

REQUEST FOR PROPOSALS

FIELD SAMPLING AND LABORATORY ANALYSES

SECTION 1. INSTRUCTIONS TO BIDDERS

Five (5) copies of the bidder's complete proposal to provide the services detailed are to be enclosed in a sealed envelope marked "Field Sampling and Laboratory Analyses" and addressed to:

Marisol Gonzalez, Office Manager
Southern California Coastal Water Research Project (SCCWRP)
3535 Harbor Blvd., Suite 110
Costa Mesa, CA 92626

All supplemental materials requested within this proposal must be attached to the Proposal. Any unauthorized conditions, limitations, or provisions attached to this proposal may be cause for rejection.

If a bidder wishes to withdraw its Proposal, the Bidder may do so without prejudice by delivery of written notice of withdrawal to the Administrative Officer at any time before the time fixed for the opening of bids.

Sealed bids must be received by 11:00 AM on April 24, 2018, at which time, the Office Manager will open the bids. Bids received by facsimile or email will not be accepted.

All bidders should inform SCCWRP via email (contractor@sccwrp.org) or letter mail by April 17, 2018 of their intention to submit a bid. The notification is not mandatory, but is necessary to receive future updates to this bid notification. SCCWRP will hold a non-mandatory bidders meeting at 11:00 AM on April 17, 2018 at SCCWRP's Offices in Costa Mesa. This meeting is intended to provide bidders the opportunity to ask questions and request clarifications about this document. Bidders who are unable to attend may provide written requests for clarification prior to the meeting. SCCWRP's response to both written and oral questions will be sent to the bidders by email and posted on the SCCWRP web site (www.sccwrp.org).

This solicitation for proposals shall not be construed as obligating SCCWRP to award a contract or to pay any compensation for the information solicited.

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SECTION 2. SCOPE OF WORK

Southern California Coastal Water Research Project (SCCWRP), a public agency for environmental research, requires support services for field sampling and laboratory analyses. These services will be required on an "as needed" basis so this RFP is structured on a unit cost, task-order basis. At present, the number and locations of sampling stations, as well as the amount of samples for laboratory analyses, have not yet been determined. Bidders are asked to provide pricing for each applicable element within this Scope of Work. At the bidder's discretion, bidders may provide one price or specify price breaks at different possible levels of effort as determined by the bidders, indicating the appropriate price differences for different levels of work (e.g., cost per sampling site or sample analysis for 10-25, 26-50, 51-100, or 100-250 sites/samples). For field activities, if bid prices will differ due to geographic factors (i.e. by region) or depth factors (e.g., 3-200 m, 200-500 m, or 500 – 1000 m), indicate separate pricing for each region or depth. If bid prices will differ for habitat (e.g., ocean vs. estuaries) or geographic factors (e.g., northern vs. southern California Bight), indicate separate pricing for each. The bidder is asked to supply prices for the 2018/19 fiscal year. The successful bidder will be offered the opportunity to revise their price quotes to incorporate a mutually agreeable adjustment for inflation or conditions. The actual number of sampling sites and samples for analysis will be awarded to the successful bidder(s) on a task order basis following execution of contract(s).

Section 2 of this Proposal Form provides a summary the methods to be used for each element of work. SCCWRP requires the highest quality work from its contractors and expects them to produce samples and laboratory results that are consistent with, and comparable to, SCCWRP's partner agencies. As a result, SCCWRP mandates that each bidder maintain the standards and procedures outlined by the Southern California Bight regional monitoring survey (hereafter referred to as "Bight Survey"). The work elements in this RFP will be similar to those described in the field methods manuals, quality assurance manuals, and laboratory manuals used in past Bight Surveys, which can be found at <http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx> <http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx> Where differences exist between this RFP and any Bight Survey document, this RFP takes precedence.

Successful bidders will be required to participate in Quality Assurance/Quality Control (QA/QC) activities to demonstrate comparability in data quality with SCCWRP partner agencies. QA/QC activities will include pre-survey and in-survey audits of equipment, taxonomic identification exercises, and instrument intercalibration exercises as detailed in the Scope of Work section below. Participation in these activities shall be at the bidders' own expense, and the costs of participation must be included in the bid prices provided in this Proposal Form. NOTE: Failure to participate, or unsatisfactory performance, in these QA/QC activities will result in the cancellation of SCCWRP's contract with the bidder.

It is anticipated that field sampling and laboratory analysis will commence in July 2018. While the Bight Survey also commences in July 2018, the successful bidder will provide the scope of

services described in this RFP for up to a period of five years on an annual renewal basis. This work is not guaranteed and the quantity of these additional task orders is currently unknown.

2.1 Water column sampling

2.1.1 Ocean and embayments greater than 3m in depth

Product

The objective of this element is to characterize ambient water quality conditions and nutrient sources that are most associated with bloom events in the SCB. Water-column profiling using conductivity-temperature-depth profilers (CTDs) will describe depth gradients in temperature, salinity, hydrogen ion content, transmissivity, dissolved oxygen, concentration of chlorophyll, and colored dissolved organic matter (CDOM) at each station. The final products will be a file of CTD data in digital format including the agency, station, date, depth (m), temperature (°C), conductivity (Siemens/m), oxygen (mg/L), light transmission (%), salinity (PSU), hydrogen ion content (pH), potential density anomaly as sigma theta (kg/m³), relative chlorophyll fluorescence (VDC), and CDOM (ug/l), plus associated voltages for dissolved oxygen, chlorophyll, and CDOM.

In addition, up to 3 discrete water sample depths will be sampled at each site for chlorophyll, dissolved oxygen, suspended solids, metals, nutrients, organic compounds and phytoplankton. These discrete samples will require on board filtration and/or preservation.

The final field products will consist of records of the collecting agency, station, sampling date and time, depth (m), and chain of custody sheet for all samples and filters to be transported to laboratories. The data shall be submitted electronically in a prespecified format by SCCWRP, which will be similar to the format used in the previous Bight Surveys (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx><http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>)

Equipment

The following equipment is required: a Seabird 9/11 (model SBE 9 that interfaces with an SBE 11 deck box) or SBE-25 CTD. Recent (within 6 months) factory calibration certification data is required. CTDs must be equipped with sensors that measure temperature, conductivity, pressure, dissolved oxygen, transmissometry (either a Sea Tech or WET Labs 25 cm pathlength with 660 nm wavelength), chlorophyll sensitive fluorometry (preferably SeaTech or WET labs with excitation centered at 440 nm and emission centered as -680 nm), and pH. Other CTDs are acceptable, but they must: a) compare well to other participating agencies' CTDs in an intercomparison exercise; b) sensors must be calibrated (specifically temperature and conductivity) at an acceptable national calibration facility; c) all sensors and housing must be capable of profiling to at least 200 m below the ocean surface; and d) CTD must collect data from sensors at a minimum of 8 scans per second.

Discrete water samples can be collected with a CTD/rosette system, a stand-alone rosette system, or individual bottles hung from a wire. Each bottle should hold a

minimum of 5 liters sample volume. An onboard filtration system is required to immediately process water samples for chlorophyll samples. A second bottle of 5 liters sample volume (identical in volume to the first or larger) will be used to sample water for nutrients and organic compounds.

Methods

Methods will be similar to those described in the Bight'08 Water Quality Report (http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/710_B08WQ.pdf) A pre-cruise equipment checkout must be conducted less than or equal to 24 hr prior to the survey cruise. This includes a pre-cruise calibration and visual inspection of the equipment (such as, plugs are secure and waterproof, computer output test for CTD sensors, and checking battery status).

During the survey, routine visual inspection of cast profiles is required to spot potential sensor problems so immediate action can be taken to replace sensor and resample sites with bad data. Before beginning a cast, a 3-minute equilibration upon initial start-up and 90 seconds at each station thereafter will be required to bring the CTD sensors to thermal equilibration with the ambient seawater. The CTD must be lowered to within 2m of bottom when possible with a descent rate not to exceed 1 m/sec; the recommended optimum descent rate is 0.25-0.50 m/sec. The instrument should have a scan rate of no fewer than 8 scans/sec. All raw data will be submitted to SCCWRP. All processed data will be averaged to one-second intervals and submitted to SCCWRP.

A post-cruise calibration will be required within 24 hr of the last site sampled. The goal is not to recalibrate the instrument, but to record the sensor reading of air saturated water so sensor drift can be calculated. Hard copies of all sensor and equipment factory maintenance, pre-and post-cruise calibration sheets and CTD field data sheets should be maintained and made available upon request.

At least one person on the field team must have experience conducting discrete sampling, filtering, and preserving chemistry and primary producer samples. The collected water from discrete samples will be prepared on board ship as necessary for laboratory delivery. Water quality sampling must be conducted such that no contamination of samples occurs that may bias results. Due to the low concentrations of trace metals in seawater, special techniques must be employed in order to prevent contamination of the samples. Discrete water samples to be analyzed for trace metals will need to be collected using trace metal clean techniques and analyzed under a trace metal clean hood as described by Bruland and Franks (1979) and Bruland et al. (2005). The contractor shall conduct equipment calibrations and maintain pre- and post-calibration logs for the field equipment used during the project. Constituents to be collected for laboratory analyses for marine waters are shown in Table 1. Total nitrogen and total phosphorus samples (from whole water samples) should be placed in a 1-liter sample container and frozen immediately. Chlorophyll will require immediate filtration of up to 1-liter on 0.7 µm GF/F type filters. The filter should be stored in an aluminum foil container and frozen immediately. Suspended solids samples must be filtered (1 liter) within 24 hr of collection on GF/F pre-weighed filters. Dissolved organic carbon (DOC) and dissolved organic and inorganic nutrients should be syringe filtered through a

0.45µm PES filter. The DOC sample should be fixed immediately with hydrochloric acid and stored at 4° C in a glass scintillation vial with minimal headspace. Dissolved nutrients (total dissolved nitrogen, total dissolved phosphorus, phosphate, ammonia, nitrate+nitrite, silicate, urea) should be placed in their respective sample vials and frozen immediately. A 1-liter trace metals sample shall be fixed with analytical grade nitric acid and stored at room temperature for later analysis, and a phytoplankton sample shall be placed in a 1-liter container and fixed in 2% formalin. Samples must be shipped frozen (if required), in the dark, and within 2 days of collection to a designated laboratory for immediate analysis. Chlorophyll sample filters can be stored frozen (before acetone addition) for no more than 28 days prior to analysis.

