

**Southern California Bight
2023 Regional Marine Monitoring Survey
(Bight'23)**

**Sediment Quality Assessment
Field Operations Manual**



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I. INTRODUCTION

Background

The Southern California Bight Pilot Project (SCBPP) was conducted in 1994 to begin addressing regional monitoring concerns. This project was the largest regional survey of environmental conditions on the mainland shelf in the Southern California Bight (SCB). It capitalized on the interest and cooperation existing in southern California and the resources available in current monitoring programs to develop an integrated and coordinated regional monitoring program that addressed the needs of the participating local, state, and federal agencies, and provided new management information. When completed, the SCBPP provided a first “snapshot” of the state of the SCB. Twelve participating agencies sampled 261 sites on the mainland shelf, which amassed a series of datasets that provided an unprecedented assessment of pollutant exposure, the status of biological resources, species diversity, and the presence of marine debris in the SCB.

Based on the initial success of the pilot program, another cooperative effort was scheduled to take place four years later. The Bight 1998 program continued the development of regional scale management information and followed the general plan of the SCBPP. Sixty-four organizations participated in the effort and the number of sites sampled grew to 416. New indicators were incorporated into the study, and the strata were expanded to include San Diego Bay, Catalina Island, the Northern Channel Islands, and historically sampled reference sites. Five years later, Bight 2003 continued to build on the cooperative interaction developed during the previous surveys. A total of 58 organizations were involved and a total of 388 sites were sampled. New strata were surveyed to include coastal estuaries, the upper continental slope (200-500 m), and the lower slope and inner basin (500-1000 m), using more parameters and new sampling methods. A fourth program, Bight 2008, took place five years later. Sixty-one organizations participated in the effort, sampling a variety of constituents at 383 sites located between Point Conception and the United States/Mexico border, including the newly added contaminants of emerging concern. The fifth survey, the 2013 Southern California Bight Regional Marine Monitoring Program (Bight'13), was comprised of 34 organizations that sampled 397 sites between Point Conception and the United States/Mexico border, including submarine canyons and marine protected areas. The Bight 2018 (Bight'18) survey continued the cooperative trend developed during the prior surveys by involving approximately 46 organizations and samples over 450 sites with the focus on fish bioaccumulation, a brackish estuaries stratum, and emerging contaminants.

The Bight 2023 (Bight'23) survey will continue the cooperative trend developed during the prior surveys by involving approximately 48 organizations that will either participate in the field collections or contribute resources and knowledge towards analyzing the samples and processing the data from over 450 sites. For this survey, some strata effort has been reduced due to cost-saving efforts and molluscan shellfish is the animal group targeted for bioaccumulation. As in the former surveys, Bight'23 will attempt to quantify the general condition of the benthos and the health of key marine resources in the region. To accomplish this goal, Bight'23 will focus on three objectives: 1) estimate the extent, magnitude, and temporal sediment quality impacts in the SCB; 2) determine the extent, magnitude, and temporal ecological changes in the SCB; and 3) determine the extent and magnitude of bioaccumulation in selected sportfishing/commercial shellfish within the SCB.

The Bight'23 Sediment Quality component of the regional survey plans to conduct summer

sampling from July through the end of September 2023. Other components of the regional survey (*e.g.*, Microbiology, Water Quality, Harmful Algal Blooms, Trash/Microplastics, Estuaries, Submerged Aquatic Vegetation) may have different sampling periods. Please see their respective work-plans for details. The purpose of this document is to provide detailed instructions on trawl and benthic field sampling methods that will be used to conduct the Sediment Quality portion of the regional survey.

II. OVERVIEW OF FIELD SURVEY

A. Sampling Period

The index period for the Bight'23 study will extend from July 1 to September 30, 2023.

B. Sampling Design

The Bight'23 study will continue to use a probability-based sampling design developed by the EPA's Environmental Monitoring & Assessment Program (EMAP) that combines the strengths of systematic and random sampling (Stevens et al. 2004). This Generalized Random Tessellated Stratified (GRTS) sampling design creates a spatially balanced random sampling of resources. Although sites were selected randomly, a systematic component was added to the selection process to minimize clustering of sample sites using a 200-meter radial exclusion zone from other randomly selected sites. Some areas had intensified sampling which used smaller hexagonal grids and adjustments were made to their assigned inclusion probabilities to prevent weighting bias. To assess temporal trends, approximately 50% of the Bight'23 samples will be new sites while 50% of the sample sites will be revisited from previous Bight surveys. See the Bight'23 Sediment Quality Assessment Workplan for further details.

Bight'23 has identified 10 different strata that will be sampled in this survey. These strata are classified as follows: inner shelf (5-30 m depth), mid shelf (30-120 m depth), outer shelf (120-200 m depth), upper slope (200-500 m depth), lower slope (500-1000 m depth), Channel Islands National Marine Sanctuary, bays, ports, marinas, and estuaries. Some freshwater estuaries were included for regulatory purposes to help participating organizations (salinity less than 27 ppt).

C. Indicators of Ecosystem Health

The primary goal of Bight'23 is to provide an assessment of the overall ecosystem condition of the SCB. To accomplish this goal, the following indicators of ecosystem health will be examined:

- Benthic - sediment characteristics, sediment contamination, infaunal assemblages, and sediment toxicity.
- Demersal fish and macroinvertebrate assemblages and gross fish abnormalities.
- Marine debris (including plastic, lumber, vegetation, glass, etc.).

III. DESCRIPTION OF FIELD TEAMS AND ACTIVITIES

A. Personnel

All field sampling will be conducted by personnel knowledgeable in safe field sampling methodologies (*e.g.*, benthic sampling, trawling, etc.). Teams of field personnel will be on each research vessel participating in the sampling effort. These groups will vary in size depending on which organization is doing the field sampling. The main requirements are that the personnel on board the vessel:

- Have the knowledge and experience necessary for working with different types of sampling devices.
- Have the knowledge and experience necessary for conducting the field collection and processing of benthic invertebrates and sediments, and trawl-caught demersal fish and megabenthic invertebrates.
- Can troubleshoot problems when they arise.

B. Chain-of-Command

The following chain-of-command is recommended to avoid confusion, identify responsible parties, and ensure that proper sampling protocols and information flow are followed by each organization:

- 1) The Lead Scientist will be an organization's primary contact regarding all survey and field-related matters.
- 2) The Boat Captain will not only be responsible for piloting the sampling vessel each day but will also have the sole authority to cease or continue sampling operations when conditions at sea are judged to be unsafe.
- 3) The Cruise Leader, designated prior to each sampling day, will be responsible for supervising the scientific crew and sampling operations aboard a sampling vessel. This person will have the final decision on whether to abandon or sample a station and will be responsible for assuring the quality of the data. At the end of each sampling day, this person will make sure that all field data and samples are delivered to the appropriate processing personnel in a timely manner. Cruise Leaders are not required to be the same person from field day to field day.
- 4) Significant changes to the established logistical plan that are outside of the jurisdiction of the Lead Scientist will be communicated to the Regional Monitoring Coordinator (Karen McLaughlin) or the Project Manager (Ken Schiff) before any change is implemented. The teams will accept technical direction from no other authority. All changes to the sampling plan that occur during the field surveys must be documented.
- 5) All technical matters, such as questions regarding station locations, major sampling

schedule changes, etc., will be discussed between the Regional Monitoring Coordinator and the Lead Scientist, AS SOON AS POSSIBLE, to address and resolve issues. Specific sampling (how-to) and equipment issues should be addressed by the chairs of the Field Technical Committee. The Toxicity Committee chair or the designee may request delays of field teams to accommodate overloaded laboratories and minimize holding time issues.

- 6) On the day of a field audit, the Field QA/QC Auditor and Cruise Leader will discuss any procedural and/or taxonomic issues observed during field operations. Additional concerns may be communicated to the Lead Scientist by the Lead Field QA/QC Auditor. The Lead Scientist will be expected to take the appropriate action to correct the situation as soon as possible.

C. Station Assignments

The study area of the Southern California Bight will be divided among the participating organizations according to the level of effort contributed by each. The number of stations to be sampled by each organization, with associated lab effort are summarized in Table 1. See Bight'23 Sediment Quality Assessment (SQA) Workplan for details on contributed lab effort. Maps and coordinates of the stations to be sampled by each organization are provided in Appendices A and B, respectively. Lab assignments by stations numbers are found in Appendix C.

Table 1. Number of sample sites and analyses by sample type assigned to organizations participating in the Bight'23 study, summer 2023.

Field Organization Codes	Trawl Sites	Grab Sites	Benthic Infauna	Sediment Chemistry	Sed Tox - <i>Eohaustorius</i>	Sed Tox - <i>Mytilus</i>
CLA-EMD	22	27	39	30	22	0
LACSD	25	34	20	32	15	0
OC San	24	43	41	47	10	0
City San Diego	26	33	41	65	12	0
Oxnard/ABC	19	27	19	0	0	27
NOAA/SCCWRP	0	15	15	15	0	0
RHMP	15	76	74	76	76	76
RMP (POLA/POLB)	0	22	23	23	23	23
WSP (RMP)	3	0	0	0	0	0
US Navy	0	16	16	16	16	16
OC Public Works	0	16	16	16	16	16
San Diego Co-permittees	0	8	8	8	8	8
MBC	0	7	0	0	0	0
Carlsbad Co-permittees	0	5	5	5	5	5
LA Co Public Works	0	4	4	4	4	4
City of Long Beach	0	1	1	1	1	1
CLA-Watershed	0	1	0	1	1	1
RCFC&WCD	0	1	1	1	1	1
SONGS	0	1	0	0	0	0

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Unassigned	28	29	15	0	0	0
Totals	162	366	338	310	210	178

Field Organization Codes and Description

Field Organization Codes	Description of Field Organization Codes
CLA-EMD	City of Los Angeles, Environmental Monitoring Division
LACSD	Los Angeles County Sanitation Districts
OC San	Orange County Sanitation District
City of San Diego	City of San Diego, Ocean Operations
OXNARD/ABC	City of Oxnard contracting Aquatic Bioassay and Consulting
NOAA/SCCWRP	National Oceanic Atmospheric Administration partnering with Southern California Coastal Water Research Project
RHMP	Regional Harbor Monitoring Program
RMP	Greater Los Angeles and Long Beach Harbor Waters Regional Monitoring Coalition
WSP	WSP USA Environment & Infrastructure
MBC	MBC Applied Environmental Sciences
POLA/POLB	Port of Los Angeles and Port of Long Beach
RCFC&WCD	Riverside County Flood Control and Water Conservation District–Weston Solutions is contractor
San Diego Co-permittees	San Diego Watershed Group (multiple agencies) – Weston Solutions is contractor
Carlsbad Co-permittees	Carlsbad Watershed Group (multiple agencies) – Weston Solutions is contractor
OC Public Works	Orange County Public Works
LA Co Public Works	Los Angeles County Department of Public Works– Weston Solutions is contractor
CLA-Watershed	City of Los Angeles Watershed Protection District sampling on behalf of Ballona Creek Watershed Management Group (City of Los Angeles, Los Angeles County Flood Control District, Los Angeles County, City of Beverly Hills, City of Culver City, City of Inglewood, City of Santa Monica, City of West Hollywood)
City of Long Beach	City of Long Beach
US Navy	USN NIWC Pacific
SONGS	San Onofre Nuclear Generating Station

D. Equipment

All groups or organizations involved in the sampling program will provide their own research vessel, crew, Van Veen grab, otter trawl, and any other equipment necessary to complete the sampling assignment. A list of equipment used during the survey and characteristics of each vessel are provided in Appendix D and E, respectively.

Grab Sampler

Each organization should have a minimum of two modified Van Veen grab samplers (one is an emergency backup) for offshore stations. Grab specifications are given in Section 8. In addition, organizations sampling freshwater estuaries will have a minimum of two plastic corers with extension poles. Core construction information is found in Appendix L. Microplastic sampling requires two 3-inch diameter aluminum pipe cores.

Trawl Nets

Each organization will have a sufficient number of 7.6 m (headrope) trawl nets and sets of otter boards (doors) available. Net and door specifications are given in Section 9.

Mobile Phones

Mobile phones are required to facilitate communication between the Cruise Leader on the sampling vessels and land-based Bight'23 project personnel. Vessel mobile telephone numbers are listed in Appendix E.

E. Weekly Communications

Representatives from each participating organization will be required to provide SCCWRP with weekly, if not more frequent schedules, of proposed sampling activities prior to conducting operations in the field. A calendar <https://bight.sccwrp.org/pages/bight-2023-field> has been set up with an instruction button for schedule entry and edits (changes). This notification will include targeted sample types (sediment, trawl, etc.), and station(s) where sampling is expected to occur. The calendar is not set up for a range of dates, so give expected site visits for any given date. Up-to-date information is critical for toxicology lab sample coordination. The toxicology lab sample coordinator may contact Lead Scientists regarding delays if laboratories are overwhelmed. Field QA/QC Auditors will also use this information to schedule when they can conduct field audits for a particular organization. Prior to a QA/QC audit, the Field Auditor will contact a Lead Scientist to verify that their proposed schedule is still in place.

Each organization will at a minimum also be required to make weekly electronic submissions of success and failures at sampling sites. This information will be used to verify that each field team is accurately and completely sampling each station and tracking the overall progress of the project.

F. Important Telephone Numbers

The names and phone numbers of appropriate personnel and emergency services are listed in Section 13 and Appendix J. If an individual cannot be reached at the listed number, the caller

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should contact SCCWRP, where an attempt will be made to provide an alternate means by which the individual can be reached.

IV. SAFETY

Sample collection at sea is inherently hazardous and this danger is greatly compounded in bad weather. Thus, the safety of the crew and equipment is of paramount importance throughout the project. Each person working onboard a vessel during the project should take personal responsibility for their own safety. Bight'23 organizers strongly encourage field sampling teams to closely monitor weather conditions while out sampling in the field and always secure any equipment on deck. The Lead Scientist should ensure all crew members/biologists are aware of the task at hand for the day and are comfortable using sampling equipment.

Many accidents at sea are preventable. Safety awareness by the Boat Captain and all crew members is the greatest single factor that will reduce accidents at sea. Each field crew should follow all established rules and provisions within their respective organization's safety program. Sampling should be canceled or postponed during hazardous weather conditions. The final decision shall be made by the Boat Captain, who is responsible for the safety of everyone onboard. As with any field program, the priority is the safety of the people onboard, followed by the safety of the equipment, and then the recovery of the data.

V. QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

A. Protocol Calibration/Quality Assurance Procedures

The Bight'23 survey will be conducted cooperatively by organizations which routinely monitor the marine and brackish environments according to established protocols. It is important to the success of the Bight'23 study that comparable data are collected by each organization. This Sediment Quality Assessment (SQA) Field Operations Manual will provide information on how field operations will be conducted to meet this requirement. The Lead Scientists and Boat Captains will be instructed on the field procedures to be followed during the survey and they, in turn, will instruct their field personnel on the proper procedures for the survey.

The Lead Scientist of each organization is responsible for distributing the Bight'23 SQA Field Operations Manual to all field personnel and ensuring that their staff understands and uses the protocols detailed in the manual.

B. Lead Scientist/Boat Captain Protocol Orientation Meeting

Lead Scientists and Boat Captains of all organizations participating in the survey are required to attend the protocol calibration meeting scheduled for June 21, 2023. The goals and objectives of the project will be discussed at this meeting, as will the responsibilities of the Bight'23 field personnel. Each Lead Scientist participating will be provided with a Bight'23 SQA Workplan and SQA Field Operations Manual. Participants will be instructed on field procedures. The discussion will also include instructions on proper data entry into the field computer application and onto field data forms. The meeting will emphasize decision-making procedures for determining station and/or sample acceptability, and the conditions that must be met before a station is abandoned. Lines of communication within the project and QA/QC activities occurring on the boat during the survey will also be discussed.

C. Scientific Team Training

The Lead Scientist from each organization will be responsible for ensuring that their field personnel have been trained properly on all field methods and procedures that will be used during the survey. It will be their responsibility to review the SQA documents (Workplan and Field Operations Manual) with their field crews, and to make sure that each person understands that these procedures must be followed during the survey. Personnel that cannot perform a required operation will not participate in conducting that operation.

D. Benthic Sampling (See Section 8)

The participation of several different vessels and field sampling teams in Bight'23 requires that uniform procedures be followed in the field to ensure high quality samples and consistent data. All field personnel will be provided with and are expected to have a working knowledge of the Bight'23 SQA Field Operations Manual. The Lead Scientist of each organization will provide the necessary training to ensure their staff fully understands and uses the protocols as detailed in the manual. All participants are expected to understand and properly carry out all steps in the collection, screening, relaxation, and fixation of infaunal samples. They must also understand the techniques related to the collection and handling of sediment microplastic, chemistry and toxicity

samples.

Field audits will be conducted to ascertain an organization's field sampling capability and their adherence to standard Bight'23 protocols. These audits will be conducted by Field QA/QC Auditors. A QA/QC audit will be completed for each organization, when possible, with priorities going to those who are new to the regional survey or have undergone a significant turnover in personnel since previous surveys. Pre-survey audits are acceptable for organizations that use Bight survey protocols as their normal monitoring procedure. Field QA/QC Auditors can request additional field audits at any time and the subject organization is obligated to arrange and allow access to field crews.

The goal of the Bight'23 survey is to collect the full range of predesignated samples at all sites. The Measurement Quality Objective (MQO) of 90% which had been established for completeness for the collection of samples in earlier surveys will apply to the current effort. This completeness goal was established to derive the maximum statistical power of the sampling design and was not set at 100% in recognition that some sites will be difficult, if not impossible to sample. Nevertheless, field crews are expected to strive to collect samples at 100% of the stations.

E. Trawl Sampling (See Section 9)

Demersal fish and megabenthic invertebrate assemblage data (species identification, enumeration, biomass, and fish length) are greatly influenced by the collection methods. Therefore, strict adherence to prescribed sampling protocols are critical. Fish catches are influenced by gear type, deployment, towing speed, tow duration, and method of retrieval. All organizations collecting samples in the field must use standard nets and follow standard trawling procedures to ensure comparable samples are collected. Field personnel will be provided with and are expected to have a working knowledge of the Bight'23 SQA Field Operations Manual. The Lead Scientist of each organization will provide the necessary training to ensure their staff fully understands and uses the protocols as detailed in the manual.

Several QA/QC activities will help to ensure the quality of the trawl survey data. These include intercalibration cruises, checks of equipment, sample processing, and taxonomic identification. Trawl equipment, deployment, and sample processing protocols will be checked during audits. The Field QA/QC Auditors will ensure that the methods used are those prescribed in the SQA Field Operations Manual.

Pre-survey audits will be conducted, when possible, for those organizations who have been consistent participants in past surveys, who have adopted Bight protocols in their normal operations, and who have not undergone a significant turnover in field personnel since the last survey. These audits will permit the Field QA/QC Auditors more time to evaluate field teams with less project-related experience and re-visit as necessary.

Prior to initiating the field checks, each organization will submit complete inventories and dimensions of their field equipment to SCCWRP. That information will be forwarded to auditing teams to assist in their QA/QC evaluations on adherence to procedures and protocols outlined in the SQA Field Operations Manual. Audit data will be recorded on a Field QA/QC Checklist (Appendix I). Any significant deviations will be noted and reported to the crew and the

organization. If left uncorrected, that data could be flagged for QA/QC deficiencies.

During a field audit, the Field QA/QC Auditor will inventory equipment and ensure that an organization conducts trawling operations in the manner outlined in the manual, and that the appropriate information is recorded on data sheets (Appendix I QAQC Audit Form). The Field Auditor will make sure that: 1) the appropriate processing equipment is onboard a vessel; 2) the scales are calibrated/verified at the start of the day; 3) the net is rigged properly; 4) the trawl is deployed and retrieved properly; 5) the catch is properly processed; 6) the appropriate data are recorded; and 7) that the pressure-temperature sensor has been used to record trawl bottom time. The Lead Scientist will be notified of the field audit results so that any problems can be addressed and corrected.

Lead Bight'23 Fish and Invertebrate Taxonomists will be designated prior to the sampling period. In addition, each organization will identify a Lead fish and invertebrate taxonomists for their respective agency. These individuals must have the required expertise in field identification of trawl-caught fishes and/or invertebrates of coastal southern California in depths ranging between 5-1000 m. They will be responsible for providing accurate identifications of species collected during the survey and will complete/oversee a review of the voucher collections before they are shipped to SCCWRP.

While it is expected that the Lead Taxonomists of each organization will have a wide range of knowledge of the common trawl-caught species, it is not expected that all the people making field identifications will know every species. *It is, therefore, very important to avoid guessing when finalizing any identification.* An error made in the identification of an organism may result in an irretrievable error in the database because most of the organisms that are identified in the field are returned to the sea. If there is any question regarding the identity of a specimen, that specimen shall be returned to the laboratory for final identification. Once the final identity of any specimen has been ascertained in the organization's laboratory, that change will be made on either the trawl fish, or the invertebrate species sheets by crossing out the original name (do not erase the original name) and writing the correct name. Conversely, if it has been determined that a species cannot be identified at the organization's laboratory, the specimen will be sent to SCCWRP for further identification. Field organizations have the option to use SCAMIT or SCAITE members for help identifying animals.

Three QA/QC activities will help to ensure accurate taxonomic identification of fishes and invertebrates by providing training and intercalibration among organizations:

- 1) Prior to the survey, a list of recommended taxonomic identification aids will be distributed to participating organizations. Lists of trawl-caught fishes and invertebrate species from southern California will also be distributed. A reference collection of voucher specimens of species collected during former Bight surveys is available at the Natural History Museum of Los Angeles County for individuals wishing to see species likely to be encountered in Bight'23. In addition, it is recommended (but not required) that field taxonomists attend Southern California Association of Marine Invertebrate Taxonomists (SCAMIT) and Southern California Association of Ichthyological Taxonomists and Ecologists (SCAITE) meetings, and the pre-survey information transfer meetings given at SCCWRP on

the identification of expected trawl species.

- 2) Lead Taxonomists from every field sampling organization will be required to participate in at least one pre-survey intercalibration cruise to ensure that identifications of commonly occurring species are standardized. Note that for Bight'23, collection permit delays canceled the intercalibration cruises.
- 3) Lead Taxonomists from each organization will also be required to participate in another pre-survey intercalibration exercise meant to assess the probability of taxonomic error in the field. In this exercise, a bucket of fish specimens and a bucket of invertebrate specimens will be passed among all participating organizations prior to the survey. The Lead Taxonomists will submit a list of species in the buckets but other taxonomists within their organization can aid in identification. Organizations can use all laboratory tools (*e.g.*, microscopes, taxonomic keys). The goal is to identify these trawl-caught species to the lowest taxon possible. A numbered tag will be attached to each organism so that the identifications can be checked against the correct specimens. This exercise will focus on identification errors. Correct identifications or "Return for Further Identification" (FID) are acceptable. FID indicates that the specimen would have needed outside taxonomic expertise for final identification. Organizations with more than 10-15% misidentifications (fishes and invertebrates separately) will redo the exercise with a different bucket of organisms. If an organization cannot meet this requirement on the second or third attempt, a qualified taxonomist from another organization must be on-board when trawl sampling is conducted.

F. Measurement Quality Objectives

Measurement Quality Objectives (MQOs) are defined in terms of accuracy, precision, and completeness. Acceptability criteria have been established for sediment grabs and trawl sample collections. The goal of the Bight'23 sediment grabs is to collect samples for infauna and chemistry at all designated stations. The goal of the Bight'23 trawl survey is to collect samples at all designated stations, identify all the organisms correctly, and to obtain accurate counts, measurements (for fishes), and weights on all species. However, the MQOs will be set at lower values in recognition of the realities of field sampling. Because some stations may occur on rocky bottom, the MQOs for the study completeness objective for trawl sample collection will be 90%. Of the samples collected, 100% will be processed, identified, counted, measured, and weighed. Accuracy and precision expectations for the crew performance are 90% for identification, counting, lengths, and biomass (± 0.2 kg) and 90% for anomalies.

Indicators	Accuracy/Error)	Precision	Completeness
Benthic Sampling			
sample collection	NA	NA	90%
Demersal fish and macroinvertebrates			
sample collection	NA	NA	90%
counting	10%	NA	90%
identification	10%	NA	90%
length	10%	NA	90%

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biomass	10%	NA	90%
external anomalies	10%	NA	90%

VI. INFORMATION MANAGEMENT

A. General Requirements

A general Bight'23 Web portal or landing page has been created: <https://bight.sccwrp.org/pages/bight-2023>. Field portal, <https://bight.sccwrp.org/pages/bight-2023-field>, contains the field event planning calendar (field work and toxicology lab planning), lookup lists, documentation, Excel data templates, submission/data checker web page and data change request form. See the Bight'23 Information Management (IM) Manual for format instructions and descriptions.

A field computer should be used whenever possible to minimize transcription errors during station occupation and event (grabs, trawls) activities. Sampling organizations have the discretion to use their own field computer system. An Esri Survey123 application is available for organizations needing a field computer system. If a field computer cannot be used, all required sampling event information must be recorded on Bight'23 field data sheets and subsequently loaded into Microsoft Excel data files for submission to the Bight'23 Data Checker. Field data sheets and related activities/information must be available for at least 5 years for data checks and event inquiries.

B. Bight'23 Field Data System: ESRI Survey123 application

For those organizations not using their own computer system, SCCWRP developed an Esri Survey123 application. To get the application, request an agency name and password. You must have the free parent application (ArcGIS Survey123 field app) on your tablet, phone, or PC (device should be GPS enabled). Visit Google Play, Apple Store, Microsoft Store, or Esri web site <https://www.esri.com/en-us/arcgis/products/arcgis-survey123/downloads>. Visit SCCWRP's Portal to download 2 separate Survey123 applications: Bight 2023 Grab Survey and Bight 2023 Trawl Survey. The applications facilitate the collection of all the required station occupation and field sampling event information (*e.g.*, grab and trawl sampling events). The applications were designed to be used on Android tablet/phones, iPad/iPhone, and PC laptop computers. If the device does not have an internal GPS, a secondary unit is needed to manually input GPS coordinates. The app is based on intuitive questions (instruction sheet can be sent via email). Use of the Bight'23 Field Data app is optional during the survey.

Benefits of using the Esri Survey123 app:

- Runs in Android, iOS, and Windows environments.
- Employs drop-down lists or radial button selections of acceptable values in many entry fields, which reduce entry time and assures accuracy and compliance with Bight'23 data standards.
- Data is stored locally as an Esri database that links to the web portal. The data file can be exported for field organizations' internal use.
- Capable of being used as simple data entry system for information collected at sea on paper field sampling data sheets or may be used as a primary data collection tool.

C. Bight'23 Field Data Submissions

Web portal. Data submission is through SCCWRP's online data submission page. Web page: <https://bight.sccwrp.org/pages/bight-2023-field> The system requires that files be submitted as Microsoft Excel spreadsheets with specific tab names and field names (see table structures in the Bight'23 SQA IM Manual or instructions on the web portal). No csv files will be accepted. Specific questions regarding how-to instructions for data entry should be directed to the Field Technical Committee.

Web portal data checker. A Python-based program checks for appropriate parameter ranges, required fields, valid values from constrained look-up lists, and proper formatting/adherence to Standard Data Transfer Protocols (SDTPs) described in Bight'23 SQA IM Manual or on the web portal. Spelling, punctuation, and proper formatting are extremely important. For example, improper capital letter, additional characters (*i.e.*, spaces, underscores), character data in numerical fields, inputted values into fields constrained by a list, or omitting fields that require a value will generate an error that needs fixing. In addition, there may be QA calculations done on the data to look for outliers which generate warnings but meet IM checks.

VII. SAMPLING LOGISTICS

A. Navigation

Accurate location of sampling sites is crucial to the success of the Bight'23 survey. Station maps and coordinates (latitude and longitude) are provided in Appendices A and B. Vessel positioning will be determined by means of Wide Area Augmentation System (WAAS) or Global Positioning System (GPS). If a vessel with an integrated GPS is not available to work within the four types of inner coastal strata, using a hand-held device is an acceptable substitute.

B. Sampling Schedule

The benthic and trawl surveys may begin July 1, 2023. All field work may be completed in the order that each organization sees fit, as long as the survey is completed by September 30, 2023.

All grab samples will be collected between sunrise and sunset, except for sediment chemistry and sediment toxicity; those samples may be collected anytime throughout the 24-hour period. Otter trawl samples must be collected between one hour after sunrise and one hour before sunset.

C. Station Types

Stations located within the ten strata will be sampled during the survey. These strata are classified as follows: inner shelf (5-30 m depth), mid-shelf (30-120 m depth), outer shelf (120-200 m depth), upper slope (200-500 m depth), lower slope (500-1000 m depth), Channel Islands National Marine Sanctuary, bays, ports, marinas, and estuaries.

The project sampling station/stratum information is listed in Appendix B. If relocating a station moves the station into a different sampling stratum, the station will be abandoned and a new replacement/overdraw site within your region will be assigned. Note in the comments section of the field data sheet the reason for abandonment.

D. Site Acceptability Criteria

The location of each sampling site will be designated in advance as a set of coordinates (latitude and longitude). Upon arrival at the site, the depth will be determined by fathometer and recorded prior to sampling, as well as a validation coordinate. This will be regarded as the target depth for all subsequent sampling at the site during the survey and will be used for determining site acceptability. While all sites are single points defined by latitude and longitude, occupation within a specified distance (*i.e.*, the radius limit) of the target coordinates will be considered acceptable. This radius limit will be 100 m for all sites except those within the island strata. The radius limit at the Northern Channel Islands will be 200 m because of the known extent of rocky bottoms in the area.

Sampling may not be possible at some sites for a variety of reasons (*e.g.*, kelp beds, rocky bottom, falling outside depth range of stratum, otherwise obstructed or unapproachable, etc.) Sites may be abandoned if they fail to meet site acceptability criteria, or if samples at the site fail to meet sample acceptance criteria. The criteria and process guiding this assessment are described below and summarized as a decision tree in Figure 1 (benthic sites) and Figure 2 (trawl sites).

- 1) Occupy the target coordinates as closely as possible.
- 2) If occupation is not possible within the radius limit due to physical obstructions (e.g., harbor facilities), or access prohibitions (e.g., harbor security closures), or land obstruction, abandon the site and record the reason for abandonment in the field computer or on a field data sheet. Sites with temporary obstructions (e.g., moored vessel) should be revisited and sampled when the area has been vacated. If the station cannot be sampled due to an extended period of occupation, note the justification on the data sheet and abandon the site.
- 3) For benthic sites, if occupation is possible but the target coordinates lie over unsuitable substrate or the site is physically obstructed (e.g., dock, vessel, rocky reef, or kelp bed, is beyond the depth limits of the survey, is beyond the capability of a sampling vessel, etc.) as determined by visual observation and fathometer survey, attempt to find an acceptable occupation within the radius limit and record target depth. If unsuccessful, check at least one other site. If an acceptable occupation is not possible, abandon the site and record the reason for abandonment on the field computer, or on a field data sheet. If intermittent success is achieved, a minimum of nine attempts at stations <500 m is recommended before abandoning the site. The Cruise Leader can choose to continue sampling beyond the minimum limit if it is decided the effort is warranted.
- 4) For trawl sites, occupy the station location and record the depth before conducting a pre-trawl fathometer survey. The survey should then be conducted to determine if the site can be sampled within the radius limits. If that survey identifies unacceptable substrate or if the site is deemed otherwise unsuitable for trawling by the Cruise Leader, the site should be abandoned.
- 5) If an acceptable occupation is possible, proceed with sampling.
- 6) Sample acceptance criteria are described for benthic sampling in Section 8 and for trawling in Section 9 and are summarized in the decision tree in Figures 1 and 2.

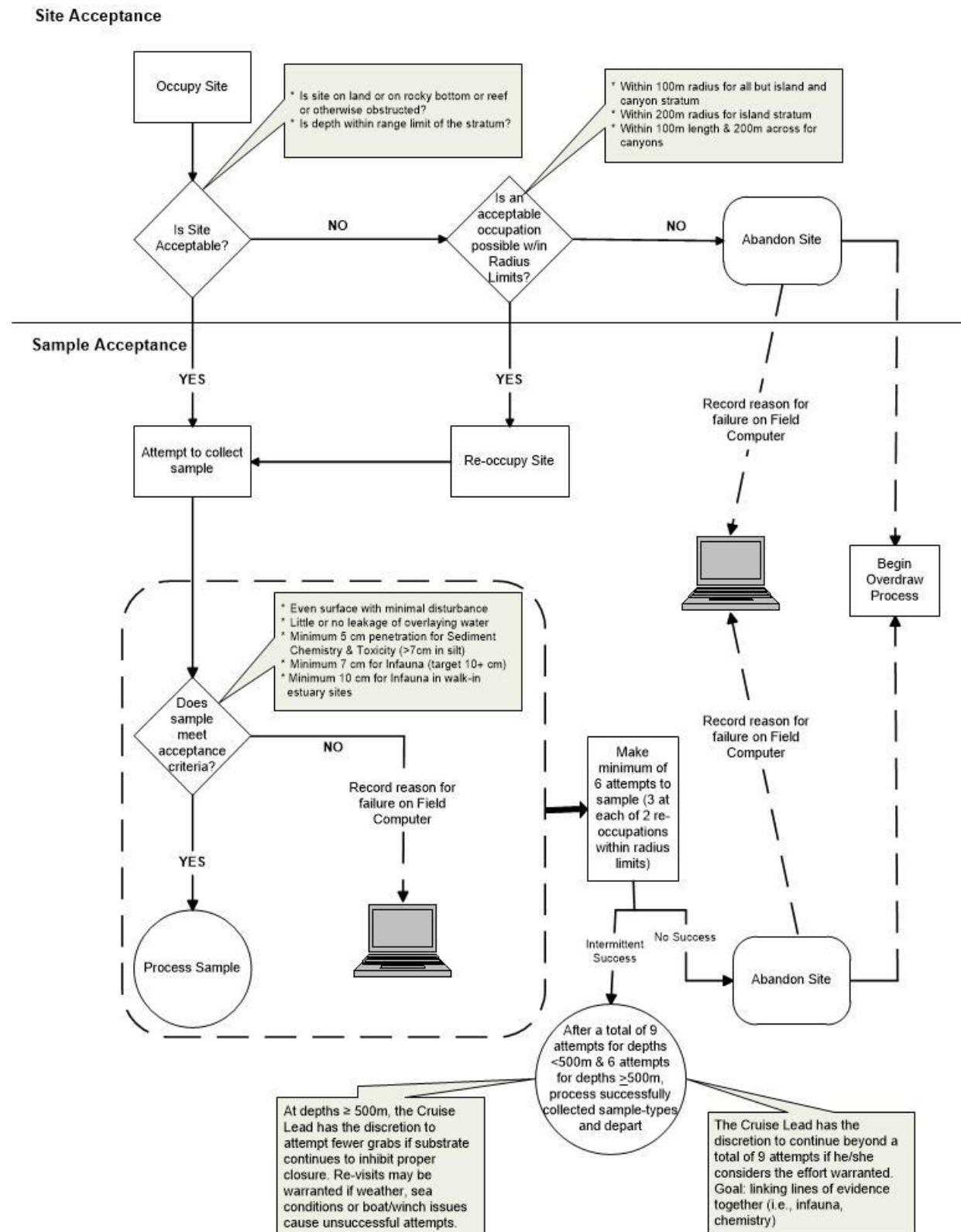


Figure 1. Benthic sampling site and sample acceptance process

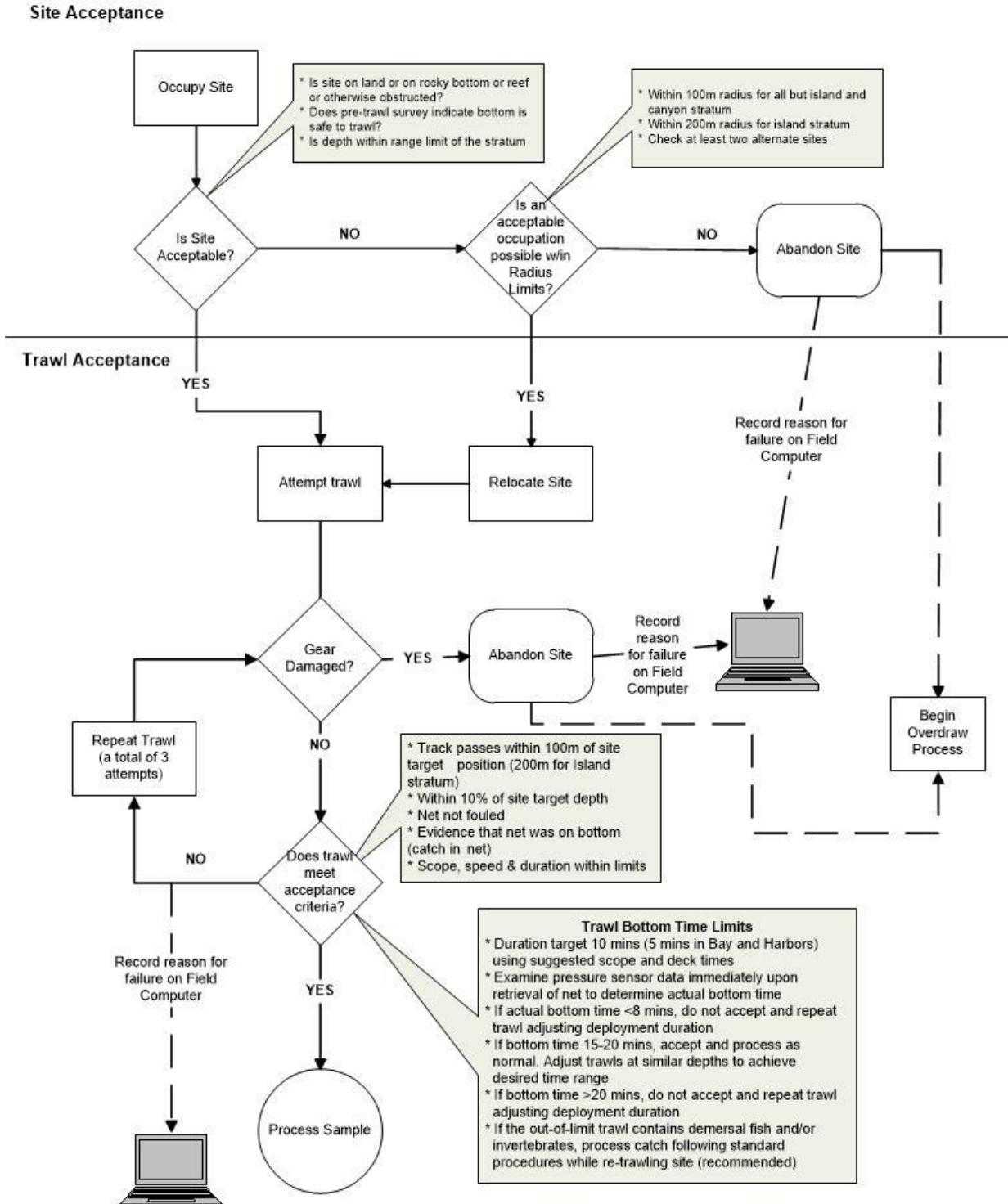


Figure 2. Trawl sampling site and sample acceptance process

E. Site Rejection Strategy

A sampling site may be rejected if any of the following occurs:

- 1) If the location places the site on land or in an obviously unsuitable location.
- 2) If the site exceeds or falls below the depth boundaries defined by the strata (*e.g.*, inner shelf 5-30 m, mid shelf 30-120 m, outer shelf 120-200 m, upper slope 200-500 m, lower slope 500-1000 m). Another depth related rejection strategy for grabs and trawls are changes of +/-10% to the established station occupation depth. Safety-related rejection strategies are depths less than 6 m in coastal ocean, 3 m in embayment, and 1 m in estuaries (main channels). The freshwater estuaries have no limit set because sites could be wadable so field crews must decide on safety concerns during sampling.
- 3) Estuaries have no salinity criteria. Salinity is measured near the sediment/water interface and recorded on data sheets.
- 4) For benthic sites <500 m, if suitable substrate cannot be found after three grabs at the nominal location, and up to three attempts each at a second and third location, the station will be abandoned. For benthic sites >500 m, a station will be abandoned after three unsuccessful attempts at two locations for a total of six attempts. Field crews have the discretion to attempt fewer grabs if substrate continues to inhibit proper closure. Field crews also have the option to attempt more grabs to complete station requirements. Adequately record the reason(s) for abandonment in the field computer, or on the field data sheet.
- 5) For trawl sites, if the fathometer survey identifies unsuitable substrate at three locations within the radius limit, if any equipment is lost or damaged, or if the site is deemed unsuitable by the Cruise Leader, the site will be abandoned completely. Additional rejection criteria can be found in Figure 2. Adequately record the reason(s) for abandonment in the field computer, or on the field data sheet.

