  
Sabellidae  
Sabellides manriquei  
Sabellides sp  
Saccocirridae  
Saccocirrus sp  
Saccoglossus sp  
Saccoglossa  
Sagartia catalinensis  
Sagartia sp  
Sagartiidae  
Samytha californiensis  
Samytha sp  
Sareptidae  
Sarsiella sp  
Sarsiella sp C  
Sarsiellidae  
Saxicavella nybakkeni  
Saxicavella pacifica  
Saxicavella sp  
Saxidomus nuttalli  
Saxidomus sp  
Scabrotrophon grovesi  
Scabrotrophon maltzani  
Scabrotrophon sp  
Scalibregma inflatum  
Scalibregma sp  
Scalibregmatidae  
Scalpellidae  
Scalpellloidea  
Scaphandridae  
Scaphopoda  
Schistocomus hiltoni  
Schistocomus sp  
Schistocomus sp A  
Schisturella cocula  
Schisturella dorotheae  
Schisturella sp

Schisturella tracalero  
Schizasteridae  
Schizocardium sp  
Schizoporella sp  
Schizoporellidae  
Schmittius politus  
Schmittius sp  
Scionella japonica  
Scionella sp  
Scissurellidae  
Scissurelloidea  
Scleractinia  
Sclerasterias heteropaes  
Sclerasterias sp  
Scleroconcha sp  
Scleroconcha trituberculata  
Sclerodactylidae  
Scleroplax granulata  
Scleroplax sp  
Scolanthus sp  
Scolanthus sp A  
Scolelepis occidentalis  
Scolelepis sp  
Scolelepis sp 1  
Scolelepis squamata  
Scolelepis tridentata  
Scoletoma tetraura Cmplx  
Scoletoma sp  
Scoloplos acmeceps  
Scoloplos acmeceps profundus  
Scoloplos armiger Cmplx  
Scoloplos sp  
Scoloura phillipsi  
Scoloura sp  
Scopularia  
Scrupocellaria diegensis  
Scrupocellaria ferox  
Scrupocellaria sp  
Scutellina  
Scycettida  
Scyphoproctus oculatus  
Scyphoproctus sp  
Scyra acutifrons  
Scyra sp  
Semele decisa  
Semele rubropicta  
Semele sp

Semele venusta  
Semelidae  
Sepioidea  
Sepiolidae  
Septibranchida  
Sergestes similis  
Sergestes sp  
Sergestidae  
Sergestoidea  
Serolidae  
Seroloidea  
Serpulidae  
Sertularella pedrensis  
Sertularella sp  
Sertulariidae  
Sessiliflorae  
Sicyonia disedwardsi  
Sicyonia ingentis  
Sicyonia penicillata  
Sicyonia sp  
Sicyoniidae  
Sigalion sp  
Sigalion spinosus  
Sigalionidae  
Sigambra sp  
Sigambra tentaculata  
Sige sp  
Sige sp A  
Sige sp B  
Siliqua lucida  
Siliqua sp  
Simomactra falcata  
Simomactra planulata  
Simomactra sp  
Sinelobus sp  
Sinelobus stanfordi  
Sinum scopulosum  
Sinum sp  
Siphonodentaliidae  
Siphonodentalium quadrifissatum  
Siphonodentalium sp  
Siphonolabrum californiensis  
Siphonolabrum sp  
Siphonophora  
Siphonosoma ingens  
Siphonosoma sp  
Sipuncula



Sipunculidae  
Sipunculidea  
Sipunculiformes  
Sipunculus nudus  
Sipunculus sp  
Siriella pacifica  
Siriella sp  
Smittina sp  
Smittinidae  
Socarnes hartmani  
Socarnes sp  
Socarnoides illudens  
Socarnoides sp  
Solamen columbianum  
Solamen sp  
Solariella nuda  
Solariella peramabilis  
Solariella sp  
Solecurtidae  
Solecurtus guaymasensis  
Solecurtus sp  
Solemya reidi  
Solemya sp  
Solemyidae  
Solemyoidea  
Solemyoidea  
Solen rostriformis  
Solen sicarius  
Solen sp  
Solenidae  
Solenocera mutator  
Solenocera sp  
Solenoceridae  
Solenoidea  
Solitaria  
Sosane occidentalis  
Sosane sp  
Sosanopsis sp  
Sosanopsis sp A  
Spatangidae  
Spatangoida  
Spatangus californicus  
Spatangus sp  
Spengeliidae  
Sphaerephesia longisetis  
Sphaerephesia similisetis  
Sphaerephesia sp

Sphaerodoridae  
Sphaerodoridium sp  
Sphaerodoridium sp A  
Sphaerodoropsis minuta  
Sphaerodoropsis sp  
Sphaerodoropsis sphaerulifer  
Sphaerodorum papillifer  
Sphaerodorum sp  
Sphaeromatidae  
Sphaerosyllis bilineata  
Sphaerosyllis californiensis  
Sphaerosyllis ranunculus  
Sphaerosyllis sp  
Spheciospongia confoederata  
Spheciospongia sp  
Sphenia luticola  
Sphenia sp  
Spinosphaera oculata  
Spinosphaera sp  
Spinosphaera sp SD1  
Spinulosida  
Spio filicornis  
Spio maciolekae  
Spio maculata  
Spio sp  
Spiochaetopterus costarum  
Spiochaetopterus sp  
Spionida  
Spionidae  
Spioniformia  
Spiophanes berkeleyorum  
Spiophanes bombyx  
Spiophanes duplex  
Spiophanes fimbriata  
Spiophanes sp  
Spiophanes wigleyi  
Spiophanicola sp  
Spiophanicola spinulosus  
Spiophanicolidae  
Spirastrellidae  
Spirontocaris holmesi  
Spirontocaris lamellicornis  
Spirontocaris prionota  
Spirontocaris sica  
Spirontocaris snyderi  
Spirontocaris sp  
Spirophorida