Quality Assurance/Quality Control

The contractor will be required to participate in a presurvey intercomparison exercise with all participants in the survey to evaluate the precision, accuracy and comparability of CTDs. The exercise will involve placing all the CTDs in a common temperature-controlled, aerated seawater tank.

2.1.2 Freshwater flows during storm events

Product

The objective of this work is to conduct stormwater sampling over the course entire storm flow events in order to produce a concentration-time series pollutograph. Sampling will be from a large variety of developed and natural homogenous land use sites, as well as from larger mixed land use watershed sites.

The Contractor will be responsible for the following:

1. Rate and record flow at the site throughout the storm event(s). In all instances, the sites will be rateable for hydraulic flow.
2. Precipitation data must be collected from the sample site(s). Use of existing precipitation gages is not allowable unless they are coterminous with a sampling location.
3. Collect water quality samples. Water quality samples must be collected across the entire hydrograph of the storm.
4. Prior to initiation of sampling, the contractor shall prepare a site sampling plan that will at a minimum include the following:
 - a. a description of the sampling location including a map of the sampling site, sampling techniques or schematic, and information about land use and hydrography. Special considerations associated with specific locations (e.g. access or confined space issues) shall also be included
 - b. a list of constituents to be sampled at each location
 - c. a discussion of the equipment to be used, including the typical precision associated with the sampling equipment and minimum measurement units

- d. a protocol for ensuring that data can be collected from all appreciable storms during the sampling period
- e. copies of necessary encroachment permits.
- f. an ArcView shape file, or similar GIS file, that includes locations (with < 3-meter accuracy) of all sample sites and a table of latitude and longitude for each sampling site using a global positioning system.

One draft copies of the sampling plan will be provided to SCCWRP for review and comment. Following receipt and incorporation of comments, the contractor will prepare and transmit one hard copy and one electronic version of the final sampling plan to SCCWRP.

The contractor will be responsible for tracking storms into their sampling site(s). The decision to sample or not sample a specific storm event will be made in consultation with the SCCWRP project manager based on criteria for storm selection agreed to with SCCWRP during the sampling set-up phase.

The contractor will also be responsible for collating all precipitation, flow, and water quality data in electronic format. The electronic file structure for data submittal shall be in a relational database structure that will be supplied to the contractor by SCCWRP. The data shall be submitted electronically in a prespecified format by SCCWRP, which will be similar to the format used by the Stormwater Monitoring Coalition (ftp://ftp.sccwrp.org/pub/download/PDFs/421_smc_sdtf.pdf)

The pricing shall reflect the elements of storm sampling; site setup and storm sampling. Site set up shall include all labor and materials necessary to establish a monitoring site such as reconnaissance, permitting, equipment, installation and completion of the site sampling plan. Site setup shall also include the removal of a storm monitoring station following completion of the required number of storm events at that site. After removal, the contractor must return the site to its original condition prior to installation. Storm sampling shall include all labor and materials to collect samples such as weather tracking, storm mobilization/demobilization, precipitation/flow/water quality sample collection, and sample delivery to the laboratory. Since the number of storms per site is uncertain, the contractor shall provide a cost estimate for a single site set up or a sampling a single site-event.

Site set up and storm sampling at urban sites comprised of highly impervious areas with well-defined, cement-lined channels are inherently different than site set ups and storm sampling at nonurban sites with large proportions of pervious area and unlined, earthen channels. For example, urban sites are generally easier to install, rate for flow, have better access to power and telecommunications, and flow for shorter periods of time than a comparable nonurban site. For this reason, SCCWRP is requesting separate pricing for site set up and storm sampling for urban versus nonurban sites.

SCCWRP avoids site setups/installations that require enclosed space entry. However, if enclosed space entry is required, SCCWRP expects the contractor to comply with all

safety rules and regulations in order to maintain complete safety on the job site. For this reason, a separate line item is provided for urban sites that require enclosed space entry.

Methods

Precipitation, flow and water quality sampling must occur over the entire course of the storm event. Precipitation and flow should be recorded at 15-minute intervals. Water quality sampling should target 10-12 individual samples over the entire hydrograph, and must capture rising flows, peak flows, and receding flows. Samples will be collected for total dissolved and suspended solids, total and dissolved organic carbon, nutrients (nitrate+nitrite, ammonia, total dissolved nitrogen, total dissolved phosphorus, total phosphorous, total nitrogen, and phosphate), bacteria (total coliforms, fecal coliforms or *E. coli*, enterococcus), trace metals, polynuclear aromatic hydrocarbons (PAH), and chlorinated hydrocarbons (total DDT and total PCB) (Table 1).

Water quality sampling must be conducted such that no contamination of samples occurs that may bias results. The contractor shall conduct equipment calibrations and maintain pre- and post-calibration logs for the field equipment used during the project.

The contractor will be responsible for supplying all sampling containers. The contractor will also be responsible for maintaining communication with the analytical laboratory and delivering samples to the analytical laboratory. The contractor will be responsible for initiating a sample chain of custody and shall not violate required holding times specific to each constituent.

Flow Monitoring

Continuous flow measurements can be made using acoustic velocity (AV) flow meters, or stage monitoring devices at sites with pre-established stage discharge relationships. Velocity, stage, and instantaneous flow data should be transmitted to a data logger/controller at 15 min, or less, intervals. All flow sensors must be mounted securely to prevent damage due to high flows or theft during non-storm flow.

Water quality sampling

Water quality sampling can be conducted either manual or using automatic samplers. Manual sampling will require on-site staffing using a depth integrating sampler such those used by the USGS. Automatic samplers, such as ISCO™ or American Sigma™, provide an unmanned alternative to stormwater sampling. Using either manual or automated sampling techniques, between 10 and 12 discrete samples, at a minimum, will be collected per storm at flow-paced intervals for each site-event. Sampling should begin prior to initial ascension of the storm hydrograph and continue until flows have returned to near baseflow levels. Typical storm sampling durations may vary from 8-24 hours depending on precipitation. Samples will be collected more frequently when flow rates are high or rapidly changing and less frequently during lower flow periods. After collection, the samples should be stored in pre-cleaned glass bottles on ice with Teflon-lined caps until shipped to the laboratory for analysis.

Automated samples should be collected using peristaltic pumps with Teflon® tubing and stainless steel intakes fixed at the bottom of the channel pointed in the upstream

direction in areas of undisturbed flow. All sampler intakes must be mounted securely to prevent damage or fouling due to high flows or theft during non-storm flow.

Quality Assurance Procedures

Experienced field crews will install all field equipment and sensors. Sensors and intakes will be securely fastened using noncontaminating stainless steel brackets, screws and anchors. In closed-pipe conveyances, expandable stainless steel bands will be used to secure the sensors within the pipe.

Components of each monitoring system, including flow sensors and peristaltic pumps, will undergo calibration and verification during installation, maintenance and pre-storm visits. All sampling equipment must be decontaminated before installation. All sample bottles must be cleaned according to USEPA-approved protocols consistent with approved methodology for analysis of storm-water samples (USEPA, 1983 and subsequent revisions). Teflon® hoses should be rinsed three times with a 2% Micro® solution or equivalent. All other Intermediate sampling equipment will be washed with a 2% Micro® solution and scrubbed with a clean plastic brush. All sample tubing will be triple purged with ambient and de-ionized water between samples.

Quality assurance samples will include equipment blanks, sample bottle and Teflon tubing rinsates, and field duplicates. All water samples must be kept properly chilled and must be transferred to the analytical laboratory within holding times. To ensure proper tracking and handling of the samples, documentation must include a proper Chain of Custody.

2.2 Sediment Sampling In Ocean or Estuaries

Product

The objective of sediment sampling is to collect sediment for benthic infaunal analysis, sediment chemistry and sediment toxicity. A minimum of four successful benthic grabs will be required: 1 for benthic infauna, 1 for sediment chemistry, and 2 for sediment toxicity. The final product will be properly preserved and labeled samples for benthic infauna, sediment chemistry (metals, nutrients, organic compounds, sediment grain size, TOC), and sediment toxicity along with associated chain-of-custody forms. Field observations and sampling positions will be recorded on Cruise logs and Benthic Sampling data forms. These will be retained by contractor for 4 years. A computer file of this information in specified formats are to be submitted within 5 working days of completion of field sampling.

Equipment

The 0.1 m² single or tandem Van Veen grab and 1.0 mm sieves will be used for sediment sampling at ocean sites. At least one person on board must have previous experience with collecting, sieving, and preserving samples using this set of gear.