F. Scientific Collecting Permits

A Specific Use permit has been submitted to the California Department of Fish and Wildlife (CDFW) but each organization can procure their own permits. Prior to collecting fish and invertebrate specimens in the field, each organization must submit a Notification of Intent to Collect for Scientific Purposes on the Scientific Collecting Permit Portal (on the permit) a minimum of 24 hours (business day only) prior to any collection activity. Submit the notices in Section 1a- Notification of Field Work or Activities on the Scientific Collecting Permit. You will need to log into the Scientific Collecting Permit Portal (SCPP) and navigate to the application. Do not select any links until you are in the application that you are notifying for. Once there go to Section 1a and click the hyperlink saying, “Add Notification Record”. Then input the notification information into the portal and click “ok/save”. Once the line is added click the blue submit word at the end of the line.

This form can be found at <https://www.wildlife.ca.gov/Licensing/Scientific-Collecting>. This

form is only to be used if the portal goes down. Any forms emailed or faxed will not be accepted unless given prior approval to use this format.

For Specific Use permits, the Principal Investigator or any listed Authorized Individuals on their permit and the permit must be onboard during sampling, and it must be presented to any CDFW warden, or personnel who request to see it. In the case of entity permits, the Principal Investigator does not need to be present, but the Authorized Individuals and permit (or reasonable facsimile) must be aboard the vessel. The phone number for the Monterey Marine Regional office is listed in the next section.

Vessels trawling at sites outside the state 3-mile limit require a federal (NOAA, National Marine Fisheries Service) letter of acknowledgement (LOA) or formal permit because of ground fish restrictions in the Southern California Bight. An LOA has been obtained and all vessels trawling in federal water must carry a copy of the LOA aboard the boat. Contact Dario Diehl (dariod@sccwrp.org) for a copy of the LOA.

G. Contact Information

It is recommended that all groups conducting fieldwork in harbors, ports, and marinas contact local security prior to attempting fieldwork in the area. Prior experience suggests that you contact the security several days prior to the work through their central numbers, then again on the day of operations, through dispatch if possible. Let them know where you will be working, and time periods, then note the name and date on which you called the security agency. If you are requested to fax in information (number may not be listed), have a copy with you in the field, and always have your scientific collecting permit – security may never have seen one before, but it does help to be able to show a permit for the activities.

In the Port of LA, call the Port Police Watch Commander each morning before starting. In the Port of Long Beach, call the Harbor Police and leave a message with the City Police. The Wharfinger and Port Pilots have been included to notify them of trawling operations and check traffic planning. It is very important in the Ports to notify the United States Coast Guard (USGS) Waterway Management of sampling plans, since the USCG is likely to be first to respond if you are reported.

It is also recommended that the USCG be informed of all nearshore sampling activity. USCG permission is needed to enter some security areas before sampling. Navy or Marine permission may also be needed.

MONTEREY

Dept. of Fish and Wildlife Marine Region 831- 649-2870

Problems with CDFW “Intent to Collect for Scientific Purposes” notification system:

Tammy Heitzenrater 831-234-0810
Tamara.Heitzenrater@wildlife.ca.gov

OXNARD/VENTURA/SANTA BARBARA

US Coast Guard

Channel Islands Coast Guard 805-985-9822

Santa Barbara Harbor

Santa Barbara Harbor Patrol 805-564-5530

VENTURA HARBOR

Ventura Harbor Patrol 805-642-8538 805-642-8618
0600-0200hr

VHF radio channel 16
Ventura Lifeguards 805-648-3321

Channel Islands Harbor

Channel Islands Harbor Patrol 805-382-3007 and 805-382-3001
Emergency line: 805-382-3000
VHF radio channel: 16, 12 and 73

Channel Islands Coast Guard 805-985-9822

Port Hueneme

Oxnard Harbor District 805-488-3677

Navy 805-982-4711

Mugu Lagoon

Pt. Mugu Security Dispatcher 805-989-7907

SANTA MONICA/LOS ANGELES PORT/LONG BEACH PORT/ORANGE COUNTY

USCG Waterway Management

USCG LA Region 310-521-3860 310-521-3869fax
VTS Channel 14
In POLA/POLB Bridge to Bridge Channel 13

Santa Monica Bay Area

Redondo Beach Harbor Patrol 310-318-0631
Marina Del Rey Harbor Patrol 310-823-7762
Los Angeles County Lifeguards 310-372-2166

Los Angeles Harbor/POLA

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Los Angeles Port Police Watch Commander	310-732-3491
Los Angeles Port Police - general	310-732-3500
Los Angeles Wharfinger	310-732-3810
Los Angeles Port Pilots	310-732-3805
notify and monitor on channel 73	

Los Angeles City Lifeguards for Cabrillo Bch.	310-548-2909
Marine Exchange of Southern California	310-832-6411

Long Beach Harbor/POLB

POLB Wharfinger

Long Beach Police Dept. (leave msg if no ans.)	
LB Harbor Patrol Dispatch (On-Water)	562-570-7182 msg
Long Beach Pilots - Field office	562-283-7820
notify and monitor on 12 and/or 74	562-432-0664
Long Beach Pilots - Main Office	562-435-5435
City of Long Beach Police Dispatch (San Gabriel River work notification)	562-435-6711

TenantServicesOffice@polb.com

notify prior to sampling in POLB

Long Beach Downtown Marina/Alamitos Bay

Long Beach Marine Patrol	
Non-emergency patrol dispatch	562-435-6711
Administration	562-570-3245
E-Mail:	marinepatrol@longbeach.gov

562-570-3249fax

0700-1700hr

Orange County Harbors

Orange County Sheriff's Harbor Patrol Division	
Sunset / Huntington Harbor	714-840-5222
Newport Harbor	949-723-1002
Dana Point Harbor	949-248-2222
Seal Beach Lifeguards	562-431-3567
Huntington Beach Lifeguards	714-536-1454

562-598-8560fax

714-536-0074fax

SAN DIEGO REGION

US Coast Guard

USCG San Diego Region	619-683-6495
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SONGS Area

SONGS Security Zone extends 1 nautical mile radius. See below.

Need authorization from SD USCG Captain of the Port to enter, transit, or anchor. Only SONGS Security can initiate the request for authorization.

Pendleton Area Marine Activity Exclusion Zones

Two restricted navigation areas have been established offshore of Camp Pendleton for military training and activities. The area between the downcoast mouth of the Santa Margarita River and the upcoast edge of the Oceanside Harbor breakwater, is a restricted area that extends 1,800 m offshore. Any activity in this restricted area that may endanger underwater installations such as anchoring, fishing, or trawling is prohibited at all times. Traffic may cross the area if the vessel maintains a direct route without delay. A second restricted area occurs north of the Santa Margarita River for most of the length of Camp Pendleton. This is a military exercise area, which cautions mariners of activity between 0600 and 2400 hrs.

Oceanside Harbor

Harbor Police	760-435-4050
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Mission Bay

Mission Bay Harbor Patrol	619-531-2000
Lifeguard Business Office	619-221-8899
Mission Bay Harbor Unit	619-221-8985

San Diego Bay

San Diego Bay Harbor Police	619-686-6272
Navy Base San Diego (NBSD) Patrol Operations	619-556-1442
Deputy Chief of Police	619-556-6662
Security Officer	619-556-6954

VIII. BENTHIC SAMPLING

A. Purpose

The purpose of benthic sampling is to obtain data on localized community structure of infaunal invertebrate assemblages, the surrounding sediment chemistry characteristics, and contaminant load from specific sampling sites. The pooled information is useful in determining not only the distribution, abundance, and diversity of infaunal organisms, but also whether the observed community patterns have been influenced by environmental and/or anthropogenic perturbations. Detergents currently on the market can introduce potential contaminants and toxicity to the sample. Use a minimalistic cleaning procedure (lots of ambient water, scrub brush to remove particles, final de-ionized water rinse) between sites. Use best professional judgement if sites exhibit oily residue or other potential cross-contamination issues. Follow SQO procedures (http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/777_CASQQ_Technical_Manual.pdf) or established EPA procedures (<https://www.epa.gov/quality/field-equipment-cleaning-and-decontamination-fec>).

A few freshwater estuaries will be sampled for regulatory purposes during this survey. Benthic sediments from this stratum will continue to be collected using either a Van Veen grab, Ponar grab, or 4-inch plastic cores. All biology or infauna samples must be collected using a 4-inch core (Appendix L for construction details) and screened using a 1.0 mm sieve size. Chemistry samples can be collected using a light weight stainless-steel Petite Ponar, plastic core, or chemistry scoop. See chemistry sections for details.

B. Sampling Effort

A total of 370 benthic stations will be sampled during the survey. Table 1 and Appendices A and B provide information on the total number of stations and the parameters that will be sampled by each participating organization.

C. Sediment Samplers

Van Veen Grab. A 0.1 m² modified Van Veen grab will be used to collect sediment samples (optional in brackish estuaries) for physical, chemical, and infaunal analyses (Stubbs et al. 1987). This device must be custom manufactured by in-house agency shops or commercial metal fabrication shop. Previous sources included the University of Washington, Scripps Institution of Oceanography (shop), and Jon Carr (Santa Cruz). The grab may be constructed of stainless or galvanized steel. All surfaces of the grab must be clean and free of rust. Either single or tandem Van Veen grabs are acceptable.

Petite Ponar. If a Petite Ponar is used for chemistry at the **freshwater estuary** sites, it must be stainless-steel because sediment touching the sides may get sampled. It is a miniature size of a Van Veen with small surface area and maximum penetrations of 7-8 cm with little or no room to scoop sediment from retractable doors. The inner surface of this small grab must be clean, free of residual sediment, and rust free.

Plastic Push Core. A 4-inch plastic core has been designated as an alternative to the standard

Van Veen sample device for benthic infauna sampling at walk-in **freshwater estuary sites only**. It can be used for chemistry sampling at **freshwater estuary sites only except for microplastic samples (see details in section E)**. The construction SOP can be found in Appendix L. The diameter of the core is standardized to the inner diameter (ID) of the tube. Biological samples must have a penetration depth of 10 cm.

D. Salinity Measurement at Estuary Sites

Water samples should be taken at or near the bottom (near the sediment/water interface). Use a Niskin sampler, other water sampling devices, or overlying water from the grab. It is recommended that a salinity meter be used to measure salinity in Parts Per Thousand (ppt) units. A conductivity meter (uS/cm) can be used, but temperature (°C) must also be recorded, and the values converted to Practical Salinity Units (psu) through a formula in Standard Methods (1999). Allow the temperature to stabilize before recording values. Follow the steps outlined below:

1. Determine an expected reference Kcl conductivity (C) for the measured temperature (t)
$$C \text{ (Kcl)} = d_0t^3 + d_1t^2 + d_2t + d_3$$

Where: $d_0 = -0.0267243$, $d_1 = 4.6636947$, $d_2 = 861.3027640$, $d_3 = 29035.1640851$
2. Determine the conductivity ratio from measured conductivity divided by reference C (Kcl)
$$R = C \text{ (sample)} / C \text{ (Kcl)}$$
3. Determine Delta S for a reference temperature of 15°C
$$\Delta S = ((t - 15 / (1 + 0.0162(t - 15))) (b_0 + b_1R^{1/2} + b_2R + b_3R^{3/2} + b_4R^2 + b_5R^{5/2}))$$

Where: $b_0 = 0.0005$, $b_1 = -0.0056$, $b_2 = -0.0066$, $b_3 = -0.0375$, $b_4 = 0.0636$, $b_5 = -0.0144$
4. Determine Salinity for the measured temperature
$$S = a_0 + a_1R^{1/2} + a_2R + a_3R^{3/2} + a_4R^2 + a_5R^{5/2} + \Delta S$$

Where: $a_0 = 0.0080$, $a_1 = -0.1692$, $a_2 = 25.3851$, $a_3 = 14.0941$, $a_4 = -7.0261$, $a_5 = 2.7081$

*Note: ppt/psu are historical unit references for salinity because calculations using a conductivity cell are unitless.

E. Special Freshwater Estuary Sampling

Site requirement is 6-inches or more of estuary water at Mean Lower Low tide. If the site is on land or has less than 6-inches of water, move to nearest main channel or deeper area but stay within 100 m of the assigned site. It is recommended that field teams do reconnaissance at the site close to MLLW, less than or equal to 0.5 ft on tide charts, and measure salinity near sediment interface. Unacceptable sites get abandoned and a new overdraw site is assigned. If the site is acceptable, field teams can revisit the site anytime afterwards to complete sampling. Note that estuary sampling is standardized to a Van Veen grab, but the field committee recognizes the logistical difficulties it entails. Infauna biological sampling in walk-in areas will accept a 4-inch PVC or aluminum push cores with minimum 10 cm penetration (Appendix L for construction SOP). Attach a pole extender to the core in intermediate water depths (Appendix L for construction SOP). It is recommended that organizations use a Van Veen in deep water. Infauna samples will be screened using a 1.0 mm sieve.

Chemistry sampling can also use the 4-inch push core, except for microplastics. Samples for microplastics must use a 3-inch aluminum push core (pre-rinsed with microplastics analysis grade

(MAG) water just before use). For general chemistry, push the core 5 cm into sediment and dump it into clean pan (e.g., aluminum, stainless steel) to remove overlying water. For microplastics, dump the contents of the aluminum push core directly into a 16 oz mason jar. At 50% of the microplastic sites, a blank must be opened and exposed to air while sediment sampling occurs. Microplastic samples must be refrigerated (do not freeze). A Petite Ponar grab can also be used for chemistry but ensure a minimum penetration of 5 cm. Collect PFAS first (metal scoop, no Teflon items such as lined lids). Additional cores for other constituents (e.g., chemistry, toxicology) should be scooped into a Teflon bag for homogenization and distribution.

F. Grab Sampling Procedures

Van Veen Grab

Prior to deployment, the grab is cocked with the safety key in place. The grab is then hoisted over the side, and the safety key is removed. The grab is lowered at up to 2 m/sec until it is approximately 5 m above the bottom, then lowered at 1 m/sec to minimize the effects of bow wave disturbance of the surface sediment. In water depths greater than 300 m, the rate of deployment may have to be reduced to <1 m/sec to avoid the grab from drifting and/or premature tripping in the water column. After bottom contact has been made (indicated by slack in the winch wire), the tension on the wire is slowly increased, causing the lever arms to close the grab. Once the grab is back on board, the top doors are opened for inspection.

While a radius limit of 100 m (200 m for island strata) has been established for site occupancy, once sampling has begun, the Cruise Leader will ensure that the vessel is maintained on station with as much precision as conditions allow. Because analytical results from separate grab samples will be used to characterize the benthic community biointegrity, contaminant load and, in many cases, toxicity of the sediment, each successive grab must be collected as close as possible to the others.

G. Priority of Grab Sampling

The priority of sampling at offshore sites are 1) infauna, 2) microplastics, 3) PFAS, 4) remaining sediment chemistry constituents, grain size and 5) sediment toxicity. Sites may not have all these sample types assigned to them. If it is impossible to obtain all assigned sample types required at a station, those samples successfully collected shall be processed and retained. The field crew has the discretion to return and complete sampling or abandon the site. Embayment sites that require both sediment chemistry and toxicity samples must collect sufficient sample for homogenization and distribution (up to 8 L). Only those sites meeting the sample acceptance criteria and sample volume requirements are designated successful.

H. Criteria for Acceptable Grab Samples

Site acceptance criteria and procedures are described in Section 7. Both site and sample acceptance criteria are summarized as a decision tree in Figure 1.

Once a site has been successfully occupied, grab sampling may still prove impossible or very difficult. Different sediment types (e.g., cobble, gravel, well-sorted sands, etc.) and localities (e.g., canyons, slopes, and rocky areas) may be difficult to sample. Sediments containing rocks often

create the most common problem by preventing complete closure of the grab and allowing sediment to wash out during retrieval. The randomized sampling design may cause some of the Bight'23 sampling sites to occur on these difficult sediment types or localities. Therefore, if after three consecutive unsuccessful grab attempts at a site and up to three more consecutive unsuccessful attempts at two other locations (nine total attempts within the radius limit and +/- 10% of the depth of the target site), the station should be abandoned, and the reason noted in the field computer or on a data sheet. Note: *if any grab was unsuccessful due to the result of mechanical (early closures, chain fouling, flipped grab, etc.) versus natural causes, it will not be included in the failure total and sampling should continue.*

If sampling success at a station is inconsistent, sites >500 m may be abandoned after a minimum of six attempts at two locations. In this case, only the successfully (complete) collected sample types should be processed and retained. A Cruise Leader may decide to revisit the site another day to complete sampling. The goal is to collect infauna and chemistry at a site to link lines of evidence.

These are the minimum efforts justifying site abandonment. Sampling failures due to operational error (*e.g.*, premature tripping) do not count towards this minimal effort. The Cruise Leader has the discretion to make a greater or lesser effort if he/she feels that it is warranted, or equipment safety is a concern. The reason for site abandonment must be documented in the field computer or on the field data sheets.

Upon retrieval of the grab, the acceptability of the sample must be determined. Acceptability is based upon two characteristics of the sample: sample condition and depth of penetration. Sample condition is judged using criteria for surface disturbance, leakage, canting, and washing (Figure 3).

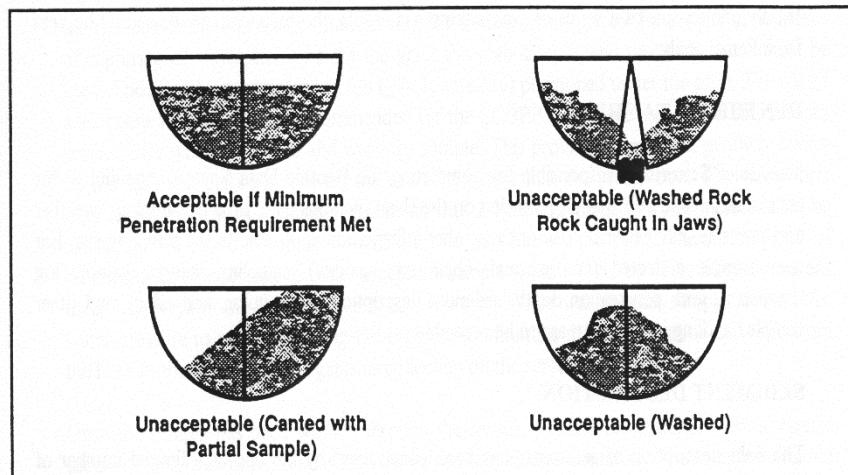


Figure 3. Examples of acceptable and unacceptable grab sample condition (from Tetra Tech 1986).

An acceptable sample condition is characterized by an even surface with minimal disturbance and

little or no leakage of the overlying water. Heavily canted samples are unacceptable. Samples with a large amount of "humping" along the midline of the grab, which indicates washing of the sample during retrieval, are also unacceptable. While some humping will be evident in samples taken from firm sediment where penetration has been poor, this can be due to the closing action of the grab and is not necessarily evidence of unacceptable washing.

If the sample condition is acceptable, the overlying water is drained off and the depth of penetration determined by insertion of a plastic (rather than metal) ruler vertically along the grab midline and measuring to the nearest 0.5 cm. Sediment penetration depth for all grabs must be at least 5 cm. Penetration depths of 7-10+ cm should be obtained in silt (fine sand to clay) and whenever possible, infaunal samples should be a minimum of 7 cm but target 10+ cm. In habitats where sediments are unusually soft (*e.g.*, some estuary muds), it may be necessary to remove the lead weights to prevent over-topping the grab.

Extra caution should be taken to drain the overlying water from the grabs for chemistry and toxicity samples. It is recommended that a siphon be employed for these grabs to avoid disturbance and loss of surface sediments. The overlying water in grabs intended for infaunal samples must be retained. Drain by slightly opening the jaws of the grab and allowing the water to run off into a tub or container for screening with the sediments (see Sample Processing below).

If both sample condition and penetration are acceptable in the first grab (*i.e.*, infauna) of offshore sites, sampling at the station will proceed with the collection of microplastic, PFAS, remaining chemistry and then sediment toxicity samples from successive grabs. At embayment sites, sufficient volume must be collected to homogenize chemistry (except microplastics and PFAS samples) and toxicity samples in a Teflon bag before distribution. **It is required that all the grabs taken at a station be of similar sediment type and depth penetration.**

I. Benthic Sampling Event Data

The Cruise Leader is responsible for collecting all the required information associated with each station occupation and each grab sampling event. While the Field Computer is the preferred method of collecting these data, paper data forms may be used (Appendix F). The required station occupation information includes:

- Station ID
- Date
- Time of day
- Agency code
- Collection Type
- Vessel name
- System used for navigation
- Weather and sea conditions
- Occupation Latitude and Longitude
- Target depth
- Salinity (at sites in the Estuary and Brackish Estuary strata)
- Station fail code (if site is abandoned)

- Comments

The required grab event information includes:

- Station ID
- Grab event number
- Gear
- Time of day for event (when grab on bottom)
- Latitude and Longitude at time of event (when grab on bottom)
- Depth of water (when grab hits bottom)
- Distance from station target location (when grab on bottom)
- Fail code (if sample fails to meet sample acceptance criteria, see Field Sheets or Information Management Plan for codes)
- Penetration
- Sediment composition (type)
- Sediment odor
- Sediment color
- Presence of shell hash (categorical: none, low 1-25%, medium 26-50%, high > 50%)
- Sample types produced from sediment grab (*e.g.*, infauna, Chem., Grain Size, Tox., Microplastic, PFAS)

J. Sediment Description

The field description of sediments is required following measurement of penetration depth. The sediment should be characterized as being cobble, coarse gravel, fine gravel, coarse sand, fine sand, silt/clay, shell hash or a mixed type. The presence of petroleum tar should be added to the comments. Obvious odors, such as hydrogen sulfide (the odor of rotten eggs), petroleum, humic, other odors, or a lack of noticeable odors should be recorded. General sediment colors (black, dark brown, light brown, olive green, red, other) should also be recorded.

K. Sample Processing

Benthic Infaunal Samples

After the sample description has been completed, the sediment sample intended for biological analysis is washed from the grab and screened. Raw water used to wash the samples is to be filtered in some fashion to prevent the accidental introduction of surface-water organisms. Thoroughly wash the sediment from the grab and transfer it to a sediment-washing table (screen box, etc.) for screening. An alternative sieving method for small vessels without wash water would involve semi-submerging the sieve overboard and swirling it in the water (taking care to prevent the loss of grab organisms and/or the introduction of surface water organisms) until the sediment washes away.

In any estuary strata, the necessity of sampling from small craft may not permit onboard screening of the sediment. In these cases, the samples may be screened and processed on land at a screening station temporarily established near the sampling location. To assure that the sample does not deteriorate, such “off-site” screening must be completed as soon as possible and no longer than

90 minutes after sample collection.

All the water drained from the grab and used to wash the grab must be captured and subsequently processed through screening. Typically, a tub (≥ 70 L capacity) is positioned under the grab. The use of a sediment-washing table is recommended, but not required. The table is useful in that it provides a flat, smooth surface over which to spread and wash the sample, thereby providing a means of gently breaking up the sediment before it runs off the end of the table into the screen box. The screening box must be equipped with a stainless-steel mesh with 1.0-mm openings. Wire diameter should be similar to that found in the U.S. Standard 1.00 mm Sieve (*i.e.*, 0.58 mm for freshwater estuaries). The surface area of the screen should be adequate to easily accept the sample without build-up. Typical surface areas used in surveys in the Bight are 1500 to 2100 cm². While washing the sample, control the water pressure to avoid damaging the organisms. Minimize direct application of water from the hose to the material and organisms collecting on the screen.

Once the sample has been washed through the screen, transfer the material (debris, coarse sediment, and organisms) retained on the screen to a sample container. Label the sample container with an external label containing the agency code, station name, gear type, "split number" (*i.e.*, 1 of 1, 2 of 3, etc.), collection date, and preservation method (see Appendix F for labeling example). An internal label bearing the same information is placed inside the infaunal samples. This label can be written in pencil or laser printed ink on 100% rag paper or other museum quality paper (*e.g.*, Resistall) suitable for wet labels. The sample container must have a screw-cap closure and be sufficiently large to accommodate the sample material with a headspace of at least 30% of the container volume. A sample may be split between two or more containers. However, each container must have external and internal labels (as described above) with the appropriate "split number" clearly marked. Field crews should have a broad range of sample container sizes available to them, with none less than 16 oz (0.47 L) capacity.

The sample container should be filled to approximately 50 to 70% of capacity with screened material. After the bulk of material has been transferred to the container, closely examine the screen for any organisms caught in the mesh. Gently remove any organisms with forceps, taking care to avoid damaging the organisms, and add them to the sample container. Thoroughly wash the screen box and scrub the mesh before the next sample is screened.

All infaunal samples will be treated with a relaxant solution for approximately 30 minutes prior to fixation. Either an Epsom salts (MgSO₄) solution or a propylene phenoxytol solution (formulations below) may be used for this purpose. Relaxant solutions may be used as the diluent water for the fixative or may be decanted after exposure and replaced with 10% buffered formalin. If it is used as diluent water, fill the sample container to 75 to 80% of its volume, close the container and invert it several times to distribute the solution. Leave the sample in the relaxant for 30 minutes. After 30 minutes, top off the container with enough sodium borate buffered formaldehyde to achieve a 10% formalin solution. Close the container, once again, and invert it several times to ensure mixing. Store the sample at room temperature for return to the laboratory.

Relaxant and fixative stock solution alternatives are as follows:

- 1) Epsom salts relaxant solution: 1.5 kg Epsom salts (MgSO₄ @ 7H₂O) per 20

- L of freshwater.
- | | | |
|----|---------------------------------|---|
| 2) | Propylene phenoxytol solution: | 30 ml propylene phenoxytol to 20 L of seawater. |
| 3) | Buffered formalin solution: | 50 g sodium borate ($\text{Na}_2\text{B}_4\text{O}_7$) per liter of formalin. |
| 4) | Buffered 10% formalin solution: | 1 part buffered formalin to 9 parts fresh or salt water. |

Further processing is necessary to remove formalin residue from infauna samples. After field preservation (2-10 days in formalin solution), decant sample and any liquid into a 0.5 mm or smaller sieve. Refill sample container with water, agitate, and pour into sieve. Gently wash sample in sieve to remove fine silt. Ensure that all animals are removed from the screen and placed back into the sample container. Fill the container with 70% ethanol (**do not use denatured alcohol**), place internal label inside, close the container tightly, invert container several times then store at room temperature. If your laboratory is not doing the identification, ship it to the appropriate taxonomic lab or SCCWRP (for distribution) in a leakproof ice chest/box/container. Note that shipping with a commercial shipping company may require hazmat packaging requirements.

In some instances, samples may be preserved for DNA analysis. Use of a relaxant is not recommended because it could interfere with DNA analysis. Decant any liquid from the sample through a screen with a mesh size of 1.0 mm or less. Ensure that all animals are removed from the screen and placed in the sample container. Fill the container with 95% Ethanol (ETOH), then close the container, invert it several times and store it for return to the laboratory. In laboratory, remove the old ETOH and replace with fresh 95% ETOH. **Do not use 70% ETOH for DNA specimens.** Be aware that ETOH removes most inks and archival pens are fussy to use in the field, so a No. 2 pencil is preferred for writing on internal labels.

A field organization has the discretion to take an additional infauna sample for DNA analysis by the Natural History Museum of Los Angeles County (in collaboration with the Smithsonian). The museum still has very poor DNA coverage for infauna invertebrates. The museum can provide 90% ethanol for collecting. Note that 90% ethanol is only recommended for short-term storage. It's best to use 95% or greater ETOH. If specimens are small, ideally 3-5 individuals of any species will elucidate the diversity at a specific locality (*i.e.*, stations). For species complexes and troublesome taxa, specimens from multiple localities are extremely useful for quickly discerning relevant distinguishing morphological characters. If specimens are large, specimen photo-documentation (needs to be associated with collection data/specimen/lot numbers) and a preserved piece of tissue will suffice. **The taxonomic labs will need to sort and identify the animals.** Small specimens should be double-vialed (inner vial contains specimens, outer vial contains label data, shell vials stoppered with only 100% cotton -- as specified in the benthic lab manual). The museum will be happy to provide glassware and cotton for the "final" inner vial storage containers. The museum will save and return outer containers or vials originating from the taxonomic laboratories upon request. The museum only accepts completely identified animals. The taxonomic identification laboratories or associated sampling organizations can contact the museum directly or use SCCWRP as a pickup and dropoff location for museum supplies and transfers. The museum will need a copy of CDFW field collection

permit. Museum contacts are Dean Pentcheff (pentcheff@gmail.com) or Regina Wetzer (rwtzter@gmail.com).

L. Sediment Chemistry

General Sediment Chemistry Samples from Offshore Sites

Following collection of benthic infauna, the next grab(s) will be taken for microplastics. Note that a daily group photo, if sampling microplastics, of field personnel is requested to validate that colored fibers in the sample did not come from their clothing. Use a stainless-steel scoop that has been pre-rinsed with MAG water (i.e., 1 µm filtered distilled water) immediately before collecting the sediment. Take the **top 5 cm** of sediment and fill a 16 oz mason jar completely (100%). Wiping off excess sediment from the threads of the mason jar with gloved fingers or cellulose materials (e.g., Kim wipes, paper towel) before sealing the container is acceptable for microplastics. At 50% of the microplastic sites, a blank must be opened and exposed to air while sediment sampling occurs. Microplastic samples must be refrigerated (do not freeze). Both sample and field blank jars should be closed as soon as possible after sampling to mitigate contamination.

If the other side of the grab is still available and undisturbed for sediment sampling, take the **top 2 cm** for PFAS using a pre-rinsed stainless-steel scoop (alcohol then DI/MAG water), otherwise an additional grab is needed. Prior to PFAS sampling, remove any nearby Teflon related coatings/products (e.g., Teflon, Kynar, Neoflon, Tefzel, Hostaflon) before scooping sediment. See Table 2 below for precautions and note that PFAS also requires blanks at 50% of the sites and a single equipment blank per agency sampling for PFAS prior to the first sample. Use new nitrile gloves for every PFAS sample.

Table 2. Field precautions for PFAS sample collection (CSWRCB 2020)

Personal care products to avoid (if possible)	Cosmetics, moisturizers, perfumes, creams, insect repellant, sunscreen (wash hands and wear nitrile gloves if used)
Acceptable clothing	Cotton clothing, cotton lab coat (not necessary in the field)
Clothing to Avoid	Water-repellent treatment (e.g., Gore-Tex, wax coatings, rain gear)
Acceptable Personal Protection Equip.	Powderless nitrile gloves, no latex gloves
Acceptable Label equipment	Pencil, ballpoint pen, fine and ultra-fine tipped sharpie Important: if labeling before opening bottle, change gloves after labeling bottle, otherwise label after sampling.
Labeling equipment to avoid	Thick tipped sharpies or markers, sticky notes, waterproof paper
Containers	Pre-labeled HDPE with Teflon-free caps (provided by SCCWRP)
Scoop	Stainless steel, avoid anything with Teflon-related coatings

Scoop cleaning	Wash scoop with soap and water, rinse with methanol or ethanol, and a final rinse with DI or MAG water before use. Can be stored in ashed heavy-duty aluminum foil (provided by SCCWRP) between sites for PFAS sampling only. PFAS-free pure water already opened for that collection event to make field blanks can also be used for rinsing.
A required Equipment (scoop) Blank	Prior to collecting the first sample, pour PFAS-free pure water over the interior of the pre-cleaned scoop and into an empty pre-labeled HDPE sample bottle (both bottles and PFAS-free pure water supplied by SCCWRP). Close lid then label as PFAS equipment blank with date. Only one equipment blank is needed per collection organization.
Field blanks to assess boat/crew contamination	At 50% of the sites: SCCWRP supplies all pre-labeled bottles and PFAS-free pure water supply. If field blanks are not pre-filled, fill a HPDE sample bottle with pure water supply to 80% full. Place this open bottle near where PFAS sample is collected. Open actual sample bottle at start of sample collection. Close actual sample bottle after sample collection. Pour pure water from open blank bottle into pre-labeled PFAS field blank for that site after sample collection is done. Write time & date on PFAS field blank. Use new pure water supply and bottles for each field blank.

Following PFAS sampling, additional grabs may be necessary to meet the sample volume requirements of the remaining chemistry samples. The sediment from each grab will be distributed evenly among the remaining individual sample containers. These sediment samples will be collected using the top **2 cm** of the undisturbed surface material **at the embayment and inner shelf** sites. Sediment will be collected using a stainless-steel scoop (a plastic scoop is acceptable for TOC and grain size samples). Scoops will be washed with seawater and rinsed with de-ionized (DI) water between stations. Use of a new scoop with each sample is also acceptable. Sediment in contact with or within 1 cm of the metal sides of the grab should be avoided to prevent sample contamination. Wearing Nitrile powder-free gloves during sediment sampling is highly recommended.

