

Cruise Plan

2015 RMP Water Cruise

Contract No. 1154

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Submitted to:

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1. Introduction

This report details plans associated with the annual Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) water cruise. The RMP water sampling program was redesigned in 2002 to adopt a randomized sampling design at thirty-one sites in place of the twenty-six base program stations sampled previously. In 2007, the number of sites was decreased to twenty-two stations, and it remains as such for 2015.

2. Cruise Plan

2.1. Objectives

All sampling will be conducted from the *RV Turning Tide*. The objectives of the sampling effort are to collect the following:

Real-time Data Collection

1. Real-time data over the duration of sampling for conductivity, temperature, optical back scatterance (OBS), and dissolved oxygen (DO) by AMS (1 meter CTD cast for duration of sampling, followed by a full water column profile where water depth allows).
2. Water samples from 22 sites for on-board (field meter) measurement of DO, pH, salinity, conductivity, and temperature by SFEI.
3. Document current and recent weather conditions at each site.

Total Fraction

Unfiltered water samples for analysis of **total**:

4. 22 sites (and 1 replicate and 1 blank) for analysis of MeHg by ethylation/CVAFS (Brooks Rand Labs (BRL))
5. 22 sites (and 1 replicate and 1 blank) for analysis of Cu by column chelation and ICP-MS (BRL)
6. 22 sites (and 1 replicate and 1 blank) for analysis of Se by column chelation and ICP-MS (BRL)
7. 22 sites (and 1 replicate and 1 blank) for analysis of CN by colorimetry (ALS Environmental (ALS))
8. 22 sites (and 1 replicate and 1 blank) for analysis of SSC (ALS)
9. 9 sites (and 0 replicates) for analysis of aquatic toxicity by Pacific EcoRisk (PER).
10. 22 sites (and 1 blank) for analysis of bisphenols (SIU).

Unfiltered water samples at 3 sites (and 0 replicates and 1 blank, except Asbestos) for analysis of **CTR Parameters in total fraction**:

11. Sb by ICP-MS (BRL)
12. Be by ICP-MS (BRL)
13. Tl by ICP-MS (BRL)
14. Total Cr by ICP-MS (BRL)

15. TBT by GC/MS (Caltest – subcontracted to Test America in Kelso, WA)
16. 1 sample at BG20 for Asbestos by EPA method 100.1/100.2 (0 replicates and 0 blanks) (Caltest – subcontracted to EMSL)
17. VOCs by GC/MS (Caltest)
18. SVOCs by GC/MS (Caltest)
19. Benzene by GC/MS (Caltest)
20. Pesticides by GC/MS (Caltest)
21. Phthalates by GC/MS (Caltest)
22. Total Solids (Caltest)

Particulate Fraction

23. One particulate (filter) sample from 22 sites (and 1 replicate and 1 blank) for POC analysis by ALS Environmental (ALS)

Dissolved Fraction

Filtered (using pre-cleaned 0.45µm cartridge filter) water samples for analysis of **dissolved**:

24. 22 sites (and 1 replicate and 1 blank) for analysis of MeHg by ethylation/CVAFS (Brooks Rand Labs (BRL))
25. 22 sites (and 1 replicate and 1 blank) for analysis of Cu by column chelation and ICP-MS (BRL)
26. 22 sites (and 1 replicate and 1 blank) for analysis of Se by column chelation and ICP-MS (BRL)
27. 22 sites (and 1 replicate and 1 blank) for analysis of DOC (ALS)
28. 22 sites (and 1 replicate) for analysis of hardness (ALS)

2.2. Sampling Methods

Field parameters

Field parameters (DO, conductivity, salinity, and pH) will be collected using a YSI water quality meter provided by SFEI. The YSI meter should be calibrated for conductivity, pH, and DO at the start of each day, and calibration results recorded on the station field sheet and laptop access form. When recording field readings, the sampler should ensure that the YSI electrode is fully submerged and not surrounded by any bubbles.

The following steps describe the YSI deployment and data management process:

Programming the YSI

1. Hit 'Esc' to go to menu
2. Arrow down to "Logging Setup"
3. Go to 'edit site list' – delete old sites or just add in new sites
4. Enter sites then press enter to store the site

5. Hit 'esc' to get out of the menu

Running the YSI

1. hit 'esc' to go to the menu
2. go to logging setup menu and set the logging interval to 5 minutes
3. go to 'start logging' and press enter
4. select site from site list and press enter
5. screw the metal cage onto the probe sensor assembly
6. lower the probe sensor assembly to 1 m below the water surface, and fix cable to the boat railing to keep the probe at that depth for the duration of the time on station
7. to stop logging – go to 'stop logging' and hit enter
8. record DO, pH, salinity, conductivity, temperature, site code, and sampling date/time on the YSI field sheet, usually requested near start or middle of time on station

The following steps describe the CTD deployment and data management process:

1. Initialize CTD via laptop.
2. Disconnect communication cord from CTD and replace rubber cap.
3. Ensure that rope is securely fasted to vessel and to CTD containment cage.
4. Ensure that DI syringe is disconnected from CTD input.
5. Turn CTD on by moving switch completely to on position (fully up).
6. Place CTD into the water, with intake approximately 1 meter below water surface (typically a bit lower in the column to allow for any seas).
7. Leave CTD deployed for duration of sampling.
8. When sampling is completed, slowly lower CTD to the bottom (at a rate less than 1' per second) until rope goes slack or the end of the rope is reached. With strong currents, the rope may extend at a severe angle precluding its reaching the bottom. As soon as the CTD reaches the bottom, immediately begin moving to surface so as to minimize the amount of sediment pulled into the intake. The CTD can be moved to the surface at any rate as data is only collected on the downcast.
9. When CTD is at the surface, return to the vessel deck and place the switch in the off position (fully down).
10. Download the data between stations.
11. At day's end (or after stations where CTD intake may have become fouled with sediment or vegetation) rinse the CTD with distilled water, flush the intake with a minimum of three syringes full of distilled water, and store the CTD with a full syringe of DI inserted onto the intake and partially emptied into the CTD.