All surfaces of the grab must be free of rust. Each boat utilized for sampling must have appropriate facilities for 1.0 mm sieving or screening of samples, including a means to filter the vessel's wash water to preclude inclusion of planktonic organisms into the sample.

Samples for sediment chemistry and toxicity should be collected with a stainless steel, Teflon-coated or plastic scoop.

Methods

Methods will be similar to those described in the Field Manual for Bight'08 (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx><http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>) Station occupation is to be guided by use of a differential global positioning system (dGPS). All sampling is to be conducted within 100 m of the nominal site coordinates. The actual position of the vessel at the point at which samples are collected (i.e. the point at which the grab contacts the seafloor) is to be recorded for each benthic grab. Field sampling is to be conducted between sunrise and sunset.

All samples will be collected with grab samplers lowered at 2 m/sec until it is 5 m above the bottom; then it should be lowered at 1 m/sec. Upon retrieval of the grab, the surface of the grab must be inspected for acceptability. To be acceptable, the surface of the grab must be even, with minimal surface disturbance and little or no leakage of overlying water. If the grab is acceptable, the overlying water should be carefully drained. For infaunal samples, the overlying water must be screened; any organisms captured on the screen should be added to the infaunal sample.

The depth of the sediment in the grab will then be measured. To be acceptable, penetration depth must be at least 5 cm. If a grab is found not to be acceptable, additional grab samples must be taken. If after 3 successful attempts (with no mechanical problems), no sample with at least 5 cm penetration is collected, the station location should be repositioned within 100 m. If successful grabs cannot be collected from two successive sites within 100 m, the site may be abandoned with no penalty to the contractor.

Samples for benthic infaunal analysis will be screened through a 1.0 mm mesh screen as directed. All vessel wash water must be filtered. The material retained on the screen will be placed in a jar. A solution of relaxant will be added to the jar. After 30 minutes, 10% sodium borate buffered formalin should be added to fix the sample. Samples will be rinsed and transferred from formalin to 70% ethanol 3-14 days after collection.

Samples for sediment chemistry and toxicity will be collected from the top 2 cm of the grab. Sediment within 1 cm of the sides of the grab should be avoided. The number of grabs must be sufficient to obtain at least 1.0 liters of this surficial sediment at ocean stations and at least 6.0 liters at each estuarine station. Sediments from all grabs taken at a station will be composited and homogenized prior to filling jars. Constituents collected for laboratory analyses are identified in Table 1. Sediment grain size and total organic carbon will each require one 4 oz jar of sample. Trace metals and organics will each require two 8 oz jars of sample. A total of 5.0 liters of sample should be stored in 1-liter glass jars for toxicity samples. Any remaining sediment may be archived. Jars will be provided by SCCWRP. Samples for sediment grain size and toxicity should be stored at 4°C on ice or in a refrigerator. Other samples may be stored at 4°C, but must be frozen

within 24 hr. Samples should be returned to the laboratory within one week. Maximum holding time for laboratories to begin toxicity testing is two weeks.

Quality Assurance/Quality Control

Quality assurance should follow the requirements listed in the Bight'08 regional monitoring QA Plan (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx><http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>) No intercalibration is required for this element. However, the contractor must be available for a pre-cruise inspection of equipment, a demonstration of sampling techniques, and an in-field audit will be required.

2.3 Macrobiological (Fish and Macroinvertebrate) Sampling

2.3.1 Trawling for fish and macrobenthic invertebrates

Product

The purpose of the trawl survey is to (1) collect samples for analysis of demersal fishes and megabenthic invertebrates for assemblage analyses; (2) estimate the prevalence of external anomalies and diseases of fishes and invertebrates; and (3) estimate the amount of marine debris. The final product will be data from each station on field observations and sampling positions (positions when the net lands on the bottom and beginning of trawl retrieval); species identification, abundance, biomass, anomalies, and length (fish only) of fish and invertebrates; and the relative amount of debris collected in each trawl. The data, including Cruise logs and Trawl Sampling data forms, will be provided in computer files using specified formats. The electronic formats will be similar to those used in previous Bight regional surveys (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>) These computer data files are to be submitted within 20 working days of completion of field sampling.

Equipment

Station occupation is to be guided by use of a differential global positioning system (dGPS). All sampling is to be conducted between one hour after sunrise and one hour before sunset. The trawl track is to pass within 100 M of the nominal site position on the mainland and within 200 M of the nominal site at the Channel Islands.

Trawling will require semi-balloon otter trawls with the following dimensions: a) 7.6 m (25 ft) head rope; b) 1.2 cm (0.5 in) cod-end mesh; and 76 cm (30 in.) x 51 cm (20 in) doors, weighing 16 kg (35 lb).

Trawl processing will require the following equipment: 1) a range of hanging spring scales (cylindrical with a hook at bottom) capable of weighing fish in buckets; the range of scales shall be capable of weighing from 0.1 to 6 kg; 2) a measuring board with meter stick for measuring centimeter size classes; 3) appropriate species identification aids recommended by field operations manual; and 4) a camera suitable for producing good quality voucher photographs of large specimens.

Qualified field staff will be required for doing all work in field. A fish taxonomist and megabenthic invertebrate taxonomist knowledgeable of the species encountered on the mainland shelf and slope of southern California must be onboard the sampling vessel during all surveys. The contractor must fix voucher and anomalous fish and invertebrates in 10% buffered seawater-formalin solution on board vessel as needed.

Methods

Methods will be similar to those described in the previous regional monitoring Field Manual at <http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>. At each station, a 10-minute trawl will be made at a speed of 1.0 m/sec (2 knots) along the isobath. After retrieval, the trawl will be inspected to determine that the net fished as required. If the trawl is deemed acceptable, the fish and invertebrates will be sorted and identified to lowest possible taxon (i.e., species for all fish and most invertebrates). Species that cannot be identified must be returned to the laboratory for identification.

All fish will be measured to centimeter size class on measuring boards. Very large specimens may be measured with a meter stick or tape measure. Maximum (board) standard length will be measured on bony fish and total length will be measured on sharks, ratfish, and hagfish, with wingspan also being recorded for stingrays. For less abundant species, the size class will be listed on the species data page. All fish will be measured. If there is a huge catch of a single species, a subsample of at least one hundred fish should be measured. Lengths of invertebrate species will not be measured, unless specifically mentioned.

Most invertebrates will be enumerated following identification. However, counts of particularly abundant species may be estimated from the biomass. Fish are enumerated indirectly during the measurement of lengths. However, a complete count is required for all species (whether all individuals are measured or not). Biomass of each species of fish and invertebrate will be measured to the nearest 0.1 kg with a spring scale. The tare of the container will be subtracted from the gross weight. Small species weighing less than 0.1 kg will be combined into a composite weight. There will be one composite weight for fish and one for invertebrates per trawl sample.

During measurement and identification, fish and invertebrates will be examined and recorded for external gross pathology, including fin and tail erosion, tumors, lesions, external parasites, and color, skeletal or other anomalies.

Debris in the trawl will be classified by type (e.g., cans, bottles, fishing gear, rocks, terrestrial vegetation, marine vegetation, benthic debris, etc.) and classified into abundance and weight categories recorded (trace, low, moderate, and high).

The contractor will be responsible for assembling a voucher collection of all species identified in the field. A voucher specimen of each species collected in the contractor's portion of the survey must be returned to SCCWRP following the survey. In almost all cases, this will consist of a specimen fixed in 10% buffered seawater-formalin solution and preserved in 70% ethanol for fish and invertebrates. Photographs are not suitable

for most specimens. The only exception is the vouchers of very large specimens that may consist of good quality photographs. Photographs must show taxonomic characters critical for identification of the specimen to species. In addition, incompletely identified specimens and fish with tumors or other anomalies should be preserved by freezing or by fixation in buffered formalin and returned to the laboratory.

Quality Assurance/Quality Control

The successful bidder will be expected to participate in QA/QC exercises that will include presurvey and in-survey equipment and protocol assessments. For taxonomy, this will include participation in any presurvey training and intercalibration exercises, in-survey audits, and collection of a voucher specimen of each species collected during the contractor's portion of the survey. Presurvey training exercise will consist of one field and one laboratory information exchange session, and participation in an intercalibration exercise requiring identification of species in a bucket of fish and a bucket of invertebrates.

2.3.2 Freshwater streams for macroinvertebrates, benthic algae, and physical habitat

Product

The purpose of this element is to collect biological samples and physical habitat information for assessments of freshwater streams. Benthic macroinvertebrates and algae will be sampled concurrently with physical habitat measurements using the methods described in the SWAMP Standard Operating Procedures (SOP, Ode 2007). The multi-habitat method of sampling will be used, wherein one location be sampled at eleven transects using a D-frame kicknet (for benthic macroinvertebrates) or appropriate collection device (for benthic algae). Algal samples will be collected for taxonomic analysis (including quantitative and qualitative samples for diatom and soft-bodied algae analysis), as well as biomass (specifically, chlorophyll-A and ash-free dry mass).

Deliverables include samples preserved in 70% ethanol (for benthic macroinvertebrates) or appropriate preservatives (for benthic algae), field data sheets, and data in a pre-specified electronic format.

Benthic biomass and qualitative algae samples shall be delivered to SCCWRP or a designated lab within SWAMP-approved holding times (typically, <1 week for qualitative algae samples). Biomass samples shall be delivered in the dark and on wet (not dry) ice.