Embayment sampling. Following collection of benthic infauna with a Van Veen grab, the next series of grabs with the Van Veen will be taken for both sediment chemistry (e.g., microplastic, PFAS remaining constituents) and toxicology. More than one grab will be necessary to meet the sample volume requirements of this sample type. The sediment from each grab will be collected from the top **5 cm** of the undisturbed surface material **at the inner coastal stations** (bays, harbors, marinas, and estuaries). Sediment will be collected from the Van Veen using a stainless-steel scoop. In-between sites, scoops will be washed with seawater to remove residual sediment and triple rinsed with DI or MAG water between stations (PFAS requires an additional rinse with alcohol and DI rinse). Use of a new scoop with each sample is also acceptable if pre-cleaned. Sediment in contact with or within 1 cm of the metal sides of the grab should be avoided to prevent sample contamination. Depending on site analysis, the total minimum volume may be 8 liters of sediment (2L for chemistry, 3L for amphipod test, 3L for mussel test). If samples contain excessive shell hash or other debris, additional sample volume is recommended. Carefully remove

large pieces of debris (e.g., eelgrass, trash, rocks, shells) without touching the sediment. Wearing Nitrile powder-free gloves during sediment sampling is highly recommended.

Sediment sampling order is similar to offshore: 1) microplastics (pre-rinse scoop with MAG water before use), 2) PFAS (pre-rinse scoop with alcohol and DI/ MAG water before use), 3) remaining chemistry constituents, and 4) toxicology. Using a stainless-steel scoop, fill a 16 oz mason jar completely (100%) with sediment. Both the jar and the stainless-steel scoop should be triple rinsed with MAG water immediately prior to sample collection. Next, fill the PFAS container 80% full (close lid and label both sample and blank before working on next step). Finally, scoop all remaining sediment into a single Teflon bag placed within a pre-labeled food-grade polypropylene bag, lining a 3 to 5-gallon bucket. Teflon bags can be found online from many vendors (for example: https://fluorolab.com/product/pfa-pail-liners/?attribute_description=5+Gallon+Pail+Liner). The double lining provides extra support and protection from contamination should there be accidental tearing of the inner bag. Massage, knead, and squeeze the bag for at least 3-5 minutes with your hands while holding the top of the bag closed in a twisted fashion (move material around to homogenize the sediment), taking care to not tear the bag or squeeze sediment out of the top of the bags. A two-person team may be needed. Homogenization should result in a uniform color and texture throughout. In the unlikely event that the inner Teflon bag tears before chemistry and toxicity samples are taken, a new bag and additional grabs are necessary to start the process again.

Once sediment is fully homogenized, use a stainless-steel scoop to transfer the sediment to the remaining chemistry sample jars, 80% full. No proportioning is necessary for chemistry jars. If chemistry samples are to be frozen, leave enough headspace for expansion. The remaining sediment is for toxicity testing. If two toxicology labs are processing the sediment, fill an additional Teflon bag with half the remaining sediment (3 L) and then place the Teflon bag within a pre-labeled food-grade polypropylene bag, or use three HDPE 1-liter sample containers, for mussel testing (field team's choice). Zip-tie the inner bag closed, then zip-tie the outer pre-labeled bag. A waterproof label should also be securely attached to the zip tie in addition to the labelling on the outer plastic bag itself. Place the zip-tied Teflon bag in a third outer polypropylene or Zip Lock bag for extra protection (optional), and place directly on ice in a cooler. The toxicological samples cannot be frozen. If Teflon bag tears after chemistry samples are taken, but retained in the outer plastic bags, sediment is acceptable for toxicology. Place an additional bag over the contents for extra protection.

Freshwater estuary sampling (for permit purposes) follows the same compositing procedure outlined for estuaries except the sampling equipment may differ. If a Van Veen is used, follow the procedure outlined above.

If a Petite Ponar is used, sediment touching the side of the grab is used. Ensure the grab is free of residual sediment in the laboratory by scrubbing the inside with soap and water using a brush, then thoroughly rinsing with tap water, followed by DI water and placing grab in a plastic bag to prevent contamination. In the field, in-between stations, scrub the inside of the grab with a brush to remove residual sediment and thoroughly rinse with ambient seawater. On site, rinse grab with ambient seawater before use. Take the grab sample and dump the contents into a clean tray or container. An aluminum tray is recommended because sediment has aluminum concentrations in the percent range and highly unlikely to add significant contamination to the sample. Next choice

of tray would be stainless steel. Clean the tray following the same procedure outlined for the Petite Ponar. An alternative for microplastic sampling is to use a 3-inch aluminum pipe as a push core (see details below) inside the grab but the rounded bottom may prevent a 5 cm penetration. A completely full Ponar grab has approximately 7-8 cm of sediment. Pour off overlying water from tray. Scoop the top 5 cm of sediment from the tray following the same order outlined above: 1) microplastics (pre-rinse scoop with MAG water before use), 2) PFAS (pre-rinse scoop with alcohol and DI/ MAG water before use), 3) remaining chemistry constituents, and 4) toxicology into a Teflon-lined bucket. Repeat the process until the required sediment volume is obtained for the site. Follow the homogenization procedure outlined for embayments to distribute samples for chemistry and toxicology.

If a plastic push core is used, sediment touching the side of the core is used. Note that microplastic samples require an aluminum 3-inch pipe as a push core (contact Leah Thornton Hampton at leahth@sccwrp.org for details). Ensure the core is thoroughly cleaned in the laboratory after construction. All metal, plastic and rubber items including cores, scoops and trays should be washed in the laboratory with hot soap and water, rinsed with tap water, rinsed with DI water, and bagged for the field (except metal push core). In the field, in-between stations, scrub the inside of the core with a brush to remove residual sediment and thoroughly rinse with ambient seawater. On site, rinse push core with ambient seawater before use. The 3-inch core for microplastics requires rinsing with MAG water just before use. For microplastic sampling, push the core to the 5-cm mark and dump it directly into the mason jar. For general chemistry, push the core to the 5-cm mark and dump the contents into a clean tray (pour off overlying water from tray). Scoop the top 5 cm of sediment from the tray following the same order outlined above: 1) PFAS, 2) remaining chemistry constituents, and 3) toxicology into a Teflon-lined bucket. Repeat the process until the required sediment volume is obtained for the site. Follow the homogenization procedure outlined for embayments to distribute samples for chemistry and toxicology.

If the site is shallow enough to wade into the water, a stainless-steel scoop can be used directly for general chemistry (microplastics require a 3-inch aluminum core with contents dumped directly into a 16 oz mason jar). Ensure the sediment being scooped is undisturbed by wading action or footprints. Follow the cleaning procedures outlined for scoops and cores. Pour off any residual overlying water if necessary. Scoop the top 5 cm of sediment following the same order outlined above: 1) microplastics (pre-rinse scoop with MAG water before use), 2) PFAS, 3) remaining chemistry constituents, and 4) toxicology into a Teflon-lined bucket. Repeat the process until the required sediment volume is obtained for the site. Follow the homogenization procedure outlined for embayments to distribute samples for chemistry and toxicology. Note that flowing water can remove the flocculant organic layer.

The following container types, sample sizes, and storage requirements will be used with the analytical laboratory supplying all sample containers for all parameters except for microplastics and PFAS (see Appendix G for summary sediment chemistry guide).

- 1) **Sediment Grain Size** – Approximately 100 g of sediment material will be collected at each station. Using a stainless-steel or plastic scoop, fill a 4-oz (125 mL) plastic container 80% full of sediment. Do not overfill, take care to leave an air space at the top. Samples should be stored at approximately 4 °C by placing them on wet ice or in a refrigerator until transported to the laboratory. **Do not**

freeze these samples. They should be delivered to the analytical laboratory within a week of sampling.

- 2) **Total Organic Carbon/Nitrogen** – Approximately 200 g of sediment material will be collected at each station. Using a stainless-steel scoop, fill an 8-oz (~250 mL) amber glass container (with a Teflon-lined lid) 80% full. Do not overfill, take care to leave an air space at the top. Frozen sediment expands and can easily break glass or lids. Samples should be stored at <4 °C by placing them on wet ice or in a refrigerator but must be frozen within 24 hours. If frozen, they should be transported to the laboratory within a week; if not, they should be delivered to the analytical laboratory within 24 hours.
- 3) **Trace Metals** – Approximately 200 g of surface sediment will be collected at each station. Using a stainless-steel or plastic scoop, fill an 8-oz (~250 mL) amber glass container (with a Teflon-lined lid) 80% full. Do not overfill, take care to leave an air space at the top. Frozen sediment expands and can easily break glass or lids. Samples should be stored at <4 °C by placing them on wet ice or in a refrigerator but must be frozen within 24 hours. If frozen, they should be transported to the laboratory within a week; if not, they should be delivered to the analytical laboratory within 24 hours.
- 4) **Trace Organics (CHCs, PCBs, PAHs, PBDEs, Pyrethroids, Neonicotinoids, Tire Wear compounds)** – Approximately 2 x 200 g of sediment material will be collected at each station. Using a stainless-steel scoop, fill two 8-oz (~250 mL) amber glass containers (with a Teflon-lined lid) 80% full. Do not overfill, take care to leave an air space at the top. Frozen sediment expands and can easily break glass or lids. Field organizations have the discretion to fill extra sample containers according to their analytical laboratory specifications. Samples should be stored at <4 °C by placing them on wet ice or in a refrigerator but must be frozen within 24 hours. If frozen, they should be delivered to the laboratory within a week. If not frozen, they should be delivered to the analytical laboratory within 24 hours. Note: the minimum required is 2 x 125 mL (4 oz) containers 80% full but does not account for potential laboratory analysis error.
- 5) **PFAS** – Using a stainless-steel scoop (take equipment blank, as described in PFAS table above, prior to taking first PFAS sample), collect approximately 100 g of sediment at selected embayment and inner shelf stations (163 total sites). Field blanks are assigned to 50% of sites. If a field blank is assigned, follow the procedure described in Table 2 above. Fill an 8-oz (~250 mL) HPDE container provided by SCCWRP 80% full of sediment. Do not overfill, take care to leave an air space at the top. Frozen sediment expands and can easily break glass or lids. Samples should be stored at <4 °C by placing them on wet ice or in a refrigerator but must be frozen within 24 hours. If frozen, they should be delivered to the laboratory within a week. If not frozen, they should be delivered to the analytical laboratory within 24 hours. Precaution: avoid any product that may contain fluoropolymers touching the sediment and use a PFAS field blank at designated sites (see Table 2 for PFAS precautions).

- 6) **Microplastics** – These samples will only be collected at selected embayments and the inner shelf stations (30 total for each stratum). Field blanks are assigned to 50% of sites. If a field blank is assigned, open the field blank jar first, and place the jar as close as reasonably possible to the working area. Using a stainless-steel scoop pre-rinsed with MAG water (provided by SCCWRP), completely fill a 16-oz (~470 mL) mason jar glass container (with a silicone-lined lid), provided by SCCWRP, with sediment. Once the sample jar has been filled with sediment, close both the sample and field blank jar completely. Samples should be stored at 4 °C by placing them on wet ice or in a refrigerator until transported to the laboratory. **Do not freeze these samples.** They should be delivered to SCCWRP within a week of sampling, if possible.
- 7) **Toxicology** – Using a stainless-steel or plastic scoop, approximately 6 L of sediment material will be collected at embayment and 3 L of sediment will be collected at select shelf stations. The embayment sample should be placed into a single Teflon bag placed within a pre-labeled food-grade polypropylene bag, lining a 3 to 5-gallon bucket. Teflon bags can be found online from many vendors (for example: https://fluorolab.com/product/pfa-pail-liners/?attribute_description=5+Gallon+Pail+Liner). Offshore shelf stations may use multiple plastic containers to hold the sediment. Samples should be stored at 4 °C by placing them on wet ice or in a refrigerator until transported to the laboratory. **Do not freeze these samples.** They should be delivered to the analytical laboratory or SCCWRP within 72 hours.

If any samples need to be transported to another organization for processing, they should be packed appropriately (blue ice or dry ice) and shipped to SCCWRP via overnight express, or a local carrier. Check with carrier for shipment restrictions.

Labeling of sample containers will be the responsibility of the field sampling crew. The following minimum information will be required on each sample label: 1) station number; 2) sampling date; 3) agency code; and 4) parameter.

Samples that will be analyzed by the organization conducting the field collection will be transferred to their laboratory by the field crew. Unless specifically instructed, samples to be analyzed by other laboratories will generally be transported to SCCWRP for later distribution. It is recommended that SCCWRP (Alle Lie, 714-755-3213 or Darrin Greenstein, 714-755-3224) be contacted prior to delivery of samples so that arrangements can be made to transfer custody. A **completed chain of custody form** must accompany all shipments of samples. If samples are shipped by carrier, a copy of the chain of custody form should be emailed to SCCWRP (Alle Lie, allel@sccwrp.org or Darrin Greenstein, darring@sccwrp.org) for tracking purposes.

M. Toxicology

General Toxicology Requirements

Three liters of sediment per species, 6 L total for two species testing (*e.g.*, *Eohaustorius*, *Mytilus*), are required for toxicology testing. A minimum of 2.5 L per species (5.0 L total) will satisfy the sampling requirement if insufficient sediment is available. In the field, each labeled toxicology container should be refrigerated or placed on wet ice. **Do not freeze these samples.** Samples to be analyzed by the organization conducting the field collection will be transferred to their laboratory by the field crew. Samples to be analyzed by other laboratories will be transported to SCCWRP for later distribution. Contact SCCWRP (Alle Lie, 714-755-3213 or Darrin Greenstein, 714-755-3224) prior to shipment so arrangements can be made to accommodate laboratory schedules. A **completed chain of custody form** must accompany all shipments of samples. It is recommended that a copy of all chain of custody forms be emailed to SCCWRP (Alle Lie, allel@sccwrp.org or Darrin Greenstein, darring@sccwrp.org) for tracking purposes.

The recommended samples holding time in the field is no more than three days before transport to the designated toxicity laboratories. The inter-laboratory transport time should not exceed 24 hours. The minimum labeling information required on each sample: 1) station number; 2) sampling date; 3) agency code; 4) parameter; and 5) split container number (if needed). A waterproof label should also be securely attached to the zip tie closing a bag, in addition to the labelling on the outer plastic bag itself.

At the very minimum, the sampling scoop will be washed with sample water and rinsed with DI water between stations. Use of a new scoop with each sample is also acceptable. Sediment within 1 cm of the metal sides of the grab will be avoided to prevent sample contamination. Field sampling crews will provide sample containers.

Offshore strata sampling. Following the collection of benthic infauna, microplastic, PFAS and remaining sediment chemistry samples in the offshore strata (inner-, mid-, outer-shelf), grabs will be taken for sediment toxicity analysis. Sediment samples will be collected by scooping the top 2 cm of the undisturbed surface material. Multiple grabs may be necessary to meet the sample volume requirements for toxicology (5-6 L). Field crews have the option to fill one Teflon bag or multiple plastic containers. If using multiple containers, the sediment from each grab will be distributed evenly among the individual sample containers. Sediments will not be homogenized in the field for offshore sites located on the inner, mid, and outer shelf.

Embayment strata sampling. Following the collection of benthic infauna, microplastic and PFAS samples, sediment grabs will be taken for combined toxicity and remaining chemistry analysis. Sediment samples will be collected by scooping the top 5 cm of the undisturbed surface material. Multiple grabs may be necessary to meet the sample volume requirements (7-8 L). Field crews will fill one Teflon bag. Sediment in contact with or within 1 cm of the metal sides of the Van Veen grab are to be avoided unless a Petite Ponar or push core is used in the field. Sediment must be homogenized in the field before distribution to remaining chemistry containers.

Homogenization. Line a 3 to 5-gallon bucket with a single Teflon bag placed within an outer pre-labeled food-grade polypropylene bag. The double lining provides extra support and protection from contamination should there be accidental tearing of the inner bag. Scoop the sediment directly into the bucket. The outside of the bucket should have a mark indicating the fill level (6 or 8 L). Carefully remove large pieces of debris (*e.g.*, eelgrass, trash, rocks, shells) without touching the sediment with your gloved hand. Knot or zip tie both bags sequentially, inner bag first than outer bag. Knead and squeeze the bag with your hands, moving material around to homogenize the sediment, taking care not to tear the bags or squeeze sediment out of

the top of the bags. Homogenization should result in a uniform color and texture throughout. After homogenization and sample distribution, secure a waterproof label to the zip-tie closing the Teflon bag. In addition, use a Sharpie to label the outer plastic bag itself. A third outer polypropylene bag can be used for extra protection (optional). The toxicity samples can be placed directly on ice in a cooler.

Special Circumstances. If two different toxicology labs are testing the sediment, use two Teflon bags and fill with half of the toxicity sample (3 L each) or three HDPE 1-liter sample containers (depending on stratum). Use a stainless steel or plastic scoop to transfer sediment. Zip-tie the inner bag closed and attach a waterproof label, then zip-tie the outer pre-labeled bag. A third outer polypropylene bag can be used for extra protection (optional). The toxicity samples can be placed directly on ice in a cooler.

N. Special Studies

Special Studies

Microplastics and PFAS sampling are considered special studies. See Section L for details.

IX. TRAWL SAMPLING

A. Purpose

The purpose of trawl sampling is to obtain data on the distribution, abundance, biomass, diversity, and disease prevalence of demersal fish and invertebrate assemblages. Historically, it has been used to collect fish and invertebrates for tissue contaminant analysis in previous regional surveys. This information is useful in characterizing possible anthropogenic effects on demersal fish and invertebrate populations. Mearns and Allen (1978) provide a comprehensive description of how small otter trawls should be designed and used for conducting biological surveys in coastal waters.

B. Sampling Effort

A total of 150 trawling stations are targeted during the survey (Table 1, Appendix A). Information regarding trawl station locations and the corresponding strata/location are listed in Appendix B.

C. Otter Trawl Specifications

A semi-balloon otter trawl (Figure 4) will be used to collect epibenthic invertebrates and demersal fishes. Net dimensions are as follows: 7.6-m (25 ft) headrope; 8.8-m (29 ft) footrope; 3.8-cm (1.5 in) body mesh; and a 1.3-cm (0.5 in) cod-end mesh. This net will have 22.9-m (75 ft) long bridles made of 1.0-1.6 cm (3/8 to 5/8 in) diameter rope (*e.g.*, Samson braid). Typical otter boards (doors) will have a width of 76 cm (30 in), height of 50 cm (20 in), and a suggested weight of 16 kg (35 lb) (Figure 5). Slight deviations (< 10%) from the dimensions are acceptable. The recommended door chains should be 5 mm (3/16 in) in diameter and should have the following numbers of links: front top -- 12; front bottom -- 11; back top -- 17; back bottom -- 16. The actual specifications of how any trawl door is set up may depend on the manufacturer of the otter trawl, but the user of the equipment should be sure to follow the factory recommended set-up procedures to ensure that the net fishes appropriately in the field.

The Bight'23 survey will require two additions to the trawl specifications: 1) non-crushable floats are required for any nets used to trawl deeper than 200 m; and 2) pressure-temperature (PT) sensors (capable of withstanding 500 m depths) will be attached to one of the trawl doors to measure water temperature, depth, and time of the individual trawls. Data collected by these sensors will be downloaded to a computer so that data regarding bottom time and depth of the trawls can be monitored in the field and analyzed after the survey has been completed. Time synchronizing between multiple computers can be problematic, so record the time offset between field data tablets/computers and computers used to download PT data in the datasheet comments field. Data is to be submitted to SCCWRP for post-survey validation checks.

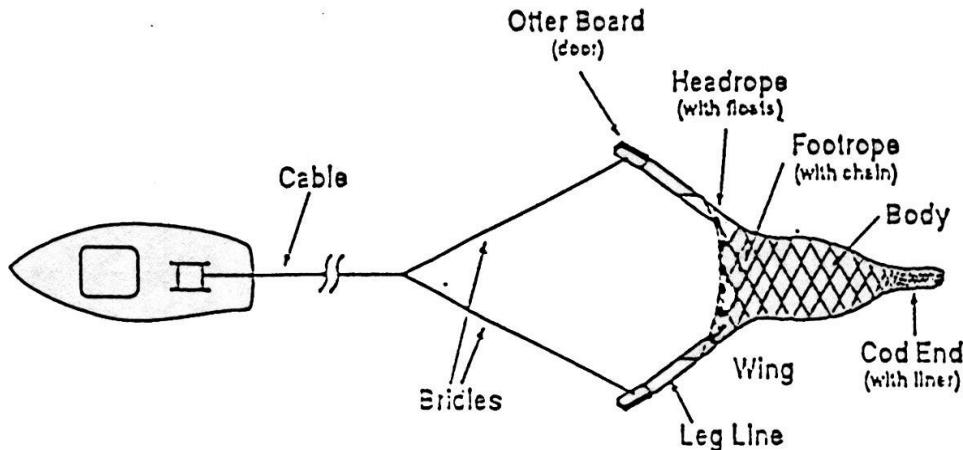


Figure 4. Semi-balloon otter trawl recommended for marine receiving-water monitoring programs in southern California (modified from Mearns and Allen, 1978)

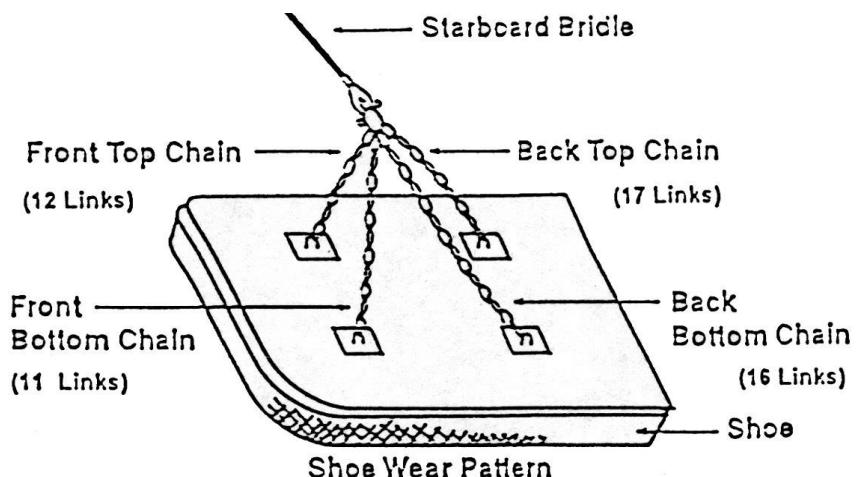


Figure 5. View of an otter board of a semi-balloon otter trawl with recommended numbers of chain (5 mm or 3/16 in. diameter) links (modified from Mearns and Allen, 1978)

D. Trawl Data Flow and Responsibilities

The collection of trawl data (identifications, measurements, etc.) is largely a field activity for which there is little opportunity to clarify or correct errors. Therefore, it is important that the field personnel appreciate the ultimate fate of the data records they are creating and assure that their field records support subsequent steps in the data creation process. For example, specimens collected as vouchers or as FID specimens, must be labeled under the same name as recorded on the field data sheet. This allows these specimens to be unambiguously associated with the data records for purposes of data QC or revision.

In addition, each organization conducting trawling must complete all stages of sample analysis (lab IDs, voucher confirmation, data sheet revisions, etc.) prior to submitting data and voucher specimens to the project for further review. The flow of data from the trawl to final data set and the parties responsible for completion of each stage is summarized in Figure 2.

E. Trawl Data Log

If for any reason the Field Computer stops functioning, the field crew will be responsible for keeping a manual trawl data log (Appendix F). The information recorded in the log includes water depth, length of the tow-wire used, times and coordinates (latitude and longitude) for start of the trawl and the end of the trawl (beginning of trawl retrieval). Similar information for when the net was deployed (net over) and when the net was retrieved (net on deck) may also be recorded. Any anomalous conditions, such as rocky substrate, debris in the catch, and/or a torn net should also be recorded in the log.

F. Net Preparation

The trawl components should be properly prepared prior to trawling so that the trawl can be deployed in an orderly and safe manner upon arrival at a station. Nets should be inspected for holes prior to deployment and repaired as needed. The net should be laid out and stacked on the stern of the vessel in the same configuration that it will be deployed: cod-end to the stern, floats up, and footrope down. The trawl net should be checked to make sure that the cod-end is tied correctly, the doors should be connected properly to the leg lines, and the bridles should be securely fastened to the doors and to the tow wire.

G. Station Occupation

Every effort should be taken to ensure that any trawl track passes the station coordinates at no greater than 100 m, and that the trawl course varies no more than +/-10% of the target depth (Figure 2). The trawl track can be plotted prior to sampling so that a successive series of waypoint locations along the track can be obtained. These coordinates can then be entered into the navigation system and then retrieved at the time of sampling to ensure that the vessel maintains its course along the trawl track.

H. Pre-Trawl Survey

After recording the depth at the assigned station, a pre-trawl survey of the trawl course will be conducted to determine site acceptability and whether uncharted features such as reefs, wrecks, etc., could obstruct the trawl and potentially damage equipment. Trawl gear can be lost if it becomes snagged on obstructions and replacement of nets can be costly. The trawl track should be evaluated by the Cruise Leader/Boat Captain using a fathometer and following the expected course along the isobath.

If the first run indicates that a particular site is unacceptable, another survey will be conducted within 100 m of the original location and within +/-10% of the original depth. If this attempt is unsuccessful, a third attempt will be conducted at a different location using the same protocols (100 m of the original location, and +/-10% of original depth). The site will be abandoned after

three unsuccessful attempts (Figure 2).

I. Trawling

Trawls will be towed along, rather than across, isobaths. While the vessel is underway the net and doors are placed in the water. It is important that the floats skim the surface and that the net is not entangled (*e.g.*, crossed leg lines, bunched or hooked portions of the net) prior to paying out the bridles. This small step could mean the difference between a successful or unsuccessful trawl. The bridles should be paid out by personnel on either side of the net, to avoid becoming entangled in the rigging during deployment.

Use of the proper scope (*i.e.*, length of marine grade wire paid out versus the water depth) is important for successful trawls. After the net touches the bottom, a sufficient length of towing wire should be paid out to ensure that the net is pulled from a horizontal rather than a vertical position. Insufficient scope will prevent the net from consistently fishing the bottom and will result in a no-catch, or a short-catch situation. In general, the required scope declines with increasing depth because the additional weight of the wire enhances the horizontal component of the towing forces (Table 3, Appendix H).

Table 3. Recommended scope and length of wire for trawling and estimated times for trawl performance at different depths in the Southern California Bight (expanded table in Appendix H).

Station Depth (m)	Depth/Wire Ratio or Scope ¹	Wire (m)	Winch ² Time (min)	Initial Net ³ Depth (m)	Minutes To Bot Lag ⁴	Minutes Off Bot Lag ⁵	10 Min Trawl Est Deck Time (min)
50	5.0	252	6.12	50.7	-0.05	2.20	7.75
100	4.1	410	9.97	82.5	1.33	2.91	8.42
150	3.6	545	13.25	109.6	3.06	3.62	9.44
200	3.3	668	16.22	134.2	4.99	4.33	10.67
250	3.1	781	18.97	157.0	7.06	5.04	12.02
300	3.0	888	21.56	178.4	9.23	5.75	13.48
350	2.8	989	24.03	198.8	11.47	6.46	15.02
400	2.7	1,086	26.39	218.4	13.78	7.17	16.62
450	2.6	1,180	28.67	237.2	16.15	7.87	18.27
500	2.5	1,271	30.87	255.5	18.56	8.58	19.97

¹ Power function was $16.139219 * (\text{Station Depth}^{-0.297449384})$ based on method protocol.

² Average agency winch rate was 41.16 m/min.

³ Average descent rate was 8.3 m/min. Average lag on bottom decent rate changed +1.6 times.

⁴ Used: $(\text{Station Depth} - \text{Wire Depth}) / (\text{Avg Descent Rate} * \text{Avg Change Rate Factor})$.

⁵ Used: regression formula: $1.4903252151 + (0.0141874591 * \text{Station Depth})$ based on Lag Off vs. Depth data.

These scopes are for 1.0 cm (0.38 in) wire. These scopes will have to be adjusted accordingly when using a different diameter of wire. Variability can occur with boat equipment (*e.g.*, winch speed, engine speed). The table is meant as a guide to Boat Captains trawling. Use the PT sensor information as a tool for subsequent trawls.

Trawling is conducted at a speed-over-ground of 1.0 m/sec (1.5 to 2.0 kt) and the net is generally towed for 10 minutes (see Table 3 for modifications), measured on deck from start of trawl to end of trawl (*i.e.*, lock down of winch to start of retrieval). All vessels will maintain speed while retrieving the net. In confined areas (*e.g.*, bays and harbors), the trawl duration may be reduced

to 5 minutes, a distance over ground of 225-300 m, or a working range of 4-7.5 minutes. While 10 minutes on the bottom is the nominal target time for each trawl, a working range of 8-15 minutes (determined by the PT sensor) is acceptable. Upon completion of each trawl the PT sensor data will be downloaded immediately to determine the actual on-bottom duration. If the bottom time is less than 8 minutes or greater than 20 minutes, the trawl is repeated. If the bottom time falls between 15-20 minutes, crews must adjust subsequent deployment durations, as necessary, to fall as close to 10 minutes as possible. If there are demersal fishes and invertebrates in trawls falling under 8 minutes or greater than 20 minutes, the catch can be processed (field crew's discretion) while the station is being re-trawled. An error code is provided for the data sheets to indicate that the data are from a failed trawl, outside the on-bottom time limits, and additional comments should indicate why a re-trawl was needed. This allows rare and unusual species to be documented while not compromising the study design.

All PT sensor information will be retained electronically and submitted with the other data types at the end of the project.

J. Criteria for Accepting a Trawl

At the end of the prescribed trawl time, the net is retrieved and brought onboard the vessel. The cod-end is then opened, and the catch deposited into a tub or holding tank. The catch is subsequently released to the scientific crew for processing. If the trawl is retrieved with little or no catch in the cod-end, its acceptability will be evaluated according to whether the trawl was conducted properly. The criteria used to evaluate the success of any trawl include making sure that proper depth, scope, speed, and distance (or duration) were maintained, whether the net was fouled (net tangled), and whether the catch shows evidence that it was on the bottom (*e.g.*, rocks, benthic invertebrates, benthic fishes) (Figure 2). If any trawl procedures were not followed, if the net was fouled or torn (the tear must be sufficient to allow escapement), or if there was no evidence of contact with the bottom (PT sensor), the trawl will be considered unacceptable, and the site will be re-trawled. When evaluating the situation to decide whether to abandon or re-trawl a station, the Cruise Leader should keep in mind that the goal is to collect the best sample possible.

If a retrieved net has been irreparably torn during a trawl, the station will be abandoned. If the trawl hangs up on the bottom, the site can be resampled or abandoned at the discretion of the Cruise Leader. If re-trawling that station proves unsuccessful after another two attempts, the site will be abandoned (Figure 2).

K. Special Case: High Density Species Incidence

If at the end of the prescribed trawl time, the net is so full of one species (*e.g.*, Pelagic Red Crab *Grimothea planipes*, Heart Urchins *Briopsis/Brisaster*) that it cannot be brought onboard normally or the species is falling out of the net on retrieval, the site may be abandoned temporarily. These occurrences are generalized to certain areas and depths. These species can move, so revisiting the site several weeks later may have different results. Field organizations revisiting these sites may want to test the area with a 1-minute trawl. The Cruise Leader has the discretion to abandon the site if abundances remain significant from a 1-minute trawl. Field organizations worried that new sites within the same general area could experience high density abundances may use a 1-minute test trawl for evaluation purposes. If high densities are present,

the site can be temporarily abandoned. The protocol is to quantify a standard 10-minute trawl. One-minute evaluation trawls are not to be quantified for Bight'23. A Cruise Leader has the discretion to work-up the trawl but must qualify the event as a failed trawl. The site may be abandoned if logistical problems prevent the boat from revisiting the site.

To process these high-density catches, follow the standard procedures listed in the subsequent sections. An optional procedure can be used for invertebrate species. It was specifically designed for Pelagic Red Crabs. At the beginning of the day obtain the weight of a wet empty trawl net (net tare weight). When a high-density trawl is obtained record the weight of the total catch (total net and catch weight) and subtract the net tare weight then record the result as the catch weight in the comments section of the trawl invertebrate data sheet. Sort through the entire catch and place the high-density species into multiple bins or buckets for weighing, counting, and anomaly quantification. Using the aliquot datasheet, weigh out 1 kg of high-density invertebrates (minus the tare) and count the number of individuals comprising the weight. Record the numbers on the aliquot datasheet (*e.g.*, 1kg = X#). Batch weigh any remaining (not high-density species) invertebrates, fishes, and debris separately and record on the aliquot datasheet. Subtract the weights of the remaining invertebrates/fishes/debris from the catch weight and multiply that weight (*i.e.*, the weight of the high-density species) by number of individuals comprising 1 kg of the high-density species. Begin processing the debris, fishes, and remaining invertebrates as listed below.

L. Sample Processing

Sorting

The trawl catch will be sorted on deck into containers. The catch may initially be rough sorted into major categories (*e.g.*, urchins, shrimp, other invertebrates, flatfishes, rockfishes, other fishes). The categories used are not important, but it is more efficient to sort into rough categories before identifying organisms to species. Trawl debris should also be sorted into containers for processing. Objects, including organisms, less than 1 cm in largest dimension, should not be included for quantification.

Trawl Debris

Debris, anthropogenic or otherwise, collected during any trawl will be quantified by recording the specific types of material and their quantities on the Trawl Debris Form (Appendix F). If possible, debris should be quantified by direct enumeration and recorded on the form. Additional information can be added to comments. Photographs are not required but interesting debris images can be sent to Leah Thornton Hampton (leahth@sccwrp.org).

Identification

The goal is to provide species-level identifications for all fishes and invertebrates captured in the trawl. Most, if not all, of the trawl-caught organisms should be identifiable to species in the field using the recommended taxonomic keys and field guides. Species of fishes and invertebrates that cannot be reliably identified to species in the field should be returned to the laboratory for further identification. In these instances, it is better that the field crew recognize their taxonomic limitations, record "FID" (further identification required) on the field sheet and include descriptions or photographs of any attributes that may later aid in the identification of that specimen.

Under no circumstances should an organism be discarded if the identity is in question.

When the “FID” organisms have finally been identified, the correct identity of the species should be recorded on the original data sheet. If the laboratory identity differs from that recorded in the field, the original name should be crossed out with a single line only; do not erase the original name. If a specimen cannot be identified by the sampling organization, it will be sent to SCCWRP or brought to SCAMIT/SCAITE meetings for help with identifications.

Although all fish and invertebrates collected during Bight'23 should be identified to the lowest possible taxon (either in the field or in the laboratory), only certain trawl-caught animals meeting very specific criteria will need to be identified to that level. There are likely to be infauna and pelagic species that will be taken incidentally in the trawl catch. These need not be processed or documented but noted in the comments for consistency among the field organizations. Only epibenthic invertebrates and fish greater than 1 cm in the largest dimension must be recorded on the datasheet. Fouling colonial and pelagic invertebrates will not need to be enumerated but noted in the comments. Recently extruded juvenile fish (*e.g.*, from live bearing Sea Perch) or shark egg sacs will not be recorded separately from the adults but weighed together with adults for a final species weight (put juvenile counts in comment section). Signs of a recently extruded juvenile include fins appearing red or bloody. Common Cymothoidae fish parasites will be recorded on the trawl invertebrate datasheet as present and given the name “Cymothoidae”. Cruise Leaders have the discretion to keep separate records of animals for organizational database purposes. Post-survey data analysis will identify all species which do not meet the epibenthic invertebrate and demersal fishes definition and flag the data in the final database records. These data will be excluded in the final report but remain in the final database records.

A recommended list of field guides and taxonomic aids for identifying fishes and invertebrates will be distributed to participating organizations prior to the survey. The most basic and comprehensive guides for fish are Miller and Lea’s Guide to the Coastal Marine Fishes of California (Love and Passarelli 2020), Kells et al. (2016), Lamb and Edgell (2010), Eschmeyer (1998), and Eschmeyer et al. (1983). Allen (1977) provides information for identifying juvenile rockfishes (*Sebastodes* spp.), while Orr et al. (2000) and Love et al. (2002) provide keys to larger rockfishes. Kramer et al. (1995) provides information for identifying flatfishes. Generally, there are no widely comprehensive guides to the epibenthic invertebrates.

Either common or scientific names of fishes may be used in the field, however, in the case of invertebrates, only scientific names are permissible. Use standard common and scientific names of fishes and scientific names of invertebrates given in a list of expected or trawl-caught species of fishes and invertebrates in southern California that have been distributed to organizations prior to the survey. For species not in these lists, use only standard common and scientific names of fishes given in Page et al. (2013), and scientific names of invertebrates from the SCAMIT (2023) edition 14 list of benthic macro- and mega-invertebrates. Remember, data submissions must have current scientific names.

For every species caught, each organization will provide at least one representative of that species to the Bight'23 voucher collection (see Voucher Collection).