Lab parameters

Pump station set-up and take-down

Trace metals and CTR parameter samples will be collected using clean hands-dirty hands protocol. This requires three samplers:

1. Super dirty = no gloves
2. Dirty = vinyl or nitrile gloves
3. Clean = vinyl gloves (optionally nitrile inside) provided by BR for Trace Metal sampling and nitrile gloves for CTR sampling

Sampling tube assemblies will be shipped to analytical laboratories, pre-cleaned using an acid wash and blanked prior to sampling. Ensure pump switches are covered with discarded plastic bag (e.g. formerly holding precleaned tubing) such that dirty hands can touch switches without becoming excessively contaminated. Replace gloves as frequently as needed if a contaminated surface is touched. The protocol described below was written for metals sampling, but can be similarly applied to other sampling parameters.

1. Super Dirty sets up table, pump, and tubing stand
2. Dirty puts on a pair of nitrile gloves and opens the outside bag of vinyl gloves, optionally opening the inner bag if they can without directly touching the bag (e.g. using inner face of outside bag to peel apart inner bag opening)
3. Clean puts on nitrile gloves, opens inner bag if needed, and pulls out a pair of vinyl gloves by the cuffs and puts them on carefully, touching a minimum of the glove outside with nitrile (e.g. touch the cuff only on the first glove, then once one hand is in vinyl, to be sure to minimize touching the cuff of the second glove, which was semi-dirtied by touching with nitrile).
4. Once Clean puts vinyl gloves on – DO NOT TOUCH ANYTHING – HANDS OFF EVERYTHING EXCEPT INSIDE THE TUBING BAG AND TUBING ENDS
5. Dirty opens outside tubing bag.
6. Clean opens inside tubing bag and pulls out the tubing by grabbing both ends (2-3 inches from the ends) and holding the middle loops. Be careful not to allow either end of the tubing to touch other surfaces on the boat (personnel, clothing, etc). Do not let go of tubing.
7. Dirty attaches outtake side of tubing (rubbery end) to the pump (near the join with teflon tubing) and stand (handling only the stand, clamp, and tubing 6” or more from the end - only Clean touches the last 3 inches of tubing).
8. Dirty gets the floats, weights and ties out of the bag and attaches the intake end of the tubing to the float and weight using the ties. Leave at least 1.5 feet free at the end of the teflon tubing to avoid contamination by the float or weight. Orient the weight such that the free end is pointing towards the end of the tubing. Clean should continue holding the end of the tubing during this process.
9. Super dirty wraps plastic tape around the tubing and maneuvers pole over edge of boat.
10. When ready to deploy, clean hands releases intake end of tubing.
11. Dirty covers the pump face (switches etc) with the now empty tubing bag, tucking under bungees, taking care not to touch exposed tubing end.
12. Dirty opens cooler. Super Dirty secures cooler open with duct tape or bungee, and arranges coolers/buckets/seats to suit Dirty & Clean preferences.
13. Run the pump at least one minute to flush. Dirty should rinse off gloves in the flush stream, taking care not to touch exposed tubing.
14. Super dirty fills POC/DOC bottle and takes to filtering station
15. For each sample, Dirty opens outside bag.

16. Clean opens inside bag and handles & fills bottle with Dirty controlling the pump on/off switch.
17. Fill all total fraction bottles.
18. Dirty opens the outer bag of the filter.
19. Clean pulls out filter and attaches it to the end of the tubing.
20. Dirty arranges the clamp jaws to hold the filter. Clean closes and drops the empty filter bag into the cooler opened by Dirty - bag will be later used to cover the teflon tubing end during transit.
21. Run the pump one minute to flush. Especially at stations where the water looks cloudy/dark in the POC and other bottles, don't run too long, or filter will clog and blow itself off from backpressure.
22. Once done with all samples, Super dirty pulls pole up and Dirty grabs the weight careful not to let the intake end strike anything, and covers intake in plastic glove or empty filter bag. Weight and intake are placed in the overflow sink. (Clean at this point can also take on any tasks assigned to Dirty)
23. At the end of the day, the weight and ties are removed from the tubing, with the tubing stored in the discarded inner bag from the days tubing, and the weight and ties placed in used outer bag.

Sample labeling

AMS field staff will print out and provide sample labels to sampling personnel prior to arrival on station. The sample ID naming convention is as follows:

RMP-15WC-xxxx

where xxxx is a four-digit number assigned by the sample tracking and labeling application.

For double bagged samples, printed labels are dropped inside the outer bag, and a sharpie is used to write the site code and fraction (T or D) on the label on the outer bag. Labels should be attached directly to bottles without bags, and the site code, analyte, and fraction should be written on the bottle lid.

POC filters should be individually wrapped in foil provided by ALS, which will be placed inside ziplock bags. The ziplock bag should be labeled with the filtered volume.