Spirorbidae  
Spirorbis sp  
Spirularia  
Squillidae  
Squilloidea  
Staurocalyptus solidus  
Staurocalyptus sp  
Stegocephalidae  
Stegocephaloidea  
Stegocephalus hancocki  
Stegocephalus sp  
Stelletta clarella  
Stelletta sp  
Stellettidae  
Stenolaemata  
Stenopleustes monocuspis  
Stenopleustes sp  
Stenothoe estacola  
Stenothoe frecanda  
Stenothoe sp  
Stenothoidae  
Stenothoides bicoma  
Stenothoides burbanki  
Stenothoides sp  
Stenula modosa  
Stenula sp  
Stephanauge annularis  
Stephanauge sp  
Stephanauge sp A  
Sternaspida  
Sternaspidae  
Sternaspis fossor  
Sternaspis sp  
Sterobalanus sp  
Sthenelais berkeleyi  
Sthenelais fusca  
Sthenelais sp  
Sthenelais tertiaglabra  
Sthenelais verruculosa  
Sthenelanella sp  
Sthenelanella uniformis  
Stichopodidae  
Stolidobranchiata  
Stolonata  
Stolonifera  
Stomatopoda  
Streblosoma crassibranchia

Streblosoma sp  
Streblosoma sp B  
Streptosyllis sp  
Strongylocentrotidae  
Strongylocentrotus franciscanus  
Strongylocentrotus purpuratus  
Strongylocentrotus sp  
Styela coriacea  
Styela gibbsii  
Styela montereyensis  
Styela plicata  
Styela sp  
Styela truncata  
Styelidae  
Stylactis sp  
Stylasterias forreri  
Stylasterias sp  
Stylatula elongata  
Stylatula sp  
Stylatula sp A  
Stylochidae  
Stylochoidea  
Stylochoplana longipenis  
Stylochoplana sp  
Stylochus californicus  
Stylochus franciscanus  
Stylochus sp  
Stylochus tripartitus  
Stylostomum sp  
Subadyte mexicana  
Subadyte sp  
Suberites sp  
Suberites suberea  
Suberitidae  
Subselliflorae  
Sulcoretusa sp  
Sulcoretusa xystrum  
Swiftia sp  
Syllidae  
Syllides japonica  
Syllides longocirrata  
Syllides mikeli  
Syllides minutus  
Syllides reishi  
Syllides sp  
Syllis (Ehlersia) heterochaeta  
Syllis (Ehlersia) hyperioni

Syllis (Syllis) elongata  
Syllis (Syllis) gracilis  
Syllis (Syllis) spongiphila  
Syllis (Typosyllis) farallonensis  
Syllis sp  
Sympagurus haigae  
Sympagurus sp  
Synaptidae  
Synaptotanaïs notabilis  
Synaptotanaïs sp  
Synchelidium rectipalmum  
Synchelidium shoemakeri  
Synchelidium sp  
Syncoryne eximia  
Syncoryne sp  
Synidotea calcarea  
Synidotea magnifica  
Synidotea media  
Synidotea sp  
Synnotum aegyptiacum  
Synnotum sp  
Synopiidae  
Synopioidea  
Syrrhoe longifrons  
Syrrhoe sp  
Syrrhoe sp A  
Tagelus affinis  
Tagelus sp  
Tagelus subteres  
Taliepus nuttallii  
Taliepus sp  
Talitroidea  
Tanaella propinquus  
Tanaella sp  
Tanaidacea  
Tanaidae  
Tanaidoidea  
Tanaidomorpha  
Tanaopsis cadieni  
Tanaopsis sp  
Tanystylidae  
Tanystylum californicum  
Tanystylum sp  
Tectidrilus diversus  
Tectidrilus profusus  
Tectidrilus sp  
Tegella aquilirostris

Tegella circumclathrata  
Tegella sp  
Tegula aureotincta  
Tegula sp  
Teinostoma sp  
Teinostoma supravallatum  
Telesto sp  
Tellina bodegensis  
Tellina carpenteri  
Tellina idae  
Tellina meropsis  
Tellina modesta  
Tellina nukuloides  
Tellina sp  
Tellina sp A  
Tellinidae  
Tellinoidea  
Temnopleuroidea  
Tenonia priops  
Tenonia sp  
Terebellida  
Terebellidae  
Terebellides californica  
Terebellides reishi  
Terebellides sp  
Terebellides sp Type C  
Terebellides sp Type D  
Terebra hemphilli  
Terebra pedroana  
Terebra sp  
Terebratalia occidentalis  
Terebratalia sp  
Terebratulidina  
Terebratelloidea  
Terebratulida  
Terebratulidina  
Terebratulina crosseii  
Terebratulina sp  
Terebridae  
Tergipedidae  
Tergipedoidea  
Tethya aurantium  
Tethya sp  
Tethygeneia opata  
Tethygeneia sp  
Tethyidae  
Tethyidae