Each organization should have a kit containing a variety of tools which will aid in field identification. The kit should include forceps (small with sharp points and large with blunt points), a hand lens, dividers or calipers, dissecting needles, scalpels with scalpel blades, probes, and plastic rulers (marked in millimeters).

Diversity Index Exclude Column

The fish and invertebrate datasheets include a “diversity index exclude” column. A “Yes” or check response represents the taxonomist’s recommendation that the taxon should be excluded from counts of the number of taxa reported in the sample. It usually only pertains to organisms not identified to species-level (*e.g.*, class/order/family/genus). Three conditions must co-exist for the reported taxon to be excluded: (1) identification is not to species-level; (2) the reported taxon is represented in the sample by other members of its same taxon group identified to a lower level (*e.g.*, species); (3) the taxonomist cannot determine if the reported taxon is distinct from other members of same taxon group identified in the sample. It is necessary that the taxonomists make this evaluation during sample analysis (*i.e.*, by annotation of the field sheet). It cannot be effectively applied after sample analysis as there is no way of determining later whether the third criterion for use was met. **Example:** The final identification of a specimen is “*Virgulariidae*”. There is not enough information for the taxonomist to determine whether the specimen might be “*Virgularia agassizii*”, which was also found in the same sample. The “*Virgulariidae*” record is given an Exclude = “Yes” on the datasheet.

Length Measurement

All fish species captured in the hauls will be measured using measuring boards, a meter stick, or a tape measure for very large specimens. Lengths of invertebrate species captured in the hauls will not be measured. A measuring board typically consists of either a flat or trough shaped board with a part of a meter stick running down the middle. A smaller board (cross board) is attached across the zero-end of the meter stick. Centimeter size-classes can be marked along the side of the measuring board with the number of the size class marked next to the appropriate centimeter. Measuring boards should be checked periodically for accuracy (+/- 1 mm).

When measuring a fish, the head should be pushed gently against the cross member at the zero-end of the measuring board. Standard length in bony fishes is obtained by measuring from the anterior tip of the head to the posterior end of the caudal peduncle, located slightly anterior of the externally visible origin of the caudal fin rays. Bending the tail laterally upwards and noting the point of sharp flexure can most closely approximate where standard length is measured (Figure 6). Total length will be measured for all cartilaginous fishes and some bony fishes (*e.g.*, eel-like fish). Wingspan will be measured in addition to total length for stingrays and whip-tailed rays because the tips of their tails are frequently broken off (Figure 7).

The length of all fish specimens will be reported in size classes of 1 cm intervals (Mearns and Allen 1978). The first centimeter size class (size class number 1) extends from >0 to 1.0 cm; size class 2 extends from >1.0 to 2.0 cm, and so forth (Figure 8). For example, a fish measuring 7.2 cm is recorded as an 8 cm size class fish.

All species will be recorded on either the Demersal Fish Identification datasheet or the Epibenthic Invertebrate Identification datasheet (Appendix F). If using a field app to record data, ensure a hardcopy is available in case of power failure. For fish species with 10 or fewer individuals, each

size class measurement will be recorded on the Demersal Fish Identification Form (Appendix F), separated by commas. For species with more than 10 individuals, the species identifications and totals are listed on the data sheet, but the individual sizes are tallied on a separate Demersal Fish Size-Class Form (Appendix F).

An attempt should be made to size-class all fish. For the rare occasions when size classing is not possible (*e.g.*, a huge catch of a single species), a subsample of at least 250 individuals should be measured. This subsample should contain size classes which are proportionally distributed to represent the overall catch for that species (see Appendix F for more details). When this occurs, the reason should be noted on the data sheet. All anomalies must be individually noted by their size class.

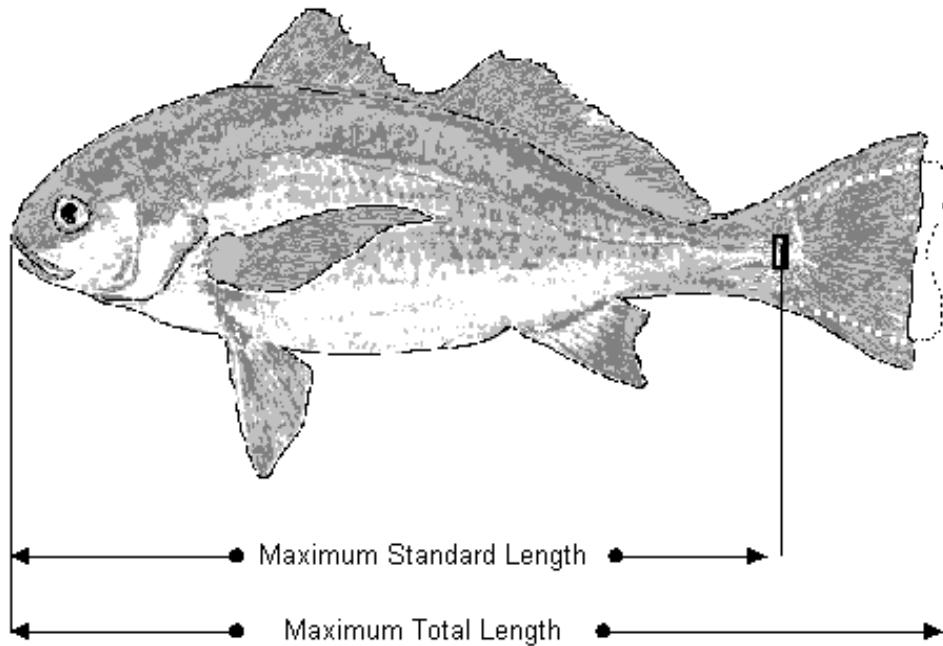


Figure 6. Endpoints for standard length (SL) and total length (TL) for bony fish.

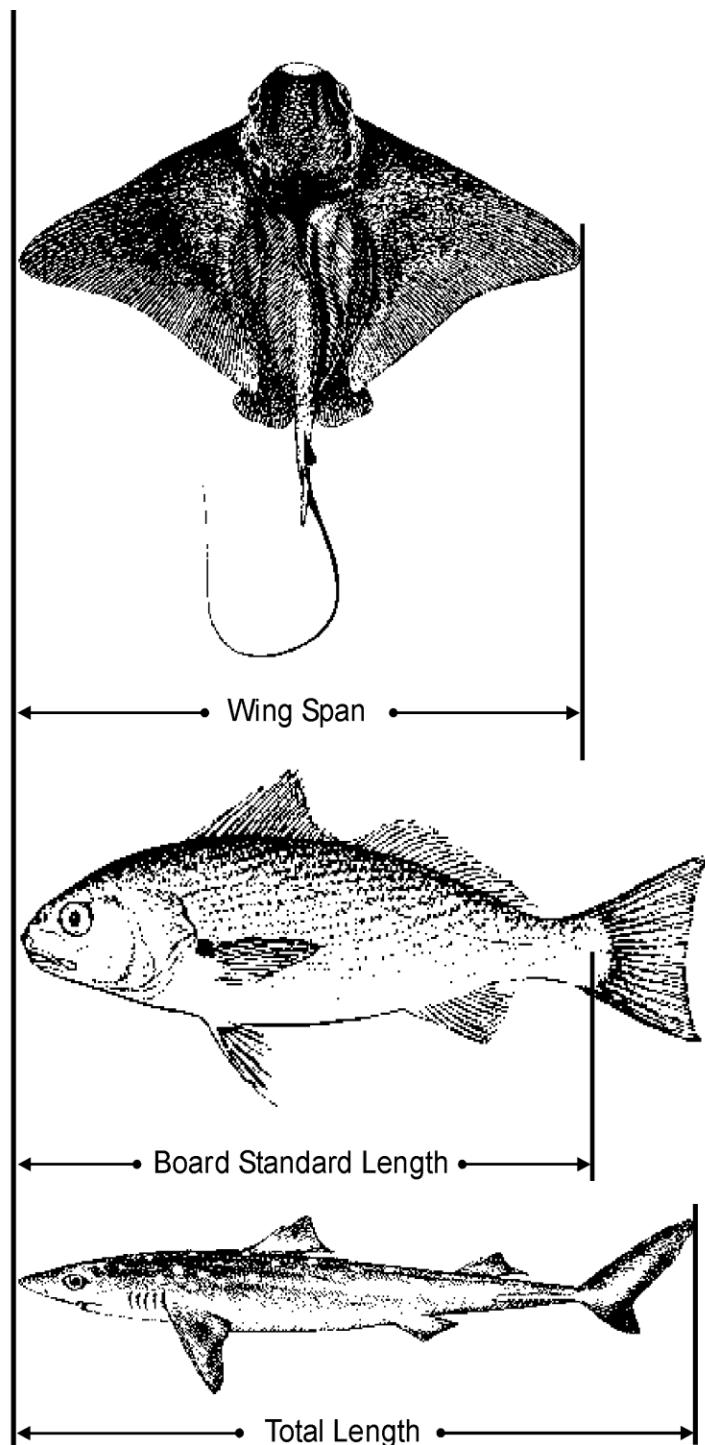


Figure 7. Comparison of board standard length (BSL) endpoints for bony fishes to wingspan (WS) and total length endpoints for cartilaginous fishes.

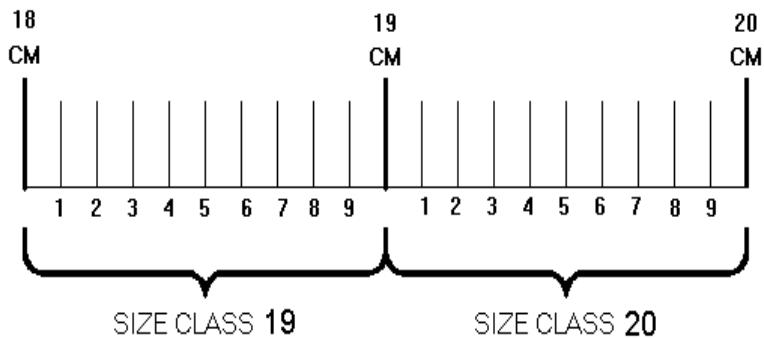


Figure 8. Relationship of centimeter size classes to millimeter values using centimeter and millimeter marks on a meter stick where size class 20 is defined as 19.1 to 20.0 mm.

Weighing

Weight data collected from fish and invertebrate species will be used to estimate the total biomass of the catch and for each species where practical. Each organization should have a range of spring scales capable of weighing up to the nearest 0.1 kg. Field crews have the discretion to use finer scales. The scales should be calibrated/verified at the start of each trawling day using a standard set of at least two weights which cover the low and high ranges of the scale. Weighing will be done using a pre-weighed tare bucket, or another suitable container (*e.g.*, plastic net bags). If a tare bucket is used, the bottom should have many holes drilled through it to allow any excess liquid to drain off before the weight is recorded. Tare buckets should be washed periodically to remove the accumulated slime.

The total biomass of each species will be measured on a spring scale. Individuals of a species with a biomass greater than 0.1 kg will be recorded to the nearest 0.1 kg. The tare container weight will be subtracted from the gross weight (species group plus tare container) to give the net weight of the species in the catch. Tare and gross weight can be recorded on the data sheet but are not required. Small species weighing less than 0.1 kg will be recorded as <0.1 kg or weighed to the 0.00 level at the discretion of the field crew. An alternative is to weigh all <0.1 kg in a composite bucket for fish or invertebrates. It is difficult to estimate catch biomass when large number of species in a trawl net are <0.1 kg. These composite weights will assist in a better calculation of total biomass for the catch.

Large organisms may be weighed individually. Individual weights of smaller specimens may also be collected using a range of scales capable of weighing to the nearest 0.1 g.

Enumeration

Fishes and invertebrates are normally enumerated after identification. The total number of each fish and invertebrate species should be recorded on their respective identification form. When catches of single fish exceed 10 individuals, those counts will also be recorded on a Demersal Fish Size-Class Form. If a particularly abundant species (250+) is encountered, the aliquot method of enumeration can be employed (at the discretion of the Cruise Leader).

Aliquots

A generalized aliquot method is commonly used to subsample large catches of fish and

invertebrate species. Begin by selecting a representative subsample of the catch by counting a minimum of 250 specimens from the catch and weighing the subsample to the nearest 0.1 kg. Next, weigh the remaining specimens and then divide that weight by the aliquot weight. Multiply that by the number of individuals in the aliquot to arrive at an estimate of the total number of individuals.

An alternative method for invertebrates can also be used. Add an unknown number of animals to a bucket until a weight of 1 kg is reached. Determine the number of animals it took to achieve the 1 kg weight. Weigh the remaining specimens, and then divide that weight by the aliquot weight. Multiply that weight by the number of individuals in the aliquot to arrive at an estimate of the total number of individuals.

The aliquot method has some inherent biases that the field crew must guard against.

- 1) The size class distribution of the individuals in the subsample should be representative of the specimens from which the aliquot was taken. Very large or small individuals could bias the weight so they should be enumerated separately.
- 2) Choose a spring scale where the weights fall within the mid to upper range of the spring scale being used. This prevents the inherent inaccuracy of the spring scale at the low end from being multiplied throughout the entire biomass calculation.
- 3) **Do not overlook anomalies** when processing aliquots. The number of anomalies should be recorded in the aliquot comments section of the data sheet and transcribed to the station species list. For fishes, include size class information. **This anomaly information needs to be included with the data submittal.**

Examination for Gross Pathology

During the identification and measurement procedures, all fishes and invertebrates will be examined for gross pathology. This entails a scan of an individual organism for obvious anomalies/parasites and noting the type of pathology (by abbreviation) next to the length of organisms (for fish) during measurement on the appropriate data sheet. The following anomalies will be noted for fish:

- 1) fin and tail erosion
- 2) tumors
- 3) leeches (*Hirudinea*)
- 4) monogeneans
- 5) other external parasites (e.g., copepods, isopods)
- 6) eye parasites (i.e., *Phrixocephalus cincinnatus*)
- 7) color anomalies (ambicoloration, albinism) (Mearns and Haaker 1973)
- 8) skeletal deformities (Valentine 1975)
- 9) lesions
- 10) other anomalies

For fishes, anomalies will be noted next to their associated length measure or tally on the Trawl Fish Species datasheet or Size Class datasheet (Appendix F) and described in the comments section. Fin erosion can be found on the dorsal, anal, and caudal fins of flatfishes, and on the lower caudal fin and pelvic fins of bilaterally symmetrical fishes. Tail erosion occurs on the top

and bottom of the caudal fin or along the entire posterior caudal fin of bilaterally symmetrical fishes. Tumors can be smooth and rounded (angioepithelial nodule) or furrowed (epidermal papilloma). Leeches are small worm-like animals that often occur on the body of some elasmobranchs and bony fishes. Monogeneans look like scales that are moving. Externally obvious copepod parasites occur on the eye, fins, gills or body of fishes. Ambicoloration is often found on the blind side of flatfish (Figure 9). Skeletal deformities include crooked backs, snub noses, or bent fin rays. Lesions include sores that do not appear to be caused by net damage, often black in color. Note that common Cymothoidae gill parasites are not to be marked as a parasite if seen on a fish.

During the data submittal process, anomalies are recorded differently into the database. A separate record should be used for fishes of the same species and size class with and without anomalies. For example, if five *Citharichthys sordidus* of size class 10 were collected at a given site and only one had an eye parasite, then two records would be needed. One record would record four *C. sordidus* of size class 10 with no anomalies, and the other would record one *C. sordidus* of size class 10 with an eye parasite (see Bight'23 Information Management Plan for more detailed information and anomaly codes pertaining to multiply occurrences on an individual).

For invertebrates, anomalies will be counted and noted in the Epibenthic Invertebrate Identification Form (Appendix F). Invertebrate anomalies are largely restricted to external parasites and include the following: surface-dwelling parasites; copepod parasites; other large, surface-dwelling molluscan, crustacean (barnacles), or turbellarian parasites; burn-spot disease (on decapods); echinoderm wasting disease (on asteroids and echinoids). Copepod parasites on the gills, which are hidden from external view and generally too small for field identification, are excluded from the anomaly category. In cases where decapods are infested with parasitic barnacles, the presence is recorded as an anomaly. Although the body of the parasitic barnacle is primarily internal, it is reflected in an external brood sac visible on the body surface. The presence of species using the exoskeleton of decapods as substrate for growth is not considered parasitic. Burn-spot disease in decapods should be counted as one anomaly per infected member of the catch, not by counting individual burn-spots on each carapace. Similarly, in echinoderm wasting disease as seen in asteroids and echinoids, each infected echinoderm should be counted as one anomaly.

Remember to associate an anomaly incidence with an individual, not an entire size class grouping or an entire group of identified species.

Retain representative examples of fishes and invertebrates exhibiting each new instance of disease or parasite. These vouchers (photo or specimen) should be submitted to SCCWRP.

Note that ectoparasites and endoparasites are common in fish but field crews have neither the time nor the experience to carefully examine each fish. Thus, only a tiny fraction of the parasites are recorded based on this superficial inspection.

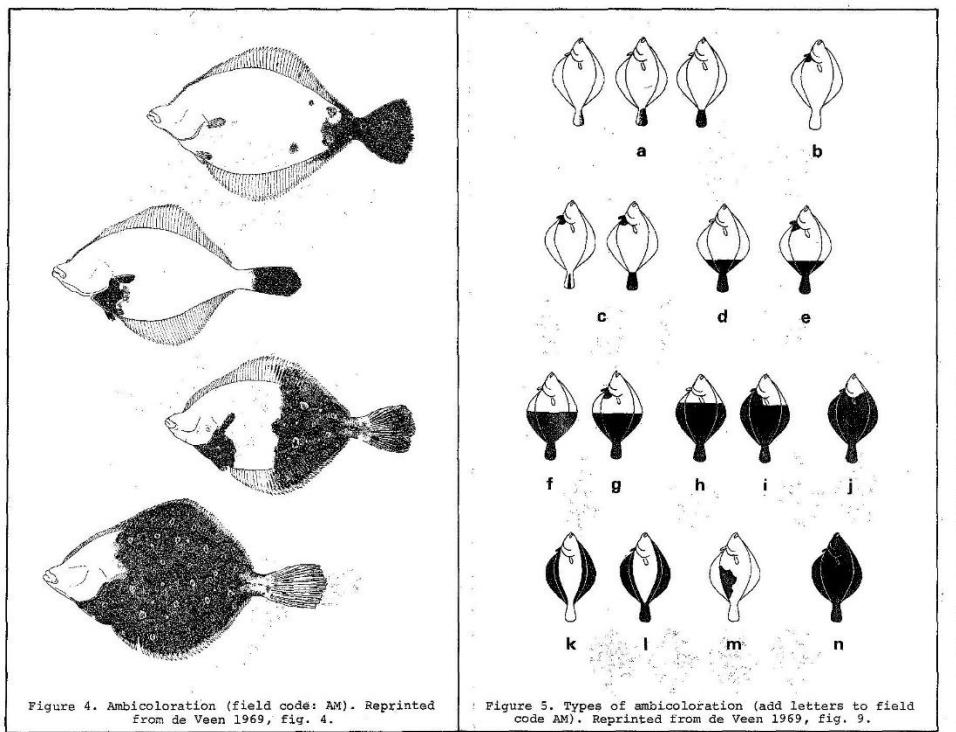


Figure 9. Examples of ambicoloration on flatfishes (Mearns and Haaker 1973)

Process Stage Monitoring

Accidental omissions can occasionally be made if a bucket of organisms is not processed. One method to avoid this problem is attaching a colored rubber tag (made of a square with a slit in one side) to the handle of each bucket to indicate a stage of processing. For instance, different tags can represent that the bucket is ready for identification, measurement, weighing, preservation, or discarding. As the bucket progresses to the next stage, the current tag can be pulled off and a new tag can be added. This procedure is not necessary for small catches but may be helpful when catches are large. Another method uses tags with commonly caught species names that can be temporarily attached to buckets to facilitate sorting and processing. The field crew has discretion to use whatever agency-specific method they choose to stop accidental omissions.

Safe Handling of Organisms

Field personnel are likely to encounter a variety of organisms that are potentially harmful. California Scorpionfish (*Scorpaena guttata*) have venomous fin spines that can cause severe pain. This species should be handled with leather gloves and/or pliers. Hot water should be applied to any puncture wound inflicted by this fish; heat is useful in breaking down the protein in the venom.

Several species of rockfishes and the Spotted Ratfish (*Hydrolagus colliei*) also have mildly venomous spines which can cause a burning sensation. The Round Stingray (*Urobatis halleri*), the California Butterfly Ray (*Gymnura marmorata*), and the Bat Ray (*Myliobatis californica*) all have venomous spines on their tails. The wound should be immersed in hot water to break down the protein in the venom.

The Pacific Electric Ray (*Tetronarce californica*) can emit a very strong electric shock. If you must handle this species, wear rubber gloves and hold it by the tail. **Do not grasp the disk with both hands!**

Pacific Angel Shark (*Squatina californica*), Pacific Spiny Dogfish (*Squalus suckleyii*), Spotted Ratfish, Midshipman (*Porichthys* spp.), and California Halibut (*Paralichthys californicus*) are some of the encountered fishes with sharp teeth that can result in painful bites if they are not handled properly.

Care must also be taken in handling the Blue Leg Mantis Shrimp (*Hemisquilla californiensis*). This species is capable of severely cutting a person with its raptorial appendages. Care should also be taken in handling any of the large crabs and octopus.

Preservation of Specimens

Voucher specimens, DNA specimens/samples (optional), incompletely identified fish and invertebrate specimens, and those with diseases that require further examination should be transported to the laboratory. Fish and invertebrate specimens may be preserved or documented for QC or identification purposes in one of four ways:

- 1) fixing in buffered formalin-seawater.
- 2) 95% ethanol (ETOH) for **DNA specimens only**; Do not use denatured or 70% ETOH.
- 3) freezing.
- 4) photographing.

Most specimens should be fixed in buffered formalin-seawater UNLESS (1) they are destined for DNA barcoding or (2) are absolutely too large for preservation in the field.

The preferred method for preserving small specimens is to fix them in 10% buffered formalin-seawater. Buffered formalin is made by mixing 50 g Na₂B₄O₇ (sodium borate) per liter of formaldehyde or 5 g per liter of 10% formalin. The body cavities of fish greater than 6 cm in length should be slit with a scalpel on the right (for most bilaterally symmetrical fish), the blind side (for flatfish), or ventral side (for dorsoventrally flattened fish, such as rays) before the specimen is placed in formalin. The slit allows the preservative to enter the body cavity and preserve the internal organs. **Note that by convention, bilaterally symmetrical fish are photographed or drawn with their heads facing left and dissections or gut cavity incisions are conducted only on the right side of the fish.**

- 1) Fishes and invertebrates will be placed in plastic bags or plastic jars and fixed in 10% buffered formalin-seawater. Fishes should be inserted tail-first into jars so that they can be removed easily without destroying the fin rays or spines.
- 2) Fishes should remain in formalin for no more than a week before being transferred to a freshwater bath. It is recommended that fish specimens soak in freshwater for at least two days. The water should be replaced at least once during that period. The fish should then be transferred to a solution of 70% ethanol for long-term preservation.

- 3) Trawl-caught invertebrates will also be fixed in 10% buffered formalin-seawater, rinsed with water after 2-10 days, and then preserved in 70% ethanol.
- 4) Freezing is acceptable to help with color pattern identification and euthanasia. If needed, large specimens can be placed in plastic bags and frozen on dry ice if excessively large quantities of formalin would be required to fix the specimen in the field. These can then be thawed and fixed in the laboratory with a 10% buffered formalin solution. If possible, large specimens with tumors, fin erosion, or lesions should be photographed then the section with the anomaly should be fixed in the field with formalin rather than frozen. **Do not freeze specimens that can otherwise be preserved in the field in formalin-seawater.**
- 5) Small invertebrates (*e.g.*, nudibranchs) may be kept cold in seawater and returned alive to the lab for identification. Color photographs of these specimens are strongly recommended.

Photography of recently caught specimens can be useful in documenting color patterns that can be used in subsequent field identifications. It is recommended that the specimen should be photo documented whenever possible. Very large specimens of fish and invertebrates can be officially photo-vouchered in the field. Photo-vouchers of very common species with easily identifiable morphological structures are acceptable. The photograph should show the overall appearance of the specimen, and additional photos must be taken to verify important taxonomic features. If characters necessary for the identification of a species cannot be seen in the photograph, preserve it because the photograph will not be accepted as a voucher. Colorful fishes may also be photographed in addition to providing a preserved specimen to aid in identification of the voucher. Photographs of unidentified rockfishes, in particular juveniles, should be taken as soon as possible after capture because their color, which is an important taxonomic character, fades or changes during preservation.

Bilaterally symmetrical fishes and dorsoventrally flattened fishes (skates, rays) should be photographed facing left. Flatfish should be photographed with the eyed side up. The left-eyed species should be photographed facing to the left and the right-eyed species should face to the right (**Note: To prevent upside-down photos**, the gill cover slit should be oriented towards the bottom profile of the body). If an anomaly or important character occurs on the opposite side of the recommended profile, additional photos should also be taken of the afflicted side. All specimens should be photographed on a light background with a ruler alongside. Labeling the photo with date, station number, and species in large bold letters is recommended but image metadata can be submitted with the photo. Notes should be made of character states that can aid in identification (*e.g.*, counts of fin rays, gill rakers, and scales).

Specimens preserved for further identification must be noted on the field data sheet. Note whether the organism is fixed (formalin or ethanol), frozen, or photographed. A photograph log should be kept during the survey, documenting the species name, the frame or image number, the date, and the station location of each photograph. Voucher specimens will not be submitted to SCCWRP until they have been transferred to alcohol, numbered, and an associated inventory list presented.

Species preservation and voucher collection is a QA/QC activity to ensure data quality and

comparability across all participating field organizations. Historically, photos have been of poor quality or lack important taxonomically identifiable structures. Review photos in the field to verify quality and morphological structures.

M. Voucher Collection

Participating organizations will provide at least one representative of each unique species collected by their field crew during the survey for the Bight'23 voucher collection. This collection will document and verify trawl diversity and the types of diseases or anomalies found in the examinations for gross pathology. Voucher specimens should be preserved in an appropriate manner and include a label with scientific name, collection date, site name, site location, and depth (Appendix F). It represents the final QAQC check for taxonomic identification. Field crews are responsible for creating, maintaining, and checking a species list for specimens collected as vouchers. These specimens are to remain with the Bight'23 collection and cannot be used for their own organizations collection.

The Bight'23 voucher collection of trawl organisms will be temporarily housed at SCCWRP. Submit an electronic voucher inventory list with the specimens on an Excel spreadsheet (*i.e.*, Organization code, Specimen Number, Scientific Name, Common Name, Station ID, Collection Date, Collection Depth, and Preservation Method). Clearly number the outside of the voucher containers so it matches the inventory list. The invertebrate collection and selected rare/unusual fishes will later be transferred to the Natural History Museum of Los Angeles County. The collection will be taxonomically validated by members of SCAMIT (invertebrates) and SCAITE (fish). The Bight program encourages new and existing participants to continue developing an organizational voucher collection for their future needs if accessing museum collections is not a good alternative. Fishes not transferred to the museum will be returned to the collecting organization for disposal.

N. DNA Barcoding Specimens

Collecting specimens for DNA barcoding is optional and at the discretion of field crews and their organizations. If more than one specimen of a newly encountered species is taken, a second specimen (tissue clips are acceptable substitutes) can be retained for future DNA analysis. If possible, the museum is interested in small multiples of invertebrate specimens from multiple locations. Each of these specimens/samples will be preserved in 95% ethanol (not denatured ethanol or isopropyl alcohol). The museum can provide 90% ethanol upon request for collecting specimens. Note that 90% ethanol is only recommended for short-term storage. For large specimens, or if only one individual of a species is collected, the whole specimen will be photo-voucherized (needs associated collection data/scientific name) or retained for the voucher collection and a snip of a fin/tissue will be retained in 95% ethanol. Priority should be with whole animals for DNA analysis because of potential mucus contamination from other trawl-caught species. Store DNA samples individually or in a bucket of 95% ethanol and away from formalinized voucher specimens. Upon returning to the laboratory, transfer specimens to fresh 95% ethanol. DNA specimens will be transferred to SCCWRP in clean glass jars or bucket with fresh 95% ethanol. Separate and label specimens by station and scientific name (see Appendix F for examples of inside and outside labels) so animals can be tracked back to its voucher counterpart and database record. Distinguish DNA specimens with a color dot on the outside of the container

for post-survey voucher validation with coded numbering (*e.g.*, D-1, DNA-1, etc.). For invertebrates, the taxonomic laboratories or associated sampling organizations can contact the museum directly or use SCCWRP as a pickup and dropoff location for museum supplies and transfers. The museum will need a copy of the CDFW field collection permit. Museum contacts for invertebrates are Dean Pentcheff (pentcheff@gmail.com) or Regina Wetzer (rwtzer@gmail.com).

At present, the museum still has poor DNA coverage for many invertebrates. If specimens are small, ideally 3-5 individuals of any species will elucidate the diversity at a specific locality (*i.e.*, stations). For species complexes and troublesome taxa, specimens from multiple localities are extremely useful for quickly discerning relevant distinguishing morphological characters. If specimens are large, specimen photo-documentation (needs associated collection data/scientific name) and a preserved tissue will suffice. For fish, the museum is only interested in new, rare, or unusual specimens.

O. FID Specimens

Specimens requiring further identification should be reexamined in the lab by the same organization and the data corrected as appropriate on the field data sheet. Do not submit FID specimens to SCCWRP unless the identifications cannot be reliably resolved in-house by staff taxonomists. Any unresolved FIDs SCCWRP receives will be identified at the time when vouchers are validated. FID data will be returned to the responsible organization so the data sheets can be revised, and the database submissions corrected.

P. Quality Assurance/Quality Control Procedures

In addition to the pre-survey QA protocols, the following QC measures will check the accuracy of taxonomic identifications and counts made during the survey:

- 1) Measurement Quality Objectives (MQO) for trawl-caught organisms are as follows:
 - Identification- 90%,
 - Enumeration- 90%
 - Length- 90%
 - Biomass- 90%
 - Gross pathology- 90%
- 2) External QA/QC field audits of each field group will be conducted during Bight'23 to ensure that trawling is being carried out per project protocols and that the specimens are being processed properly. Taxonomic identifications will be checked during at least one visit to each vessel by QA/QC Field Auditors. They will observe species identifications by each organization in the field and record the data on a Taxonomy QA/QC Data Sheet (Appendix I). Their duties include rechecking the identifications of at least 25% of the species collected during the day and noting any problems with the identification of pathologies. An auditor may ask that a species gets retained, re-measured and re-weighed for QAQC purposes. The Lead Scientist will be informed of any problems and the field

personnel will be instructed regarding the appropriate identifications as needed. Each vessel will be expected to have appropriate taxonomic identification aids during the survey. The trawl committee may recommend that data from organizations that fail their external audit be flagged in the database for possible exclusion from the Bight'23 Trawl report.

- 3) The Cruise Leader for the field team will perform QC field audits on a minimum of 10% of their assigned trawl sites. For example, if 21 sites are assigned then 3 QC audits are performed or if 4 sites are assigned then 1 QC audit is performed. The audit is performed on fellow team members conducting trawling operations. The Cruise Leader will predetermine the QC stations. Per QC audit, two species of fish (one bilaterally symmetrical and the other a flatfish) and invertebrates will be internally audited. Whenever possible, the species selected for auditing should have a minimum of 10 individuals (greater is recommended). After normal processing, the crew will retain these species. The Cruise Leader (or designee) will reprocess the same specimens with the results recorded on a QA/QC data sheet (Appendix I) and then compare with the original results. If obvious discrepancies occur, the Cruise Leader is responsible for re-training and oversight as the specimens are reprocessed, in addition to oversight at subsequent trawl sites. Species selected for QC processing should change throughout the project. If low abundances of invertebrate and fish (<10 individuals) occur, QC audits can run into subsequent trawl sites until complete. The Cruise Leader has the option to QC process invertebrate abundances between 5-10 individuals if subsequent trawl sites still produce low invertebrate counts.
- 4) Taxonomic QC voucher checks. A voucher specimen of each species collected by each organization (preserved and photo-voucherized) will be submitted to SCCWRP (see Voucher Collection above). The identification of these specimens will be checked by qualified taxonomists (*i.e.*, members of SCAMIT, SCAITE) following the survey to further ensure that identifications were made correctly. Anomalies will also be verified. Errors will be corrected in the data.
- 5) A digital copy of all field organizations' internal QC data sheets are to be emailed to SCCWRP (Dario Diehl, dariod@sccwrp.org). They will be summarized and reported to the steering committee and included in the final trawl report.

Lead Scientists, Cruise Leaders, and Lead Taxonomists are responsible for training their staff on methods described within this SQA Field Operations Manual. A check-list of internal QA/QC activities (*e.g.*, fishboard accuracy check, scale calibration, oversight of measuring and weighing techniques, anomaly checks, datasheet review, etc.) is recommended.

Q. Special Studies

None

X. LABELING AND SHIPPING OF SAMPLES AND FIELD DATA SHEETS

A. Sample Labels/Tracking

Each sample will be identified and tracked by the station, parameter, date sampled, and split number if required. Individual log numbers may be used at the discretion of the sampling organization. Sample log numbers will be handled by SCCWRP for the samples shipped to SCCWRP that are not run by the organization that collected them in the field.

B. Labels

Labels will be printed by the organization responsible for field sampling prior to the survey and will include, at a minimum, the station number, parameter, date, and split (*i.e.*, 1 of 1, 2 of 3, etc.). Dates will be reported as day/month/year. External labels should be affixed with clear postal tape to the outside of the container. Internal labels for biological samples must us archival paper. Use 100% cotton rag (*e.g.*, Resistall, available from University Products) which can be both laser printed and written on with No. 2 pencil. These labels are put directly into the container with its specimen(s). Ethanol removes most inks and archival pens are fussy to use in the field – hence No. 2 pencil is preferred. Plasticized label paper is not suitable for wet collections of any kind.

C. Field Data Sheets

If a field computer data system is not being used during any part of the Bight'23 sampling, data sheets and cruise logs will be retained by the sampling organization up to 5 years following completed sampling. Ensure all species identifications are complete on the trawl data sheets. Species identified in the laboratory must be added to these data sheets and verified within the laboratory.

Upon completion of all laboratory identifications, the good quality hardcopies of original field data sheets, photographs, and collection permit are to be retained by the sampling organization. Submit all field data electronically to the SCCWRP web portal (data checker). Submit good quality PDFs of all field data to SCCWRP as soon as the data sheets have completed internal QA/QC review by sampling organizations. Ensure all handwritten comments from pencil are visible and clear in the PDF or hardcopy. SCCWRP may request the originals if sampling organizations submit poor PDF copies or ask for additional electronic copies which clearly highlight problematic text.

D. Shipping of Samples

All benthic infauna, sediment chemistry, and toxicity samples not analyzed by the field sampling organization's laboratory will be shipped or delivered to SCCWRP within the prescribed holding time. All shipping of samples will be the responsibility of the field sampling organizations. See Appendix K for detailed SCCWRP shipping information. Check regulations for shipping hazardous materials.

Voucher collections will be taken or shipped to SCCWRP after an organization has completed proper specimen preservation, transfers to specimen jars, internal taxonomic identification, and inventory list.

E. Chain of Custody Forms

Chain of custody forms (field organizations own form or Appendix F) are to be filled out detailing the transfer of samples from the vessel crew to the laboratory, or to delivery personnel. A form is to be filled out for each set of samples that will be transferred to a specific location. The sample and container type should be included on the form to identify the samples being transferred. This form is to be signed by the crew member transferring the samples and the laboratory staff member receiving them. A copy of the form is to be kept and the original form with signatures will accompany the samples. If samples are shipped by carrier, a copy of the chain of custody form is to be sent to SCCWRP for tracking purposes.

XI. CONTINGENCY PLANS

A. Purpose

Any field program can be affected by factors outside the control of the sampling crews. Weather, equipment failure, errors in designating station locations, and accidents can all prevent the field crews from obtaining samples at one or more stations. Contingency plans made in advance of the survey can greatly facilitate decision-making in the field. It is the responsibility of the Cruise Leader to make most of these decisions in the field, based on the protocol described below. If there is any question regarding which protocol to follow, the Field Coordinator (Dario Diehl) should be notified immediately.

B. Adverse Weather Conditions

If the weather conditions deteriorate during any sampling day, it is ultimately the responsibility of the Boat Captain to determine if the conditions are sufficiently bad to prevent further sampling. The Cruise Leader in consultation with the Boat Captain should evaluate all alternatives, such as sampling in more protected areas or returning to the prescribed schedule when the weather improves. Every attempt should be made to avoid wasting the entire day. However, **the safety of the crew is priority number one.**

C. Station Inaccessibility

Stations can be inaccessible because 1) they were incorrectly positioned on land, 2) located in water too shallow for the boat, or 3) they cannot be sampled for unforeseen circumstances. If it cannot be sampled, the sampling site will be moved to a location within 100 m horizontal distance from the original site, staying within +/-10% of the depth of the original site. If it still cannot be sampled, the station will be abandoned. For most Bight'23 strata (shelf, slope, Northern Channel Islands), no station should be sampled in less than 6 m or more than 1000 m. In bays and harbors, the safety margin is 3 m. In estuaries, 1 m is the safety margin using shallow draft vessels. Estuary samples should only be collected within subtidal portions of the channel. In freshwater estuaries with potential wadable sites, it is the judgement of the field team as to safety and accessibility of the site.