Blank sample collection

One field blank will be collected prior to field sample collection at station SB070W. This blank will be taken at the beginning of the day, before any other sample collection, to ensure the sample is collecting using a clean sampler (ie. no site water contamination). Prior to field blank sample collection, sample tubing is rinsed with lab blank water for at least 30 seconds (may vary depending on how much water is provided by labs and how much is required for analyses - pump rate is about 1L per minute).

DI water will be provided by BRL for metals and ancillary parameter blanks, and Caltest for CTR parameter blanks. Because there is only one POC and DOC field blank, it will be collected from filtered blank waters.

Sample Collection

Sample tubing must be rinsed with site water prior to any sample collection for at least a minute (total fraction) and for only one minute (dissolved fraction, to not clog the filter). The overflow sink drains to a 5 gallon bucket or water jug to avoid contaminating the site with water flowing off the boat deck. If a blank sample will be collected that day, do not attach the float and weight or flush the sampler until after the blank sample has been collected.

The “clean hands” sampler will rinse all bottles without preservative with site water before filling - organics bottles should be rinsed once, and all other bottles should be rinsed twice. To rinse, partially fill a bottle (5-10 seconds, enough to rinse the interior surface), close the cap, shake/swirl thoroughly, and dispose of the rinsate. Bottles with preservative are filled directly, without overflowing. Bottles that will be frozen are filled to 3/4 of the total bottle volume (none on this cruise). See table 8 for a list of sample bottles by parameter and bottle handling instructions.

Sampling Stations

Samples will be collected at three pump and tubing set-ups, each corresponding to a pump and pre-cleaned sampling tubing assembly. Metals and ancillary parameters will be collected at station 1; toxicity samples will be collected using a high-volume pump at station 2, and non-metal CTR parameters will be collected at station 3.

DOC/POC samples will be collected as whole water samples at the metals sampling station, and will be filtered using a vacuum pump and pre-ashed filters inside the boat cabin. Bisphenol samples will be collected by submerging the sample bottle using a steel sampling pole.

Staff will be roughly assigned to sampling stations in the following order:

- Staff 1 - CTD, YSI, Bisphenols sampling, labeling
- Staff 2 - Metals and ancillary parameters, “clean hands”
- Staff 3 - Metals and ancillary parameters, “dirty hands”
- Staff 4 - POC/DOC filtering, CTR “clean hands”
- Staff 5 - Toxicity samples, CTR “dirty hands”

At stations where toxicity sampling is not required, staff 5 will collect bisphenols samples

At stations where CTR parameter sampling is not required, staff 4 and 5 will assist with the sampling of field parameters. Additional staff will assist with sample labeling, organization, and equipment cleaning.

Station 1: Metals & Ancillary parameters

A low-volume peristaltic pump will be provided by SFEI and 9 sampling tube assemblies (one each for 5 sampling dates and 4 backups) will be provided by SFEI and pre-cleaned by BRL. Each tubing assembly consists of 16 ft of PVDF and 3 ft of silicone tubing attached with zip ties. Pre-cleaned filters for dissolved trace elements sampling and pre-ashed filters for POC samples will be provided by BRL and ALS, respectively.

Bagged samples should be collected before unbagged samples. Samples should be collected using clean hands-dirty hands technique in the order listed below.

A. DOC/POC

Particulate organic carbon: Collect samples into clean 2-L sample bottles. Use the filter setup (see Figure 1) to filter water through the pre-ashed filters. Filters should be removed from packaging using forceps only. Filter samples inside the boat cabin to protect bottles from the sun. Swirl sample and pour out measured volume of water using graduated cylinders. Add water in 50-100 mL increments until filter clogs. Do not let filter run dry between additions, turn off pump well in advance as residual vacuum continues to pull quickly especially when filter is not clogged. Do not add water too quickly or in large volumes: water may become trapped on top of clogged filter. On final addition for a given filter, filter can run run dry. Keep track of amount of water filtered and record this amount on the site sheet and in the access form on the laptop. Also record the pre-assigned number of the filter.

Carefully lift filter chimney/funnel straight up to avoid knocking off filtered material. Leaving filter pump on can help prevent filter lifting with chimney. Fold filter in half carefully to not expose any filtered material, and taking care not to touch filtered material with forceps. Can use second pair of forceps or chimney to flatten/fold filter. Individually wrap filters in foil pouches provided by ALS using forceps, and place these pouches inside ziplock bags along with pre-printed label. Label the ziplock bags with the filtered volume and immediately freeze the sample on dry ice.

Dissolved organic carbon: Pour some of the filtrate (water in the bottom of the flask after the POC sample has been collected on the filter) into 40-mL bottles (this will be the DOC fraction). Make sure there is no head space, but do not overfill to keep preservative intact. Refrigerate the DOC, do not freeze. Rinse filtration apparatus with DI between stations, and wipe off and rinse with DI any material accidentally left on forceps when done.

B. Total

- a. Trace metals (Cu, Se, Sb, Be, Tl)
- b. MeHg (preserved with H₂SO₄ - no rinse)
- c. CN
- d. SSC

Because ALS only sent 1L bottles, guesstimate the sample volume to collect for each station. As a rule of thumb: at any stations deeper than 20 ft with only a hint of color in POC water bottle (Central Bay, Golden Gate), collect 1L. If the sample is slightly cloudy, collect around 500 mL or a bit less (½ full). If the water is cloudy (brownish around the boat, less than 6ft depth, rocked by wind/waves) collect around 250ml (¼ full). Most sites should be in the slightly cloudy category.