Physical habitat of streams is to be assessed using the standard operating procedures adopted by SWAMP (Ode 2007). The full suite of measures includes: site location, pH, specific conductivity, dissolved oxygen, alkalinity, channel dimensions, streambed substrate, cobble embeddedness, canopy cover, gradient, sinuosity, human influence in the riparian zone, riparian vegetation, macro- and micro-algae presence or thickness, instream habitat complexity, water velocity, rapid habitat assessments, and photo documentation. Data will be delivered in both hard copy formats (using SWAMP datasheets provided with the Standard Operating Procedures) and digitally as an Access database, using pre-specified data formats similar to those found on the SCCWRP web site <http://www.sccwrp.org/Data/DataSubmission/SMCStreamDataSubmission.aspx>.

Equipment

Required equipment for macroinvertebrate collection includes clean waders, a d-frame sampling net with 500- μ m mesh, with a canvas bottom and an open top. A 500- μ m sieve and 5-gal bucket may be used to remove large particles and organic matter from the samples.

Required equipment for benthic algae collection includes rubber/PVC/syringe delimiters, a sampling bucket, wash bottle, filtration kits, and sample containers.

Required equipment for physical habitat assessment includes 150-m measuring tape, surveying flags, an autolevel and stadia rod, digital stop-watch, convex spherical densiometer, clinometer, compass, pygmy flow meter (pinwheel-type or electro-magnetic), small metric ruler, range finder, GPS receiver, an alkalinity titration kit, a digital camera with date and time stamps, and probes. Probes will be used to measure pH, dissolved oxygen, temperature and conductivity.

Methods

Full details of the sampling method are described in Ode et al (2016). Briefly, reaches are divided up into 11 equidistant transects (A-K, 15 m apart in small streams and 25 m apart in streams over 10 m wide). Ten inter-transects are established halfway between each transect. Water chemistry parameters (temperature, pH, specific conductivity, alkalinity, and dissolved oxygen) are measured prior to entering the stream, or at the upstream end of the sampling reach. Streambed substrate, cobble embeddedness, canopy cover, human influence in the riparian zone, riparian vegetation, instream habitat complexity, rapid habitat assessments, and photo documentation is assessed at each transect and/or intertransect, as specified in Ode et al (2016). Gradient and sinuosity are measured across the entire reach, as specified in Ode et al (2016). Water velocity is measured at one point within the reach (or within 250 m up- or downstream, if a more suitable stream cross section is identified), as described in Ode et al (2016). If water velocity is too low to measure with a flow meter, a neutrally buoyant object may be used, as described in Ode et al (2016). If water velocity is absent or too low to measure with a neutrally buoyant object, flow conditions will be documented by a narrative description and supported by additional photographic documentation.

All equipment must be calibrated and operated according to manufacturer's specifications, including water chemistry probes, flow meters, and global positioning systems.

All equipment must be cleaned of biotic material prior to deployment. Sampling procedures are described in the SWAMP Standard Operating Procedure (Ode et al 2016). All gear must be cleaned to prevent the spread of invasive species. Sampling gear (waders, nets, and other gear that can tolerate treatment) should be scrubbed with a stiff-bristled brush or high-pressure water, inspected for residue or clinging organisms, and then treated with a physical or chemical treatment. Physical treatments include freezing (below 26°F for at least 24 hours), hot water (above 120°F for 5 minutes), or drying (gear should be completely dry for a minimum of 48 hours). Chemical treatments include soaking gear for 5 minutes in benzethonium chloride (1,840 mg/L), Commercial

Solutions Formula 409 Cleaner Degreaser Disinfectant (50% dilution), or copper sulfate (252 mg/L copper ion). Physical and chemical treatments are in addition to (not a substitute for) scrubbing. Sampling gear that cannot withstand physical and chemical treatment (e.g., pH probes) shall be rinsed and visually inspected to ensure that no material is transferred between sites. Hosea and Finlayson (2005) provide details on chemical treatments, and information about which treatment is best for which types of gear. Sites with known major infestations of invasive species (such as the New Zealand mud snail) shall be sampled using dedicated waders and nets.

Quality Assurance/Quality Control

Quality control shall be achieved through proper maintenance and calibration of all equipment, as per manufacturers' specifications, and through training. Field crews shall participate in training and intercalibration activities on collecting physical habitat data sponsored by the State Water Quality Control Program (or similar field training opportunities). In addition, field crews may be audited in the field by SCCWRP staff.

It is expected that completeness will exceed 95% of physical habitat variables. Replicate measures of water chemistry variables (i.e., water temperature, pH, specific conductivity, dissolved oxygen, and alkalinity) and water velocity shall be measured at a subset of 10% of sites. Replicate measurements shall be within 10% or repeated.

2.4 Nutrient Chemistry Laboratory Analysis

Product

The purpose of this element is to analyze samples of stormwater, marine water, or sediment for nutrient related constituents (Table 2). The final products will be computer files in the pre-defined formats similar to those described in the previous Regional Monitoring Information Management Plan (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>) including field orders and analyte codes. All data are due within 45 days of sample delivery.

Equipment

Nutrients must be analyzed by nutrient-specific methods described below.

Methods

Maximum acceptable method detection limits (MDLs) for nutrients are given by media in Table 2. Nitrate + nitrite will be analyzed using the cadmium reduction method (SM 4500-NO3 F), nitrite will be analyzed using the colorimetric method (SM 4500-NO2 B), ammonium will be analyzed using distillation and the automated phenate method (SM 4500-NH3 G), and soluble reactive phosphorus will be analyzed using the automated ascorbic acid reduction method (SM 4500-P F). Total nitrogen and total phosphorus can be collected into HDPE bottles and stored frozen. For TN/TP (USGS I-4650-03) and TDN/TDP (USGS I-2650-03), persulfate will be used to digest unfiltered and filtered water samples to convert the nitrogen from all N compartments into nitrate and the phosphorus from all P compartments into orthophosphate for the simultaneous determination of TN and TP. The resulting digests will be analyzed by automated colorimetry for nitrate-N and orthophosphate. Dissolved organic carbon will be

determined for filtered sample water via the combustion infrared method (SM 5310-B) using a Total Organic Carbon Analyzer. Total suspended solids must be filtered within 24 hours of collection on pre-weighed GF/F filters. Total suspended solids filters can then be dried in an oven at 80 deg C until dry and stored upright in a desiccator until analysis. Total suspended solids will be analyzed using the gravimetric technique (SM 2540-D). Holding times must not exceed 28 days.

Quality Assurance/Quality Control

An intercalibration exercise among participating labs will be conducted in which certified or standard reference materials and environmental will be distributed and analyzed. Participation in group meetings regarding intercalibration and quality control issues is required by all participating labs.

2.5 Trace Metal Chemistry Laboratory Analysis

Product

The purpose of this element is to analyze samples of stormwater, marine water or sediment for trace metal constituents (Table 3). The final products will be computer files in the prescribed format similar to those described in previous Regional Survey (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>), including field orders and analyte codes. All data are due within 45 days of sample delivery.

Equipment

Atomic absorption spectrometer (AA), inductively coupled plasma atomic emission spectrometer (ICP-AES), and inductively coupled plasma mass spectrometer (ICP- MS) must be utilized for trace metals analyses.

Methods

For trace metal analytes, sediment and water samples will be digested using a strong acid method (chloric acid/nitric acid) and analyzed by graphite furnace AAS, ICP-MS and/or cold vapor atomic fluorescence spectroscopy (CVAFS) described in methods approved or recommended by EPA. Prior to analysis of any field samples, the laboratory should establish five-point calibration ranges for all the target analytes. The lowest point of each calibration curve must be equal to the maximum acceptable method detection limits (MDLs) for all the trace metals (Table 3). Initial MDLs for target analytes must be obtained and should not be higher than the maximum acceptable MDLs. Sediment data are to be reported as dry weight. Alternative methods for marine water are acceptable, including trace metal extractions to remove interferences.

Quality Assurance/Quality Control

An intercalibration exercise among participating labs will be conducted in which certified or standard reference materials (e.g. CRM-10-050 (Lot #L516) from Resource Technology Corporation) will be analyzed. Participation in group meetings regarding intercalibration and quality control issues is required by all participating labs.

2.6 Trace Organic Chemistry Laboratory Analysis

Product

The goal of this work element is to measure trace organic chemicals collected from stormwater or sediments samples. Samples are to be analyzed for 41 PCB congeners (Table 4), 7 DDT and 5 chlordane compounds (Table 5), 24 PAH compounds (Table 6), 11 Pyrethroid and fipronil pesticides (Table 7), 13 PBDEs congeners (Table 8), TOC/TN, and moisture content. The final products will be computer files in the prescribed format similar to those described in previous Regional Surveys (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>), including field orders and analyte codes. All data are due within 45 days of sample delivery.

Equipment

A gas chromatography/electron-capture detector (GC/ECD), gas chromatography/mass spectrometer (GC/MS), liquid chromatography tandem mass spectrometer (LC-MS/MS) and elemental analyzer (for TOC/TN) shall be utilized for analysis of the majority of organic analytes.

Methods

Sediment samples shall be extracted and purified prior to instrumental analyses using EPA-approved methods or equivalents. Surrogate standards should be spiked into the samples (including quality control samples) prior to extraction. Internal calibration is preferred as the quantitation method and internal standards are added to the samples before injection. PCBs, DDTs and chlordane will be measured using a GC/ECD and a capillary column. Confirmation of peak identification is required and should be done using a GC/MS and capillary column under the identical chromatographic conditions to those used for the GC/ECD instrument. Selected Ion Monitoring (SIM) mode is preferred in order to achieve comparable detection sensitivity as with GC/ECD. PCBs should be measured on a congener-specific basis, as opposed to the Aroclor pattern-matched approach. To achieve reasonable chromatographic resolution, the total run time for PCB analysis should not be less than 60 minutes. Chlordane will be measured as cis- and trans-chlordanes, trans-nonachlor, heptachlor, heptachlor epoxide and oxychlordane.