Tetilla arb  
Tetilla sp  
Tetillidae  
Tetractinomorpha  
Tetrastemma candidum  
Tetrastemma nigrifrons  
Tetrastemma reticulatum  
Tetrastemma signifer  
Tetrastemma sp  
Tetrastemma sp A  
Tetrastemmatidae  
Teuthoidea  
Thalamoporella californica  
Thalamoporella sp  
Thalamoporellidae  
Thalassematidae  
Thalassinidea  
Thecatae  
Thelepus hamatus  
Thelepus setosus  
Thelepus sp  
Theora lubrica  
Theora sp  
Thesea sp  
Thesea sp B  
Thespesiopsyllidae  
Thoracica  
Thorlaksonius depressus  
Thorlaksonius platypus  
Thorlaksonius sp  
Thracia curta  
Thracia sp  
Thracia trapezoides  
Thraciidae  
Thracioidea  
Thuiaria cylindrica  
Thuiaria sp  
Thyasira flexuosa  
Thyasira sp  
Thyasiridae  
Thysanocardia nigra  
Thysanocardia sp  
Tiburonella sp  
Tiburonella viscana  
Timarete luxuriosa  
Timarete sp  
Tindaria sp

Tindariidae  
Tiron biocellata  
Tiron sp  
Tiron tropakis  
Tivela sp  
Tivela stultorum  
Tochuina sp  
Tochuina tetraquetra  
Tonnoidea  
Toxopneustidae  
Trachycardium quadragenarium  
Trachycardium sp  
Travisia brevis  
Travisia gigas  
Travisia pupa  
Travisia sp  
Tresus nuttallii  
Tresus sp  
Tricellaria occidentalis  
Tricellaria praescuta  
Tricellaria sp  
Trichobranchidae  
Tridentella quinicornis  
Tridentella sp  
Tridentellidae  
Trigonulina pacifica  
Trigonulina sp  
Trikentrion flabelliformis  
Trikentrion sp  
Triopha catalinae  
Triopha maculata  
Triopha sp  
Triphoroidea  
Tritella pilimana  
Tritella sp  
Triticella elongata  
Triticella sp  
Triticellidae  
Tritonia diomedea  
Tritonia festiva  
Tritonia sp  
Tritoniidae  
Trivia californiana  
Trivia ritteri  
Trivia sp  
Triviidae  
Trochidae



Trochina  
Trochochaeta multisetosa  
Trochochaeta sp  
Trochochaetidae  
Trochoidea  
Trombidiformes  
Truncatellidae  
Tubificidae  
Tubificoides bakeri  
Tubificoides sp  
Tubulanidae  
Tubulanidae sp A  
Tubulanus albocinctus  
Tubulanus capistratus  
Tubulanus cingulatus  
Tubulanus frenatus  
Tubulanus nothus  
Tubulanus polymorphus  
Tubulanus sp  
Tubularia crocea  
Tubularia sp  
Tubulariidae  
Tubularoidea  
Tubulipora sp  
Tubulipora tuba  
Tubuliporidae  
Tubuliporina  
Turbellaria  
Turbinellidae  
Turbinidae  
Turbonilla almo  
Turbonilla castanea  
Turbonilla chocolata  
Turbonilla diegensis  
Turbonilla kelseyi  
Turbonilla nuttingi  
Turbonilla raymondi  
Turbonilla regina  
Turbonilla santarosana  
Turbonilla sp  
Turbonilla sp A  
Turbonilla tenuicula  
Turridae  
Turritella cooperi  
Turritella sp  
Turritellidae  
Typhlotanaidae

Typhlotanais crassus  
Typhlotanais sp  
Typhlotanais williamsi  
uncertain  
Ungulinidae  
Upogebia lepta  
Upogebia macginitieorum  
Upogebia sp  
Upogebiidae  
Urechidae  
Urechis caupo  
Urechis sp  
Uristes entalladurus  
Uristes sp  
Urochordata  
Uromunna sp  
Uromunna ubiquita  
Urothoe sp  
Urothoe varvarini  
Urothoidae  
Urticina sp  
Valenciniidae  
Valkerioidea  
Valvatacea  
Valvatida  
Valvifera  
Vanikoridae  
Vanikoroidea  
Vargula sp  
Vargula tsujii  
Vaunthompsonia pacifica  
Vaunthompsonia sp  
Vellendoidea  
Veneridae  
Veneroida  
Veneroidea  
Venerupis philippinarum  
Venerupis sp  
Vermetidae  
Vermetoidea  
Vermiliopsis infundibulum  
Vermiliopsis sp  
Verticordiidae  
Verticordioidea  
Vesiculariidae  
Vesicularoidea  
Vetigastropoda