After collecting whole water samples, the “clean hands” sampler should attach a pre-cleaned filter provided by BRL to the end of the tubing. The “dirty hands” sampler should use a clamp to hold the filter in place. The filter should be flushed for at least 1 minute before collecting the first dissolved sample.

C. Dissolved

- a. Trace metals (Cu, Se)

- b. MeHg (preserved with H₂SO₄ - no rinse)**
- c. Salinity/Hardness**

Station 2: Toxicity

A high-volume peristaltic pump will be provided by AMS and 9 sampling tube assemblies (one per toxicity station) will be pre-cleaned by Pacific Eco Risk. Collect samples into a 5 gallon carboy and place the bottle label directly on the bottle. Sampling personnel should use gloves (nitrile or vinyl OK) while handling the pump and tubing. Bottles should be left with some headspace after filling.

Station 3: CTR parameters

A low-flow peristaltic pump will be provided by AMS and 5 sampling tube assemblies (one each for 3 sampling dates and 2 backups) will be provided by SFEI and pre-cleaned by Caltest. The tubing assemblies consist of 16 or 12 ft PVDF tubing and 3 ft of silicone tubing attached using zip ties, and will be acid-washed and lab-blanked for organic contaminants using EPA Methods 624 and 625. All samples collected will be whole water using clean hands-dirty hands technique. SVOC and VOC should be collected with minimum to no headspace as practicable. Gloves should be worn in the same manner as for the metals collection, if for no other reason but to avoid contaminating gloves potentially used for metals. If separate gloves will be used for metals and CTR sampling, nitrile gloves can be used for both clean and dirty hands CTR sampling.

- A. Organics**
- B. Pesticides**
- C. Tributyltin**
- D. Asbestos - collected at BG20 only**
- E. Total Solids**

Station 4: Bisphenols

Bisphenol samples will be collected by submerging the sample bottle using a steel sampling pole. Fill containers between 1/2 and 2/3 full. Do not brace the sampling pole against the boat rail to use as a lever, which will cause the pole to break. Slowly pull the sampling pole directly out of the water and into the boat with the non-sampling end angled upwards until the bottle can be reached. See Appendix B for detailed sampling instructions.

2.3. Personnel

The personnel and work assignments for this cruise are shown in Table 1.

Table 1. Personnel for 2015 RMP Water Cruise

Name	Affiliation	Duties	Cell
Paul Salop	AMS	Cruise Manager (8/26)	510-323-6523
Doug George	AMS	Cruise Manager (8/26 – 9/1)	650-776-1449
Emily Novick	SFEI	Field Sampling, (8/27)	240-277-3669
Don Yee	SFEI	Field Sampling, (8/26, 8/27)	650-530-0603
Amy Franz	SFEI	Field Sampling, (8/28, 8/31, 9/1)	510-282-5012
Jennifer Sun	SFEI	Field Sampling, (8/26, 8/27, 8/28, 9/1)	949-202-6671
Patrick Kim	SFEI	Field Sampling, (8/26, 8/27, 8/28, 9/1)	510-685-0574
Rebecca Sutton	SFEI	Field Sampling, (8/31, 9/1)	510-701-7050
Phil Trowbridge	SFEI	Field Sampling, (8/26, 8/28)	603-340-5220
Adam Wong	SFEI	Field Sampling, (8/31, 9/1)	530-400-5192
Carolyn Doehring	SFEI	Field Sampling, (8/26, 8/27)	815-922-5973
Shira Bezalel	SFEI	Photography (8/31)	510-761-3321
Chris Vallee	USGS	Vessel contact	916-764-2419
Jerry Eldorado	Aloha Trans	Logistics	925-640-1600

Representatives of program sponsors may be aboard the *RV Turning Tide* during portions of the cruise to observe sampling operations. Msrs. Salop and George will be responsible for oversight of sampling operations, compliance with cruise plan and quality assurance guidelines, maintenance of the sample field log, chain-of-custody procedures, and CTD profiling. Captain Vallee will be responsible for vessel operation and safety. Msrs. Novick, Yee, Franz, Sun, Kim, Sutton, Trowbridge, Wong, and Doehring will alternate trace metals, CTR, and ancillary sampling.

2.4. Cruise Schedule

Sampling activities for the 2015 RMP Water Cruise are shown in Table 2. The tentative schedule assumes that an average of one hour will be required for sampling at each station. Sampling times may also vary depending upon suspended sediment loads, number and type of samples collected, and other factors. The schedule is for planning purposes only, and may be revised during sampling operations to reflect weather conditions, equipment performance, or other factors. Any sites unable to be sampled at the scheduled time will be rescheduled later in the cruise if possible, or will be replaced with the first available site within the segment from the current 2017 sampling schedule (see Appendix A for site locations). A record of all sites not able to be sampled and why will be maintained as part of the cruise recordkeeping.

There are no target sites for 2015 within close proximity to sensitive areas. AMS personnel have arranged to check in with USCG Command Center (**415-399-3547**) as needed in attempt to minimize disruptions to sampling.