PAHs will be measured using a GC/MS and a capillary column. Chromatographic conditions should be so chosen that benzo[b]fluoranthene and benzo[k]fluoranthene can partially be resolved. Mass spectrometry full scan should be used in acquiring data to allow confirmation of positive peak identification by matching sample spectra with reference spectra. Pyrethroid analytes will be quantified by GC-ECD after confirmation of their presence by GC-MS.

Prior to analysis of any field samples, the laboratory should establish five-point calibration ranges for all the target analytes. The lowest point of each calibration curve must be equal to the report level (Tables 3-8). The MDL for each target analyte must be obtained and should not be higher than the reporting level. Data are to be reported as dry weight. The PCB and PAH compounds are prepared in custom-made mixtures and can be purchased from AccuStandard, Inc.

Quality Assurance/Quality Control

QA/QC requirements will be similar to those prescribed in the QA Plan from previous regional surveys (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>) An intercalibration exercise will be conducted in which certified or standard reference materials and environmental samples will be analyzed for PCB congeners, DDTs, chlordanes, and PAHs. The winning bidder must be comparable to those of other participating agencies in the Regional Survey. Participation in group meetings regarding intercalibration is required for all participating labs.

2.7 Biological Laboratory analysis

2.7.1 Ocean and embayment infaunal samples

Product

Sample analysis for benthic infaunal samples includes the following tasks: (1) transfer of the sample from formalin to alcohol; (2) sorting the sample to remove all organisms from the debris; and (3) identification and enumeration of all organisms in the sample. In addition, prequalification of the laboratory in a taxonomic intercalibration exercise and participation in a series of workshops on taxonomy, culminating in a synoptic review of the project data by all participants, is required.

The final product will be a data file showing the number of individuals in each taxon at each station as well as supporting documentation and data for QA/QC. Contractor will retain data sheets for 5 years.

The data should also be provided in computer files in formats pre-specified formats similar to those used in previous Regional Surveys (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>). All data are due within 160 days of sample delivery.

Methods

Benthic samples must be washed and transferred to a 70% solution of ethanol after a minimum of 72 hours or a maximum of two weeks after collection. It is recommended that the alcohol be buffered with marble chips. Formalin from the sample should be decanted through a 0.5 mm or finer mesh.

Sorting will include completion of a Sorting Record form provided to the contractor. Samples must be sorted under a stereo microscope. All individual organisms except foraminiferans and planktonic organisms should be removed from the sample and sorted into taxa lots (e.g., Annelida, Mollusca). Fragments of organisms should also be removed. Each taxon lot should be internally labeled with the sample number. Labels should be written in pencil or indelible ink on 100% rag-paper, poly-paper or other paper suitable for wet labels.

The laboratory may use its own bench sheets for identification. However, in addition to columns for the taxon name and the number of individuals, two additional columns must be included: (1) Voucher and (2) Exclude. The voucher column will be used to note the removal of specimens for the voucher collection (See below). The exclude column is

used to note when a taxon should be excluded from the data for counts of number of species. Instructions will be provided for filling out these columns.

Taxonomic identifications, including nomenclature and orthography, will be based on Edition 5 of the Southern California Association of Marine Invertebrate Taxonomists as well as keys and other materials produced for the survey. The objective will be to accurately identify all organisms to the lowest possible taxonomic category, most often species, and to provide an accurate count of the organisms in each taxon.

Following identification and enumeration, all specimens are to be retained in taxa lots within the sample. Minimally, the material must be segregated and internally labeled into the following 17 lots:

Annelid lots:

- Oligochaeta
- Spionidae
- Cirratulidae
- Other Polychaetes (by order)

Echinoderm lots:

- Ophiuroidea
- Misc. Echinodermata

Arthropod lots:

- Ostracoda
- Amphipoda
- Decapoda
- Misc Arthropoda

Misc. Phyla lots:

- Cnidaria
- Nematoda
- Nemertea
- Other Phyla (a collective lot)

Molluscan lots:

- Bivalvia
- Gastropoda
- Misc. Mollusca

The laboratory will be responsible for maintaining thorough and complete records through all stages of sample analysis and QC procedures.

Quality Assurance/Quality Control

Since taxonomic consistency is of particular importance in a cooperative survey, the taxonomists will be required to participate in meetings to discuss taxonomic issues. It is expected that the meetings will be held approximately once a month during the project.

In addition, after the data from all laboratories is compiled, the taxonomists will have 2-3 meetings organized by major taxa to review the final data for taxonomic consistency.

Before benthic organisms are identified, the contractor must show that the taxonomists who will process samples can meet the Measurement Quality Objectives for sample identification and enumeration by participating in a pre-qualification exercise. The contractor will submit a list of taxonomists who will be processing samples along with the taxonomic groups for which each person will be responsible. Any taxonomist who did not participate in the quality control exercise for sample identification in Bight'98 or '03 will be required to identify and enumerate two taxa lots in the taxonomic group for which they are responsible. The data sheets for the samples and the samples sorted into taxa lots as reported in the results will be returned to SCCWRP. The results of the identifications will be scored by the Chairperson of the Benthic Working Group and selected members of SCAMIT as described in Montagne and Bergen (1977). If the taxonomist meets the Measurement Quality Objectives (MQO) of 10% for the number of taxa reported, total organism count, and accuracy of identification, the taxonomist will be considered qualified to process samples. If the taxonomist does not meet the MQOs, the committee will evaluate the reasons for the failure and make a recommendation to the Steering Committee as to whether the taxonomist is qualified to process samples. If the Steering Committee finds that the taxonomist is not qualified, that person will not be allowed to process samples.

The contractor must create a voucher collection of all taxa identified to species in the survey. Only glass containers are to be used for the storage of voucher material unless specimens are inappropriate for wet storage.

Quality control for sorting will require resorting a minimum of 10% of each sample must be resorted by an experienced sorter other than the original sorter. If the MQO of 95% removal efficiency is not met, the entire sample must be resorted.

Quality control for taxonomic identification and enumeration will involve re-identification of 10% of samples processed by each laboratory according the procedures described in Montagne and Bergen (1997). The contract lab will re-identify a number of samples equal to 10% of the number of samples processed. After the results of the re-identification have been submitted, the taxonomists will meet to resolve discrepancies between the laboratories.

2.7.2 Freshwater benthic macroinvertebrate samples

Product

Samples of benthic macroinvertebrates will be sorted and identified to Standard Taxonomic Level II, as determined by the SAFIT Standard Taxonomic Effort (Richards and Rogers 2007). Level II corresponds to species-level identification for most groups of organisms (with Chironomidae to genus). All samples will be sorted to completion, or until at least 600 specimens have been identified.

The final product will be data showing the numbers of individuals in each taxon in each sample, as well as supporting documentation and data for QA/QC. Where appropriate,

taxonomic information will be accompanied by life stage (i.e., larva, pupa, or adult), functional feeding group, and tolerance value. Data for 500-count must be provided.

The data must be provided in computer files in SCCWRP specified formats, which are similar to those from previous regional watershed surveys (<http://www.sccwrp.org/Data/DataSubmission/SMCStreamDataSubmission.aspx>). All data are due within 120 days of sample delivery.

Methods

Benthic samples must be washed and transferred to a 70% solution of ethanol after a minimum of 72 hours or a maximum of two weeks after collection. Sorting will include completion of a Sorting Record form provided to the contractor. All individual organisms should be removed from the sample and sorted into taxa lots (e.g., Ephemeroptera, Mollusca). Fragments of organisms, and incomplete organisms lacking identifiable headparts should also be removed. Each taxon lot should be internally labeled with the sample number. Labels should be written in pencil or indelible ink on 100% rag-paper, poly-paper or other paper suitable for wet labels.

The laboratory may use its own bench sheets for identification. However, in addition to columns for the taxon name and the number of individuals, two additional columns must be included: (1) Voucher, (2) Exclude and (3) Slide. The voucher column will be used to note the removal of specimens for the voucher collection (See below). The exclude column is used to note when a specimen should be excluded from the data for counts of number of species. The slide column indicates when a specimen was slide-mounted for identification. Instructions will be provided for filling out these columns.

Taxonomic identifications, including nomenclature and orthography, will be based on the most recent Standard Taxonomic Effort of the Southwestern Association of Freshwater Invertebrate Taxonomists. The objective will be to accurately identify all organisms to STE Level II (unless otherwise specified), and to provide an accurate count of the organisms in each taxon.

Following identification and enumeration, all specimens are to be retained in taxa lots within the sample. individual vials, with each vial corresponding to a single taxonomic identification within a sample.

The laboratory will be responsible for maintaining thorough and complete records through all stages of sample analysis and QC procedures. All specimens will be retained by the contractor for 3 years. Voucher specimens shall be curated for 7 years.

Quality Assurance/Quality Control

Prequalification of the laboratory in a taxonomic intercalibration exercise and participation in the Southwestern Association of Freshwater Invertebrate Taxonomists (SAFIT) is required.

Since taxonomic consistency is of particular importance, the taxonomists will be required to participate in meetings and workshops to discuss taxonomic issues. It is expected that taxonomic workshops will be made available through SAFIT and/or SCCWRP.