Virgularia bromleyi	
Virgularia galapagensis	
Virgularia sp	
Virgulariidae	
Vitreolina columbiana	
Vitreolina macra	
Vitreolina sp	
Vitrinella berryi	
Vitrinella oldroydi	
Vitrinella sp	
Vitrinellidae	
Volutoidea	
Volvulella californica	
Volvulella catharia	
Volvulella cylindrica	
Volvulella panamica	
Volvulella sp	
Westwoodilla caecula	
Westwoodilla sp	
Xanthidae	
Xenoleberis californica	
Xenoleberis sp	
Xenopneusta	
Xylophaga sp	
Xylophaga washingtona	
Yoldia cooperii	
Yoldia seminuda	
Yoldia sp	
Ysideria hastata	
Ysideria sp	
Zaolutus actius	
Zaolutus sp	
Zeuxo normani	
Zeuxo sp	
Zoantharia	
Zoanthidea	
Zygeupolia rubens	
Zygeupolia sp	
Zygonemertes sp	
Zygonemertes virescens	
Clevelandia ios	arrow goby
Sebastes aurora	aurora rockfish
Zapteryx exasperata	banded guitarfish
Sebastes rufus	bank rockfish
Syngnathus exilis	barcheek pipefish
Paralabrax nebulifer	barred sand bass
Amphistichus argenteus	barred surfperch

Ophidion scrippsae	basketweave cusk-eel
Myliobatis californica	bat ray
Lepidogobius lepidus	bay goby
Syngnathus leptorhynchus	bay pipefish
Lyconema barbatum	bearded eelpout
Raja binoculata	big skate
Bathyagonus pentacanthus	bigeye poacher
Lycodes cortezianus	bigfin eelpout
Hippoglossina stomata	bigmouth sole
Cheilotrema saturnum	black croaker
Lycodes diapterus	black eelpout
Eptatretus deani	black hagfish
Embiotoca jacksoni	black perch
Stomias atriventer	blackbelly dragonfish
Lycodopsis pacifica	blackbelly eelpout
Coryphopterus nicholsii	blackeye goby
Sebastes melanostomus	blackgill rockfish
Lycodapus fierasfer	blackmouth eelpout
Chromis punctipinnis	blacksmith
Careproctus melanurus	blacktail snailfish
Xeneretmus latifrons	blacktip poacher
Sebastes mystinus	blue rockfish
Lythrypnus dalli	bluebanded goby
Plectobranhus evides	bluebarred prickleback
Xeneretmus triacanthus	bluespotted poacher
Sebastes paucispinis	bocaccio
Artedius notospilotus	bonehead sculpin
Apristurus brunneus	brown cat shark
Sebastes auriculatus	brown rockfish
Mustelus henlei	brown smoothhound
Enophrys taurina	bull sculpin
Pleuronectes isolepis	butter sole
Pleuronichthys coenosus	C-O sole
Scorpaenichthys marmoratus	cabezon
Sebastes dallii	calico rockfish
Gymnura marmorata	California butterfly ray
Gobiesox rhessodon	California clingfish
Menticirrhus undulatus	California corbina
Nezumia stelgidolepis	California grenadier
Paralichthys californicus	California halibut
Diaphus theta	California headlightfish
Synodus lucioceps	California lizardfish
Scorpaena guttata	California scorpionfish
Semicossyphus pulcher	California sheephead
Raja inornata	California skate
Alepocephalus tenebrosus	California slickhead
Symphurus atricauda	California tonguefish

Sebastes pinniger	canary rockfish
Gnathophis catalinensis	Catalina conger
Sebastes goodei	chilipepper
Scomber japonicus	chub mackerel
Sebastes caurinus	copper rockfish
Sebastes levis	cowcod
Pleuronichthys decurrens	curlfin sole
Sebastes crameri	darkblotched rockfish
Radulinus boleoides	darter sculpin
Anchoa compressa	deepbody anchovy
Embassichthys bathybius	deepsea sole
Cryptotrema corallinum	deepwater blenny
Hypsopsetta guttulata	diamond turbot
Facciolella gilbertii	dogface witch-eel
Microstomus pacificus	Dover sole
Micrometrus minimus	dwarf perch
Pleuronectes vetulus	English sole
Xystreureys liolepis	fantail sole
Parmaturus xaniurus	filetail catshark
Sebastes rubrivinctus	flag rockfish
Icelinus fimbriatus	fringed sculpin
Icelinus oculatus	frogmouth sculpin
Heterostichus rostratus	giant kelpfish
Stereolepis gigas	giant sea bass
Sebastes carnatus	gopher rockfish
Sebastes rastrelliger	grass rockfish
Mustelus californicus	gray smoothhound
Sebastes rosenblatti	greenblotched rockfish
Sebastes chlorostictus	greenspotted rockfish
Sebastes elongatus	greenstriped rockfish
Rhamphocottus richardsonii	grunt sculpin
Citharichthys fragilis	gulf sanddab
Sebastes semicinctus	halfbanded rockfish
Medialuna californiensis	halfmoon
Sebastes umbrosus	honeycomb rockfish
Heterodontus francisci	horn shark
Pleuronichthys verticalis	hornyhead turbot
Physiculus rastrelliger	hundred-fathom codling
Alloclinus holderi	island kelpfish
Trachurus symmetricus	jack mackerel
Atherinopsis californiensis	jacksmelt
Paralabrax clathratus	kelp bass
Hexagrammos decagrammus	kelp greenling
Ulvicola sanctaerosae	kelp gunnel
Brachyistius frenatus	kelp perch
Syngnathus californiensis	kelp pipefish
Leiocottus hirundo	lavender sculpin