Table 2. Tentative Schedule for 2015 RMP Water Cruise

Date	Time	Activity
Aug 25	0900-1500	<i>RV Turning Tide</i> transits from Oakley to Redwood City Marina (675 Seaport Blvd, 650-363-1390).
	1500-1700	AMS and SFEI personnel mobilize sampling equipment and load aboard vessel <i>RV Turning Tide</i> at Redwood City Marina . Aloha Transportation (Aloha) meets vessel at Redwood City Marina and ferries skipper to Driftwood Marina to retrieve personal vehicle.
Aug 26	0700-1630	Mobilize remaining sampling gear aboard vessel at Redwood City Marina . Sample BA30, LSB062W, LSB066W, LSB064W, LSB061W, and LSB065W (low tide 0.3' at 4:56; high tide 7.3' at 11:28). Return to Redwood City Marina and demobilize vessel. Aloha retrieves all remaining samples for transfer to AMS.
Aug 27	0700-1615	Mobilize sampling gear aboard vessel at Redwood City Marina . Sample field blank, SB070W, SB068W, SB067W, CB040W, and BC10 (low tide -0.3' at 5:25, high tide 6.9' at 11:55). Transit to Emeryville Marina (3310 Powell St, Emeryville, 510-654-3716) and demobilize vessel.
	1615-1915	Aloha Transportation meets vessel at Emeryville Marina and retrieves all personnel for transfer to personal vehicles in Redwood City and all samples for transport to AMS.
Aug 28	0700-1430	Mobilize sampling gear aboard vessel at Emeryville Marina . Sample BC20, CB041W, and CB042W (low tide -0.5' at 5:26; high tide 5.5' at 12:12 am). Transit to Emeryville Marina and demobilize vessel.
	1430-1800	Aloha Transportation meets vessel at Emeryville Marina and retrieves all samples for transport to PER (toxicity) and AMS (all other)
August 31	0845-1630	Mobilize sampling gear aboard vessel at Emeryville Marina . Sample SPB039W, SPB041W, and SPB040W (low tide 0.0' at 9:07; high tide 6.5' at 15:05). Transit to Benicia Marina (266 East B St., Benicia, 707-745-2628) and demobilize vessel. 7:00 am
	1630-1800	Aloha Transportation meets vessel at Benicia Marina and retrieves all personnel for transfer to personal vehicles in Emeryville and all samples for transport to AMS.
Sept 1	0600-1500	Mobilize sampling gear aboard vessel at Benicia Marina . Sample SU048W, SU049W, SU050W, BG20, and BG30 (high tide 5.6' at 4:36, low tide 0.3' at 11:10). Transit to Driftwood Marina (6338 Bridgehead Rd, Oakley, 925-757-9449) and demobilize vessel.
	1500-1700	Mr. Johnson meets vessel at Driftwood Marina and sampling personnel demobilize all samples and sampling equipment. AMS retains all remaining samples and sampling equipment for delivery to AMS. Aloha Transportation

		meets vessel at Driftwood Marina and transfers personnel to personal vehicles in Benicia.
Sept 2	TBD	Contingency day, as needed.

2.5. Lodging

Recommended lodging options for vessel personnel are shown in Table 3.

Table 3. Contact Information for Suggested RMP Water Cruise Lodging.

Location	Nights	Hotel
Redwood City	August 25,26	Comfort Inn 1818 El Camino Real Redwood City, CA 650-599-9636
Emeryville	August 27	Extended Stay America 3650 Mandela Pkwy Oakland, CA 510-923-1481
Benicia	August 31	Best Western Heritage Inn 1955 E 2 nd St. Benicia, CA 94510 707-746-0401

2.6. Other Contacts

Laboratory contact information for RMP field sampling is shown in Table 4, and for local dry ice vendors is shown in Table 5.

Table 4. Laboratory Contact Information for 2015 RMP Water Cruise.

Lab / Company	Name	Phone
BRL	Tiffany Stilwater	206-632-6206
ALS	Shar Sami	360-501-3293
PER	Scott Ogle	707-207-7760
Caltest	Melinda Kelley	707-258-4000 x32
Southern Illinois University	Da Chen (in an emergency contact Rebecca Sutton)	618-453-6946 (lab) 804-695-6501 (cell)

Table 5. Dry Ice Vendors Proximate to RMP Water Cruise Berthing Locations.

Port City	Vendor	Address / Phone	Hours (M-F)
Redwood City	Albertsons	200 Woodside Place Redwood City 650-873-4212	0700-1600
Emeryville	Arco	889 West Grand Oakland 510-465-4450	24 hrs
Benicia	Concord Airgas	1825 Arnold Industrial Concord 925-825-8822	0700-1700
Oakley	Raley's	2077 Main Street Oakley 925-625-0744	0600-2300

2.7. Sampling Sites

Three target sites for 2015 were removed from the site list during planning for the following reasons:

- LSB063W was removed due to its location between the Dumbarton Bridge and railroad bridge to the south (Figure 1). It was replaced with site LSB0066W.
- SB069W was removed due the combination of its location proximate to the Oakland Airport runways and required transit of 1 km over shallow mudflat (2' MLLW on nautical charts) to access. It was replaced with SB070W.
- CB039W is located within the navigation channel approximately 500 m west of the Chevron Long Wharf Marine Oil Terminal. It was replaced with CB042W.

2015 target sampling sites are shown in Figure 2 and listed in Table 6. All coordinates are in WGS-84 datum. Target analytes are shown in Table 7. Sampling and handling requirements associated with each analyte are shown in Table 8. The replacement-site pool is shown in Appendix A.