D. Lost Gear

Lost gear can potentially have a significant effect on the sampling program. Equipment can be expensive, and replacements may not be obtained in a timely manner. Crews should take every precaution against the loss of gear by properly tightening shackles and other connectors.

If important gear is lost, notify the Boat Captain immediately, so he can record the position using the vessel's navigation system. If possible, deploy a buoy at that exact location so relocation is made easier. Attempt to recover the equipment for a reasonable amount of time. If unsuccessful, use spare equipment (when available) or continue sampling without that particular equipment. Notify the Regional Monitoring Coordinator as soon as possible when equipment is lost.

XII. WASTE DISPOSAL

Proper disposal of all waste is an important component of field activities. At no time will any waste be disposed of improperly. The proper methods of waste disposal are outlined below:

A. Routine Garbage

Regular garbage (paper towels, paper cups, etc.) is placed in trash containers on board the boats. It can then be disposed of on land in public receptacles or recycled.

B. Detergent Washes

Biodegradable detergents are not to be used for routine cleaning of any sampling equipment during Bight'23. They are not as effective as laboratory detergents with lower pH. Limit detergent disposal at sea on an as-needed basis or use ambient seawater.

C. Chemicals

Acetone, formalin, and other hazardous materials should be disposed of by following all appropriate hazardous materials regulations. They should never be disposed of at sea.

D. Fish Waste

After each trawl catch has been processed completely, the remaining catch should be returned to the sea. Use discretion when discarding the catch. For sampling conducted nearshore or in bays and harbors, return only live fish and invertebrates to the area where trawling occurred. All remaining fish should be disposed offshore. Under no circumstances should fish be given to the public.

XIII. BIGHT'23 PROGRAM ORGANIZATION

SEDIMENT QUALITY ASSESSMENT COMMITTEE

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APPENDICES

APPENDIX A

BIGHT'23 STATION LOCATION MAPS

APPENDIX B

BIGHT'23 FIELD SAMPLING ORGANIZATIONS

AND STATION DRAW INFORMATION

APPENDIX C

BIGHT'23 SAMPLE PROCESSING

ANALYTICAL LABORATORIES

APPENDIX D

BIGHT'23 SAMPLING EQUIPMENT

APPENDIX E

BIGHT'23 VESSEL SPECIFICATIONS

APPENDIX F

BIGHT'23 FIELD DATA FORMS

APPENDIX G

BIGHT'23 SEDIMENT SAMPLING GUIDE

APPENDIX H

BIGHT'23 TRAWL WIRE SCOPE GUIDE

APPENDIX I

BIGHT'23 QA/QC AUDIT FORMS

APPENDIX J

BIGHT'23 ORGANIZATION CONTACTS

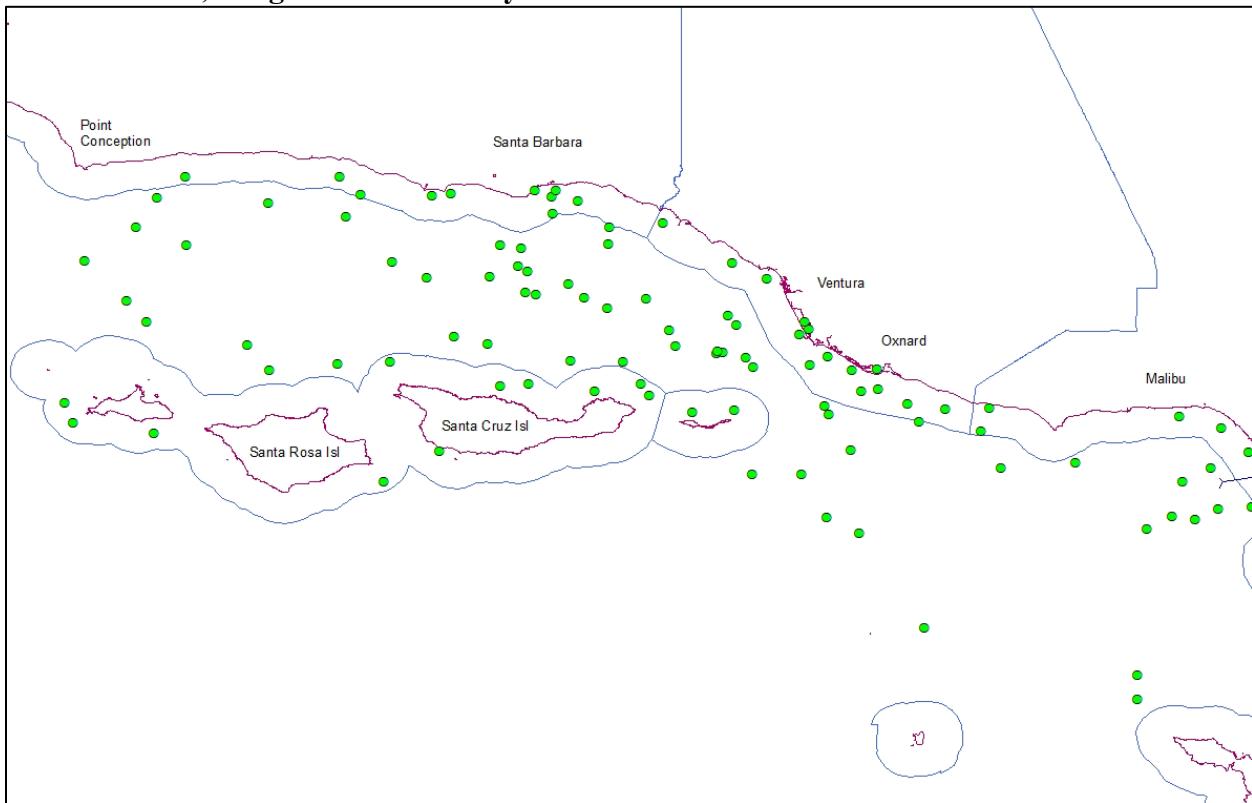
APPENDIX K

BIGHT'23 SHIPPING INFORMATION

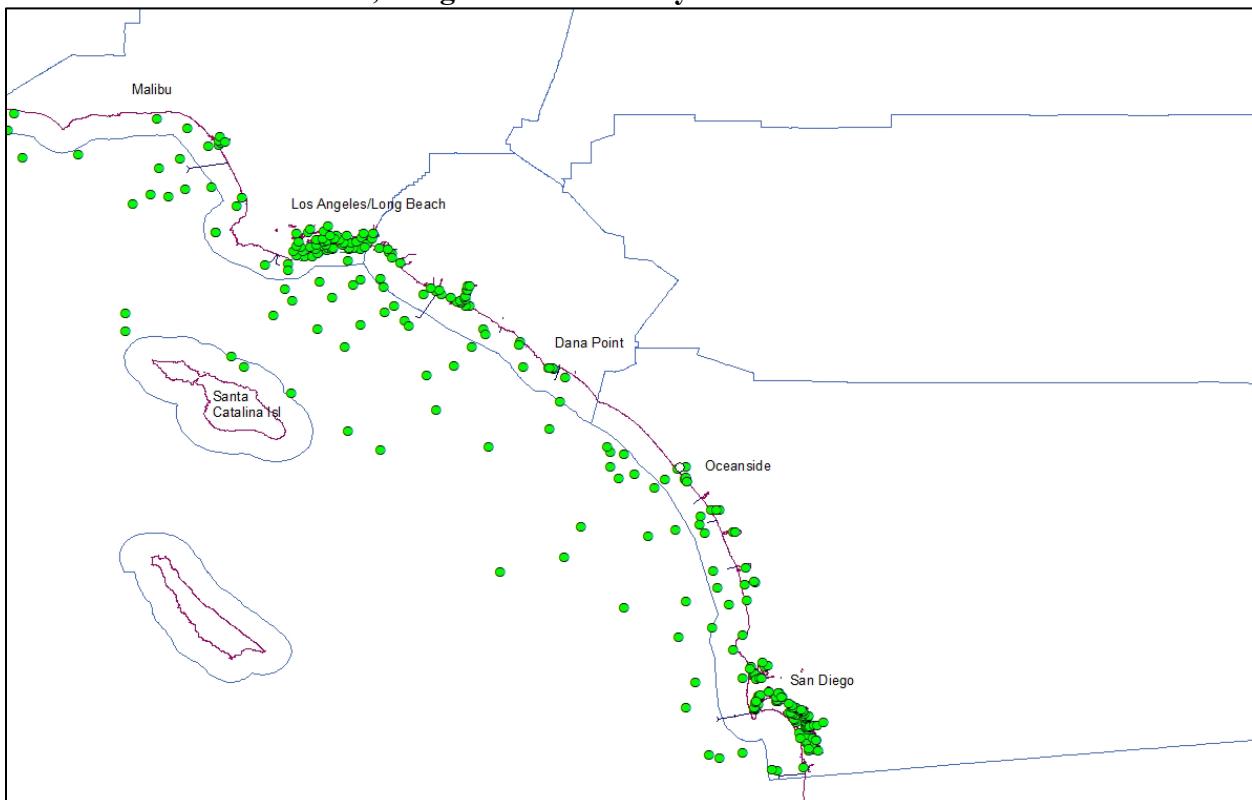
APPENDIX A

BIGHT'23 STATION LOCATION MAPS

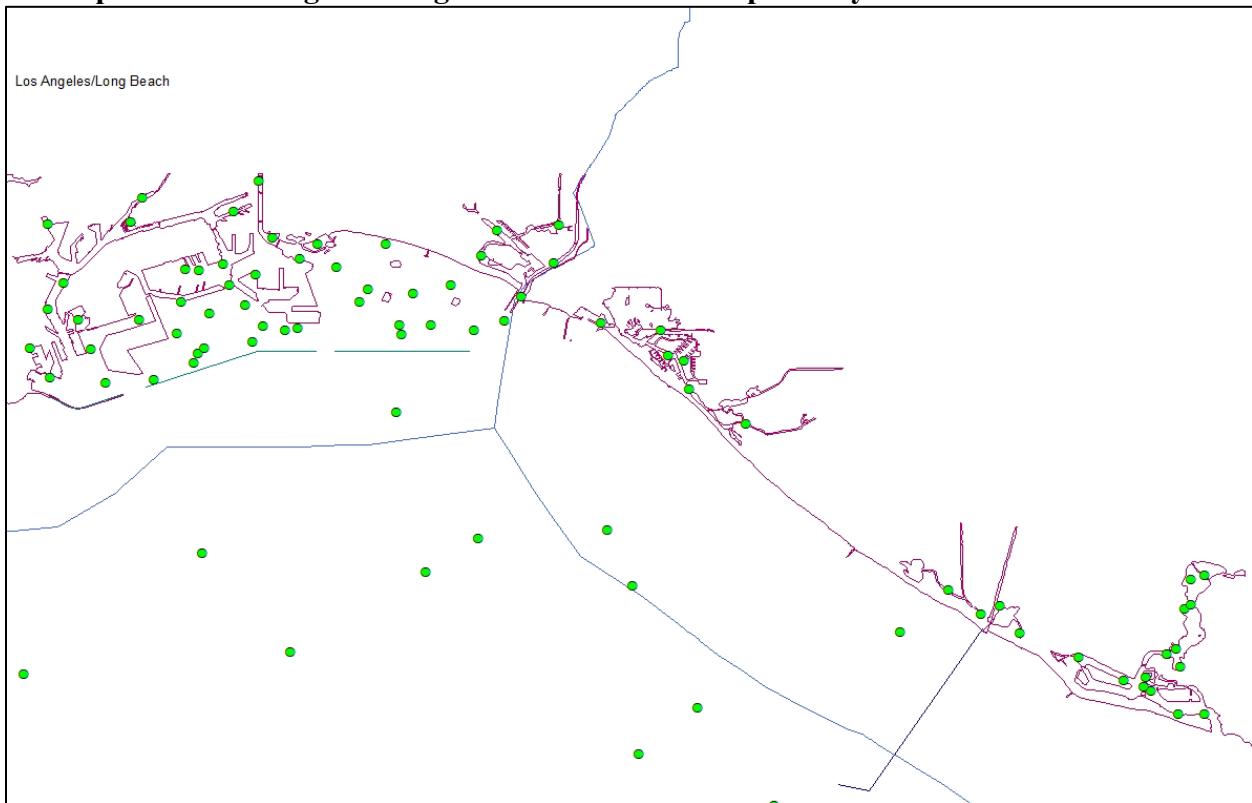
Northern SCB, images include county and state 3-mile boundaries.



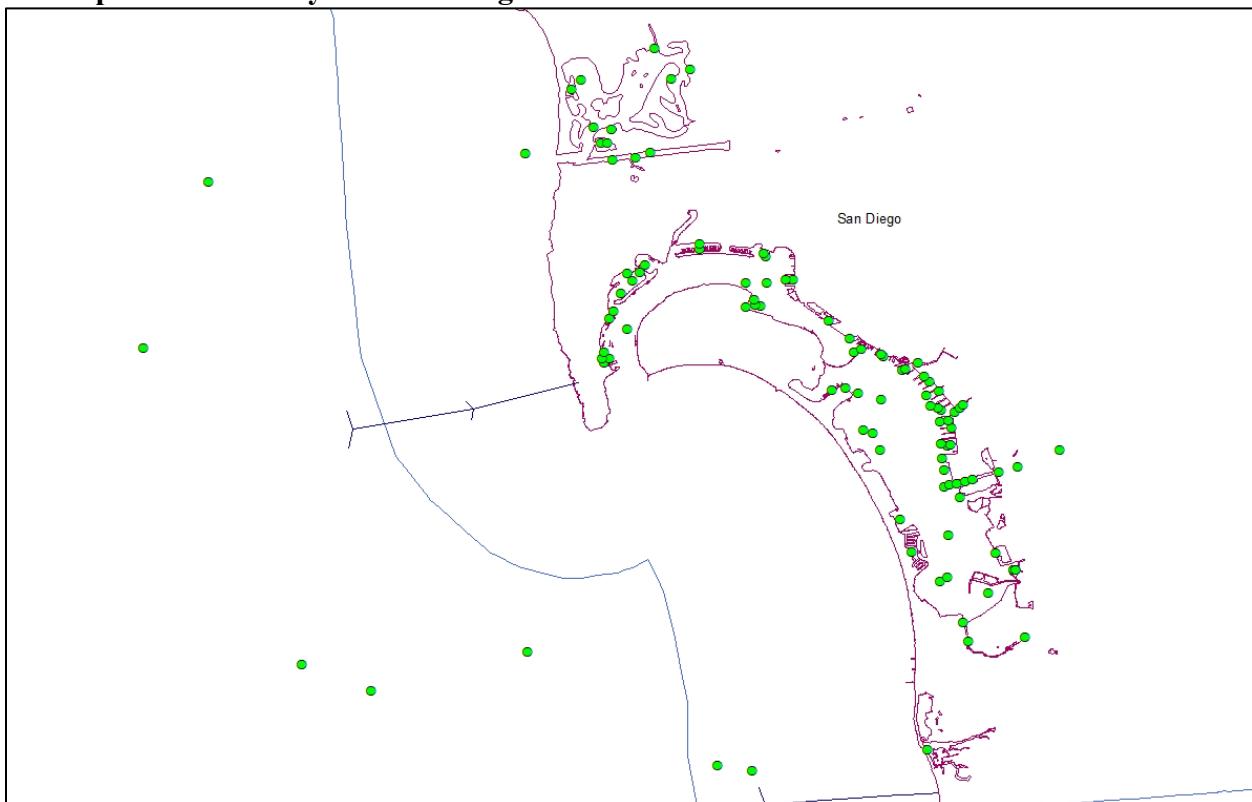
Central and Southern SCB, images include county and state 3-mile boundaries.



Closeup of the Los Angeles/Long Beach harbor to Newport Bay.



Closeup of Mission Bay and San Diego Harbor.



APPENDIX B
BIGHT '23 FIELD SAMPLING ASSIGNMENTS
BASED ON
REGIONAL SURVEY PARTICIPANTS

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix B

B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Ch em	Infuna	Tox Eoh	Tox Myt	Pi ast	PF Qu	Ne o
B23-12000	32.609758	-117.107404	32	36.5855	117	6.4442	Bay	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12001	32.613722	-117.123706	32	36.8233	117	7.4224	Bay	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12002	32.615234	-117.121302	32	36.9141	117	7.2781	Bay	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12003	32.629576	-117.120989	32	37.7746	117	7.2593	Bay	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12004	32.634848	-117.137437	32	38.0909	117	8.2462	Bay	San Diego Bay	New	RHMP	RHMP	X	X	X	X	X	X	
B23-12005	32.642379	-117.117124	32	38.5427	117	7.0275	Bay	San Diego Bay	RHMP	RHMP	RHMP	X	X	X	X			
B23-12006	32.645728	-117.122482	32	38.7437	117	7.3489	Bay	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12007	32.646565	-117.120760	32	38.7939	117	7.2456	Bay	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12008	32.646936	-117.118238	32	38.8162	117	7.0943	Bay	San Diego Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12009	32.658339	-117.144218	32	39.5003	117	8.6531	Bay	San Diego Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12010	32.664260	-117.146848	32	39.8556	117	8.8109	Bay	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12011	32.665184	-117.149804	32	39.9110	117	8.9882	Bay	San Diego Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12012	32.675472	-117.143841	32	40.5283	117	8.6305	Bay	San Diego Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12013	32.677782	-117.151689	32	40.6669	117	9.1013	Bay	NBC-NAB	new	Navy	NA	X	X	X	X			
B23-12014	32.699541	-117.230208	32	41.9725	117	13.8125	Bay	San Diego Bay	New	RHMP	RHMP	X	X	X	X	X	X	
B23-12015	32.707000	-117.189900	32	42.4200	117	11.3940	Bay	NASNI	Revisit	Navy	NA	X	X	X	X			
B23-12016	32.707400	-117.185000	32	42.4440	117	11.1000	Bay	NASNI	Revisit	Navy	NA	X	X	X	X			
B23-12017	32.707812	-117.186718	32	42.4687	117	11.2031	Bay	NASNI	new	Navy	NA	X	X	X	X			
B23-12018	32.709500	-117.186900	32	42.5700	117	11.2140	Bay	NASNI	Revisit	Navy	NA	X	X	X	X			
B23-12019	32.714963	-117.182907	32	42.8978	117	10.9744	Bay	San Diego Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12020	32.715218	-117.189873	32	42.9131	117	11.3924	Bay	San Diego Bay	New	RHMP	RHMP	X	X	X	X	X	X	
B23-12021	32.724148	-117.182983	32	43.4489	117	10.9790	Bay	San Diego Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12022	32.767905	-117.241481	32	46.0743	117	14.4889	Bay	Mission Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12023	32.784007	-117.245969	32	47.0404	117	14.7581	Bay	Mission Bay	RHMP	RHMP	RHMP	X	X	X	X			
B23-12024	32.784475	-117.215358	32	47.0685	117	12.9215	Bay	Mission Bay	Revisit	RHMP	RHMP	X	X	X	X	X	X	
B23-12025	32.787656	-117.208778	32	47.2594	117	12.5267	Bay	Mission Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12026	32.794621	-117.220832	32	47.6773	117	13.2499	Bay	Mission Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12027	33.712420	-118.257900	33	42.7452	118	15.4740	Bay	LA/LB	Revisit	RMP	WSP	X	X	X	X	X	X	
B23-12028	33.713450	-118.241310	33	42.8070	118	14.4786	Bay	LA/LB	Revisit	RMP	WSP	X	X	X	X	X	X	
B23-12029	33.714043	-118.276701	33	42.8426	118	16.6020	Bay	LA/LB	PortLA	RMP	NA	X	X	X	X			
B23-12030	33.722423	-118.226498	33	43.3454	118	13.5899	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12031	33.724210	-118.224370	33	43.4526	118	13.4622	Bay	LA/LB	Revisit	RMP	WSP	X	X	X	X	X	X	
B23-12032	33.726297	-118.207675	33	43.5778	118	12.4605	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12033	33.728683	-118.157000	33	43.7210	118	9.4200	Bay	LA/LB	Revisit	RMP	CLAEM	X	X	X	X	X	X	
B23-12034	33.730170	-118.132382	33	43.8102	118	7.9429	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12035	33.731680	-118.204150	33	43.9008	118	12.2490	Bay	LA/LB	Revisit	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12036	33.732107	-118.147171	33	43.9264	118	8.8303	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12037	33.732107	-118.157928	33	43.9264	118	9.4756	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12038	33.735980	-118.222465	33	44.1588	118	13.3479	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12039	33.739800	-118.171317	33	44.3880	118	10.2790	Bay	LA/LB	Revisit	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12040	33.742717	-118.153200	33	44.5630	118	9.1920	Bay	LA/LB	Revisit	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12041	33.744217	-118.168733	33	44.6530	118	10.1240	Bay	LA/LB	Revisit	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12042	33.745663	-118.140449	33	44.7398	118	8.4269	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix B

B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Chem	Infuna	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12043	33.751472	-118.179440	33	45.0883	118	10.7664	Bay	LA/LB	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12044	33.759400	-118.162667	33	45.5640	118	9.7600	Bay	LA/LB	Revisit	RMP	CLAEM	X	X	X	X	X	X	
B23-12045	32.623479	-117.104780	32	37.4088	117	6.2868	Marina	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12046	32.623601	-117.133460	32	37.4161	117	8.0076	Marina	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12047	32.711543	-117.232552	32	42.6926	117	13.9531	Marina	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12048	32.716005	-117.228427	32	42.9603	117	13.7056	Marina	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12049	32.718402	-117.230400	32	43.1041	117	13.8240	Marina	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12050	32.718569	-117.226112	32	43.1141	117	13.5667	Marina	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12051	32.721249	-117.224043	32	43.2749	117	13.4426	Marina	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12052	32.725018	-117.183684	32	43.5011	117	11.0210	Marina	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12053	32.726491	-117.205529	32	43.5895	117	12.3318	Marina	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12054	32.728398	-117.205529	32	43.7039	117	12.3318	Marina	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12055	32.762470	-117.239165	32	45.7482	117	14.3499	Marina	Mission Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12056	32.762708	-117.236932	32	45.7625	117	14.2159	Marina	Mission Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12057	32.767196	-117.235646	32	46.0318	117	14.1388	Marina	Mission Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12058	32.780705	-117.249278	32	46.8423	117	14.9567	Marina	Mission Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12059	33.204387	-117.391321	33	12.2632	117	23.4792	Marina	Oceanside Har	RHMP	RHMP	NA	X	X	X				
B23-12060	33.208250	-117.396637	33	12.4950	117	23.7982	Marina	Oceanside Har	New	RHMP	RHMP	X	X	X	X	X	X	
B23-12061	33.209461	-117.395309	33	12.5677	117	23.7185	Marina	Oceanside Har	Revisit	RHMP	NA	X	X	X				
B23-12062	33.212893	-117.394675	33	12.7736	117	23.6805	Marina	Oceanside Har	RHMP	RHMP	NA	X	X	X				
B23-12063	33.458595	-117.693595	33	27.5157	117	41.6157	Marina	Dana Point Har	RHMP	RHMP	NA	X	X	X	X	X	X	
B23-12064	33.460309	-117.706007	33	27.6186	117	42.3604	Marina	Dana Point Har	New	RHMP	RHMP	X	X	X	X	X	X	
B23-12065	33.460413	-117.695691	33	27.6248	117	41.7415	Marina	Dana Point Har	RHMP	RHMP	NA	X	X	X				
B23-12066	33.461018	-117.701980	33	27.6611	117	42.1188	Marina	Dana Point Har	RHMP	RHMP	NA	X	X	X				
B23-12067	33.600107	-117.883954	33	36.0064	117	53.0372	Marina	Newport Bay	New	OC Sa	NA	X	X	X	X	X	X	
B23-12068	33.600107	-117.893113	33	36.0064	117	53.5868	Marina	Newport Bay	New	OC Sa	NA	X	X	X	X	X	X	
B23-12069	33.607657	-117.902272	33	36.4594	117	54.1363	Marina	Newport Bay	New	OC Sa	NA	X	X	X	X	X	X	
B23-12070	33.609098	-117.904639	33	36.5459	117	54.2783	Marina	Newport Bay	Revisit	OC Sa	NA	X	X	X	X	X	X	
B23-12071	33.611432	-117.911431	33	36.6859	117	54.6859	Marina	Newport Bay	New	OC Sa	NA	X	X	X	X	X	X	
B23-12072	33.612376	-117.904235	33	36.7425	117	54.2541	Marina	Newport Bay	New	OC Sa	NA	X	X	X	X	X	X	
B23-12073	33.616150	-117.892459	33	36.9690	117	53.5475	Marina	Newport Bay	New	OCPW	NA	X	X	X	X	X	X	
B23-12074	33.619250	-117.926921	33	37.1550	117	55.6153	Marina	Newport Bay	Revisit	OC Sa	NA	X	X	X	X	X	X	
B23-12075	33.719888	-118.061247	33	43.1933	118	3.6748	Marina	Huntington Har	New	OCPW	NA	X	X	X	X	X	X	
B23-12076	33.721773	-118.066481	33	43.3064	118	3.9889	Marina	Huntington Har	New	OCPW	NA	X	X	X	X	X	X	
B23-12077	33.724121	-118.283517	33	43.4473	118	17.0110	Marina	LA/LB	PortLA	RMP	NA	X	X	X	X			
B23-12078	33.755483	-118.129894	33	45.3290	118	7.7936	Marina	Alamitos Bay	Revisit	MBC	NA	X	X	X	X	X	X	
B23-12079	33.759464	-118.185549	33	45.5678	118	11.1329	Marina	Long Beach	New	C of LB	NA	X	X	X	X	X	X	
B23-12080	33.764174	-118.124707	33	45.8505	118	7.4824	Marina	Alamitos Bay	New	MBC	NA	X	X	X	X	X	X	
B23-12081	33.767000	-118.249380	33	46.0200	118	14.9628	Marina	LA/LB	Revisit	RMP	NA	X	X	X	X	X	X	
B23-12082	33.847032	-118.399478	33	50.8219	118	23.9687	Marina	Redondo Har	New	MBC	NA	X	X	X	X	X	X	
B23-12083	33.964700	-118.453517	33	57.8820	118	27.2110	Marina	Marina del Rey	Revisit	LACPW	NA	X	X	X	X	X	X	
B23-12084	33.970367	-118.447683	33	58.2220	118	26.8610	Marina	Marina del Rey	Revisit	LACPW	NA	X	X	X	X	X	X	
B23-12085	33.974926	-118.451816	33	58.4955	118	27.1089	Marina	Marina del Rey	New	LACPW	NA	X	X	X	X	X	X	

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B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Chem	Infuna	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12086	33.983083	-118.450750	33	58.9850	118	27.0450	Marina	Marina del Rey	Revisit	LACPW	NA	X	X	X	X	X	X	
B23-12087	34.171200	-119.223480	34	10.2720	119	13.4088	Marina	Chan Isl Har	Revisit	ABC	NA	X	X	X	X	X	X	
B23-12088	34.407018	-119.688943	34	24.4211	119	41.3366	Marina	Santa Barbara	New	ABC	NA	X	X	X	X	X	X	
B23-12089	32.651550	-117.122464	32	39.0930	117	7.3478	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12090	32.655454	-117.123159	32	39.3272	117	7.3895	Port	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12091	32.659733	-117.121495	32	39.5840	117	7.2897	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12092	32.660309	-117.120251	32	39.6186	117	7.2151	Port	NBSD	new	Navy	NA	X	X	X	X			
B23-12093	32.660613	-117.123390	32	39.6368	117	7.4034	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12094	32.666000	-117.120000	32	39.9600	117	7.2000	Port	NBSD	Revisit	Navy	NA	X	X	X	X			
B23-12095	32.667970	-117.123916	32	40.0782	117	7.4349	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12096	32.668559	-117.121091	32	40.1135	117	7.2655	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12097	32.671354	-117.118965	32	40.2812	117	7.1379	Port	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12098	32.672089	-117.123512	32	40.3253	117	7.4107	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12099	32.672677	-117.124723	32	40.3606	117	7.4834	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12100	32.672797	-117.117168	32	40.3678	117	7.0301	Port	NBSD	new	Navy	NA	X	X	X	X			
B23-12101	32.673297	-117.127103	32	40.3978	117	7.6262	Port	NBSD	new	Navy	NA	X	X	X	X			
B23-12102	32.673854	-117.115846	32	40.4312	117	6.9507	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X		X	
B23-12103	32.676795	-117.128354	32	40.6077	117	7.7013	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12104	32.678400	-117.124300	32	40.7040	117	7.4580	Port	NBSD	Revisit	Navy	NA	X	X	X	X			
B23-12105	32.678894	-117.160462	32	40.7336	117	9.6277	Port	NBC-NAB	new	Navy	NA	X	X	X	X			
B23-12106	32.679450	-117.155885	32	40.7670	117	9.3531	Port	NBC-NAB	new	Navy	NA	X	X	X	X			
B23-12107	32.681501	-117.127547	32	40.8901	117	7.6528	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12108	32.683200	-117.129200	32	40.9920	117	7.7520	Port	NBSD	Revisit	Navy	NA	X	X	X	X			
B23-12109	32.685346	-117.136641	32	41.1207	117	8.1985	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12110	32.685903	-117.135493	32	41.1542	117	8.1296	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12111	32.688004	-117.237912	32	41.2802	117	14.2747	Port	NBPL	new	Navy	NA	X	X	X	X			
B23-12112	32.689435	-117.236193	32	41.3661	117	14.1716	Port	NBPL	new	Navy	NA	X	X	X	X			
B23-12113	32.689435	-117.238894	32	41.3661	117	14.3336	Port	NBPL	new	Navy	NA	X	X	X	X			
B23-12114	32.690324	-117.143284	32	41.4195	117	8.5970	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12115	32.690913	-117.143688	32	41.4548	117	8.6213	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12116	32.691687	-117.238244	32	41.5012	117	14.2946	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12117	32.691721	-117.153217	32	41.5033	117	9.1930	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12118	32.692677	-117.150547	32	41.5606	117	9.0328	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12119	32.696206	-117.154582	32	41.7724	117	9.2749	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12120	32.702400	-117.161780	32	42.1440	117	9.7068	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12121	32.702865	-117.236460	32	42.1719	117	14.1876	Port	San Diego Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12122	32.705591	-117.234719	32	42.3355	117	14.0831	Port	San Diego Bay	New	RHMP	NA	X	X	X	X	X	X	
B23-12123	32.716092	-117.173953	32	42.9655	117	10.4372	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12124	32.716190	-117.176237	32	42.9714	117	10.5742	Port	San Diego Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12125	33.719307	-118.227859	33	43.1584	118	13.6715	Port	LA/LB	New	CLAEM	NA	X	X	X	X	X	X	
B23-12126	33.723870	-118.262700	33	43.4322	118	15.7620	Port	LA/LB	Revisit	CLAEM	NA	X	X	X	X	X	X	
B23-12127	33.729240	-118.233610	33	43.7544	118	14.0166	Port	LA/LB	Revisit	CLAEM	NA	X	X	X	X	X	X	
B23-12128	33.730182	-118.196824	33	43.8109	118	11.8094	Port	LA/LB	New	CLAEM	NA	X	X	X	X	X	X	

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix B

B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Chem	Infuna	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12129	33.731100	-118.192400	33	43.8660	118	11.5440	Port	LA/LB	Revisit	RMP	NA	X	X	X	X	X	X	
B23-12130	33.732599	-118.089457	33	43.9559	118	5.3674	Port	Anaheim Bay	New	MBC	NA	X		X		X	X	
B23-12131	33.733807	-118.246313	33	44.0284	118	14.7788	Port	LA/LB	New	RMP	NA	X	X	X	X	X	X	
B23-12132	33.733914	-118.267236	33	44.0348	118	16.0342	Port	LA/LB	PortLA	RMP	NA	X	X	X	X		X	
B23-12133	33.737431	-118.277348	33	44.2459	118	16.6409	Port	LA/LB	New	RMP	NA	X	X	X	X	X	X	
B23-12134	33.738910	-118.210390	33	44.3346	118	12.6234	Port	LA/LB	Revisit	CLAEM	NA	X	X	X	X	X	X	
B23-12135	33.739848	-118.232053	33	44.3909	118	13.9232	Port	LA/LB	New	CLAEM	NA	X	X	X	X	X	X	
B23-12136	33.745530	-118.215700	33	44.7318	118	12.9420	Port	LA/LB	Revisit	CLAEM	NA	X	X	X	X	X	X	
B23-12137	33.746266	-118.272088	33	44.7760	118	16.3253	Port	LA/LB	PortLA	RMP	NA	X	X	X	X			
B23-12138	33.749044	-118.206878	33	44.9427	118	12.4127	Port	LA/LB	PortLA	RMP	NA	X	X	X	X		X	
B23-12139	33.750720	-118.226182	33	45.0432	118	13.5709	Port	LA/LB	New	CLAEM	NA	X	X	X	X	X	X	
B23-12140	33.751090	-118.230630	33	45.0654	118	13.8378	Port	LA/LB	Revisit	RMP	NA	X	X	X	X	X	X	
B23-12141	33.752690	-118.217760	33	45.1614	118	13.0656	Port	LA/LB	Revisit	RMP	NA	X	X	X	X	X	X	
B23-12142	33.754344	-118.191791	33	45.2607	118	11.5074	Port	LA/LB	New	RMP	NA	X	X	X	X	X	X	
B23-12143	33.766200	-118.277470	33	45.9720	118	16.6482	Port	LA/LB	Revisit	RMP	NA	X	X	X	X	X	X	
B23-12144	33.770535	-118.214157	33	46.2321	118	12.8494	Port	LA/LB	PortLA	RMP	NA	X	X	X	X			
B23-12145	33.775243	-118.245368	33	46.5146	118	14.7221	Port	LA/LB	PortLA	RMP	NA	X	X	X	X			
B23-12146	32.556620	-117.128214	32	33.3972	117	7.6928	Estuar	Tj River Est	Revisit	SD W	NA	X	X	X	X	X	X	
B23-12147	32.593342	-117.114373	32	35.6005	117	6.8624	Estuar	Otay	New	SD W	NA	X	X	X	X	X	X	
B23-12148	32.599950	-117.115976	32	35.9970	117	6.9586	Estuar	SD Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12149	32.613535	-117.099143	32	36.8121	117	5.9486	Estuar	SD Bay	RHMP									
B23-12150	32.617840	-117.098240	32	37.0704	117	5.8944	Estuar	SD Bay	Revisit	RHMP	NA	X	X	X	X	X	X	
B23-12151	32.647681	-117.115402	32	38.8609	117	6.9241	Estuar	SD Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12152	32.648239	-117.112723	32	38.8944	117	6.7634	Estuar	SD Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12153	32.651035	-117.104019	32	39.0621	117	6.2412	Estuar	Sweet M	New	SD W	NA	X	X	X	X	X	X	
B23-12154	32.652642	-117.097407	32	39.1585	117	5.8444	Estuar	Sweet M	New	SD W	NA	X	X	X	X	X	X	
B23-12155	32.687856	-117.131475	32	41.2714	117	7.8885	Estuar	SD Bay	RHMP	RHMP	NA	X	X	X	X			
B23-12156	32.756983	-117.235297	32	45.4190	117	14.1178	Estuar	SD River	Revisit	SD W	NA	X	X	X	X	X	X	
B23-12157	32.757755	-117.227320	32	45.4653	117	13.6392	Estuar	SD River	Revisit	SD W	NA	X	X	X	X	X	X	
B23-12158	32.934250	-117.256654	32	56.0550	117	15.3992	Estuar	Penasq Lag	New	SD W	NA	X	X	X	X	X	X	
B23-12159	32.970289	-117.259409	32	58.2173	117	15.5645	Estuar	Dieguito Lag	New	SD W	NA	X	X	X	X	X	X	
B23-12160	33.090312	-117.286961	33	5.4187	117	17.2176	Estuar	Batiquitos Lag	New	Carls	NA	X	X	X	X	X	X	
B23-12161	33.090312	-117.282552	33	5.4187	117	16.9531	Estuar	Batiquitos Lag	New	Carls	NA	X	X	X	X	X	X	
B23-12162	33.139112	-117.337572	33	8.3467	117	20.2543	Estuar	Aqua Hed Lag	Revisit	Carls	NA	X	X	X	X	X	X	
B23-12163	33.139452	-117.318740	33	8.3671	117	19.1244	Estuar	Aqua Hed Lag	Revisit	Carls	NA	X	X	X	X	X	X	
B23-12164	33.140126	-117.324378	33	8.4076	117	19.4627	Estuar	Aqua Hed Lag	Revisit	Carls	NA	X	X	X	X	X	X	
B23-12165	33.231970	-117.412910	33	13.9182	117	24.7746	Estuar	Santa Marg Est	Revisit	River	NA	X	X	X	X	X	X	
B23-12166	33.620443	-117.896948	33	37.2266	117	53.8169	Estuar	Newport Bay	New	OCPW	NA	X	X	X	X	X	X	
B23-12167	33.622033	-117.893642	33	37.3220	117	53.6185	Estuar	Newport Bay	New	OCPW	NA	X	X	X	X	X	X	
B23-12168	33.627596	-117.947092	33	37.6557	117	56.8255	Estuar	SA River	New	OCPW	NA	X	X	X	X	X	X	
B23-12169	33.633786	-117.960269	33	38.0272	117	57.6161	Estuar	Talbert M C	New	OCPW	NA	X	X	X	X	X	X	
B23-12170	33.635542	-117.890887	33	38.1325	117	53.4532	Estuar	Newport Bay	New	OCPW	NA	X	X	X	X	X	X	
B23-12171	33.636618	-117.953748	33	38.1971	117	57.2249	Estuar	SA River	Revisit	OCPW	NA	X	X	X	X	X	X	