Before benthic organisms are identified, the contractor must show that the taxonomists who will process samples can meet the Measurement Quality Objectives for sample identification and enumeration by participating in a pre-qualification exercise. The contractor will submit a list of taxonomists who will be processing samples along with the taxonomic groups for which each person will be responsible. A taxonomist must be a member of SAFIT.

The contractor must create a voucher collection of all taxa identified in the survey. Only glass containers or permanently mounted slides are to be used for the storage of voucher material.

Quality control for sorting will require resorting a minimum of 10% of each sample must be resorted by an experienced sorter other than the original sorter. If the MQO of 95% removal efficiency is not met, the entire sample must be resorted.

Quality control for taxonomic identification and enumeration will involve re-identification of 10% of samples processed by each laboratory. The contract lab will re-identify a number of samples equal to 10% of the number of samples processed.

Quality control for taxonomic identification involve re-identification of affected specimens. If the QA taxonomist identifies a systemic problem (e.g., one taxon is consistently mis-identified), the identifications of all affected specimens in a project batch must be corrected. If the errors identified by the QA taxonomist do not appear to be systemic (e.g., taxa are haphazardly or randomly misidentified) OR if the identifications lead to a failure of MQOs (i.e., taxon ID error rate < 10% of taxa and < 10% of individuals in each sample), the entire project batch must be reviewed, and another 10% of samples must be resubmitted for external QA. Discrepancies will be resolved through consultation with taxonomists outside Contractor's laboratory.

2.8 Toxicity Testing

2.8.1 Sediment toxicity tests

Product

Bulk sediment samples will be tested for survival of *Eohaustorius estuarius* after 10 days exposure, and for sublethal effects using a 2-day development test on embryos of the mussel *Mytilus galloprovincialis* exposed at the sediment-water interface. The final products will be a computer file of amphipod survival and mussel effects with associated test water quality in the prescribed format similar to that used in previous Regional Surveys

(<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>), including field order and analyte codes. In addition, a hardcopy report must be delivered that provides test endpoint summary statistics and a statement of quality assurance including descriptions of QA/QC deviations, if any. All data are due within 45 days of sample delivery. Pricing for sediment toxicity tests are separated by species.

Methods

The amphipod survival test will be conducted according to US EPA (1994) guidelines. This test consists of a 10-day exposure of *Eohaustorius estuarius* to sediment under static conditions. Amphipods are placed in glass chambers containing seawater and a 2 cm layer of test sediment. The number of surviving amphipods is measured at the end of the test and used to calculate the percentage survival. Five laboratory replicates will be conducted for each test. All sediment samples must be dry sieved through a 1.0 mm-mesh stainless steel screen prior to testing in order to remove predatory and large macrofauna.

All amphipod test organisms must be verified through consultation with a taxonomist, if necessary. Individuals selected for testing should be visually inspected to confirm that they are the proper size and in good condition (i.e., no external damage). Holding time prior to testing should be 10 days or less.

A reference toxicant test must be run with every batch of test samples in order to document amphipod relative sensitivity and test precision. This test will consist of a 96-hour exposure to five different concentrations of ammonia dissolved in seawater. Ammonia concentrations will be selected to provide an estimate of the LC50 and will be verified by analysis of each concentration. Reference toxicant test results that fall outside of control chart limits (2 std dev of mean) will trigger a review of test procedures and a possible retest of the corresponding sediment samples.

Water quality of the overlying water and pore water will be measured for each sample type at the beginning of the exposure. Overlying water quality will also be measured at the end of exposure. Temperature will be measured continuously in the exposure room. Instruments will be calibrated daily. Deviations in water quality will be noted on the data files and a synopsis given in the hardcopy summary report.

Each test batch must include a negative control using "home sediment". This toxicity test procedure is considered unacceptable if amphipod survival in home sediment is less than 90%, or if survival in any control replicate is less than 80%. Reference toxicant results should be within two standard deviations of the mean response specific to the laboratory. Water quality parameters (salinity, temperature, pH, and ammonia) should also be within the tolerance range of the test organism, as specified in EPA (1994) guidance.

Embryos of the mussel *Mytilus galloprovincialis* exposed at the sediment-water interface will be used to test for sublethal effects. Details of the exposure system can be found in Anderson et al. (1996) and methods for the preparation and handling of the mussel embryos are in USEPA (1995). Additional details of the exposure system may be revised by the Regional Survey Toxicology Committee to facilitate the use of a composite sample, rather than a core, in the test. All sediment samples must be dry sieved through a 1.0 mm-mesh stainless steel screen prior to testing in order to remove large macrofauna. Fertilized mussel eggs shall be prepared as described in the EPA manual (USEPA 1995).

A 2-day water only reference toxicant test using ammonia must be performed simultaneously with each set of field samples tested. Each laboratory must establish a control chart consisting of at least three tests and no more than the 20 most recent. The EC50 for each test performed should fall within two standard deviations of the mean of the previous tests on the control chart. All test batches must include a negative control consisting of sediment from a common source (specified by the Regional Survey Toxicology Committee) and all components of the exposure system.

Water quality parameters (dissolved oxygen, pH, salinity and ammonia) should be made prior to test initiation on Day 0 and at test termination. Temperature should be monitored continuously. Daily observations should be made on each replicate with special attention to aeration, sediment condition and the presence of any invertebrates in the test sample.

The mean control percent normal-alive for each test batch must be 80% or greater. In addition, water quality parameters must be within acceptable limits.

Quality Assurance/Quality Control

QA/QC protocols will follow those of previous Regional Surveys (<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>). The selected contractor must be able to demonstrate proficiency of toxicity testing on whole sediments with *Eohaustorius* and with *Mytilus*. Prior to the analysis of samples, the test laboratory must document at least three prior tests for each species in which test acceptability was attained. In addition, the laboratory should have conducted at least three prior reference toxicant tests for each species so that a control chart can be constructed.

The selected contractor must participate in Regional Monitoring coordination meetings, one post survey data exchange meeting, and successfully complete both an amphipod survival test and mussel sublethal test interlaboratory comparison exercise, which will be conducted prior to sample testing. This exercise will include the analysis of field-

collected sediments and a reference toxicant test. Successful completion of this exercise by a laboratory will be evaluated using two criteria: 1) attainment of test acceptability criteria, and 2) agreement of results between laboratories.

2.8.2 Freshwater water column toxicity tests

Product

Freshwater samples will be tested for toxicity using the 7-day *Ceriodaphnia dubia* survival and reproduction test. The final product will be a computer file of the test results and associated test water quality specified by SCCWRP, including field order and analyte codes. In addition, a hardcopy report must be delivered that provides test endpoint summary statistics and a statement of quality assurance including descriptions of QA/QC deviations, if any. All data are due within 45 days of sample delivery.

Methods

The 7-d *Ceriodaphnia dubia* growth and reproduction test will be conducted according to EPA Method 1002.0 (USEPA 2002). Each sample will be tested at 100% concentration (no dilution) under static renewal conditions. Ten replicates are tested for each sample. A concurrent reference toxicant (e.g., copper) and a control consisting of laboratory dilution water is included in each test batch. The test endpoints are percent survival and number of offspring. Test solutions will be renewed daily and the organisms fed each day

Species identification should be verified through consultation with a taxonomist, if necessary. Individuals selected for testing should be visually inspected to confirm that they are the proper size and in good condition (i.e., no external damage). The tests will be conducted on the 100% sample concentration only. Dilutions of the samples will not be tested.

A reference toxicant test must be run with every batch of test samples in order to document relative test sensitivity and test precision. This test will consist of a concurrent exposure to five different concentrations of the toxicant dissolved in seawater. Toxicant concentrations will be selected to provide an estimate of the median effect concentration and will be verified by chemical analysis of a midrange test concentration. Reference toxicant test results that fall outside of control chart limits (2 sd of mean) will trigger a review of test procedures and a possible retest of the corresponding samples.

Water quality of each sample will be measured throughout the exposure. Dissolved oxygen, conductivity, pH, and temperature of the test samples will be measured each day. Alkalinity, hardness, and total ammonia shall be measured on the test samples at the beginning of the experiment. Deviations in water quality will be noted on the data files and a synopsis given in the hardcopy summary report.

This toxicity test procedure is considered unacceptable if test acceptability criteria described in the method reference are not met. Reference toxicant results should also be within two standard deviations of the mean response specific to the laboratory. Water quality parameters (salinity, temperature, pH, and ammonia) should also be within the tolerance range of the test organism, as specified in the method reference.

Quality Assurance/Quality Control

The selected contractor must be able to demonstrate proficiency of toxicity testing with the species. Prior to testing, the laboratory must document at least three prior tests in which test acceptability was attained. In addition, the laboratory should have conducted at least three prior reference toxicant tests so that a control chart can be constructed.

The selected contractor must participate in at least one regional survey coordination meeting, one post survey data exchange meeting, and successfully complete an interlaboratory comparison exercise using the selected test method. The interlaboratory comparison exercise will be conducted prior to sample testing. This exercise will include the analysis of field-collected samples and a reference toxicant test. Successful completion of this exercise by a laboratory will be evaluated using two criteria: 1) attainment of test acceptability criteria, and 2) agreement of results between laboratories.

2.9 Bacteriological Analyses

Product

The goal of this work element is to measure public health indicator bacteria collected from fresh and marine surface waters. Samples are to be analyzed for total coliform, fecal coliform, enterococcus and *E. Coli*. The final product will be computer files in the pre-defined formats similar to previous Regional Monitoring Information Management Plan

(<http://sccwrp.org/Documents/BightDocuments/Bight13Documents/Bight13PlanningDocuments.aspx>), including field orders and analyte codes. All data are due within 30 days of sample delivery.