Figure 2. Location of 2015 RMP Target Water Stations

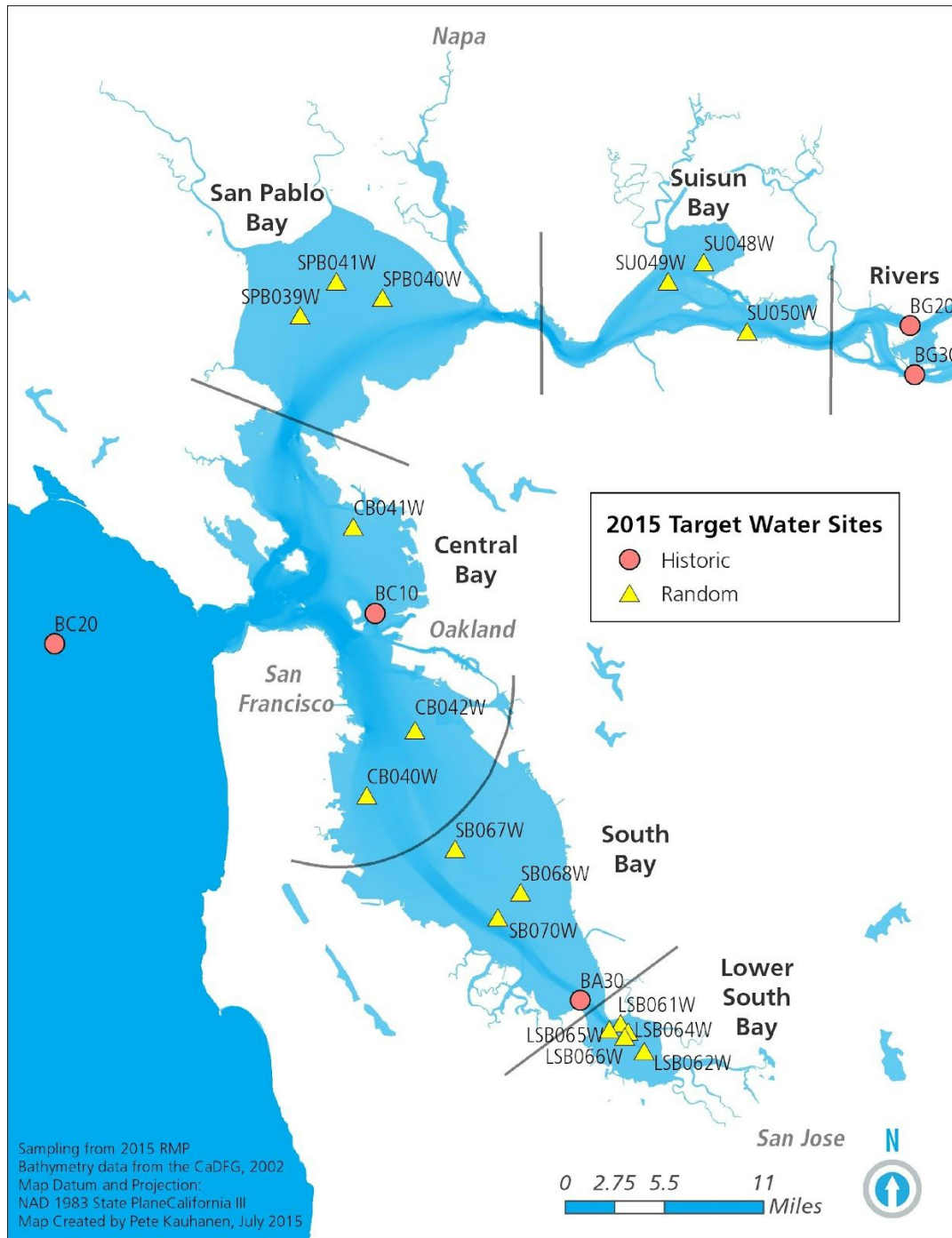


Table 6. Location of 2015 RMP Water Cruise Target Sampling Sites.

Site Name / Region	Site Code	Target Lat	Target Long	Depth (ft)
CB	BC10	37.8215833	-122.3495	12+
CB	BC20	37.7915	-122.67333	12+
RIV	BG20	38.05969966	-121.8112677	12+
RIV	BG30	38.02054094	-121.806267	12+
SB	BA30	37.51375	-122.1346166	12+
CB	CB040W	37.67518852	-122.3541416	12+
CB	CB041W	37.89051473	-122.3731122	3 to 6
CB	CB042W	37.72810027	-122.3063608	12+
LSB	LSB061W	37.49578108	-122.0934142	3 to 6
LSB	LSB062W	37.47366172	-122.0693736	12+
LSB	LSB064W	37.48902428	-122.085894	12+
LSB	LSB065W	37.49060912	-122.1045144	6 to 12
LSB	LSB066W	37.48520534	-122.0890141	6 to 12
SB	SB067W	37.63346894	-122.2636692	12+
SB	SB068W	37.59946797	-122.1966771	3 to 6
SB	SB070W	37.57892359	-122.2193074	6 to 12
SPB	SPB039W	38.05927587	-122.4315357	6 to 12
SPB	SPB040W	38.07478345	-122.3480335	6 to 12
SPB	SPB041W	38.08730512	-122.3952352	3 to 6
SU	SU048W	38.10814102	-122.0220148	3 to 6
SU	SU049W	38.09219376	-122.0580855	6 to 12
SU	SU050W	38.0529817	-121.9769826	6 to 12

Table 7. RMP Samples to be Collected by Site. Numbers of samples at each site indicated.