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B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Chem	Infa una	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12172	33.637131	-117.888683	33	38.2279	117	53.3210	Estuar	Newport Bay	New	OCPW	NA	X	X	X	X	X	X	
B23-12173	33.641899	-117.971337	33	38.5139	117	58.2802	Estuar	Talbert M C	New	OCPW	NA	X	X	X	X	X	X	
B23-12174	33.645790	-117.888900	33	38.7474	117	53.3340	Estuar	Up Newport B	Revisit	OCPW	NA	X	X	X	X	X	X	
B23-12175	33.647050	-117.884210	33	38.8230	117	53.0526	Estuar	Up Newport B	Revisit	OCPW	NA	X	X	X	X	X	X	
B23-12176	33.698294	-118.040215	33	41.8977	118	2.4129	Estuar	Bolsa Chic Lag	New	OCPW	NA	X	X	X	X	X	X	
B23-12177	33.710204	-118.059501	33	42.6122	118	3.5701	Estuar	Bolsa Chica	New	OCPW	NA	X	X	X	X	X	X	
B23-12178	33.730050	-118.068869	33	43.8030	118	4.1321	Estuar	Huntington Har	New	OCPW	NA	X	X	X	X	X	X	
B23-12179	33.741480	-118.116620	33	44.4888	118	6.9972	Estuar	SG River Est	Revisit	MBC	NA	X	X	X	X	X	X	
B23-12180	33.753020	-118.105280	33	45.1812	118	6.3168	Estuar	SG River	Revisit	MBC	NA	X	X	X	X	X	X	
B23-12181	33.761462	-118.200889	33	45.6877	118	12.0534	Estuar	LA River Est	PortLA	RMP	NA	X	X	X	X			
B23-12182	33.766034	-118.103714	33	45.9620	118	6.2228	Estuar	Los Al Est	Revisit	MBC	NA	X	X	X	X	X	X	
B23-12183	33.780830	-118.205690	33	46.8498	118	12.3414	Estuar	LA River	Revisit									
B23-12184	33.971080	-118.439230	33	58.2648	118	26.3538	Estuar	Ballona Creek	Revisit	LA W	NA	X	X	X		X	X	
B23-12185	34.103088	-119.108658	34	6.1853	119	6.5195	Estuar	Mugu Lag S	New	SONGS	NA	X		X	X	X	X	
B23-12186	34.182869	-119.230435	34	10.9721	119	13.8261	Estuar	Channel Isl Har	New	ABC	NA	X		X	X	X	X	
B23-12187	32.549680	-117.187731	32	32.9808	117	11.2639	Inner Sh	Bight	New	CSD	CSD	X	X	X	X	X	X	
B23-12188	32.758893	-117.264982	32	45.5336	117	15.8989	Inner Sh	Bight	New	CSD	CSD	X	X	X	X	X	X	
B23-12189	32.823168	-117.287053	32	49.3901	117	17.2232	Inner Sh	Bight	New									
B23-12190	32.855288	-117.264982	32	51.3173	117	15.8989	Inner Sh	Bight	New									
B23-12191	33.207838	-117.441554	33	12.4703	117	26.4933	Inner Sh	Bight	New	CSD	CSD	X	X	X	X	X	X	
B23-12192	33.439429	-117.667788	33	26.3657	117	40.0673	Inner Sh	Bight	New	OC Sa	OC Sa	X	X	X	X	X	X	
B23-12193	33.520951	-117.770247	33	31.2571	117	46.2148	Inner Sh	Orange Shelf	Revisit	OC Sa		X	X	X	X	X	X	
B23-12194	33.627799	-117.987516	33	37.6679	117	59.2510	Inner Sh	San Pedro Sh	Revisit	OC Sa	OC Sa	X	X	X	X	X	X	
B23-12195	33.643400	-118.078743	33	38.6040	118	4.7246	Inner Sh	San Pedro Sh	Revisit	OC Sa	OC Sa	X	X	X	X	X	X	
B23-12196	33.654493	-118.225096	33	39.2696	118	13.5057	Inner Sh	Bight	New	OC Sa	OC Sa	X	X	X	X	X	X	
B23-12197	33.659600	-118.131000	33	39.5760	118	7.8600	Inner Sh	San Pedro Sh	Revisit	OC Sa	OC Sa	X	X	X	X	X	X	
B23-12198	33.662448	-118.087148	33	39.7469	118	5.2289	Inner Sh	Bight	New	OC Sa	OC Sa	X	X	X	X	X	X	
B23-12199	33.695200	-118.296000	33	41.7120	118	17.7600	Inner Sh	PV Shelf	Revisit	LACSD	LACSD	X	X	X	X	X	X	
B23-12200	33.702212	-118.158881	33	42.1327	118	9.5328	Inner Sh	Bight	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12201	33.733383	-118.122033	33	44.0030	118	7.3220	Inner Sh	San Pedro Sh	Revisit	RMP	CLAEM	X	X	X	X	X	X	
B23-12202	33.962433	-118.476117	33	57.7460	118	28.5670	Inner Sh	Santa Monica B	Revisit	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12203	34.003818	-118.523062	34	0.2291	118	31.3837	Inner Sh	Bight	New	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12204	34.023300	-118.593483	34	1.3980	118	35.6090	Inner Sh	Santa Monica B	Revisit	CLAEM	CLAEM	X	X	X	X	X	X	
B23-12205	34.036690	-118.917100	34	2.2014	118	55.0260	Inner Sh	Huenem/Dume	Revisit	LACSD	LACSD	X	X	X	X	X	X	
B23-12206	34.101020	-119.151050	34	6.0612	119	9.0630	Inner Sh	Huenem/Dume	Revisit	LACSD	LACSD	X	X	X	X	X	X	
B23-12207	34.124880	-119.192480	34	7.4928	119	11.5488	Inner Sh	Huenem/Dume	Revisit	LACSD	LACSD	X	X	X	X	X	X	
B23-12208	34.162130	-119.240388	34	9.7278	119	14.4233	Inner Sh	Bight	New	ABC	ABC	X	X	X	X	X	X	
B23-12209	34.178630	-119.347140	34	10.7178	119	20.8284	Inner Sh	East SB Chan	Revisit	ABC	ABC	X	X	X	X	X	X	
B23-12210	34.193757	-119.361782	34	11.6254	119	21.7069	Inner Sh	Bight	New	ABC	ABC	X	X	X	X	X	X	
B23-12211	34.256975	-119.295567	34	15.4185	119	17.7340	Inner Sh	Bight	New	ABC	ABC	X	X	X	X	X	X	
B23-12212	34.283680	-119.354530	34	17.0208	119	21.2718	Inner Sh	East SB Chan	Revisit	ABC	ABC	X	X	X	X	X	X	
B23-12213	34.351713	-119.472140	34	21.1028	119	28.3284	Inner Sh	Bight	New	ABC	ABC	X	X	X	X	X	X	
B23-12214	34.396139	-119.661999	34	23.7683	119	39.7199	Inner Sh	East SB Chan	Revisit	ABC	ABC	X	X	X	X	X	X	

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B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Ch em	Infa una	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12215	34.398397	-119.864848	34	23.9038	119	51.8909	Inner Sh	Campus Point	Revisit	ABC		X	X	X	X	X	X	
B23-12216	34.406928	-119.654231	34	24.4157	119	39.2538	Inner Sh	Bight	New	ABC	ABC	X	X	X	X	X	X	
B23-12217	32.551480	-117.199500	32	33.0888	117	11.9700	Mid Sh	South SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12218	32.576677	-117.317497	32	34.6006	117	19.0498	Mid Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12219	32.589690	-117.264290	32	35.3814	117	15.8574	Mid Sh	South SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12220	32.925241	-117.295744	32	55.5145	117	17.7446	Mid Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12221	33.087640	-117.350970	33	5.2584	117	21.0582	Mid Sh	North SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12222	33.105260	-117.362160	33	6.3156	117	21.7296	Mid Sh	North SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12223	33.125309	-117.361003	33	7.5186	117	21.6602	Mid Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12224	33.265584	-117.533447	33	15.9350	117	32.0068	Mid Sh	North SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12225	33.269751	-117.564827	33	16.1851	117	33.8896	Mid Sh	North SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12226	33.282937	-117.571281	33	16.9762	117	34.2769	Mid Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12227	33.512166	-117.771484	33	30.7300	117	46.2890	Mid Sh	Orange Shelf	Revisit	OC Sa		X	X	X	X			
B23-12228	33.601949	-118.056462	33	36.1169	118	3.3877	Mid Sh	San Pedro Sh	Revisit	OC Sa	OC Sa	X	X	X	X			
B23-12229	33.621000	-118.195000	33	37.2600	118	11.7000	Mid Sh	San Pedro Sh	Revisit	OC Sa	OC Sa	X	X	X	X			
B23-12230	33.648100	-118.149000	33	38.8860	118	8.9400	Mid Sh	San Pedro Sh	Revisit	OC Sa	OC Sa	X	X	X	X			
B23-12231	33.680986	-118.296381	33	40.8592	118	17.7828	Mid Sh	Bight	New	OC Sa	LACSD	X	X	X	X			
B23-12232	33.827174	-118.412397	33	49.6305	118	24.7438	Mid Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12233	33.848150	-118.567450	33	50.8890	118	34.0470	Mid Sh	Santa Monica B	Revisit	CLAEM	CLAEM	X	X	X	X			
B23-12234	33.865833	-118.528100	33	51.9500	118	31.6860	Mid Sh	Santa Monica B	Revisit	CLAEM	CLAEM	X	X	X	X			
B23-12235	33.868896	-118.470404	33	52.1338	118	28.2243	Mid Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12236	33.934860	-118.539760	33	56.0916	118	32.3856	Mid Sh	Santa Monica B	Revisit	CLAEM	CLAEM	X	X	X	X			
B23-12237	34.035581	-118.992476	34	2.1349	118	59.5486	Mid Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12238	34.222711	-119.500045	34	13.3626	119	30.0027	Mid Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12239	34.316120	-119.565304	34	18.9672	119	33.9183	Mid Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12240	34.344060	-119.562530	34	20.6436	119	33.7518	Mid Sh	East SB Chan	Revisit	ABC	ABC	X	X	X	X			
B23-12241	34.367969	-119.659567	34	22.0782	119	39.5740	Mid Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12242	34.388700	-119.616061	34	23.3220	119	36.9637	Mid Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12243	34.399063	-119.985862	34	23.9438	119	59.1517	Mid Sh	Bight	New	NO/SC		X	X	X	X			
B23-12244	34.400981	-119.832791	34	24.0589	119	49.9675	Mid Sh	East SB Chan	Revisit	ABC	ABC	X	X	X	X			
B23-12245	34.430146	-120.283152	34	25.8088	120	16.9891	Mid Sh	Bight	New	NO/SC		X	X	X	X			
B23-12246	34.430146	-120.022117	34	25.8088	120	1.3270	Mid Sh	Bight	New	NO/SC		X	X	X	X			
B23-12247	32.585740	-117.340700	32	35.1444	117	20.4420	Outer Sh	South SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12248	32.749516	-117.372475	32	44.9710	117	22.3485	Outer Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12249	32.873447	-117.333778	32	52.4068	117	20.0267	Outer Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12250	33.188127	-117.465349	33	11.2876	117	27.9209	Outer Sh	Bight	New	CSD	CSD	X	X	X	X			
B23-12251	33.221016	-117.511475	33	13.2610	117	30.6885	Outer Sh	North SD Shelf	Revisit	CSD	CSD	X	X	X	X			
B23-12252	33.384230	-117.678184	33	23.0538	117	40.6910	Outer Sh	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12253	33.464034	-117.761898	33	27.8420	117	45.7139	Outer Sh	Orange Shelf	Revisit	OC Sa	OC Sa	X	X	X	X			
B23-12254	33.547898	-117.852920	33	32.8739	117	51.1752	Outer Sh	Orange Shelf	Revisit	NA	OC Sa	X	X	X	X			
B23-12255	33.557553	-118.130943	33	33.4532	118	7.8566	Outer Sh	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12256	33.568723	-118.030330	33	34.1234	118	1.8198	Outer Sh	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12257	33.613389	-118.285733	33	36.8034	118	17.1440	Outer Sh	Bight	New	OC Sa	OC Sa	X	X	X	X			

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix B

B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Chem	Infa una	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12258	33.767100	-118.460000	33	46.0260	118	27.6000	Outer Sh	Santa Monica B	Revisit	LACSD	LACSD	X	X	X	X			
B23-12259	33.767450	-118.459030	33	46.0470	118	27.5418	Outer Sh	Santa Monica B	Revisit	NA	LACSD	X	X	X	X			
B23-12260	33.853074	-118.606921	33	51.1845	118	36.4152	Outer Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12261	33.912233	-118.588467	33	54.7340	118	35.3080	Outer Sh	Santa Monica B	Revisit	LACSD	LACSD	X	X	X	X			
B23-12262	33.997675	-118.931978	33	59.8605	118	55.9187	Outer Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12263	34.014344	-119.036461	34	0.8606	119	2.1877	Outer Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12264	34.044130	-119.055580	34	2.6478	119	3.3348	Outer Sh	Huenem/Dume	Revisit	LACSD	LACSD	X	X	X	X			
B23-12265	34.066440	-119.134150	34	3.9864	119	8.0490	Outer Sh	Huenem/Dume	Revisit	LACSD	LACSD	X	X	X	X			
B23-12266	34.069883	-119.106117	34	4.1930	119	6.3670	Outer Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12267	34.107170	-119.319020	34	6.4302	119	19.1412	Outer Sh	East SB Chan	Revisit	NA	LACSD	X	X	X	X			
B23-12268	34.110090	-119.221780	34	6.6054	119	13.3068	Outer Sh	Huenem/Dume	Revisit	LACSD	NA	X	X	X	X			
B23-12269	34.122810	-119.331290	34	7.3686	119	19.8774	Outer Sh	East SB Chan	Revisit	NA	LACSD	X	X	X	X			
B23-12270	34.130935	-119.380868	34	7.8561	119	22.8521	Outer Sh	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12271	34.132675	-119.369899	34	7.9605	119	22.1939	Outer Sh	East SB Chan	Revisit	NA	LACSD	X	X	X	X			
B23-12272	34.132900	-119.379020	34	7.9740	119	22.7412	Outer Sh	East SB Chan	Revisit	NA	LACSD	X	X	X	X			
B23-12273	34.168970	-119.460880	34	10.1382	119	27.6528	Outer Sh	East SB Chan	Revisit	ABC	NA	X	X	X	X			
B23-12274	34.206770	-119.567480	34	12.4062	119	34.0488	Outer Sh	East SB Chan	Revisit	NA		X	X	X	X			
B23-12275	34.224120	-119.606080	34	13.4472	119	36.3648	Outer Sh	East SB Chan	Revisit	ABC	NA	X	X	X	X			
B23-12276	34.230300	-119.687260	34	13.8180	119	41.2356	Outer Sh	East SB Chan	Revisit	ABC	NA	X	X	X	X			
B23-12277	34.232870	-119.706630	34	13.9722	119	42.3978	Outer Sh	East SB Chan	Revisit	ABC	NA	X	X	X	X			
B23-12278	34.247365	-119.632401	34	14.8419	119	37.9440	Outer Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12279	34.260880	-119.767260	34	15.6528	119	46.0356	Outer Sh	East SB Chan	Revisit	NO/SC	NA	X	X	X	X			
B23-12280	34.269523	-119.702056	34	16.1714	119	42.1233	Outer Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12281	34.277830	-119.718440	34	16.6698	119	43.1064	Outer Sh	East SB Chan	Revisit	ABC	ABC	X	X	X	X			
B23-12282	34.307860	-119.712830	34	18.4716	119	42.7698	Outer Sh	East SB Chan	Revisit	ABC	NA	X	X	X	X			
B23-12283	34.313824	-119.748493	34	18.8294	119	44.9096	Outer Sh	Bight	New	ABC	ABC	X	X	X	X			
B23-12284	34.394770	-120.331740	34	23.6862	120	19.9044	Outer Sh	West SB Chan	Revisit	NO/SC	NA	X	X	X	X			
B23-12285	32.692900	-117.394910	32	41.5740	117	23.6946	Up Slope	SD Slope	Revisit	CSD	CSD	X	X	X	X			
B23-12286	32.962094	-117.322019	32	57.7256	117	19.3211	Up Slope	Bight	New	CSD	CSD	X	X	X	X			
B23-12287	33.001244	-117.331001	33	0.0746	117	19.8600	Up Slope	Bight	New									
B23-12288	33.093830	-117.417150	33	5.6298	117	25.0290	Up Slope	SD Slope	Revisit	CSD	CSD	X	X	X	X			
B23-12289	33.209751	-117.546567	33	12.5851	117	32.7940	Up Slope	Bight	New	CSD	CSD	X	X	X	X			
B23-12290	33.235780	-117.564531	33	14.1468	117	33.8718	Up Slope	Bight	New	CSD	CSD	X	X	X	X			
B23-12291	33.365807	-117.959736	33	21.9484	117	57.5842	Up Slope	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12292	33.508612	-118.166321	33	30.5167	118	9.9792	Up Slope	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12293	33.508612	-117.878899	33	30.5167	117	52.7339	Up Slope	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12294	33.536816	-117.847705	33	32.2090	117	50.8623	Up Slope	Orange Slope	Revisit	OC Sa	OC Sa	X	X	X	X			
B23-12295	33.547518	-118.229194	33	32.8511	118	13.7516	Up Slope	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12296	33.556099	-118.021956	33	33.3659	118	1.3174	Up Slope	Orange Slope	Revisit	OC Sa	OC Sa	X	X	X	X			
B23-12297	33.586407	-118.076501	33	35.1844	118	4.5901	Up Slope	Bight	New	OC Sa	OC Sa	X	X	X	X			
B23-12298	33.694200	-118.347000	33	41.6520	118	20.8200	Up Slope	PV Shelf	Revisit	OC Sa	LACSD	X	X	X	X			
B23-12299	34.025917	-119.190261	34	1.5550	119	11.4157	Up Slope	Bight	New	LACSD		X	X	X	X			
B23-12300	34.041600	-119.197570	34	2.4960	119	11.8542	Up Slope	Huenem/Dume	Revisit	LACSD		X	X	X	X			

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B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Chem	Infa una	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12301	34.116124	-119.540557	34	6.9674	119	32.4334	Up Slope	Bight	New	LACSD	LACSD	X	X	X	X			
B23-12302	34.118280	-119.628900	34	7.0968	119	37.7340	Up Slope	East SB Chan	Revisit	LACSD	LACSD	X	X	X	X			
B23-12303	34.141879	-119.450737	34	8.5128	119	27.0442	Up Slope	Bight	New	LACSD		X	X	X	X			
B23-12304	34.144000	-120.177990	34	8.6400	120	10.6794	Up Slope	West SB Chan	Revisit	NO/SC		X	X	X	X			
B23-12305	34.145700	-119.769970	34	8.7420	119	46.1982	Up Slope	East SB Chan	Revisit	LACSD		X	X	X	X			
B23-12306	34.158350	-119.827790	34	9.5010	119	49.6674	Up Slope	East SB Chan	Revisit	LACSD		X	X	X	X			
B23-12307	34.183210	-120.350630	34	10.9926	120	21.0378	Up Slope	Bight	Revisit	NO/SC		X	X	X	X			
B23-12308	34.219099	-120.384859	34	13.1460	120	23.0915	Up Slope	West SB Chan	New	NO/SC		X	X	X	X			
B23-12309	34.257683	-119.872888	34	15.4610	119	52.3733	Up Slope	Bight	New	NO/SC		X	X	X	X			
B23-12310	34.286850	-120.455660	34	17.2110	120	27.3396	Up Slope	West SB Chan	Revisit	NO/SC		X	X	X	X			
B23-12311	34.314230	-120.281840	34	18.8538	120	16.9104	Up Slope	West SB Chan	Revisit	NO/SC		X	X	X	X			
B23-12312	34.344180	-120.368680	34	20.6508	120	22.1208	Up Slope	West SB Chan	Revisit	NO/SC		X	X	X	X			
B23-12313	34.362920	-120.010400	34	21.7752	120	0.6240	Up Slope	West SB Chan	Revisit	NO/SC		X	X	X	X			
B23-12314	34.386167	-120.142347	34	23.1700	120	8.5408	Up Slope	Bight	New	NO/SC		X	X	X	X			
B23-12315	32.851030	-117.410790	32	51.0618	117	24.6474	Low Slop	SD Slope	Revisit	CSD	NA	X	X	X	X			
B23-12316	32.917535	-117.535354	32	55.0521	117	32.1212	Low Slop	Bight	New	CSD	NA	X	X	X	X			
B23-12317	32.931670	-117.394720	32	55.9002	117	23.6832	Low Slop	SD Slope	Revisit	CSD	NA	X	X	X	X			
B23-12318	32.998580	-117.814185	32	59.9148	117	48.8511	Low Slop	Bight	New	CSD	NA	X	X	X	X			
B23-12319	33.032430	-117.668750	33	1.9458	117	40.1250	Low Slop	SD Slope	Revisit	CSD	NA	X	X	X	X			
B23-12320	33.079552	-117.479588	33	4.7731	117	28.7753	Low Slop	Bight	New	CSD	NA	X	X	X	X			
B23-12321	33.101920	-117.631100	33	6.1152	117	37.8660	Low Slop	SD Slope	Revisit	CSD	NA	X	X	X	X			
B23-12322	33.274032	-118.086377	33	16.4419	118	5.1826	Low Slop	Orange Slope	Revisit	OC Sa	NA	X	X	X	X			
B23-12323	33.281654	-117.842068	33	16.8992	117	50.5241	Low Slop	Bight	New	OC Sa	NA	X	X	X	X			
B23-12324	33.317468	-118.160612	33	19.0481	118	9.6367	Low Slop	Orange Slope	Revisit	OC Sa	NA	X	X	X	X			
B23-12325	33.322018	-117.702653	33	19.3211	117	42.1592	Low Slop	Bight	New	OC Sa	NA	X	X	X	X			
B23-12326	33.402691	-118.288198	33	24.1615	118	17.2919	Low Slop	Bight	New	OC Sa	NA	X	X	X	X			
B23-12327	33.442999	-117.981484	33	26.5800	117	58.8890	Low Slop	Bight	New	OC Sa	NA	X	X	X	X			
B23-12328	33.463950	-118.394740	33	27.8370	118	23.6844	Low Slop	SP Chan	Revisit	OC Sa	NA	X	X	X	X			
B23-12329	33.464250	-117.919678	33	27.8550	117	55.1807	Low Slop	Orange Slope	Revisit	OC Sa	NA	X	X	X	X			
B23-12330	33.486910	-118.423530	33	29.2146	118	25.4118	Low Slop	SP Chan	Revisit	OC Sa	NA	X	X	X	X			
B23-12331	33.543688	-118.664620	33	32.6213	118	39.8772	Low Slop	Bight	New	LACSD	NA	X	X	X	X			
B23-12332	33.579220	-118.328940	33	34.7532	118	19.7364	Low Slop	SP Chan	Revisit	OC Sa	NA	X	X	X	X			
B23-12333	33.583931	-118.664620	33	35.0359	118	39.8772	Low Slop	Bight	New	LACSD	NA	X	X	X	X			
B23-12334	33.637810	-118.302560	33	38.2686	118	18.1536	Low Slop	SP Chan	Revisit	OC Sa	NA	X	X	X	X			
B23-12335	33.664360	-119.027100	33	39.8616	119	1.6260	Low Slop	Bight	New	NA	NA	X	X	X	X			
B23-12336	33.824993	-119.138633	33	49.4996	119	8.3180	Low Slop	Bight	New	LACSD	NA	X	X	X	X			
B23-12337	33.832450	-118.648850	33	49.9470	118	38.9310	Low Slop	SM Basin	Revisit	LACSD	NA	X	X	X	X			
B23-12338	33.852080	-119.194310	33	51.1248	119	11.6586	Low Slop	Huenem/Dume	Revisit	LACSD	NA	X	X	X	X			
B23-12339	33.925236	-119.236224	33	55.5142	119	14.1734	Low Slop	Bight	New	LACSD	NA	X	X	X	X			
B23-12340	33.925236	-119.319873	33	55.5142	119	19.1924	Low Slop	Bight	New	LACSD	NA	X	X	X	X			
B23-12341	33.935690	-118.897150	33	56.1414	118	53.8290	Low Slop	Huenem/Dume	Revisit	LACSD	NA	X	X	X	X			
B23-12342	33.944267	-118.771433	33	56.6560	118	46.2860	Low Slop	SM Basin	Revisit	LACSD	NA	X	X	X	X			
B23-12343	33.965300	-119.152574	33	57.9180	119	9.1545	Low Slop	Bight	New	LACSD	NA	X	X	X	X			

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix B

B23 Station	Lat (Decimal)	Long (Decimal)	Lat (Deg)	Lat (Min)	Long (Deg)	Long (Min)	B23 Stratum	Region	Origin Type	Sed Grab Assign	Trawl Assign	Ch em	Infa una	Tox Eoh	Tox Myt	Pla st	PF Qu	Ne o
B23-12344	34.285133	-119.933301	34	17.1080	119	55.9981	Low Slop	Bight	New	NO/SC	NA	X	X	X	X			
B23-12345	33.913220	-119.947190	33	54.7932	119	56.8314	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12346	33.964260	-119.852540	33	57.8556	119	51.1524	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12347	33.994510	-120.337390	33	59.6706	120	20.2434	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12348	34.012170	-120.475620	34	0.7302	120	28.5372	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12349	34.030220	-119.422890	34	1.8132	119	25.3734	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12350	34.033520	-119.350020	34	2.0112	119	21.0012	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12351	34.046810	-120.489950	34	2.8086	120	29.3970	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12352	34.058550	-119.496100	34	3.5130	119	29.7660	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12353	34.066630	-119.588620	34	3.9978	119	35.3172	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12354	34.075050	-119.748280	34	4.5030	119	44.8968	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12355	34.078580	-119.700810	34	4.7148	119	42.0486	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12356	34.078800	-119.509370	34	4.7280	119	30.5622	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12357	34.101800	-120.141440	34	6.1080	120	8.4864	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12358	34.112550	-120.025330	34	6.7530	120	1.5198	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12359	34.115250	-119.935380	34	6.9150	119	56.1228	Chan Isl	North Chan Isl	Revisit	NO/SC	NA	X			X			
B23-12360	32.594827	-117.095037	32	35.6896	117	5.7022	FW Rg E	Otay	New	SD W	NA	X		X	X			
B23-12361	32.617818	-117.098755	32	37.0691	117	5.9253	FW Rg E	San Diego Bay	RHMP	RHMP	NA	X		X	X			
B23-12362	32.617840	-117.098240	32	37.0704	117	5.8944	FW Rg E	San Diego Bay	Revisit	RHMP	NA	X		X	X			
B23-12363	32.658330	-117.083080	32	39.4998	117	4.9848	FW Rg E	Sweetwater R	Revisit	SD W	NA	X		X	X			
B23-12364	32.759515	-117.222246	32	45.5709	117	13.3348	FW Rg E	SD River	New	SD W	NA	X		X	X			
B23-12365	32.976071	-117.236687	32	58.5643	117	14.2012	FW Rg E	S Dieguito Lag	New	SD W	NA	X		X	X			
B23-12366	32.977147	-117.239547	32	58.6288	117	14.3728	FW Rg E	S Dieguito Lag	New	SD W	NA	X		X	X			
B23-12367	33.009179	-117.258204	33	0.5507	117	15.4922	FW Rg E	San Elijo Lag	New	Carls	NA	X		X	X			
B23-12368	33.203410	-117.390780	33	12.2046	117	23.4468	FW Rg E	San Luis Rey R	Revisit	SD W	NA	X		X	X			
B23-12369	33.237992	-117.394233	33	14.2795	117	23.6540	FW Rg E	Santa Marg R	New	River	NA	X		X	X			
B23-12507	34.272772	-119.361782	34	16.3663	119	21.7069	Inner Sh		Over	NA	ABC	X						
B23-12590	32.638253	-117.160142	32	38.2952	117	9.6085	Inner Sh		Over	NA	CSD	X						
B23-12591	32.589951	-117.193249	32	35.3971	117	11.5949	Inner Sh		Over	NA	CSD	X						
B23-12630	32.648269	-117.375910	32	38.8961	117	22.5546	Up Slope		Over	NA	CSD	X						
B23-12750	33.654493	-118.136809	33	39.2696	118	8.2085	Inner Sh		Over	NA	OC Sa	X						
B23-12770	33.597338	-117.977337	33	35.8403	117	58.6402	Mid Sh		Over	NA	OC Sa	X						

Chem = samples for general chemistry analysis; Tox Eoh = samples for toxicology *Eohaustorius* (amphipod) testing; Tox Myt = samples for toxicology *Mytilus* (Mussel) testing; Plast = samples for microplastic analysis; PF Qu = samples for PFAS and 6PPD-Quinone analysis; Neo = samples for neonicotinoids analysis; Estuar = Estuary stratum; Inner Sh = Inner Shelf stratum; Mid Sh = Middle Shelf stratum; Outer Sh = Outer Shelf stratum; Up Slope = Upper Slope stratum; Low Slop = Lower Slope stratum; Chan Isl = Channel Islands National Marine Sanctuary stratum; FW Rg E = Freshwater Regulatory Estuary.

Field Organization Codes and Description

Lab code	Description
ABC	City of Oxnard contracting Aquatic Bioassay and Consulting
Carls	Carlsbad Watershed Co-permittees (contractor: Weston Solutions)
C of LB	City of Long Beach
CLAEM	City of Los Angeles, Environmental Monitoring Division

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CSD	City of San Diego
LACPW	Los Angeles County Public Works (contractor: Weston Solutions)
LACSD	Los Angeles County Sanitation Districts
LA W	City of Los Angeles, Watershed Protection Division
MBC	Marine Aquatics Sciences represents power generating stations
NA	Not Available
Navy	USN NIWC Pacific
NO/SC	NOAA/SCCWRP
OCPW	Orange County Public Works
OC Sa	Orange County Sanitation District
RHMP	Regional Harbor Monitoring Program (contractor: WSP USA Environment & Infrastructure)
River	Riverside County Flood Control and Water Conservation District (contractor: Weston Solutions)
RMP	Greater Los Angeles and Long Beach Harbor Waters Regional Monitoring Coalition (contractor: Anchor QEA)
SD W	San Diego Watershed Co-permittees (contractor: Weston Solutions)
SONGS	San Onofre Nuclear Generating Station

APPENDIX C

BIGHT '23 LABORATORY ASSIGNMENTS

BASED ON

REGIONAL SURVEY PARTICIPANTS

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix C

Appendix C. Laboratory assignments are associated with participating Bight 2023 participants and correspond to station names. See end of appendix to convert participant codes.

Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic	
B23-12000	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12001	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12002	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12003	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12004	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12005	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12006	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12007	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12008	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12009	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12010	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12011	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12012	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12013	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12014	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12015	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12016	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12017	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12018	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12019	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12020	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12021	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12022	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12023	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12024	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12025	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12026	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12027	RMP	WSP	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12028	RMP	WSP	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP		Ph/Wk	Ph/Wk	Physis
B23-12029	RMP	NA	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP				
B23-12030	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12031	RMP	WSP	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12032	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12033	RMP	CLAEM	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12034	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12035	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12036	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12037	CLAEM	CLAEM		CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12038	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12039	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12040	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12041	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12042	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12043	CLAEM	CLAEM	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM		Ph/Wk	Ph/Wk	Physis
B23-12044	RMP	CLAEM	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12045	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk	Ph/Wk	Physis
B23-12046	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12047	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk	Ph/Wk	Physis
B23-12048	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk	Ph/Wk	Physis

Bight'23 Sediment Quality Assessment Field Operations Manual – Appendix C

Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic	
B23-12049	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12050	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12051	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12052	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12053	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12054	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12055	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12056	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12057	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12058	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12059	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12060	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12061	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12062	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12063	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC			
B23-12064	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk	Ph/Wk	Physis
B23-12065	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12066	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12067	OC San	NA	OCPW	OC San	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12068	OC San	NA	OCPW	OC San	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12069	OC San	NA	OCPW	OC San	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12070	OC San	NA	OCPW	OC San	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12071	OC San	NA	OCPW	OCPW	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12072	OC San	NA	OCPW	OCPW	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12073	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12074	OC San	NA	OCPW	OCPW	OC San	OC San	OC San	OC San	OC San	OCPW	OCPW	OCPW	OCPW	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12075	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12076	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	Ph/Wk	Ph/Wk	Physis	
B23-12077	RMP	NA	RMP	RMP	RMP	RMP	RMP	PHYSIS	RMP	RMP	Physis	Physis	RMP		Ph/Wk		
B23-12078	MBC	NA	ABC	CSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis	MBC	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12079	C of LB	NA	C of LB	C of LB	C of LB	C of LB	PHYSIS	C of LB	C of LB	Physis	Physis	C of LB		Ph/Wk	Ph/Wk	Physis	
B23-12080	MBC	NA	ABC	CSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis	MBC		Ph/Wk	Ph/Wk	Physis	
B23-12081	RMP	NA	RMP	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12082	MBC	NA	ABC	CSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis	MBC		Ph/Wk	Ph/Wk	Physis	
B23-12083	LACPW	NA	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW		Ph/Wk	Ph/Wk	Physis
B23-12084	LACPW	NA	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12085	LACPW	NA	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW		Ph/Wk	Ph/Wk	Physis
B23-12086	LACPW	NA	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW	LACPW		Ph/Wk	Ph/Wk	Physis
B23-12087	ABC	NA	ABC	CSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis	OC San	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12088	ABC	NA	ABC	CSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis	OC San		Ph/Wk	Ph/Wk	Physis	
B23-12089	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12090	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk	Ph/Wk	Physis
B23-12091	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk		
B23-12092	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12093	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12094	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12095	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12096	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk		
B23-12097	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12098	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk		
B23-12099	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP		Ph/Wk		
B23-12100	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				

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Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic	
B23-12101	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12102	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk			
B23-12103	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12104	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12105	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12106	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12107	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12108	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Ph/Wk	Ph/Wk	Physis	
B23-12109	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12110	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12111	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12112	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12113	Navy	NA	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy	Navy				
B23-12114	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12115	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12116	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12117	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12118	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12119	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12120	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12121	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk			
B23-12122	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12123	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12124	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	OP/SC	Ph/Wk	Ph/Wk	Physis
B23-12125	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	Physis	Ph/Wk	Ph/Wk	Physis	
B23-12126	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12127	CLAEM	NA		CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12128	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	Physis	Ph/Wk	Ph/Wk	Physis	
B23-12129	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk	Ph/Wk	Ph/Wk	Physis	
B23-12130	MBC	NA		CSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis			Ph/Wk	Ph/Wk	Physis	
B23-12131	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk	Ph/Wk	Ph/Wk	Physis	
B23-12132	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk				
B23-12133	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk	Ph/Wk	Ph/Wk	Physis	
B23-12134	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12135	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	Physis	Ph/Wk	Ph/Wk	Physis	
B23-12136	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	Physis	Ph/Wk	Ph/Wk	Physis	
B23-12137	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Physis				
B23-12138	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk				
B23-12139	CLAEM	NA	ABC	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	Physis	Physis	CLAEM	Physis	Ph/Wk	Ph/Wk	Physis	
B23-12140	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12141	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk	Ph/Wk	Ph/Wk	Physis	
B23-12142	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Ph/Wk	Ph/Wk	Ph/Wk	Physis	
B23-12143	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	OP/SC	Ph/Wk	Ph/Wk	Physis	
B23-12144	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Physis				
B23-12145	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP	Physis				
B23-12146	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	Ph/Wk	Ph/Wk	Physis	
B23-12147	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	Ph/Wk	Ph/Wk	Physis	
B23-12148	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12149																	
B23-12150	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	Ph/Wk	Ph/Wk	Physis	
B23-12151	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12152	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				

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Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic
B23-12153	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W		Ph/Wk	Ph/Wk	Physis
B23-12154	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W		Ph/Wk	Ph/Wk	Physis
B23-12155	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP				
B23-12156	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W		Ph/Wk	Ph/Wk	Physis
B23-12157	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W		Ph/Wk	Ph/Wk	Physis
B23-12158	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W		Ph/Wk	Ph/Wk	Physis
B23-12159	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W		Ph/Wk	Ph/Wk	Physis
B23-12160	Carls	NA	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls		Ph/Wk	Ph/Wk	Physis
B23-12161	Carls	NA	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls		Ph/Wk	Ph/Wk	Physis
B23-12162	Carls	NA	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls		Ph/Wk	Ph/Wk	Physis
B23-12163	Carls	NA	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls		Ph/Wk	Ph/Wk	Physis
B23-12164	Carls	NA	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls	Carls		Ph/Wk	Ph/Wk	Physis
B23-12165	River	NA	River	River	River	River	River	River	River	River	River	River		Ph/Wk	Ph/Wk	Physis
B23-12166	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12167	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12168	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12169	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12170	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12171	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12172	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12173	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12174	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12175	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12176	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12177	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12178	OCPW	NA	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW	OCPW		Ph/Wk	Ph/Wk	Physis
B23-12179	MBC	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP		Ph/Wk	Ph/Wk	Physis
B23-12180	MBC	NA	ABC	ABC	CSD	CSD	CSD	CSD	CSD	Physis	Physis	OC San		Ph/Wk	Ph/Wk	Physis
B23-12181	RMP	NA	RMP	RMP	RMP	RMP	Physis	RMP	RMP	Physis	Physis	RMP				
B23-12182	MBC	NA	ABC	ABC	CSD	CSD	CSD	CSD	CSD	Physis	Physis	OC San		Ph/Wk	Ph/Wk	Physis
B23-12183																
B23-12184	LA W	NA	LA W	LA W	LA W	LA W	LA W	LA W	LA W	Physis	Physis	OC San		Ph/Wk	Ph/Wk	Physis
B23-12185	SONGS	NA	ABC	LACSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis			Ph/Wk	Ph/Wk	Physis
B23-12186	ABC	NA	ABC	LACSD	CSD	CSD	CSD	CSD	CSD	Physis	Physis			Ph/Wk	Ph/Wk	Physis
B23-12187	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD	OP/SC	Ph/Wk	Ph/Wk	
B23-12188	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD	OP/SC	Ph/Wk	Ph/Wk	
B23-12189			NA							NA	NA	CSD	OP/SC	Ph/Wk	Ph/Wk	
B23-12190			NA							NA	NA	CSD	OP/SC	Ph/Wk	Ph/Wk	
B23-12191	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD	OP/SC	Ph/Wk	Ph/Wk	
B23-12192	OC San	OC San	NA	OC San	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12193	OC San		NA	OC San	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12194	OC San	OC San	NA	OC San	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12195	OC San	OC San	NA	OC San	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12196	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12197	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12198	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San	OP/SC	Ph/Wk	Ph/Wk	
B23-12199	LACSD	LACSD	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD	OP/SC	Ph/Wk	Ph/Wk	
B23-12200	CLAEM	CLAEM	NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	
B23-12201	RMP	CLAEM	RMP	RMP	RMP	RMP	PHYSIS	RMP	RMP	NA	NA	RMP	OP/SC	Ph/Wk	Ph/Wk	
B23-12202	CLAEM	CLAEM	NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	
B23-12203	CLAEM	CLAEM	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	
B23-12204	CLAEM	CLAEM	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	

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Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic
B23-12205	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD	OP/SC	Ph/Wk	Ph/Wk		
B23-12206	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD	OP/SC	Ph/Wk	Ph/Wk		
B23-12207	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD	OP/SC	Ph/Wk	Ph/Wk		
B23-12208	ABC	ABC	NA	NA	CSD	CSD	CSD	ABC	NA	NA	ABC	OP/SC	Ph/Wk	Ph/Wk		
B23-12209	ABC	ABC	NA	NA	CSD	CSD	CSD	ABC	NA	NA	ABC	OP/SC	Ph/Wk	Ph/Wk		
B23-12210	ABC	ABC	NA	LACSD	CSD	CSD	CSD	ABC	NA	NA	ABC	OP/SC	Ph/Wk	Ph/Wk		
B23-12211	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC	OP/SC	Ph/Wk	Ph/Wk	
B23-12212	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC	OP/SC	Ph/Wk	Ph/Wk	
B23-12213	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC	OP/SC	Ph/Wk	Ph/Wk	
B23-12214	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	
B23-12215	ABC		NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	
B23-12216	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	CLAEM	OP/SC	Ph/Wk	Ph/Wk	
B23-12217	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12218	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12219	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12220	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12221	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12222	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12223	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12224	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12225	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12226	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12227	OC San		NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12228	OC San	OC San	NA	OC San	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12229	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12230	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12231	OC San	LACSD	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12232	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12233	CLAEM	CLAEM	NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM				
B23-12234	CLAEM	CLAEM	NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM				
B23-12235	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12236	CLAEM	CLAEM	NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM				
B23-12237	LACSD	LACSD	NA	ABC	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12238	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC			
B23-12239	ABC	ABC	NA	ABC	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC			
B23-12240	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC			
B23-12241	ABC	ABC	NA	LACSD	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC			
B23-12242	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	CLAEM			
B23-12243	NO/SC		NA	LACSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12244	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	CLAEM			
B23-12245	NO/SC		NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	CSD				
B23-12246	NO/SC		NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	CSD				
B23-12247	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12248	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12249	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12250	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12251	CSD	CSD	NA	CSD	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12252	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12253	OC San	OC San	NA	OC San	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12254	NA	OC San	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
B23-12255	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12256	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				

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Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic
B23-12257	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12258	LACSD	LACSD	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12259	NA	LACSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
B23-12260	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12261	LACSD	LACSD	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12262	LACSD	LACSD	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12263	LACSD	LACSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
B23-12264	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12265	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12266	LACSD	LACSD	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12267	NA	LACSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
B23-12268	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12269	NA	LACSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
B23-12270	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12271	NA	LACSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
B23-12272	NA	LACSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
B23-12273	ABC	NA	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC		Ph/Wk		
B23-12274	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		Ph/Wk		
B23-12275	ABC	NA	NA	NA	Physis	Physis	Physis	Physis	Physis	ABC	NA	NA	ABC			
B23-12276	ABC	NA	NA	NA	Physis	Physis	Physis	Physis	Physis	ABC	NA	NA	ABC			
B23-12277	ABC	NA	NA	NA	Physis	Physis	Physis	Physis	Physis	ABC	NA	NA	ABC		Ph/Wk	
B23-12278	ABC	ABC	NA	NA	Physis	Physis	Physis	Physis	Physis	ABC	NA	NA	ABC			
B23-12279	NO/SC	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	CSD				
B23-12280	ABC	ABC	NA	CSD	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC				
B23-12281	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC		Ph/Wk		
B23-12282	ABC	NA	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC				
B23-12283	ABC	ABC	NA	NA	CSD	CSD	CSD	CSD	ABC	NA	NA	ABC				
B23-12284	NO/SC	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	CSD				
B23-12285	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12286	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12287																
B23-12288	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12289	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12290	CSD	CSD	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12291	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12292	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12293	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12294	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12295	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12296	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12297	OC San	OC San	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12298	OC San	LACSD	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12299	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12300	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD		Ph/Wk		
B23-12301	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD		Ph/Wk		
B23-12302	LACSD	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12303	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12304	NO/SC	NA	NA	Physis	Physis	Physis	Physis	Physis	Physis	CSD	NA	NA	CLAEM		Ph/Wk	
B23-12305	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD		Ph/Wk		
B23-12306	LACSD	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD		Ph/Wk		
B23-12307	NO/SC	NA	NA	PHYSIS	PHYSIS	PHYSIS	PHYSIS	PHYSIS	PHYSIS	CSD	NA	NA	CLAEM		Ph/Wk	
B23-12308	NO/SC	NA	NA	PHYSIS	PHYSIS	PHYSIS	PHYSIS	PHYSIS	PHYSIS	CSD	NA	NA	CLAEM		Ph/Wk	

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Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic
B23-12309	NO/SC		NA	NA	PHYSIS	PHYSIS	PHYSIS	PHYSIS	CSD	NA	NA	CSD		Ph/Wk		
B23-12310	NO/SC		NA	NA	PHYSIS	PHYSIS	PHYSIS	PHYSIS	CSD	NA	NA	CLAEM		Ph/Wk		
B23-12311	NO/SC		NA	NA	PHYSIS	PHYSIS	PHYSIS	PHYSIS	CSD	NA	NA	CLAEM		Ph/Wk		
B23-12312	NO/SC		NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM		Ph/Wk		
B23-12313	NO/SC		NA	NA	CLAEM	CLAEM	CLAEM	CLAEM	CLAEM	NA	NA	CLAEM		Ph/Wk		
B23-12314	NO/SC		NA	NA	Physis	Physis	Physis	Physis	CSD	NA	NA	CSD		Ph/Wk		
B23-12315	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12316	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12317	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12318	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12319	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12320	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD		Ph/Wk		
B23-12321	CSD	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12322	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San		Ph/Wk		
B23-12323	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San		Ph/Wk		
B23-12324	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San		Ph/Wk		
B23-12325	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San		Ph/Wk		
B23-12326	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San		Ph/Wk		
B23-12327	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San		Ph/Wk		
B23-12328	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12329	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12330	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12331	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12332	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12333	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12334	OC San	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	OC San				
B23-12335	NA	NA	NA	NA	OC San	OC San	OC San	OC San	OC San	NA	NA	NA				
B23-12336	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12337	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12338	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12339	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12340	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12341	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12342	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12343	LACSD	NA	NA	NA	LACSD	LACSD	LACSD	LACSD	LACSD	NA	NA	LACSD				
B23-12344	NO/SC	NA	NA	NA	CSD	CSD	CSD	CSD	CSD	NA	NA	CSD				
B23-12345	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	ABC	NA	NA				
B23-12346	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	ABC	NA	NA				
B23-12347	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12348	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12349	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12350	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12351	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12352	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12353	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12354	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12355	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12356	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12357	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12358	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12359	NO/SC	NA	NA		Physis	Physis	Physis	Physis	Physis	CSD	NA	NA				
B23-12360	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	

Eight'23 Sediment Quality Assessment Field Operations Manual – Appendix C

Station	Field Grab	Field Trawl	Tox - Myt	Tox - Eoh	Grain Size	TOC	TN	Metals	CHC, PCB, PAH	Pyreth	PBDE	Infauna	Micro-plastics	PFAS	6PPD-quinone	neonic
B23-12361	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP					
B23-12362	RHMP	NA	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP	RHMP					
B23-12363	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W					
B23-12364	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W					
B23-12365	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W					
B23-12366	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W					
B23-12367	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W					
B23-12368	SD W	NA	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W	SD W					
B23-12369	River	NA	River	River	River	River	River	River	River	River	River					
B23-12507	NA	ABC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B23-12750	NA	OC San	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B23-12770	NA	OC San	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B23-12630	NA	CSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B23-12590	NA	CSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B23-12591	NA	CSD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Tox Myt = samples for toxicology *Mytilus* (Mussel) testing; Tox Eoh = samples for toxicology *Eohaustorius* (amphipod) testing; Grain Size = samples for grain size analysis; TOC = samples for total organic carbon analysis; TN = samples for total nitrogen; Metals = samples for trace metals analysis; CHC = samples for chlorinated hydrocarbons analysis; PCB = samples for polychlorinated biphenyls analysis; PAH = samples for polycyclic aromatic hydrocarbons analysis; Pyreth = samples for pyrethroids analysis; PBDE = samples for polybrominated diphenyl ethers analysis; PBDE = samples for polybrominated diphenyl ethers analysis; Micro-plastics = samples for microplastic analysis; PFAS = samples for PFAS analysis; 6PPD-quinone = samples for 6PPD-Quinone analysis; neonic = samples for neonicotinoids analysis.

Field Organization Codes and Description

Lab code	Description
ABC	City of Oxnard contracting Aquatic Bioassay and Consulting
Carls	Carlsbad Watershed Co-permittees (contractor: Weston Solutions)
C of LB	City of Long Beach
CLAEM	City of Los Angeles, Environmental Monitoring Division
CSD	City of San Diego
LACPW	Los Angeles County Public Works (contractor: Weston Solutions)
LACSD	Los Angeles County Sanitation Districts
LA W	City of Los Angeles, Watershed Protection Division
MBC	Marine Aquatics Sciences represents power generating stations
NA	Not Available
Navy	USN NIWC Pacific
NO/SC	NOAA/SCCWRP
OCPW	Orange County Public Works
OC San	Orange County Sanitation
OP/SC	Ocean Protection Council/SCCWRP
Physis	Physis Environmental Laboratories, Inc.
Ph/Wk	Physis Environmental Laboratories/Weck Laboratories combination
RHMP	Regional Harbor Monitoring Program (contractor: WSP USA Environment & Infrastructure)
River	Riverside County Flood Control and Water Conservation District (contractor: Weston Solutions)
RMP	Greater Los Angeles and Long Beach Harbor Waters Regional Monitoring Coalition (contractor: Anchor QEA)
SD W	San Diego Watershed Co-permittees (contractor: Weston Solutions)
SONGS	San Onofre Nuclear Generating Station

APPENDIX D

BIGHT'23 FIELD SAMPLING

EQUIPMENT AND SUPPLY LIST

BIGHT'23 EQUIPMENT AND SUPPLY LIST

GENERAL

Bight'23 Field Operations Manual
Bight'23 Sediment Quality Assessment Workplan
Field Computer/Tablets
Station Occupation data sheets
Field data sheets (Demersal Fish, Epibenthic Invertebrate, Trawl Debris, Sample Tracking, Chain of Custody)
Map or list of sites (or programmed into ship's navigation system)
Clipboards and No. 2 pencils
Plastic bags, Zip-Locks, and whirl-paks
Waterproof pens
100% rag paper tags or equivalent
First aid supplies
Sunscreen
Protective glasses
Gloves – leather, latex, and nitrile
Hand Tools - channel locks or pliers, sockets and wrenches, diagonal cutters, etc.
Paper towels and/or cotton towels
Floats/anchors (to mark lost equipment)
Camera
Plenty of water for crew

TRAWL SURVEYS

7.6-m otter trawl net, doors, bridles (and extras)
Spare chain, shackles, and rope
Sorting buckets, tubs, and tags
Field guides and keys
Hand lens
Ice chest with wet ice
Dissecting kits
Spring scales, tare buckets, and calibration weights
Fish Measuring Boards
Jars
Buffered formalin
Relaxant
70% ETOH
95% ETOH (optional for DNA samples)
Pressure/Temperature Sensor (may want to have spares, in case of loss)
Camera, camera board
Photo ID bucket
Camera with spare batteries and memory
Spare specimen bottles

BENTHIC SURVEYS

Modified Van Veen grab sampler
Push corer
Plastic centimeter rulers
Timers
Screening box with 1.0 mm screen (0.5 mm Brackish Estuaries)
Large plastic tubs
Relaxant in seawater
Buffered formalin
Graduated cylinders
Safety Glasses
Stainless (no Teflon coatings) and plastic sediment scoops
Ice Chest with wet Ice
Ice Chest with Dry Ice (for freezing samples if necessary)
Glass Jars / Teflon bags for sediment chemistry and Toxicity
Plastic Jars (variety) for infauna
External labels
Clear packaging tape for outside of infauna containers
Deionized water
Brushes
Forceps
Siphon hose or turkey baster (to remove supernatant water)
5-gallon bucket
Sediment Toxicity Teflon bags
Sediment Toxicity secondary plastic bags
Zip ties
Benthic Screening tables or screens
Hoses (each vessel as their own configuration)
Microplastics field blanks
MAG water from SCCWRP
HPDE sample jars (for PFAS)
HPDE PFAS-free pure water supplies, 34 oz. each (for PFAS field blanks)
Heavy-duty ashed aluminum foil (for wrapping scoops for PFAS after cleaning)

APPENDIX E

BIGHT'23 VESSEL SPECIFICATIONS

SPECIFICATION	1	2	3	4	5	6	7	8	9
agency	City of L.A.	City of L.A.	LACSD	LACSD	OC San	City of S.D.	City of S.D.	NOAA/CINMS	SeaVentures
vessel name	La Mer	Marine Surveyor	Ocean Sentinel	Phaon	Nerissa	Monitor III	Oceanus	Shearwater	Early Bird II
length (ft)	84	61	66	25	58	42	48	62	42
home port	Marina del Rey	Cabrillo	Cabrillo	Cabrillo	Newport Beach	Driscoll's Wharf	Driscoll's Wharf	Santa Barbara	Dana Point
call sign	WYW4507	WO5232	WDC2543	WTA5037	WDC2773	WUV9304	WDH8556	WDB2424	WDC3623
cellular phone	310/507-3186	310/507-3186	310/613-5434	310/415-4006	714/307-9146	858/342-7331	858/342-7331	805/729-2727	949/637-2433
NAV EQUIPMENT									
radar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
fathometer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GPS/WAAS enabled	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAMPLING EQUIPMENT									
puller cat-head	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
wire dia/puller (in)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
wire length/puller (ft)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
winch/grab	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
wire dia/grab (in)	3/16	5/16	3/16	N/A	3/8	1/4	1/4	0.322	1/4
wire length/grab (ft)	656	459	3000	N/A	3280	4000	5000	1200	3000-5000
winch/trawl	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
wire dia/trawl (in)	3/8	5/8	3/8	N/A	3/8	1/4	1/4	0.322	1/4
wire length/trawl (ft)	4-5K	4592	4000	N/A	3280	4000	5000	1200	3000-5000
davit	No	Yes	Yes	Yes	crane	Yes	Yes	No	No
A/H - frame	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes- articulated
articulated crane	Yes	No	Yes	No	Yes	No	No	Yes	No
refrigerator	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
freezer	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes

SPECIFICATION	10	11	12	13	14	15	16
agency	ABC Grabs	ABC Grabs/Trawls	MBC	MBC	Weston	Weston	NIWC Pacific US Navy
vessel name	Kathryn Ann	Yellowfin	Poco Loco	Scorpaena	(inflatable)	Pacman	Benthic Cat
length (ft)	42	70	24	26	12	?	42
home port	Ventura Harbor	Terminal Island	N/A	N/A	N/A	N/A	San Diego
call sign	WBA6600	WCW2778	N/A	N/A	N/A	N/A	WDL3692
cellular phone	805/340-3469	310/560-9917	N/A	N/A	760-458-4877	760-908-5753	310-961-6577
NAV EQUIPMENT							
radar	Yes	Yes	No	Yes	No	No	Yes
fathometer	Yes	Yes	Yes	Yes	No	Yes	Yes
GPS/WAAS enabled	No	Yes	Yes	Yes	Yes	Yes	Yes
SAMPLING EQUIPMENT							
puller cat-head	Yes	Yes	Yes	No	No	No	No
wire dia/puller (in)	N/A	N/A	1/2 rope	No	No	No	N/A
wire length/puller (ft)	N/A	N/A	800	No	No	No	N/A
winch/grab	Yes	Yes	Yes	Yes	Yes	Yes	Yes
wire dia/grab (in)	1/2	7/16	½ rope	¼ spectra	¼ spectra	½ wire	5/8 dyneema
wire length/grab (ft)	1200	14000	800	800	50	250	85
winch/trawl	N/A	Yes	Yes	Yes	No	N/A	N/A
wire dia/trawl (in)	N/A	7/16	1/2 rope	1/4 spectra	N/A	N/A	N/A
wire length/trawl (ft)	N/A	14000	800	800	N/A	N/A	N/A
davit	Yes	No	Yes	No	Yes	No	No
A/H - frame	No	Yes	No	Yes	No	Yes	Yes
articulated crane	No	Yes	No	No	No	No	Yes
refrigerator	Yes	Yes	No	No	No	No	Yes (4 cu ft)
freezer	No	Yes	No	No	No	No	Upon Request

APPENDIX F

BIGHT '23 FIELD SAMPLING

DATA SHEETS

STATION OCCUPATION

BIGHT '23

Agency Code	
Vessel Name	
Latitude	
Longitude	
Arrival Time	
(hh:mm)	
Depth (m)	

Weather	
Clear	Rain
Overcast	Thunderstorm
Partly Cloudy	Fog
Drizzle	Fog & Drizzle
Hazy	Smoky

Station ID

Date

Abandoned site?

Station Fail Code

(2)

Y or N (If Y explain in
comments)

Wind
Speed (kts) _____
Direction (4)

Swell

Period (s) _____

Height (ft) _____

Direction (1)

Nav Type
GPS
Enhanced
Enhanced

Station Comments

GRAB EVENTS

(Check all sample types that apply)

Grab Event Comments:

Table 1. Summary of the main characteristics of the 1000 samples used in this study.

Grab Event Comments:

Table 1. Summary of the main characteristics of the 1000 samples used in this study.

Grab Event Comments:

Grab Event Comments:

—
—
—

Grab Event Comments:

Code Descriptions for the back of the Bight'23 Grab Form

(1) Directions: N, NE, E, SE, S, SW, W, NW, or XX for calm

(2) Station Fail codes: S1-None, S2-Temporary sea conditions (comment req.), S3-Temporary atmosphere (comment req.), S4-Temporary mechanical (comment req.), S5-PreAbandoned (comment req.), S6-Site On Land (comment req.), S7-Vessel safety (comment req.), S8-No Access Allowed (comment req.), S9-Prolonged rough seas, S11-Too Shallow (comment req.), S12-Too many Event Failures (comment req.), S13-Anthropogenic obstruction (comment req.), S14-Natural hard bottom obstructions (comment req.), S15-Not trawlable - smooth, undulating bottom, S16-Not sampleable - other (comment req.), S17-Sampling organization logistics, S19-Temporarily abandon site due to High density species incidence, S20-Permanently abandon site due to high density species incidence.

(3) Sediment Composition: Coarse sand, Fine sand, Silt/clay, Course Gravel, Fine Gravel, Shell Hash, Cobble, Mixed

(4) Sediment Odor: None (N), Petroleum (P), Hydrogen sulfide (HS), Humic (HU), Other (O, describe in comments)

(5) Sediment Color: Dark Brown, Light Brown, Gray, Black, Olive green, Red, Other

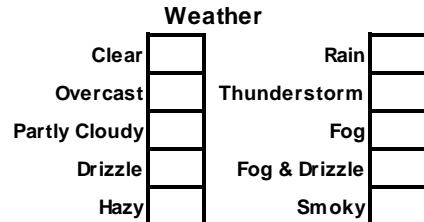
(6) Shell Hash Category: N-None, L-Low (1-25%), M-Medium (26-50%), H-High (>50%)

(7) Grab Fail Codes: G1-None, G2-Outside Radius Limit, G3-Outside Target Depth, G4-Premature closure, G5-Flipped, G6-Rocks/gravel, G7-Dead shell, G8-Live animal (comment req.), G9-Debris (comment req.), G17-Hard bottom, G11-Heavily Canted, G12-Large Humping, G13-Washed, G14-Disturbed Surface, G15-< 5 cm Penetration, G16-<= 7 cm Penetration for biology only, G10-Qther (comment req.).

STATION OCCUPATION

BIGHT '23

Agency Code	
Vessel Name	
Latitude	
Longitude	
Arrival Time (hh:mm)	
Depth (m)	



Sea State	
Calm	
Choppy	
Rough	
Confused	

Abandoned site?
Y or N (If Y explain in comments)

Station ID

Date

Station Fail Code (2)

Wind

Speed (kts) _____

Direction (4) _____

Swell

Period (s) _____

Height (ft) _____

Direction (1) _____

Nav Type

GPS

WAAS enhanced

GNSS enhanced

Station Comments

Equipment Type

Trawl

Core

Petite Ponar

Van Veen

Tandem Van Veen

TRAWL EVENTS

Trawl Number	Net Position	Deck Time (hh:mm:ss)	Latitude (DD°MM.mmmm)	Longitude (DDD°MM.mmmm)	Depth (m)
	Net Over				
	Start Trawl				
	End Trawl				
	Net on Deck				

Enter Values

Wire Out (m)	
Closest Distance to target (m)	
PT On-Bottom Duration (mm:ss)	
PT Bottom Temperature (°C)	
Trawl Fail Code (3)	

Check all that apply

P/T Sensor Data	<input type="checkbox"/>
Community Structure	<input type="checkbox"/>
Debris Detected	<input type="checkbox"/>
Other (Comment req'd)	<input type="checkbox"/>
P/T Manufacture:	
P/T Serial #:	

Comments:

	Net Over					
	Start Trawl					
	End Trawl					
	Net on Deck					

Wire Out (m)	
Closest Distance to target (m)	
PT On-Bottom Duration (mm:ss)	
PT Bottom Temperature (°C)	
Trawl Fail Code (3)	

P/T Sensor Data	<input type="checkbox"/>
Community Structure	<input type="checkbox"/>
Debris Detected	<input type="checkbox"/>
Other (Comment req'd)	<input type="checkbox"/>
P/T Manufacture:	
P/T Serial #:	

Comments:

Code Descriptions for the back of the Bight '23 Trawl Form

(1) Directions: N, NE, E, SE, S, SW, W, NW, or XX for calm

(2) Station Fail codes: S1-None, S2-Temporary sea conditions (comment req.), S3-Temporary atmosphere (comment req.), S4-Temporary mechanical (comment req.), S5-PreAbandoned (comment req.), S6-Site On Land (comment req.), S7-Vessel safety (comment req.), S8-No Access Allowed (comment req.), S9-Prolonged rough seas, S11-Too Shallow (comment req.), S12-Too many Event Failures (comment req.), S13-Anthropogenic obstruction (comment req.), S14-Natural hard bottom obstructions (comment req.), S15-Not trawlable - smooth, undulating bottom, S16-Not samplable - other (comment req.), S17-Sampling organization logistics, S19-Temporarily abandon site due to High density species incidence, S19-Permanently abandon site due to high density species incidence.

(3) Trawl Fail Codes: T1-None, T2-Outside Radius Limit, T3-Outside Target Depth, T4-Fouled Net (comment req.), T5-Open cod end (knot untied), T6-Trawl hit unknown obstruction, T7-Doors not contacting the bottom, T8-Torn Net, T9-Unusually low catch, T10-Improper Deck Time, T11-Improper Bottom Time, T12-Inadequate trawl track, T13-Other Trawl Failure (comment req.), T14-High density species incidence.

BIGHT '23 DEMERSAL FISH IDENTIFICATION FORM

Station: _____

Page _____ of _____

Date: _____

Completed by: _____

Failed

Trawl Number

Species	N	Diversity Index Exclude (Y or N)	Standard Length Size Class (cm) <i>Use for up to 10 individuals. Use Size Class sheet for more abundant species</i>	FID/ Vouch	Weight (kg)		
					Gross	Tare	Net
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							

Anomaly Codes: (record as superscript to tally mark): **A** = ambicoloration, **B** = albinism, **D** = skeletal deformity, **E** = copepod eye-parasite, **F** = fin erosion, **H** = leeches, **L** = lesion (*describe in Comments*), **M** = Monogeneans, **N** = none, **NE** = none examined, **O** = other anomaly (*describe in Comments*), **P** = other external parasite (*describe in Comments*), **T** = tumor. Note multiple occurrences on an individual (put “-” and #). **FID** = specimen(s) collected for further identification, **#V** = Number of specimens collected as species vouchers

Comments:

--

QA done at station: (circle) Yes No

BIGHT '23 DEMERSAL FISH SIZE CLASS FORM

Station: _____

Trawl Number

Page ____ of ____

Date: _____

Completed by: _____

Gross weight (kg) _____

Tare Weight (kg) _____

Net weight (kg) _____

Size class	Anomalies	Species:	N
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

Anomaly Codes (record as superscript to length measurement): A = ambicoloration, B = albinism, D = skeletal deformity, E = copepod eye-parasite, F = fin erosion, H = leeches, L = lesion (describe in Comments), M = Monogeneans, N = none, NE = none examined, O = other anomaly (describe in Comments), P = other external parasite (describe in Comments), T = tumor. Note multiple occurrences on an individual (put “-” and #).

Comments: _____

Total Abundance

QA done for species: (circle) Yes No

BIGHT '23 DEMERSAL FISH ALIQUOT DATA FORM

Species:	N	Gross (kg)	Tare (kg)	Net (kg)
Record Catch gross weights here:	<i>Show calculations here</i>			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	<hr/> <hr/> <hr/>			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	<hr/> <hr/> <hr/>			

All weights are to be recorded in kg.

Comments:

BIGHT '23 EPIBENTHIC INVERTEBRATE FORM

Station: _____

Page _____ of _____

Date: _____

Completed by: _____

Failed

Trawl Number

Species	N	Diversity Index Exclude Code	Anomalies	Comments	FID or Vouch	Weight (kg)		
						Gross	Tare	Net
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

Anomaly Codes: U = burnspot, P = external parasite, O = other anomaly (describe in Comments), W = wasting disease. Note multiple occurrences on an individual (put "- and #). FID = specimen(s) collected for further identification, #V = Number of specimens collected as species vouchers

Comments:

QA done at station: (circle) Yes No

BIGHT '23 EPIBENTHIC INVERTEBRATE ALIQUOT DATA FORM

Species:	N	Gross (kg)	Tare (kg)	Net (kg)
Record Catch gross weights and comments here:	Show calculations here			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	$\underline{\quad} - \underline{\quad} = \underline{\quad}$			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	$\underline{\quad} \times \underline{\quad} = \underline{\quad}$			

All weights are to be recorded in kg.

ALIQUOT DATA

Species:	N	Gross (kg)	Tare (kg)	Net (kg)
Record Catch gross weights and comments here:	Show calculations here			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	$\underline{\quad} - \underline{\quad} = \underline{\quad}$			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	$\underline{\quad} \times \underline{\quad} = \underline{\quad}$			

All weights are to be recorded in kg.

ALIQUOT DATA

Species:	N	Gross (kg)	Tare (kg)	Net (kg)
Record Catch gross weights comments here:	Show calculations here			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	$\underline{\quad} - \underline{\quad} = \underline{\quad}$			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	$\underline{\quad} \times \underline{\quad} = \underline{\quad}$			

All weights are to be recorded in kg.

Station: _____ Trawl #: _____ Date: _____

 CHECK HERE IF NO DEBRIS PRESENT IN SAMPLE

Plastic	Count	Comment
Bag		
Bandaid		
Balloon (mylar/latex)/Ribbon		
Bottle		
Buoy		
Cap/Lid		
Cigarette Box/Wrapper		
Cup		
Filmstrip (movie)		
Fishing Line/Net		
Food Bag/Wrapper		
Polypropylene Rope		
Single use food container		
Toy		
Utensil		
Plastic Piece (unid.)		
Other Plastic (comment req.)		
Glass		
Beer Bottle		
Other Glass Bottle/Jar		
Glass Piece (unid.)		
Other Glass (comment req.)		

Misc. Items/Pieces	Count	Comment
Boat/Engine/Engine Part		
Clothing		
Concrete/Asphalt		
Fiberglass		
Food		
Latex/nitrile gloves		
Leather		
Lumber		
Mask—specify single use or cloth		
Paper		
Rag/Cloth		
Rubber		
Shoe		
Tape		
Tire		
Other misc. (comment req.)		
Metal		
Drink Can		
Can – other		
Fishing Gear		
Wire		
Metal piece (unid.)		
Other metal (comment req.)		

Natural Debris	Marine Origin	Count	Est.*	Comment
	Foliose Algae – not kelp			
	Gorgonian Sea Fan (dead)			
	Kelp Holdfast			
	Kelp Stripe/Blade			
	Other Foliose Algae			
	Rock			
	Seagrass			
	Other Marine (comment req.)			

Terrestrial Vegetation	Count	Est.*	Comment
Leaves/Seed Pod			
Stick/Branch/Driftwood			
Other Terrestrial (comment req.)			

*For Natural Debris only, if the count >10 and an exact count cannot be made, leave the "Count" column blank and estimate the amount (M or H) in the "Est." column.

Moderate: M = 11-100

High: H = >100

Completed by: _____ (name, agency)

BIGHT '23 SAMPLE TRACKING FORM

AGENCY:

Page of

**SUBMITTAL
DATE:** _____

COMPLETED
BY: _____

Check mark or X indicates the sediment sample was collected at the station.

Check mark or X indicates the sediment sample was collected at the station.
Include all stations that have been abandoned during the sampling day(s) and describe the reason for each instance of abandonment.

BIGHT '23 CHAIN OF CUSTODY FORM

Agency: _____

Contact name: _____

Date: _____

Contact Phone #: _____

Sampled By: _____

Station	Collection Date	Sample Parameter (e.g., TOC/TN, Metals, Organics)	Container type	# of Containers	Comments

Relinquished by: _____

Agency: _____

Signature: _____

Date: _____

Comments: _____

Accepted by: _____

Agency: _____

Signature: _____

Date: _____

Relinquished by: _____

Agency: _____

Signature: _____

Date: _____

Comments: _____

Accepted by: _____

Agency: _____

Signature: _____

Date: _____

Suggested label format for biology samples

EXAMPLE 1	EXAMPLE 2	
Agency: LACSD Station Name: B23-12003 Gear/Split: Van Veen / 3 of 3 Date of Collection: 21 Aug 2023 Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: SCCWRP Station Name: B23-12004 Sample Type: Trawl Fish Voucher Date of Collection: 1 July 2023 Species: <i>Sebastes saxicola</i> Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>
Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>
Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>
Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>
Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>	Agency Code: _____ Station Name _____ Sample Type/Split No. _____ Date of Collection: _____ Circle One: <u>95% ethanol</u> OR <u>10% formalin</u>

Suggested additional label added to “Voucher” or “FID” specimen.

APPENDIX G

Bight'23 SAMPLE HANDLING GUIDE

Eight'23 Sediment Quality Assessment Field Operations Manual – Appendix G

Constituent	Jar Size	Jar Type	Scoop	Storage Temperature	Preservation	Holding Time	Notes
Grain Size	118 ml	Plastic snap or screw-top lid	Stainless Steel (SS)/Plastic	Refrigerated	None	6 months	100 ml sample size
TOC/TN	250 ml	Borosilicate amber glass, wide mouth, Teflon-lined lid	SS	Frozen	None	1 year	200 ml sample size (jar filled ~80%)
Metals	250 ml	Borosilicate amber glass, wide mouth, Teflon-lined lid	SS/Plastic	Frozen	None	6 months Hg; 1 year for others	200 ml sample size (jar filled ~80%)
Organics 1 (CHCs, PCBs, PAHs)	250 ml recommended, min125 ml	borosilicate amber glass, wide mouth, Teflon-lined lid	SS	Frozen	None	1 year	Jar filled ~80%
Organics 2 (PBDE, Pyrethroids, Neonicotinoids, Tire wear compounds)	250 ml recommended, min 125 ml	borosilicate amber glass, wide mouth, Teflon-lined lid	SS	Frozen	None	1 year	Jar filled ~80%
PFAS	250 ml	HDPE, wide mouth (No Teflon items)	SS	Frozen (Refrigerated for field blanks)	None	1 year	Jars/PFAS-free water/heavy-duty aluminum foil provided by SCCWRP 250 ml sample size (jar filled ~80%)
Microplastics	500 ml (16 oz)	Mason jar, silicon lined lid	SS	Refrigerated	None	∞	Jars and microplastics analysis grade (MAG) water provided by SCCWRP; fill jar completely (100%)
Toxicity	Embayments - 1 Teflon bag equivalent to 6 X 1 L jars of sediment	Offshore strata either 3 X 1L HDPE wide mouth jars full of sediment or 1 Teflon bag	SS/Plastic	Refrigerated	None	2 weeks	6L minimum for embayment and estuaries; 3L min for offshore; sediment homogenized in bag; transport to laboratory within 3 days
Infauna	varies by sample volume	HDPE or plastic wide mouth	N/A	Room	Relax with Epsom salts, then fix in 10% buffered Formalin		Bring range of jar sizes, multiple jars can also be used

Sample Handling Instructions

1. Grain size - 100 ml plastic container - refrigerated. If your laboratory is not doing analysis, ship to SCCWRP on ice. **Do not freeze.**
2. TOC/TN - 250 ml amber glass jar - frozen. If your laboratory is not doing analysis, ship to SCCWRP on dry ice. If you are contractually obligated to use a specific laboratory for analysis, you may ship it directly, but send a copy of the chain of custody to SCCWRP.
3. Metals - 250 ml amber glass jar - frozen. If your laboratory is not doing analysis, ship to SCCWRP on dry ice. If you are contractually obligated to use a specific laboratory for analysis, you may ship it directly, but send a copy of the chain of custody to SCCWRP.
4. Organics - 2 X 250 ml (minimum of 2 x 125 ml) amber glass jar - frozen (CHCs, PCBs, PAHs, PBDE, Pyrethroids, Neonics, Tire wear compounds). Field organizations have the discretion to fill extra sample containers according to their analytical laboratory specifications. If your laboratory is not doing analysis, ship to SCCWRP on dry ice. If you are contractually obligated to use a specific laboratory for analysis, you may ship it directly, but send a copy of the chain of custody to SCCWRP.
5. PFAS - 250 ml HDPE container provided by SCCWRP – frozen (refrigerate field blanks). Ship to SCCWRP on dry ice. Use preprinted sample container labels and pencil, ball-point pen, or fine tip sharpies to write on labels.
6. Microplastics – 16 oz Mason Jar (500 ml) provided by SCCWRP - refrigerated. Ship to SCCWRP on ice. **Do not freeze.**
7. Toxicity – For embayment sites, 1 Teflon bag full of sediment equivalent to 6 X 1L plastic HDPE wide mouth containers - refrigerated. **Teflon bag homogenization is required in embayment sites only**, not for offshore stations. Offshore sites only require sediment equivalent to 3 X 1L plastic HDPE wide mouth containers – refrigerated. Note that in embayment sites, chemistry (2 L) and toxicity (6 L) sediment are homogenized together before distribution. Ensure the bag is big enough to knead and mix sediment thoroughly. If your laboratory is not doing analysis, ship to SCCWRP on ice within 72 hr of collection. If your laboratory is doing one analysis, *Eohaustorius* or *Mytilus*, retain 3 L and ship the Teflon bag to SCCWRP. Call Darrin Greenstein (1-714-755-3224) with any questions.
11. Infauna – After field preservation (2-10 days in formalin solution), decant sample and any liquid into a 0.5 mm or smaller sieve. Refill sample container with water, agitate, and pour into sieve. Gently wash sample in sieve to remove fine silt. Ensure that all animals are removed from the screen and placed back into the sample container. Fill the container with 70% ethanol (**do not use denatured alcohol**), place internal label inside, close the container tightly, invert container several times then store at room temperature. If your laboratory is not doing the identification, ship samples to the appropriate taxonomic lab or SCCWRP (for distribution) in a leakproof ice chest/box/container.