Triakis semifasciata	leopard shark
Gobiesox eugrammus	lined clingfish
Ophiodon elongatus	lingcod
Citharichthys xanhostigma	longfin sanddab
Raja rhina	longnose skate
Zaniolepis latipinnis	longspine combfish
Sebastolobus altivelis	longspine thornyhead
Argyropelecus sladeni	lowcrest hatchetfish
Prionotus stephanophrys	lumptail searobin
Icichthys lockingtoni	medusafish
Triphoturus mexicanus	Mexican lampfish
Sebastes macdonaldi	Mexican rockfish
Melanostigma pammelas	midwater eelpout
Engraulis mordax	northern anchovy
Stenobranchius leucopsarus	northern lampfish
Agonopsis vulsa	northern spearnose poacher
Caulolatilus princeps	ocean whitefish
Sebastes serranoides	olive rockfish
Neoclinus uninotatus	onespot fringehead
Girella nigricans	opaleye
Squatina californica	Pacific angel shark
Argentina sialis	Pacific argentine
Sarda chiliensis	Pacific bonito
Torpedo californica	Pacific electric ray
Eptatretus stoutii	Pacific hagfish
Merluccius productus	Pacific hake
Sebastes alutus	Pacific ocean perch
Peprilus simillimus	Pacific pompano
Citharichthys sordidus	Pacific sanddab
Sardinops sagax	Pacific sardine
Lepidopus fitchi	Pacific scabbardfish
Leptocottus armatus	Pacific staghorn sculpin
Oxylebius pictus	painted greenling
Lycodapus mandibularis	pallid eelpout
Apodichthys flavidus	penpoint gunnel
Eucryphycus californicus	persimmon eelpout
Eopsetta jordani	petrale sole
Paraliparis albescens	phantom snailfish
Rhacochilus vacca	pile perch
Sebastes eos	pink rockfish
Zalembeus rosaceus	pink seaperch
Sebastes simulator	pinkrose rockfish
Icelinus cavifrons	pit-head sculpin
Porichthys notatus	plainfin midshipman
Stellerina xyosterna	pricklebreast poacher
Odontopyxis trispinosa	pygmy poacher
Sebastes wilsoni	pygmy rockfish

Seriphus politus	queenfish
Hypsurus caryi	rainbow seaperch
Brosmophycis marginata	red brotula
Sebastes babcocki	redbanded rockfish
Errex zachirus	rex sole
Bathylagus milleri	robust blacksmelt
Pleuronectes bilineatus	rock sole
Halichoeres semicinctus	rock wrasse
Sebastes rosaceus	rosy rockfish
Rathbunella alleni	rough ronquil
Chitonotus pugetensis	roughback sculpin
Etrumeus teres	round herring
Urolophus halleri	round stingray
Zalieutes elator	roundel batfish
Rhacochilus toxotes	rubberlip seaperch
Cataetyx rubrirostris	rubynose brotula
Anoplopoma fimbria	sablefish
Xenistius californiensis	salema
Psettichthys melanostictus	sand sole
Bathyraja interrupta	sandpaper skate
Neoclinus blanchardi	sarcastic fringehead
Artedius harringtoni	scalyhead sculpin
Oxyjulis californica	senorita
Sebastes zacentrus	sharpchin rockfish
Phanerodon atripes	sharpnose seaperch
Cymatogaster aggregata	shiner perch
Sebastes jordani	shortbelly rockfish
Zaniolepis frenata	shortspine combfish
Sebastolobus alascanus	shortspine thornyhead
Caelorinchus scaphopsis	shoulderspot grenadier
Rhinobatos productus	shovelnose guitarfish
Macroramphosus gracilis	slender snipefish
Eopsetta exilis	slender sole
Radulinus asprellus	slim sculpin
Liparis mucosus	slimy snailfish
Anchoa delicatissima	slough anchovy
Nezumia liolepis	smooth grenadier
Kathetostoma avarruncus	smooth stargazer
Xeneretmus leiops	smootheye poacher
Artedius lateralis	smoothhead sculpin
Orthonopias triacis	snubnose sculpin
Agonopsis sterletus	southern spearnose poacher
Sebastes ovalis	speckled rockfish
Citharichthys stigmaeus	speckled sanddab
Porichthys myriaster	specklefin midshipman
Squalus acanthias	spiny dogfish
Sebastes diploproa	splitnose rockfish

Bellator xenisma	splitnose searobin
Roncador stearnsii	spotfin croaker
Icelinus tenuis	spotfin sculpin
Hyperprosopon anale	spotfin seaperch
Chilara taylori	spotted cusk-eel
Gibbonsia elegans	spotted kelpfish
Hydrolagus colliei	spotted ratfish
Paralabrax maculatofasciatus	spotted sand bass
Pleuronichthys ritteri	spotted turbot
Sebastes hopkinsi	squarespot rockfish
Platichthys stellatus	starry flounder
Sebastes constellatus	starry rockfish
Raja stellulata	starry skate
Gibbonsia metzi	striped kelpfish
Embiotoca lateralis	striped seaperch
Rathbunella hypoplecta	stripedfin ronquil
Xeneretmus ritteri	stripefin poacher
Sebastes saxicola	stripetail rockfish
Cephaloscyllium ventriosum	swell shark
Sebastes ensifer	swordspine rockfish
Platyrrhinoidis triseriata	thornback
Pronotogrammus multifasciatus	threadfin bass
Icelinus filamentosus	threadfin sculpin
Atherinops affinis	topsmelt
Sebastes serriceps	treefish
Aulorhynchus flavidus	tube-snout
Bothrocara brunneum	twoline eelpout
Sebastes miniatus	vermilion rockfish
Hyperprosopon argenteum	walleye surfperch
Genyonemus lineatus	white croaker
Atractoscion nobilis	white seabass
Phanerodon furcatus	white seaperch
Poroclinus rothrocki	whitebarred prickleback
Anarrhichthys ocellatus	wolf-eel
Ophichthus zophochir	yellow snake eel
Icelinus quadriseriatus	yellowchin sculpin
Umbrina roncador	yellowfin croaker
Sebastes flavidus	yellowtail rockfish
Lythrypnus zebra	zebra goby