SITECO DE	C T D - A M S	C o n v e n t i o n a l W Q - S F E I	m e H g, T - B R L	C u, S e, T - B R L	C N, T - A L S	S S C, T - A L S	T o x i c i t y - P E R	B i s p h e n o l s - S I U	P O C - A L S	D O C - A L S	M e H g, D - B R L	C u, S e, D - B R L	H a r d n e s s, D - A L S	T o t a l S o l i d s, T - C a l t e s t	S b, B e, T l, C r, T - B R L	T B T, T - C a l t e s t	A s b e s t o s, T - C a l t e s t	O r g a n i c s (E P A 6 2 5) T - C a l t e s t	O r g a n i c s (E P A 6 2 4) T - C a l t e s t	P e s t i c i d e s, T - C a l t e s t
Field Blank			1	1	1	1		1	1	1	1	1	1		1	1		1	1	1
BC10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1
BC20	1	1	1	1	1	1		1	1	1	1	1	1							
BG20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BG30	1	1	1	1	1	1	1	1	1	1	1	1	1							
BA30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1
LSB061W	1	1	1	1	1	1	1	1	1	1	1	1	1							
LSB062W	1	1	1	1	1	1		1	1	1	1	1	1							
LSB064W	1	1	1	1	1	1		1	1	1	1	1	1							
LSB065W	1	1	1	1	1	1		1	1	1	1	1	1							
LSB066W	1	1	1	1	1	1		1	1	1	1	1	1							
SB067W	1	1	1	1	1	1	1	1	1	1	1	1	1							
SB068W	1	1	1	1	1	1		1	1	1	1	1	1							
SB070W	1	1	1	1	1	1		1	1	1	1	1	1							
CB040W	1	1	1	1	1	1	1	1	1	1	1	1	1							
CB041W	1	1	1	1	1	1		1	1	1	1	1	1							
CB042W	1	1	1	1	1	1		1	1	1	1	1	1							
SPB039W	1	1	2	2	2	2	1	1	2	2	2	2	2							
SPB040W	1	1	1	1	1	1		1	1	1	1	1	1							
SPB041W	1	1	1	1	1	1		1	1	1	1	1	1							
SU048W	1	1	1	1	1	1	1	1	1	1	1	1	1							
SU049W	1	1	1	1	1	1		1	1	1	1	1	1							
SU050W	1	1	1	1	1	1		1	1	1	1	1	1							
Total	22	22	24	24	24	24	9	23	24	24	24	24	24	3	4	4	1	4	4	4

Table 8. Containers and Sample Handling for RMP Water Cruise. (T=total, P=particulate, D=dissolved). Samples to be stored with no additional preservation, on wet ice or refrigerated (4C), and in the dark, unless otherwise noted with an “ * ”.

Sample	T/P/D	Lab	Container	Handling Requirements
DO, cond, pH, temp, OBS	T	AMS	None	CTD deployment
DO, cond, pH, temp, sal	T	SFEI	None	Grab measurement on board vessel
MeHg	T	BRL	250 ml FLPE	No rinse; has 1-2 ml 50% H2SO4; dup at 1 site (6 month hold time)
Cu, Se	T	BRL	2 L HDPE	Dup at 1 site (6 month hold time)
CN	T	ALS	500 mL HDPE	*Preserve with NaOH to a pH ≥ 12 (14 day hold if preserved); dup at 1 site
SSC	T	ALS	1 L	Dup at 1 site (7 day hold time)
Toxicity	T	PER	20 L	Place on wet ice, deliver to PER morning after sampling (36 hrs hold time)
Bisphenols	T	SIU	4 L amber glass	Amber glass, fill approx $\frac{2}{3}$ (leave headspace). Ship on 8/31 and at the conclusion of the cruise.
Total Solids	T	Caltest	1 pint polyethylene	No duplicates needed
Sb, Be, Tl, Cr (CTR)	T	BRL	Included with Cu, Se samples	No duplicates needed (6 month hold time)
TBT (CTR)	T	Caltest	1L amber glass	7 day hold time. A courier will deliver samples to Caltest the morning after sampling.
Asbestos (CTR)	T	Caltest	1 L amber glass	48 hour hold time. A courier will deliver samples to Caltest the morning after sampling.
VOCs, SVOCs, PAH, phthalates by EPA 625 (CTR)	T	Caltest	4 @ 1 L amber glass (2 L for field blanks)	7 day hold time. A courier will deliver samples to Caltest the morning after sampling.
VOCs, SVOCs by EPA 624 (CTR)	T	Caltest	Four 40 mL VOA vials (2 preserved, 2 unpreserved)	*Two vials preserved with HCl (provided), two unpreserved. Hold time is 7 days for preserved bottles, 3 days for unpreserved bottles. A courier will deliver samples to Caltest the morning after sampling.
Pesticides by EPA 608 (CTR)	T	Caltest	4 @ 1L amber glass (2 L for field blanks)	7 day hold time. A courier will deliver samples to Caltest the morning after sampling.
POC	P	ALS	Filters (1 per site)	1 filter per site. Field filtered; quick freeze -20C; dup at 1 site (100 day hold time)
DOC	D	ALS	250 ml HDPE	Field filtered (filtrate of POC sample); has 1-2 mL H2SO4, dup at 1 site (28 day hold time)
MeHg	D	BRL	250 ml FLPE	No rinse; has 1-2 ml 50% H2SO4; dup at 1 site (6 month hold time)
Cu, Se	D	BRL	2 L HDPE	Dup at 1 site (6 month hold time)
Hardness	D	ALS	500 ml PE	Dup at 1 site