Equipment

Bacteria samples must be analyzed by indicator-specific methods described below.

Methods and Analytical Holding Time

Total coliform, fecal coliform or *E. coli*, and Enterococcus will be analyzed using standard methods, within a 6-hour holding time from sample collection (Table 9). Methods may include membrane filtration, most probable number, and/or Idexx.

Quality Assurance/Quality Control

An intercalibration exercise among participating labs will be conducted. Participation in group meetings regarding intercalibration and quality control issues is required by all participating labs.

Table 1. Target analytes for sampling.

Analyte Group	Constituent	Marine Water	Sediment	Tissue	Freshwater/ Stormwater
General	Grain Size		X		
	TSS	X			X
	TDS				X
	TOC/TN		X		
Nutrients	TOC		X		X
	DOC	X			X
	TN	X	X		X
	TDN	X			X
	NH4	X			X
	NO2+NO3	X			X
	SiO4	X			
	Urea	X			
	TP	X			X
	TDP	X			X
PO4	X			X	
Metals	Al		X		
	Cd	X	X		X
	Cr	X	X		X
	Cu	X	X		X
	Fe	X	X		
	Hg	X	X		X
	Ni	X	X		X
	Pb	X	X		X
	Se				X
	Ag	X	X		X
	Zn	X	X		X
Organics	DDTs	X	X	X	X
	PCBs	X	X	X	X
	PAHs		X	X	X
	Chlordanes	X	X	X	X
	Dieldrin	X	X	X	
	Pyrethroids		X		X
	PBDEs		X	X	
Microbiological	Total Coliform	X			X
	Fecal coliform	X			X
	E. coli	X			X
	Enterococcus	X			X

Table 2. Detection limits for laboratories analyzing nutrients.

Target	Freshwater	Marine/Estuarine Waters	Sediments (dry wt)
Chlorophyll- <i>a</i>	0.01 µg L ⁻¹	0.01 µg L ⁻¹	
NH ₄	0.01 mg L ⁻¹	0.02 - 0.2 µM	
NO ₃ + NO ₂	0.02 mg L ⁻¹	0.05 µM	
PO ₄	0.0075 mg L ⁻¹	0.01 µM	
SiO ₄	0.05 - 0.1 µM	0.05 - 0.1 µM	
Total dissolved nitrogen	0.2 µM	0.2 µM	
Total dissolved phosphorus	0.01 µM	0.01 µM	
Total nitrogen	0.2 µM	0.2 µM	
Total phosphorus	0.016 mg L ⁻¹	0.01 µM	0.01%
Total Suspended Solids	0.5 mg L ⁻¹	0.01 µg L ⁻¹	
Total Organic Carbon	0.05 µg L ⁻¹	0.005 µg L ⁻¹	0.1%
Total Organic Nitrogen			0.1%

Table 3. List of metals and target detection limits.

Target Analyte	Stormwater (µg/L)	Marine Water (µg/L)	Sediment (ug/g dry wt)
Aluminum	1		- ^a
Antimony			10
Arsenic	0.1		1.6
Barium			^a
Beryllium			0.2
Cadmium	0.1	1	0.09
Chromium	0.1		16
Copper	0.1	1	7.0
Iron	1		^a
Lead	0.05	1	9.3
Mercury	0.005		0.03
Nickel	0.1	2	4.2
Selenium	0.1		1.0
Silver	0.1		0.2
Zinc	0.1	5	30

^a Must report a value above the detection limit.

Table 4. List of target analytes and detection limits for PCBs congeners.

Congener	Stormwater (ng/L)	Sediment (ng/g dry wt)	Tissue (ng/g wet wt)
8		1	1
11		1	1
18	1	1	1
27		1	1
28	1	1	1
29		1	1
31		1	1
33		1	1
37	1	1	1
44	1	1	1
49	1	1	1
52	1	1	1
56		1	1
60		1	1
64		1	1
66	1	1	1
70	1	1	1
74	1	1	1
77	1	1	1
81	1	1	1
87	1	1	1
95		1	1
97		1	1
99	1	1	1
11	1	1	1
15	1	1	1

Congener	Stormwater (ng/L)	Sediment (ng/g dry wt)	Tissue (ng/g wet wt)
11	1	1	1
114	1	1	1
118	1	1	1
119	1	1	1
123	1	1	1
126	1	1	1
128	1	1	1
137		1	1
138	1	1	1
141		1	1
146		1	1
149	1	1	1
151	1	1	1
153	1	1	1
156	1	1	1
157	1	1	1
158	1	1	1
167	1	1	1
168	1	1	1
169	1	1	1
170	1	1	1
174		1	1
177	1	1	1
180	1	1	1
183	1	1	1
187	1	1	1
189	1	1	1

Congener	Stormwater (ng/L)	Sediment (ng/g dry wt)	Tissue (ng/g wet wt)
194	1	1	1
195	1	1	1
201	1	1	1
203		1	1
206	1	1	1
209		1	1

TABLE 5. Target analytes and reporting levels for chlorinated hydrocarbons.

Target	Sediment (ng/g dry wt)	Tissue (ng/g wet wt)
o,p'-DDT	0.5	1.0
p,p'-DDT	0.5	1.0
o,p'-DDD	0.5	1.0
p,p'-DDD	0.5	1.0
o,p'-DDE	0.5	1.0
p,p'-DDE	0.5	1.0
p,p'-DDMU	0.5	1.0
cis-chlordane	0.5	1.0
trans-chlordane	0.5	1.0
cis-nonachlor	0.5	1.0
trans-nonachlor	0.5	1.0
oxychlordane	0.5	1.0
Dieldrin	0.5	1.0

TABLE 6. Reporting limits for PAH analytes.

Target Analyte	Stormwater (µg/L)	Sediment (ng/g dry wt)
Naphthalene	0.05	20
2-Methylnaphthalene	0.1	20
1-Methylnaphthalene	0.1	20
Biphenyl	0.1	20
2,6-Dimethylnaphthalene	0.1	20
Acenaphthylene	0.05	20
Acenaphthene	0.05	20
1,6,7-Trimethylnaphthalene	0.1	20
Fluorene	0.1	20
Phenanthrene	0.1	20
Anthracene	0.1	20
1-Methylphenanthrene	0.1	20
Fluoranthene	0.1	20
Pyrene	0.05	20
Benzo[a]anthracene	0.05	20
Chrysene	0.1	20
Benzo[b]fluoranthene	0.1	20
Benzo[k]fluoranthene	0.1	20
Benzo[e]pyrene	0.1	20
Benzo[a]pyrene	0.1	20
Perylene	0.1	20
Indeno[1,2,3-cd]pyrene	0.1	150
Dibenzo[a,h]anthracene	0.1	150
Benzo[g,h,i]perylene	0.1	150

TABLE 7. Pyrethroid analytes and reporting levels.

Target Analyte	Sediment (ng/g dry wt)
Bifenthrin	0.5
Permethrin	0.5
Cypermethrin	0.5
Cyfluthrin	0.5
Deltamethrin	0.5
Esfenvalerate	0.5
Lambda-cyhalothrin	0.5
Fenpropathrin	0.5
Fipronil	0.5
Fipronil sulfide	0.5
Fipronyl desulfanyl	0.5
Fipronil sulfone	0.5

Table 8. Target analytes and reporting levels for PBDE congeners.

Congener	Sediment Reporting Limit (ng/g dry wt)	Tissue Reporting Limit (ng/g dry wt)
BDE-17	0.1	0.5
BDE-28	0.1	0.5
BDE-47	0.1	0.5
BDE-49	0.1	0.5
BDE-66	0.1	0.5
BDE-85	0.1	0.5
BDE-99	0.1	0.5
BDE-10	0.1	0.5
BDE-138	0.1	0.5
BDE-153	0.1	0.5
BDE-154	0.1	0.5
BDE-183	0.1	0.5
BDE-190	0.1	0.5
BDE-209	1.0	5.0

Table 9. List of bacteriological target analytes and target detection.

Parameter	Target Detection Limit
Enterococcus	1 colonies/100 mL
E. coli /Fecal coliform	2 MPN/100 mL
Total coliform	2 MPN/100 mL

2.10 Literature Cited

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SECTION 3. SPECIAL REQUIREMENTS AND INSTRUCTIONS

Bidders will be required to comply with the following special requirements and instructions during the performance of services rendered under this project:

3.1 Insurance

Bidders shall, at their sole expense, maintain in effect at all times during the performance of services awarded under this Proposal Form, general liability insurance providing for bodily injury liability and property damage liability. The combined single limits of liability for bodily injury or property damage shall be One Million Dollars (\$1,000,000) for each occurrence and One Million Dollars (\$1,000,000) aggregate, with the policy naming Southern California Coastal Water Research Project Authority as Additional Insured. Further, workers compensation insurance shall be held and maintained as required by applicable laws of the State of California with a minimum amount and limit of One Million Dollars (\$1,000,000) for each accident. Bidders shall also hold automobile liability insurance (bodily injury and property damage liability), including coverage for all owned, hired, and non-owned automobiles, with the combined single limit of liability of Two Hundred Fifty Thousand Dollars (\$250,000) for any one accident or loss. Bidders shall provide SCCWRP with evidence that policies providing such coverage and limits are in full force and effect within ten (10) days of the award of any contracts by SCCWRP. Such certificates shall provide that not less than thirty (30) calendar days advance notice will be given to SCCWRP prior to cancellation, termination, or material alteration of said policies of insurance.