#### **List 11. Benthic Species Groups**

##### **Group**

Ophiuroidea  
Echinodermata  
Mollusca



Annilida  
Crustacea  
Other

### **List 12. Fish Tissue Codes**

<u>Common Name</u>	<u>Scientific Name</u>
Category I	
Longfin sanddab	<i>Citharichthys xanhostigma</i>
Pacific sanddab	<i>Citharichthys sordidus</i>
Gulf sanddab	<i>Citharichthys fragilis</i>
Speckled sanddab	<i>Citharichthys stigmaeus</i>
Slender sole	<i>Eopsetta exilis</i>
California halibut (<20 cm)	<i>Paralichthys californicus</i>
Petrale sole (<20 cm)	<i>Eopsetta jordani</i>
Category II	
Diamond turbot	<i>Hypsopsetta guttulata</i>
Spotted turbot	<i>Pleuronichthys ritteri</i>
C-O sole	<i>Pleuronichthys coenosus</i>
Hornyhead turbot	<i>Pleuronichthys decurrens</i>
Dover sole	<i>Microstomus pacificus</i>
English sole	<i>Pleuronectes vetulus</i>
Rock sole	<i>Pleuronectes bilineatus</i>

### **List 13. Qualifier Codes**

<b>Qualifier</b>	<b>Description</b>
>	greater than
<	less than
ND	Not Detected
NA	Not Analyzed
NS	Not Sampled
P	Present, not counted
A	Count base on calculation of Aliquot

### **List 14. Debris Types**

<b>DebrisCode</b>	<b>DebrisType</b>
A	Rocks
B	Terrestrial Vegetation
C	Marine Vegetation
D	Lumber
E	Plastic

F	Metal Debris
G	Paper
H	Medical Waste
I	Cans
J	Glass Bottles
K	Fishing Gear
L	Tires
M	Other
N	Benthic Debris

**List 15. Debris Abundance Codes**

Code	Description	Estimate
P	Present	1
L	Low	1 to 10
M	Moderate	11-100
H	High	>100

**List 16. Debris Weight Estimates**

Code	Description	Estimate
T	Trace	0.0-0.1Kg
L	Low	0.2-1.0Kg
M	Moderate	1.1-10Kg
H	High	>10Kg

**List 17. Fish Bioaccumulation Test Material**

TestMaterialCode	TestMaterialName
MU	Muscle
LG	Liver/Gall
BL	Blood

**List 18. Chemical Parameter Codes**

Odes Code	Target Analytes	Proposed Code
ALUMINUM	Aluminum	
ANTIMONY	Antimony	
ARSENIC	Arsenic	
BARIUM	Barium	
BERYLLIUM	Beryllium	
CADMIUM	Cadmium	

CHROMIUM-T	Chromium
COPPER	Copper
IRON	Iron
LEAD	Lead
MERCURY	Mercury
NICKEL	Nickel
SELENIUM	Selenium
SILVER	Silver
ZINC	Zinc
NAPHTHALENE	Naphthalene
2-METHNAP	2-Methylnaphthalene
1-MPHENAH	1-Methylnaphthalene
BIPHENYL	Biphenyl
26-2MNAP	2,6-Dimethylnaphthalene
ACENAPTYLE	Acenaphthylene
ACENAPE	Acenaphthene
167-3MNAP	1,6,7-Trimethylnaphthalene
FLUORENE	Fluorene
PHENANTHRN	Phenanthrene
ANTHRACENE	Anthracene
1-MPHENAH	1-Methylphenanthrene
FLUORANTHN	Fluoranthene
PYRENE	Pyrene
BAA	Benz[a]anthracene
CHRYSENE	Chrysene
BAF	Benzo[b]fluoranthene
BKF	Benzo[k]fluoranthene
BEP	Benzo[e]pyrene
BAP	Benzo[a]pyrene
PERYLENE	Perylene
ICDP	Indeno(1,2,3-c,d)pyrene
2BANTH	Dibenz[a,h]anthracene
BGHIP	Benzo[g,h,i]perylene
PCB18	PCB 18
PCB28	PCB 28
PCB37	PCB 37
PCB44	PCB 44
PCB49	PCB 49
PCB52	PCB 52
PCB66	PCB 66
PCB70	PCB 70
PCB74	PCB 74
PCB77	PCB 77
PCB81	PCB 81
PCB87	PCB 87
PCB99	PCB 99