APPENDIX H

BIGHT'23 TRAWL WIRE SCOPE GUIDE

Station Depth (m)	Depth/Wire Scope ¹	Wire (m)	Winch ² Time (min)	Initial Net ³ Depth (m)	Minutes to Bottom Lag ⁴	Minutes Off Bottom Lag ⁴	10 Min Trawl Est Deck Time (min)
3	11.6	35	0.85	7.0	-0.31	1.53	8.16
5	10.0	50	1.21	10.1	-0.38	1.56	8.06
10	8.1	81	1.98	16.4	-0.48	1.63	7.89
20	6.6	132	3.22	26.6	-0.50	1.77	7.72
30	5.9	176	4.28	35.4	-0.41	1.92	7.67
40	5.4	215	5.24	43.3	-0.25	2.06	7.69
50	5.0	252	6.12	50.7	-0.05	2.20	7.75
60	4.8	286	6.96	57.6	0.18	2.34	7.84
70	4.6	319	7.76	64.2	0.44	2.48	7.96
80	4.4	351	8.52	70.5	0.72	2.63	8.10
90	4.2	381	9.25	76.6	1.02	2.77	8.25
100	4.1	410	9.97	82.5	1.33	2.91	8.42
110	4.0	439	10.66	88.2	1.66	3.05	8.61
120	3.9	466	11.33	93.7	1.99	3.19	8.80
130	3.8	493	11.98	99.2	2.34	3.33	9.01
140	3.7	520	12.62	104.5	2.70	3.48	9.22
150	3.6	545	13.25	109.6	3.06	3.62	9.44
160	3.6	571	13.86	114.7	3.44	3.76	9.68
170	3.5	596	14.47	119.7	3.82	3.90	9.91
180	3.4	620	15.06	124.6	4.20	4.04	10.16
190	3.4	644	15.64	129.5	4.59	4.19	10.41
200	3.3	668	16.22	134.2	4.99	4.33	10.67
210	3.3	691	16.78	138.9	5.40	4.47	10.93
220	3.2	714	17.34	143.5	5.81	4.61	11.19
230	3.2	736	17.89	148.1	6.22	4.75	11.47
240	3.2	759	18.43	152.5	6.64	4.90	11.74
250	3.1	781	18.97	157.0	7.06	5.04	12.02
260	3.1	803	19.50	161.4	7.49	5.18	12.31
270	3.1	824	20.02	165.7	7.92	5.32	12.59
280	3.0	846	20.54	170.0	8.35	5.46	12.89
290	3.0	867	21.06	174.2	8.79	5.60	13.18
300	3.0	888	21.56	178.4	9.23	5.75	13.48
310	2.9	908	22.07	182.6	9.67	5.89	13.78
320	2.9	929	22.56	186.7	10.12	6.03	14.09
330	2.9	949	23.06	190.8	10.56	6.17	14.39
340	2.9	969	23.55	194.8	11.02	6.31	14.70
350	2.8	989	24.03	198.8	11.47	6.46	15.02
360	2.8	1,009	24.51	202.8	11.93	6.60	15.33
370	2.8	1,028	24.99	206.8	12.39	6.74	15.65
380	2.8	1,048	25.46	210.7	12.85	6.88	15.97
390	2.7	1,067	25.93	214.6	13.32	7.02	16.29
400	2.7	1,086	26.39	218.4	13.78	7.17	16.62
410	2.7	1,105	26.85	222.2	14.25	7.31	16.94
420	2.7	1,124	27.31	226.0	14.72	7.45	17.27
430	2.7	1,143	27.77	229.8	15.20	7.59	17.60
440	2.6	1,162	28.22	233.5	15.67	7.73	17.94
450	2.6	1,180	28.67	237.2	16.15	7.87	18.27
460	2.6	1,198	29.12	240.9	16.63	8.02	18.61
470	2.6	1,217	29.56	244.6	17.11	8.16	18.95
480	2.6	1,235	30.00	248.2	17.59	8.30	19.29
490	2.6	1,253	30.44	251.9	18.07	8.44	19.63
500	2.5	1,271	30.87	255.5	18.56	8.58	19.97

¹ Power function was $16.139219 * (D^{-0.297449384})$ based on method protocol where D = station depth.² Average agency winch rate was 41.16 m/min.³ Average descent rate was 8.3 m/min. Average lag on bottom decent rate changed +1.6 times.⁴ Used: (Station Depth – Wire Depth) / (Avg Descent Rate * Avg Change Rate Factor).⁵ Used: regression formula: $1.4903252151 + (0.0141874591 * \text{Station Depth})$ based on Lag Off vs. Depth data

Note: This table is meant to be a guide. Vessels working in shallow water should monitor their pressure/temperature and adjust accordingly.

APPENDIX I

Bight'23 FIELD SAMPLING QA/QC AUDIT FORMS

Bight'23 Grab Audit Checklist

Organization:	Date:	
Boat:		
Tasks	Check for Yes	Comments
Pre-survey Field Audit		
- organization used basic B'23 protocols	<input type="checkbox"/>	NA = Not observed, available, applicable
In-Survey Field Audit		
Within sampling Index (July 1 – Sept 30)	<input type="checkbox"/>	
Sampled Bight'23 station	<input type="checkbox"/>	
What strata?	<input type="checkbox"/>	
Personnel		
Who is the Cruise Leader?	<input type="checkbox"/>	
Crew safely handles equipment	<input type="checkbox"/>	
Crew knows methods in manual	<input type="checkbox"/>	
Crew prepared	<input type="checkbox"/>	
Crew knows chain-of-command	<input type="checkbox"/>	
Any observed trouble shooting	<input type="checkbox"/>	
Crew has datasheets/manual/computer	<input type="checkbox"/>	
Crew trained by Lead Scientist	<input type="checkbox"/>	
Equipment		
Modified Van Veen Grab (single/double)	<input type="checkbox"/>	
Material (galvanized/stainless)	<input type="checkbox"/>	
Wash table/screen boxes (1mm)	<input type="checkbox"/>	
Raw water screened	<input type="checkbox"/>	
Communications (phone/others)	<input type="checkbox"/>	
Boat has GPS (handheld/WAAS)	<input type="checkbox"/>	
Boat has fathometer	<input type="checkbox"/>	
Boat has life vests/ring	<input type="checkbox"/>	
CDFW Collection Permit aboard	<input type="checkbox"/>	
Site acceptability		
Within radius (100 m/200 m)	<input type="checkbox"/>	
Within 10% depth (neglect <10 m)	<input type="checkbox"/>	
Estuary stratum – recorded bottom salinity	<input type="checkbox"/>	
Greater than minimum depths? (Min depths: 6m-coastal, 3m-bay, 1m-estuary, none-brackish)	<input type="checkbox"/>	
Followed manual for site acceptability	<input type="checkbox"/>	
Intermittent success (9 if <500m)	<input type="checkbox"/>	
Intermittent lower slope success (6 if >500m)	<input type="checkbox"/>	
If site abandonment, was it valid?	<input type="checkbox"/>	
Was site completed normally?	<input type="checkbox"/>	
Benthic Sampling		
Grab lowered at appropriate speed	<input type="checkbox"/>	
Crew could tell when grab hit bottom	<input type="checkbox"/>	
Crew checked sample condition (surface disturbance/evenness)	<input type="checkbox"/>	

Bight'23 Grab Audit Checklist

Organization:

Date:

Boat:

Tasks	Check for Yes	NA = Not observed, available, applicable
Comments		
Crew checked sample penetration		
Hanging debris removal, potential microplastic contamination		
Exterior debris discarded		
Overlying water drained carefully		
Penetration depth measured (nearest 0.5 cm)		
Sediment described properly		
Datasheet/computer input observed		

Biology grab

Was biology grab done first	
Biology grab >=7cm penetration	
Water drained from grab retained/sieved	
Sediment thoroughly removed from sample	
Estuary-sediment removal done on land	
Off site screening done within 90 min	
Retained material transferred to jars	
Examined screen/used forceps	
30% headspace in jars	
Internal/external labels – splits	
30 minute relaxant treatment	
10% Formalin added after treatment	

Chemistry grabs

Crew checked similar sediment types	
Crew checked similar penetration depths	
Chemistry grab >= 5 cm penetration	
Circle Scoop material (stainless steel/plastic)	
PFAS, SS scoop must have no Teflon coatings	
SS/plastic acceptable for TOC/Grain size	
Surface sediment only collected	
Top 2 cm for the offshore	
Microplastics, top 5 cm offshore	
Top 5 cm for the bays, harbors, estuaries	
While scooping, avoided 1 cm of grab wall	
Offshore multiple grabs distributed evenly	
Embayments: sed/tox homogenized	
Circle samples taken (Grain Size, TOC/TN, Metals, Organics, PFAS, Microplastics, DNA)	
Were samples iced in the field?	
Planning to return samples to lab (24 hrs.)	
Microplastics field blanks	
PFAS-free pure water supply (PFAS field blank)	
HDPE Jar (for PFAS without Teflon-lined lid)	
PFAS field blanks	
Normal chemistry Jar with Teflon-lined lid	
Jars labeled appropriately	

Toxicology grabs

Sediment not homogenized in field	
Circle Scoop material (stainless/plastic)	
Surface sediment only collected	
Top 2 cm for the offshore	
Top 5 cm for bays, harbors, estuaries	
Offshore multiple grabs distributed evenly	
Embayments: sed/tox homogenized	
Tox: Teflon bag or jars HDPE w/ Teflon-lined lids	
Jars labeled appropriately	
Circle samples taken (Eohaustorius, Mytilus, Both, Tox)	
All samples iced/refrigerated	

QAQC

- Grab scrubbed out between sites
- Grab washed out between sites
- Scoops cleaned between sites
- Scoops placed in clean plastic bags for normal sampling
- PFAS Scoop wrapped in ashed heavy-duty aluminum foil
- Scoops rinsed before use – ambient water
- Left-over sediment dumped over side

Where (at site, underway, next site)?

Where (at site, underway, next site)?

End of Day/Transport

- Sample tracking observed
- Shipped samples iced in cooler
- Chain of Custody Form completed
- Datasheet/Tablet/Computer data check

Special Studies

Observed special study sampling

Comments:

Bight'23 Otter Trawl Checklist

Agency: _____ **Vessel:** _____ **Date:** _____

EQUIPMENT AND PROCEDURES	Yes	No	N/A	Comments
--------------------------	-----	----	-----	----------

Equipment Specifications				
Net Headrope (7.6 m)				
Body Mesh Size (4.1 cm)				
Cod-end Liner Mesh Size (1.3 cm)				
Non-crushable Floats				
Footrope Chain				
Otter Boards (51 x 76 cm or 20 x 30 in.)				
Bridle Length (22.9 m)				
P/T Sensor Mounted on Door				
P/T Reader/software/computer				
Other				

Trawling Procedures

Properly Deployed				
Proper Wire Scope				
Checked Bottom Time (target 10 min coast, 5 min bays)				
Proper Trawl Decisions (< 8 min on attempted 10 min trawl)				
Proper Trawl Decisions (15-20 min on attempted 10 min trawl)				
Proper Trawl Decisions (> 20 min on attempted 10 min trawl)				
Successful Trawl				
Qualified Crew				
Other				

Notes:

BIGHT'23 FIELD QA/QC**Trawl Processing Equipment Checklist**

Agency: _____ Vessel: _____ Date: _____

EQUIPMENT	Yes	No	N/A	Comments
Sorting Buckets/Trays				
Live Holding Tanks (optional)				
Measuring Boards				
Data Sheets/Field Computer System				
Trawl Cover Sheets				
Trawl Fish Species Sheets				
Trawl Fish Size Class Sheets				
Trawl Invertebrate Species Sheets				
Trawl Debris Sheets				
Tare Container				
Spring Scales				
3 kg				
15 kg				
Other				
Other				
Field Guides and Aids				
Love and Passarelli (2020) – new Miller and Lea				
Eschmeyer et al. (1983)				
Kramer et al. (1995) (flatfishes)				
Allen (1977) (juvenile rockfishes)				
Orr et al. (2000) rockfishes				
Other				
Field ID Tool Kit				
Wide-mouth Jars (Plastic)				
Plastic Bags				
10% Buffered Formalin				
Freezer or Ice Chest				
Other				

SPRING SCALE CALIBRATION CHECK

Test Weight	Weight (kg)				
	Scale A	Scale B	Scale C	Scale D	Scale E
0.15 kg					
0.30 kg					
0.45 kg					

BIGHT'23 FIELD QA/QC

Trawl Processing Procedures Checklist

Agency: _____ **Vessel:** _____ **Date:** _____

EQUIPMENT	Yes	No	N/A	Comments
Proper Trawl Acceptance				
Removal of All Organisms from Net				
Species Identifications:				
Qualified Staff				
Accurate ID of Common Species				
Return of Difficult Species to Lab				
Length Measurement:				
Proper Designation of Size Class				
Proper Data Sheet Recording for <10 Fish				
Proper Recording on Size Class Data Sheet				
Bony Fish (Standard Length)				
Sharks, Rays, Ratfish (Total Length)				
Stingrays (Wingspan)				
Weight Measurement:				
Scales Calibrated				
Tare Bucket Weight Checked				
Proper Weighing Procedures:				
Species Greater than 0.1 kg				
Species Less than 0.1 kg				
Invertebrate Counts Made				
Invertebrate Counts from Weights				
Anomaly Examination Conducted				
Proper Anomaly Identifications				
Proper Anomaly Notation on Data Sheets				
Debris Assessment Conducted				
FID/Voucher Preservation				
10% Buffered Formalin				
Slitting Body Cavity of Fish				
Proper Labeling				
Proper Photographic Techniques				
Photo Log				
Completion of Data Sheets				
Trawl Cover Sheets				
Trawl Fish Species Sheets				
Trawl Fish Size Class Sheets				
Trawl Invertebrate Species Sheets				
Trawl Debris Data Sheets				

BIGHT'23 FIELD QA/QC**Fish and Invertebrate Identification and Processing Audit**

Agency: _____

Vessel: _____

Date: _____

Trawls

Attempted

- - - -

**Species
Identification**Number Species
Examined

Successful

- - - -

Number Species
Correct

Percent

- - - -

Percent Species
Correct

Anomaly Identification

No. Anomalies Examined

**Incorrect
ID****Correct ID**

No. Anomalies Correct

% Anomalies Correct

Problem Anomalies:

Correct ID

Incorrect ID	Correct ID	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Species	Count			Size			Weight(kg)		
	Listed	Audited	% Diff.	Listed	Audited	%Diff.	Listed	Audited	%Diff.
1	_____	_____	_____	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____	_____	_____	_____	_____
10	_____	_____	_____	_____	_____	_____	_____	_____	_____

Comments

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Completed by _____

BIGHT'23 TRAWL DEMERSAL FISH - QUALITY CONTROL FORM

Station: _____ Trawl #: _____ Agency: _____

Date: _____ Previously Measured by: _____

Re-Measured by: _____

Original Gross weight (kg) _____ Tare Weight (kg) _____ Net weight (kg) _____

QC Re-weigh weight (kg) _____ Tare Weight (kg) _____ Net weight (kg) _____

Size Class	Original Species:			Anomalies
	QC Re-ID:			
	Re-ID Count	+/-2 mm	Tweener count	
1		1-2		
2		2-3		
3		3-4		
4		4-5		
5		5-6		
6		6-7		
7		7-8		
8		8-9		
9		9-10		
10		10-11		
11		11-12		
12		12-13		
13		13-14		
14		14-15		
15		15-16		
16		16-17		
17		17-18		
18		18-19		
19		19-20		
20		20-21		
21		21-22		
22		22-23		
23		23-24		
24		24-25		
25		25-26		
26		26-27		
27		27-28		
28		28-29		
Total		Total		

Other Species found in sample:			QA/QC Acceptance	Pass	Fail	Initials
			Identification			
			Count			
			Length			
			Biomass			
Other species Weight (kg)			Pathology			
Gross	Tare	Net	Notes:			

Anomaly Codes (record as superscript to length measurement): **A** = ambicoloration, **B** = albinism, **D** = skeletal deformity, **E** = copepod eye-parasite (i.e., *Phrioxocephalus*), **F** = fin erosion, **H** = Leeches, **L** = lesion (describe in Comments), **M** = Monogeneans, **O** = other anomaly (describe in Comments), **P** = other external parasite (describe in Comments), **T** = tumor. Note multiple occurrences on an individual put “-” and #

Using the “Tweener” count section of the QAQC Form

This form closely resembles regular “size class data sheets” except for the allowance of measurements that fall directly near an integer value of a size class. This “tweener” method should be used by the Field Auditor for the recheck/assessment, not for subsequent retests of a species by field crew. To use the form, any measured fish that falls +/- 2 mm on either side of a centimeter mark (integer), place a tally mark on the right side of the form straddling the two sizes in question. For example, a fish measuring 59 mm would have a tweener tally in the 5-6 cm category. A fish measuring 63 mm would have a normal tally in the 7 cm size class category.

Measurement errors generally occur with fish measured near the centimeter mark. These errors tend to be subjective, so the “tweener” method helps Field Auditors reduce the ambiguity. To evaluate the crew’s performance, the Field Auditor compares normal size class tallies. Any differences can be the result of “tweeners” and moves tweener tallies up or down once. If a 10% or greater difference still exist, the crew has failed the initial QC assessment and needs to re-measure the batch of fish again. Another failure results in spot training by the Cruise Leader and re-measurements until error is less than 10%. The subsequent trawl is categorized as another QC trawl with auditor assessing the crew again. The Field Auditor does not have to use the tweener (right-side) section, so all size-class measurements will be recorded on the left-side of the sheet.

3	
4	
5	
6	
7	
8	

Diagram illustrating the use of the “Tweener” count section of the QAQC Form. The table shows size classes 3 through 8. The “tweener” section is located on the right side of each row, where the size class number meets the next column. Arrows point from the following text boxes to specific entries in the “tweener” section:

- The first row (size class 3) has a box stating: “This fish can be counted as a 4 or 5 size class” pointing to the “tweener” section.
- The second row (size class 4) has a box stating: “This fish can be counted as a 5 or 6 size class” pointing to the “tweener” section.
- The third row (size class 5) has a box stating: “These fish can be counted as a size 6 or 7 size class” pointing to the “tweener” section.

BIGHT'23 TRAWL INVERTEBRATE - QUALITY CONTROL FORM

Station: _____ Trawl #: _____ Agency: _____
 Date: _____ Previously Measured by: _____
 Re-Measured by: _____

Species #1

Original Species name:			
QC Re-ID Species name:			
Comments/Anomalies	N	QC Re-weigh (kg)	
		Gross	Tare
Other species found in lot			
1			
2			
3			

Anomaly Codes: **B** = burnspot, **P** = External Parasite, **W** = wasting disease, **O** = other anomaly (*describe*) _____

Species #2

Original Species name:			
QC Re-ID Species name:			
Comments/Anomalies	N	QC Re-weigh (kg)	
		Gross	Tare
Other species found in lot			
1			
2			
3			

Anomaly Codes: **B** = burnspot, **P** = External Parasite, **W** = wasting disease, **O** = other anomaly (*describe*) _____

Species #1

QA/QC Acceptance			
Metric	Pass	Fail	Initials
ID			
Count			
Biomass			
Anomalies			

Species #2

QA/QC Acceptance			
Metric	Pass	Fail	Initials
ID			
Count			
Biomass			
Anomalies			

Notes:

ALIQUOT RECORDING AND CALCULATIONS WORKSHEET (If necessary)**Species 1****ALIQUOT DATA**

Species:	N	Gross (kg)	Tare (kg)	Net (kg)
<i>Record Catch gross weights here:</i>	<i>Show calculations here</i>			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	<hr/> _____ - _____ = _____			
	<hr/>			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	<hr/> _____ x _____ = _____			
	<hr/>			
	<hr/>			

All weights are to be recorded in kg.

Species 2**ALIQUOT DATA**

Species:	N	Gross (kg)	Tare (kg)	Net (kg)
<i>Record Catch gross weights here:</i>	<i>Show calculations here</i>			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	<hr/> _____ - _____ = _____			
	<hr/>			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	<hr/> _____ x _____ = _____			
	<hr/>			
	<hr/>			

All weights are to be recorded in kg.

Error Calculation Examples

1 Fish count:

Calculated as percent difference between total numbers of fish in original count vs. QA/QC recount.

Initial count:	46 specimens of <i>Sebastes saxicola</i>
QA/QC recount:	44 specimens of <i>Sebastes saxicola</i>
Percent error:	46 - 44 = 2
	(2 / 46)*100 = 4.3% error
Acceptability:	Yes
Report:	Note percent error and sign off on QA/QC sheet under “QA/QC Acceptance” - “Count”. Attach QA/QC sheet to original data record. Enter QA/QC data into computer record.
From DBM or QA/QC Officer:	* DBM: database manager or field computer system included in notebook and as comment in Event table.

2 Fish Size-class measurement:

Calculated as a percent difference between original report and QA/QC size class notations.

Example for *Microstomus pacificus*: 36 specimens were distributed over 12 size classes as follows:

QA/QC

Size	Initial Abundance	QA/QC Abundance	Difference
4	2	3	1
5	0	1	1
6	3	3	0
7	0	0	0
8	5	5	0
9	0	1	1
10	2	1	1
11	4	4	0
12	6	7	1
13	7	6	1
14	2	2	0
15	1	2	1
16	4	3	1

Total discrepancies = 4

Percent error:	4 specimen discrepancies / 36 specimens = 11.1% size class error
Acceptability:	No
Results:	Re-measure until MQO is met. In this case, until two readings errors are less than 10%.

Report:	Note percent error and sign off on QA/QC sheet under “QA/QC Acceptance” - “Length”. Attach QA/QC sheet to original data record. Enter into QA/QC data into computer record.
From DBM or QA/QC Officer:	Included in notebook and as field event comment.

Note: Each of the above circled pairs is considered a single error. Correction of one of the paired errors results in the pair being correct.

3 Biomass QA/QC:

Calculated as percent difference between original report and QA/QC size class notations. Weights of 1.0 kg or less are expected to be within +/- 0.1 kg of the QA/QC weight. Net weights greater than 1.0 kg will need to be within 10% of a QA/QC weight. Percent error calculated between these determinations is used to determine acceptability.

Example: Sample of <i>Lyopsetta exilis</i> initially weighs 1.5 kg. Re-weighed, it measures 1.4 kg	
Percent error:	$1.5 - 1.4 = 0.1$ differences $0.1 / 1.5 = 6.6\%$ error
Acceptability:	Yes
Results:	conserve with files
Report:	Note percent error and sign off on QA/QC sheet under “QA/QC Acceptance” - “Biomass”. Attach QA/QC sheet to original data record. Enter into computer record.
From DBM or QA/QC Officer:	included in notebook and as field event comment.

4 Pathology:

Example: There are 19 individuals of *Citharichthys sordidus* in the catch, one with an eye parasite. Recount reveals the same individual with an eye parasite and a skeletal deformity.

Initial count:	19 individual non-abnormality 1 individual eye parasite
QA/QC recount:	19 individual non-abnormality 1 individual eye parasite and skeletal deformity
Percent error:	1 individual with mismatched anomaly $(1 / 19) * 100 = 5.26\%$ error
Acceptability:	No
Results:	Re measure until two closest discrepancy results agree by > 90% and select fish group measured as data reported.
Report:	Note percent error and sign off on QA/QC sheet under “QA/QC Acceptance” - “Pathology”. Attach QA/QC sheet to original data record. Enter into computer record.
From DBM or QA/QC Officer:	included in notebook and as field event comment.

APPENDIX J

Bight'23 SAMPLING ORGANIZATION AND ANALYTICAL LABORATORY CONTACTS

SAMPLING ORGANIZATION CONTACTS

Aquatic Bioassay and Consulting Laboratories

29 North Olive St.
Ventura, CA 93001
Karin Wisenbaker (805) 643-5621 x17
karin@aquaticbioassay.com karin@aquaticbioassay.com

City of Los Angeles, Environmental Monitoring Division

12000 Vista del Mar
Playa del Rey, CA 90293
Stacee Karnya (310) 648-5194 (office) or (714) 716-6682 (cell)
stacee.karnya@lacity.org

City of San Diego

Public Utilities Department,
Environmental Monitoring and Technical Services Division.
2392 Kincaid Rd.
San Diego, CA 92101
Adriano Feit (619) 758-2377
afeit@sandiego.gov

Los Angeles County Sanitation Districts

Marine Biology Group
24501 S. Figueroa Street
Carson, CA 90745
Terra Petry (310) 830-2400 X5603
terrapetry@lacsd.org
Chase McDonald (310) 830-2400 x5601
cmcdonald@lacsd.org

MBC Aquatic Sciences, Inc.

3000 Red Hill Ave.
Costa Mesa, CA 92626
D.J Schuessler (714) 850-4834
dschuessler@mbcaquatic.com

Orange County Sanitation District

10844 Ellis Ave.
Fountain Valley, CA 92728
Ken Sakamoto (714) 593-7470
ksakamoto@ocsan.gov

Southern California Coastal Water Research Project

3535 Harbor Blvd.

Suite 110, Costa Mesa, CA 92626
Dario Diehl (714) 372-3212
dariod@sccwrp.org

Weston Solutions, Inc.
5817 Dryden Place, Suite 101
Carlsbad, CA 92008-2433
Dan McCoy (760) 795-6920
dan.mccoy@westonsolutions.com

Wood Environmental and Infrastructure Solutions (formerly Amec)
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San Diego, CA 92123
Chris Stransky (858) 300-4350
chris.stransky@woodplc.com

Anchor QEA, LLC
9700 Research Drive
Irvine, California 92618
Andrew Martin (949) 334-9630
amartin@anchorqea.com

US Navy (NIWC)
53475 Strothe Rd.
San Diego, CA 92152
Molly Colvin (619) 553-2788
marienne.a.colvin.civ@us.navy.mil

US Navy (NAVFAC SW)
Anthony Yamat
750 Pacific Hwy
San Diego CA 92132-0001
(619) 705-5257
anthony.s.yamat.civ@us.navy.mil

APPENDIX K

Bight'23 SCCWRP SAMPLE SHIPPING INFORMATION

Bight'23 Sample Shipping Information

Contact: Alle Lie
Phone: (714) 755-3213
FAX: (714) 755-3299
Email: allel@sccwrp.org

Contact: Sydney Dial
Phone: (714) 755-3268
FAX: (714) 755-3299
Email: sydneyd@sccwrp.org

Contact: Darrin Greenstein
Phone: (714) 755-3224
FAX: (714) 755-3299
Email: darring@sccwrp.org

Shipping Address:

SCCWRP
3535 Harbor Blvd., Suite 110
Costa Mesa, CA 92626
Attn: Darrin Greenstein

In advance of any shipment of samples, please email Alle Lie (allel@sccwrp.org) a list of the samples she can expect to receive. If Alle is not available, please contact Sydney Diel (sydneyd@sccwrp.org) or Darrin Greenstein (darring@sccwrp.org).

Please call ahead to make an appointment to deliver samples in person to SCCWRP. If Alle, Sydney, or Darrin is not available to receive the call, leave a message and they will automatically be paged. Those making deliveries with prearranged appointments will be processed before others without one. There will be someone at SCCWRP between 7:00 a.m. and 5:00 p.m., Monday through Friday. Arrangements can be made to receive samples outside of normal working hours, or on weekends if necessary.

If samples are shipped using a commercial carrier, such as Fed-Ex, please email/FAX Alle, Sydney, or Darrin a copy of the weigh bill. This proved useful in previous surveys to track/locate samples that were misplaced.

Alle will be the main contact for coordinating sample handling at SCCWRP. If Alle is not available, please contact Sydney (714) 755-3268. If both Alle and Sydney are not available, please contact Darrin (714) 755-3268.

APPENDIX L

BIGHT'23 WALK-IN ESTUARY PLASTIC CORE AND EXTENSION POLE CONSTRUCTION SOP PLUS SAMPLING GUIDE

By David Gillett

Hand Core Device Construction SOP

Building Materials:

18" – Schedule 40 PVC pipe - <https://www.homedepot.com/p/4-in-x-10-ft-PVC-Sch-40-DWV-Plain-End-Pipe-30577/203308683>

4" – galvanized steel riser clamps - <https://www.mscdirect.com/product/details/02164127>

4" – rubber pipe cap w/ galvanized tightening clamp -
<https://www.homedepot.com/p/CHERNE-4-in-PVC-Pipe-Cap-270784/100204814>

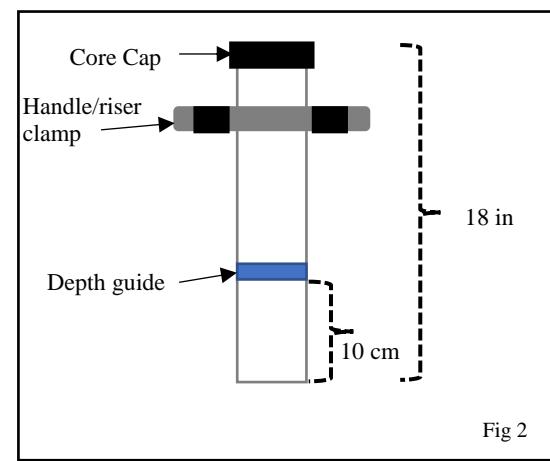
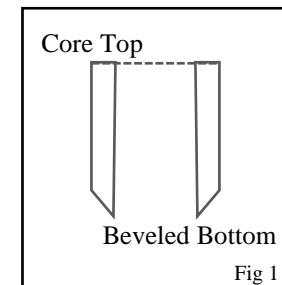
Saw w/ PVC blade.

Rasp file, Dremel tool, etc.

Duct tape, some manner of waterproof tape, or heavy rubber band.

Construction:

1. If the pipe is longer than 18" trim to appropriate length. Eighteen inches is a recommendation, but a few inches shorter or longer is fine if ergonomically more comfortable.
2. Using the file or Dremel tool or other preferred device, cut a bevel at one end of the tube, this will become the bottom (Fig 1). This will aid in penetrating the sediment.
3. Measure 10cm up from the bottom of the core and place a wrap of tape or rubber band (Fig 2). This will be the minimum depth guide for inserting the core into the sediment.
4. Place the riser clamp approximately 12 – 15 inches from the bottom of the core (Fig 2). This will be the handle for inserting and removing the core from the sediment.
5. Consider wrapping the ends of the riser in waterproof electrical tape to make the handle more comfortable to push and pull on.
6. Ensure rubber cap fits the end of the corer.



Pole Extension Construction SOP for the Hand Core

Building Materials

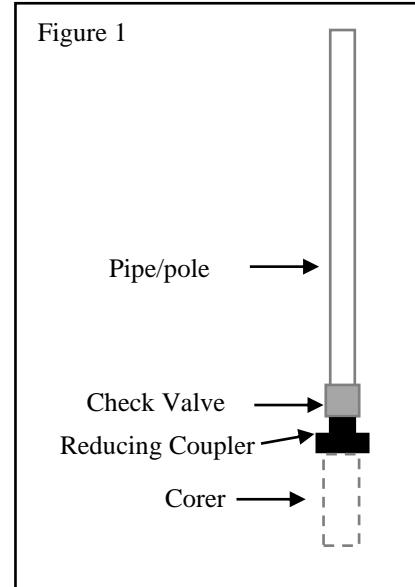
10ft length of 3" diameter PVC pipe.

4"-3" rubber reducing coupler - <https://www.zoro.com/fernco-flexible-coupling-for-pipe-size-6-x-3-1056-63/i/G2779637/>

3" diameter spring-load check valve.

Construction:

1. Attach check valve to one end of the pipe (compression or cement fitting). Make sure the direction of the valve is flow up the pipe from the bottom.
2. Attach 3" side of couple to the check valve. Tighten the gasket.
3. Mark 2-cm increments along the length of the pipe. This will be used to estimate core penetration into the sediment.



Low Salinity Estuary Hand Core Sampling Protocol for Biology

1. Wadable Scenario

- a. Assemble core with handle place 12-15 inches from the bottom of the core. Ensure handle bolts are tight.
- b. Wade into approximate sample location. **Make sure you do not walk over where the sample is to be collected.**
- c. Push core into the sediment, feeling for when the 10-cm marker on the core reaches the sediment surface. If possible, insert beyond 10 cm, but no more than 15cm.
- d. When core is in the sediment to the appropriate depth, place cap on top of core. Tighten gasket to create a water-tight seal.
- e. Gently pull core from the sediment. It may require some jostling and rocking of the core back and forth to break the seal with the sediment.
- f. Keep the core vertical as you pull it out of the water. As the bottom of the core breaks the surface of the water, use your hand or a wide flat object to prevent any slippage of the sediment out of the tube.
- g. Place the corer in or over the sieving device: stacked screens of 1 mm and 0.5 mm.
- h. Loosen the core cap, allowing the sediment to slide out. Gently rinse the insides of the core into the sieve.
- i. If the sample looks less than the minimum required depth, then collect a new core.
- j. Process as normal. Put contents from each screen into separate jars.

2. Non-Wadable Pole scenario

- a. Assemble the coupler to the pole.
- b. Attach the core to the wide side of the coupler. Make sure that the core is seated all the way into the coupler and that the gaskets are tight.
- c. Place the pole+corer over the side of the boat, gently resting at the sediment surface.
- d. Note the approximate cm mark of the water along the pole, this is the starting point.
- e. Gently push the core into the sediment at least 10cm and no more than 15cm, approximating the distance with the 2cm markings on the pole.
- f. Make sure the core goes into the sediment vertically and the pole+core doesn't flex out at the point of the coupler.
- g. Gently pull core from the sediment. It may require some jostling and twisting of the core to break the seal with the sediment.
- h. Keep the core vertical as you pull it out of the water. As the bottom of the core breaks the surface of the water, use your hand or a wide flat object to prevent any slippage of the sediment out of the tube.
- i. Place the corer in or over the sieving device: stacked screens of 1 mm and 0.5 mm.
- j. Remove the core from the pole, allowing the sediment to slide out. Gently rinse the insides of the core into the sieve.

- k. If the sample looks less than the minimum required depth, then collect a new core.
 - l. Process as normal. Put contents from each screen into separate jars.
3. *Non-Wadable Grab Scenario*
- a. Deploy the Van-Veen as normal.
 - b. Once it is back on board, quickly open the top flap and insert the corer into the sample as close to the mid-line/pivot of the grab as possible.
 - c. Place the rubber cap on top of the corer and tighten the gasket.
 - d. Gently pull the core up out of the grab, place your hand or a wide flat object across the bottom of the core once it is clear to prevent any slippage of the sediment out of the tube.
 - e. Place the corer in or over the sieving device: stacked screens of 1 mm and 0.5 mm.
 - f. Remove the core from the pole, allowing the sediment to slide out. Gently rinse the insides of the core into the sieve.
 - g. If the sample looks less than the minimum required depth, then collect a new core.
 - h. Process as normal. Put contents from each screen into separate jars.