3.2 Field Sampling Elements of Work

1. Possession of a valid Coast Guard license by the Captain of each boat utilized for field sampling is mandatory.
2. Possession of a valid scientific collecting permit by the cruise chief of each boat utilized for field sampling is mandatory.
3. All bidders for field sampling activities will be responsible for verifying the locations and depths of all sampling stations, and all stations must be plotted on North American (NAD) 1983 Datum charts.
4. All boats must have the ability to store collected samples using a refrigerator, freezer, or dry ice.
5. All samples collected must be delivered to SCCWRP or a designated laboratory within one week of collection, dependent on analysis requirements.
6. All containers, labels, and fixatives for field collections will be provided by SCCWRP.

SECTION 4. BID EVALUATION PROCESS AND CRITERIA

Following the opening of bids, SCCWRP will evaluate and score the bids received. Each work element of each bid submitted will be evaluated separately using the following criteria and scoring system, with a maximum possible score of 100.

1. Price (40 points): The lowest bid price will receive the maximum score of 40 points, with higher bids receiving scores proportional to the lowest bid price. If separate prices are provided for different quantities, SCCWRP will evaluate the bid based on the quantity of service that is most likely to be awarded.
2. Qualifications and experience (40 points): Each bid will be rated on a scale of 0 to 40 points, based upon the bidder's demonstrated experience using the methodologies and equipment required for the work, relevant experience of the bidder's staff members, and contingency planning for equipment and personnel due to weather, equipment failure, or other emergencies.
3. Survey/intercalibration experience (20 points): The regional survey data will be compiled from multiple sources. Consistency in procedures and measurements among data providers is important to the survey's success. Each bid will be rated on a scale of 0 to 20 points on the bidder's demonstrated experience in achieving similarity to others in cooperative surveys and intercalibrations. Points will be awarded for any intercalibration exercise or integrated multi-organization cooperative program. Preference will be given to those bidders with demonstrated comparability to other organizations participating in the southern California regional survey.

The bidder receiving the highest total score for each work element will be awarded a contract to perform the work. SCCWRP retains the right to award separate contracts for each of the work elements specified within the Proposal Form. SCCWRP also reserves the right to offer multiple contracts for the field surveys if there is sufficient geographical cost differentiation in the bids.

SECTION 5. PROPOSAL SUBMISSION

5.1 Bids

Bidders may submit bids for any or all of the work elements as detailed in this Proposal Form. The amount and locations of sampling stations, as well as the amount of samples for laboratory analyses, have not yet been determined. Bidders are asked to provide pricing for each element within the Scope of Work; at the bidder's discretion, bidders may provide one price or specify price breaks at different possible levels of effort as determined by the bidders, indicating the appropriate price differences for possible levels of work (i.e. cost per sampling site or sample analysis for 10-25, 26-50, 51-100, or 100-250 sites/samples). For field activities, if bid prices will differ due to geographic factors (i.e. by region) or depth factors (i.e. 3-200 m, 200-500 m, or 500–1000 m), indicate separate pricing for each region or depth. The actual number of sampling sites and samples to be analyzed will be determined prior to the execution of contracts with the successful bidder(s). For work elements not being bid, please indicate NO BID on the first line of those sections.

1. Collect water column samples in ocean or saline embayment waters between Point Conception and the Mexican border. Includes both CTD profiling and sampling at 3 discrete depths.

	Pt Conception to Point Dume	Point Dume to Dana Point	Dana Point to the US/Mexico International Border	Channel Islands
3-60 m depth	\$_____	\$_____	\$_____	\$_____
60-200 m depth	\$_____	\$_____	\$_____	\$_____

2. Collect stormwater samples between Point Conception and the Mexican border.

	Urban	Non-Urban
Site Setup	\$_____	\$_____
Enclosed Space Premium	\$_____	NA
Measurements and Sample Collection	\$_____	\$_____

3. Collect sediment samples in ocean or embayment between Point Conception and the Mexican border.

	Pt Conception to Point Dume	Point Dume to Dana Point	Dana Point to the US/Mexico International Border	Channel Islands
Estuaries	\$_____	\$_____	\$_____	\$_____
3-200 m depth	\$_____	\$_____	\$_____	\$_____
200-500 m depth	\$_____	\$_____	\$_____	\$_____
500-1,000m depth	\$_____	\$_____	\$_____	\$_____

4. Conduct bioassessment and physical habitat in streams between Point Conception and the Mexican border.

Number of samples	Pt Conception to Point Dume	Point Dume to Dana Point	Dana Point to the US/Mexico International Border
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____

5. Conduct trawls in ocean waters between Point Conception and the Mexican border.

	Pt Conception to Point Dume	Point Dume to Dana Point	Dana Point to the US/Mexico International Border	Channel Islands
3-200 m depth	\$_____	\$_____	\$_____	\$_____
200-500 m depth	\$_____	\$_____	\$_____	\$_____

6. Laboratory analysis for nutrients.

Number of samples	Price per Sample		
	Stormwater	Marine water	Sediments
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____

7. Laboratory analysis for general constituents.

Number of samples	Price per Sample		
	Stormwater	Marine water	Sediments
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____

8. Laboratory analysis for trace metals.

Number of samples	Price per Sample		
	Stormwater	Marine water	Sediments
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____

9. Laboratory analysis for Chlorinated Hydrocarbons and PCBs.

Number of samples	Price per Sample		
	Stormwater	Tissue	Sediments
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____
_____	\$_____	\$_____	\$_____

10. Laboratory analysis for PAHs.

Number of samples	Price per Sample	
	Stormwater	Sediments
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____

11. Laboratory analysis for Pyrethroid pesticides.

Number of samples	Price per Sample Sediments
_____	\$_____
_____	\$_____
_____	\$_____
_____	\$_____

12. Laboratory analysis for PBDEs.

Number of samples	Price per Sample	
	Sediment	Tissue
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____

13. Analyze benthic infauna samples collected in

A) Ocean waters (3-500 m depth) between Point Conception and Mexican border, including the Channel Islands.

Number of samples	Price per Sample
_____	\$_____
_____	\$_____
_____	\$_____
_____	\$_____

B) Saline estuarine waters between Point Conception and Mexican border.

Number of samples	Price per Sample
_____	\$_____
_____	\$_____
_____	\$_____
_____	\$_____

C) Freshwater streams between Point Conception and Mexican border.

Number of samples	Price per Sample
_____	\$ _____
_____	\$ _____
_____	\$ _____
_____	\$ _____

14. Analyze sediment toxicity samples collected in ocean or estuarine waters.

Number of samples	Price per Sample	
	<i>Eohaustorius</i>	<i>Mytilus</i>
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____

15. Analyze water column toxicity samples collected in freshwater using *Ceriodaphnia dubia*.

Number of samples	Price per Sample
	<i>Ceriodaphnia</i>
_____	\$_____
_____	\$_____
_____	\$_____
_____	\$_____

16. Laboratory analysis for Bacteria.

Number of samples	Price per Sample	
	Freshwater	Marine Water
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____
_____	\$_____	\$_____

5.2 Additional Information to Accompany Proposal Form

The following additional information must accompany this Proposal Form as detailed below. This additional information must not exceed fifteen (15) single-sided pages, 12 point font, exclusive of resumes.

5.2.1 Statement of Qualifications

Bidders are required to submit a Statement of Qualifications detailing the following information pertinent to the elements of work being bid. The document should include the following:

- a) a description of the firm;
- b) a listing of environmental research and monitoring activities performed within the last five years;
- c) a listing of equipment to be utilized to perform the work;
- d) a listing of personnel that will perform the work (include resumes as an appendix);
- e) a description of the bidder's participation in previous integrated multi-agency cooperative projects, including SCCWRP's 1994, 1998, 2003, 2008 or 2013 Regional Marine Surveys or Stormwater Monitoring Coalition Regional Watershed Surveys; and
- f) a description of the bidder's participation in previous intercalibration exercises such as those sponsored by SCCWRP, Stormwater Monitoring Coalition and/or NOAA.
- g) a description of the bidders contingency plan detailing methods to complete the work being bid under the time frames indicated in the event of vessel, personnel and/or equipment failure.

5.2.2 Certifications and Permits

Bidders are required to list all relevant certifications and permits necessary and/or desirable to perform the work being bid.

5.2.3. Certification Of Bidder

Name of corporation, partnership, or individual in whose behalf the bid is submitted:

Address: _____

City/State/Zip: _____

Phone: _____ FAX: _____ E-mail: _____

Tax Identification No.: _____

The full names and addresses of all persons and parties interested in the foregoing proposal as principals are as follows: (If bidder is a corporation or organization, give names of President, Secretary, and Treasurer; if bidder is a partnership, give the names of all partners.)

Name	Title
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I certify under penalty of perjury under the laws of the State of California that the foregoing representations are true and correct. Further, I certify that I have carefully examined the proposed work and the specifications as contained herein, and hereby propose to perform and complete all the work for this project as specified, in accordance with these specifications, and to furnish all materials and equipment necessary therefore to the satisfaction of SCCWRP, at the price(s) indicated within this document. In the event that this proposal is accepted by SCCWRP and the said work is awarded to the undersigned bidder, the said bidder agrees to sign and date, within seven (7) calendar days after it has been delivered or mailed to the bidder or its authorized agent, the Agreement for the performance of the work.

Signature of Bidder: _____

Title: _____ Date: _____