PCB101	PCB 101
PCB105	PCB 105
PCB110	PCB 110
PCB114	PCB 114
PCB118	PCB 118
PCB119	PCB 119
PCB123	PCB 123
PCB126	PCB 126
PCB128	PCB 128
PCB138	PCB 138
PCB149	PCB 149
PCB151	PCB 151
PCB153	PCB 153
PCB156	PCB 156
PCB157	PCB 157
PCB158	PCB 158
PCB167	PCB 167
PCB168	PCB 168
PCB169	PCB 169
PCB170	PCB 170
PCB177	PCB 177
PCB180	PCB 180
PCB183	PCB 183
PCB187	PCB 187
PCB189	PCB 189
PCB195	PCB 194
PCB201	PCB 201
PCB209	PCB 206
PP DDT	4,4'-DDT
OP DDT	2,4'-DDT
PP DDD	4,4'-DDD
OP DDD	2,4'-DDD
PP DDE	4,4'-DDE
OP DDE	2,4'-DDE
CHLORDANE	Chlordane
DIELDRIN	Dieldrin
	Lindane

5-phenyldecane	C10LAB-5
4-phenyldecane	C10LAB-4
3-phenyldecane	C10LAB-3
2-phenyldecane	C10LAB-2
6-phenylundecane	C11LAB-6
5-phenylundecane	C11LAB-5
4-phenylundecane	C11LAB-4
3-phenylundecane	C11LAB-3
2-phenylundecane	C11LAB-2

6-phenyldodecane	C12LAB-6
5-phenyldodecane	C12LAB-5
4-phenyldodecane	C12LAB-4
3-phenyldodecane	C12LAB-3
2-phenyldodecane	C12LAB-2
7&6-phenyltridecane	C13LAB-7/6
5-phenyltridecane	C13LAB-5
4-phenyltridecane	C13LAB-4
3-phenyltridecane	C13LAB-3
2-phenyltridecane	C13LAB-2
7-phenyltetradecane	C14LAB-7
6-phenyltetradecane	C14LAB-6
5-phenyltetradecane	C14LAB-5
4-phenyltetradecane	C14LAB-4
3-phenyltetradecane	C14LAB-3
2-phenyltetradecane	C14LAB-2

TOC	TOC	
	Lipid	LIPID

#### **List 19. QA Codes**

<b>Code</b>	<b>Description</b>
E	Estimated Value
Q	Questionable Data
D	Lab Contamination

#### **List 20. Sediment Toxicity Species**

<b>SpeciesCode</b>	<b>SpeciesName</b>
EE	Eohaustorius estuarius
VF	Vibrio fisheri
GP	Gonyaulax polyedra
PL	Pyrocystis lunula
HEPG2	RGS cell line
PF	Pyrocystis fusiformis

#### **List 21. Sediment Toxicity Protocol**

<b>ProtocolCode</b>	<b>ProtocolDescription</b>
EPA 1994	EPA amphipod test method (EPA/600/R-94/025)
QLB 1996	QwikLite Basics 1996
Microbics 1992	Microbics Corp. 1992
ASTM 1853	ASTM. 1997. E 1853-96

**List 22. Sediment Toxicity Matrix**

<b>MatrixCode</b>	<b>MatrixDescription</b>
BS	bulk sediment
IW	interstitial water
EL	elutriate
EX	extract
OL	overlying water
RT	reference toxicant

**List 23. Sediment Toxicity End Points**

<b>EPCode</b>	<b>EndPoint</b>
SP	survial percent
RL	relative luminescence
B[a]Peq	Benzo [a] Pyrene equivalents
EC50	median effective concentration
IC50	median inhibitory concentration

**List 24. Sediment Toxicity Water Quality**

<b>STWQCode</b>		<b>STWQName</b>	<b>Units</b>
DO	Dissolved Oxygen	mg/L	
PH	pH	pH	
SAL	Salinity	g/L	
TEMP	Temperature	C	
NH3T	Total Ammonia	mg/L	
ST	Total Sulfide	ug/L	
NH3U	Unionized Ammonia	mg/L	
H2S	Hydrogen Sulfide	mg/L	

**List 25. Toxicity Test Acceptability Codes**

<b>AcceptCode</b>	<b>CodeDescription</b>
A	Acceptable data for analysis
C	Reduced number of replicates
D	Control performance criteria not met
E	Sample stored > 14 days
G	Reference test missing or outside limits
H	Water quality data incomplete
J	Minor deviation in test conditions

**List 26. Sediment Colors**

**Color**

Olive Green

Brown

Black

Red

Gray

**List 27. Biomarker Fish Maturity Codes**

<b>MaturityCode</b>	<b>MaturityState</b>
U	Unidentifiable
MM	Male Mature
FM	Female Mature
MI	Male Immature
FI	Female Immature

**List 28. Biomarker Analysis Methods**

<b>AnalysisCode</b>	<b>Method</b>
FACS	Fluorescent Aromatic Compounds
Comet	Steinert 1996

**List 29. Biomarker Parameters**

**Parameter**

Protein

NPH

PHN

BAP

OI

TM

**List 30. Biomarker Units**

**Units**

mg protein/ml bile

ng equivalents/ml bile

um

**List 31. Fish Anomaly Codes**

<b>Code</b>	<b>Anomaly</b>
A	Ambicoloration

B	Albinism
D	Deformity (Skeletal)
F	Fin Erosion
L	Lesion
P	Parasite
T	Tumor
AB	Ambicoloration/Albinism
AD	Ambicoloration/Deformity (Skeletal)
AF	Ambicoloration/Fin Erosion
AL	Ambicoloration/Lesion
AP	Ambicoloration/Parasite
AT	Ambicoloration/Tumor
BD	Albinism/Deformity (Skeletal)
BF	Albinism/Fin Erosion
BL	Albinism/Lesion
BP	Albinism/Parasite
BT	Albinism/Tumor
DF	Deformity (Skeletal)/Fin Erosion
DL	Deformity (Skeletal)/Lesion
DP	Deformity (Skeletal)/Parasite
DT	Deformity (Skeletal)/Tumor
FL	Fin Erosion/Lesion
FP	Fin Erosion/Parasite
FT	Fin Erosion/Tumor
LP	Lesion/Parasite
LT	Lesion/Tumor
PT	Parasite/Tumor
ABD	Ambicoloration/Albinism/Deformity (Skeletal)
ABF	Ambicoloration/Albinism/Fin Erosion
ABL	Ambicoloration/Albinism/Lesion
ABP	Ambicoloration/Albinism/Parasite
ABT	Ambicoloration/Albinism/Tumor
ADF	Ambicoloration/Deformity (Skeletal)/Fin Erosion
ADL	Ambicoloration/Deformity (Skeletal)/Lesion
ADP	Ambicoloration/Deformity (Skeletal)/Parasite
ADT	Ambicoloration/Deformity (Skeletal)/Tumor
AFL	Ambicoloration/Fin Erosion/Lesion
AFP	Ambicoloration/Fin Erosion/Parasite
AFT	Ambicoloration/Fin Erosion/Tumor
ALP	Ambicoloration/Lesion/Parasite
ALT	Ambicoloration/Lesion/Tumor
APT	Ambicoloration/Parasite/Tumor
BDF	Albinism/Deformity (Skeletal)/Fin Erosion
BDL	Albinism/Deformity (Skeletal)/Lesion
BDP	Albinism/Deformity (Skeletal)/Parasite
BDT	Albinism/Deformity (Skeletal)/Tumor
BFL	Albinism/Fin Erosion/Lesion



BFP	Albinism/Fin Erosion/Parasite
BFT	Albinism/Fin Erosion/Tumor
DFL	Deformity (Skeletal)/Fin Erosion/Lesion
DFP	Deformity (Skeletal)/Fin Erosion/Parasite
DFT	Deformity (Skeletal)/Fin Erosion/Tumor
DLP	Deformity (Skeletal)/Lesion/Parasite
DLT	Deformity (Skeletal)/Lesion/Tumor
DPT	Deformity (Skeletal)/Parasite/Tumor
FLP	Fin Erosion/Lesion/Parasite
FLT	Fin Erosion/Lesion/Tumor
FPT	Fin Erosion/Parasite/Tumor
LPT	Lesion/Parasite/Tumor

**List 32. Invertebrate Anomaly Codes**

Anomaly Code	Anomaly
P	Parasite
U	Burnspot Disease
PU	Burnspot Disease/Parasite

**List 33. Chemistry Analysis Method Codes**

MethodCode	Method
CHN	EA1108 CHN Elemental Analyzer
GCECD	CG/ECD
GCMS	GS/MS
IONGCMS	Ion Trap GC/MS
FAA	Flame Atomic Absorption Spectrometer
GFAA	Graphite Furnace Atomic Absorption Analysis
CVAA	Cold Vapor Atomic Absorption Analysis
HAA	Hydride Atomic Absorption Analysis
FIAS	Flow Injection Analysis System
ICPAES	Inductively Coupled Plasma Atomic Emmision Spectrometer
ICPMS	Inductively Coupled Plasma Mass Spectrometer

**List 34. Chemistry Preparation Codes**

PrepCode	Preparation Method
ASE	Accelerated Solvent Extraction
ROLLER	Roller Table Extraction
SOXHLET	Soxhlet Solvent Extraction
SFE	Supercritical Fluid Extraction
MASE	Microwave Assisted Solvent Extraction
SONIC	Ultrasonic Extraction
EPA3050A	Strong Acid Hot Plate Method (EPA3050A)

EPA3050B	Strong Acid Hot Plate or Microwave Method (EPA3050B)
EPA3051	Strong Acid Microwave Method (EPA 3051)
EPA3055	Strong Acid Hot Plate Method (EPA 3055)
EPA245.5	Mercury in Sediment (Cold Vapor with Permanganate Digestion)

**List 35. Microbiology Method Codes**

Method  
MTF  
CLT MPN  
CLT QT  
MF

**List 36. Microbiology Parameters**

Parameter	Description
Total Coliforms	
Fecal Coliforms	
Enterococcus	

**List 37. Microbiology Sample Types**

Type  
Results  
QC Check  
Duplicate

**List 38. Microbiology Surf Conditions**

Height  
Low (1-3)  
Mid (4-6)  
High (7+)

**List 39. Microbiology Sea State**

State  
Calm  
Choppy  
White Caps

**List 40. Microbiology Units**

Units  
cfu / 100ml  
MPN Index/100ml