APPENDIX A

2017 TARGET SITES (Replacement sites for 2015). All coordinates are in WGS-84 datum.

Site Code	Site Name / Region	Target Lat	Target Long	Depth (ft)
Central Bay	CB043W	37.92713888	-122.4811147	3 to 6
Central Bay	CB044W	37.80640203	-122.3262212	12+
Lower South Bay	LSB067W	37.46959684	-122.0656735	6 to 12
Lower South Bay	LSB068W	37.48673013	-122.1177547	6 to 12
San Pablo Bay	SPB042W	38.03763743	-122.3642433	12+
San Pablo Bay	SPB043W	38.06832963	-122.466697	3 to 6
South Bay	SB071W	37.62124822	-122.3357213	6 to 12
South Bay	SB072W	37.62977094	-122.2138478	3 to 6
Suisun Bay	SU051W	38.06700374	-122.0937161	12+
Suisun Bay	SU052W	38.06318259	-122.0453347	12+

APPENDIX B
Sampling Instructions

RMP Field Parameters Sampling Instructions

YSI Sampling

Programming the YSI (at the beginning of each sampling day)

1. Hit 'Esc' to go to menu
2. Arrow down to "Logging Setup"
3. Go to 'edit site list' – delete old sites or just add in new sites
4. Enter sites then press enter to store the site
5. Hit 'esc' to get out of the menu

Calibrating the YSI (at the beginning of each sampling day)

- Calibrate the YSI for conductivity, pH and DO once per day at the beginning of the day prior to sampling
 - Conductivity
 - fill the calibration cup 1/3 full with 12,800 uS/cm standard (enough to submerge both the metal tip probe with no trapped air pocket in the side port – note that the port assembly has substantial volume and may overflow the cup if it is overfilled)
 - submerge the probe in the calibration cup, and allow the meter reading to equilibrate
 - hit 'esc' to go to menu, go to 'calibrate,' and choose 'Conductivity'
 - set the calibration standard to 12.8 mS/cm, and press enter to calibrate
 - pH
 - fill the calibration cup 1/4 full with pH 7 buffer (probe is near the tip)
 - submerge the probe in the calibration cup, and allow the meter reading to equilibrate
 - hit 'esc' to go to menu, go to 'calibrate,' choose 'pH', and choose '2 point'
 - set the calibration standard to 7, and press enter to calibrate
 - pour out the pH 7 buffer, rinse the cup and probe, and repeat with pH 10 buffer
 - DO
 - fill the calibration cup about 1/8 full with DI water, screw on to the probe, and shake vigorously to wet the DO probe
 - unscrew the cup and pour out the water
 - loosely screw the cap back onto the probe, and allow the meter reading to equilibrate
 - hit 'esc' to go to menu, go to 'calibration,' choose 'DO 2 mil PE (Blue),' choose 'DO %,' and set the barometric pressure to 760 mmHg (sea level)
 - press enter to calibrate
- Rinse the probe and calibration cup with DI water in between calibrations. Make sure the calibration cup is dry before adding new calibration solution.
- No calibration is needed for salinity or temperature

Running the YSI

1. hit 'esc' to go to the menu
2. go to logging set up menu and set the logging interval to 5 minutes
3. go to 'start logging' and press enter
4. select site from site list and press enter
5. screw the metal cage onto the probe sensor assembly
6. lower the probe sensor assembly to 1 m below the water surface, and fix cable to the boat railing to keep the probe at that depth for the duration of the time on station
7. to stop logging – go to 'stop logging' and hit enter
8. record DO, pH, salinity, conductivity, temperature, site code, and sampling date/time on the YSI field sheet, usually requested near the start or middle of the time on station
9. when not in use, **** MAKE SURE TO STORE THE pH PROBE IN pH 4 BUFFER**** Store probe in the calibration cup in the short term, and in the small probe storage cup (with cap and o-ring) in the long term

For a detailed SOP on downloading data from the YSI and a copy of the software go to S:\SFEI\SFEI Field Software.

RMP Field Parameters Sampling Instructions

CTD Sampling

1. Initialize CTD via laptop.
2. Disconnect communication cord from CTD and replace rubber cap.
3. Ensure that rope is securely fasted to vessel and to CTD containment cage.
4. Ensure that DI syringe is disconnected from CTD input.
5. Turn CTD on by moving switch completely to on position (fully up).
6. Place CTD into the water, with intake approximately 1 meter below water surface (typically a bit lower in the column to allow for any seas).
7. Leave CTD deployed for duration of sampling.
8. When sampling is completed, slowly lower CTD to the bottom (at a rate less than 1' per second) until rope goes slack or the end of the rope is reached. With strong currents, the rope may extend at a severe angle precluding its reaching the bottom. As soon as the CTD reaches the bottom, immediately begin moving to surface so as to minimize the amount of sediment pulled into the intake. The CTD can be moved to the surface at any rate as data is only collected on the downcast.
9. When CTD is at the surface, return to the vessel deck and place the switch in the off position (fully down).
10. Download the data between stations.
11. At day's end (or after stations where CTD intake may have become fouled with sediment or vegetation) rinse the CTD with distilled water, flush the intake with a minimum of three syringes full of distilled water, and store the CTD with a full syringe of DI inserted onto the intake and partially emptied into the CTD.

RMP Water Cruise – Clean Hands / Dirty Hands Procedure

Trace metals must be collected using the clean hands-dirty hands procedure described below. CTR parameter sampling must be collected using an analogous clean hands-dirty hands procedure. This requires three samplers:

1. Super dirty = no gloves
2. Dirty = vinyl or nitrile gloves (vinyl is ideal for Trace Metals sampling)
3. Clean = vinyl gloves (optionally nitrile inside) provided by BRL for Trace Metal sampling and nitrile gloves for CTR sampling

Replace gloves as frequently as needed if a contaminated surface is touched or a glove is ripped

1. Super Dirty sets up table, pump, and tubing stand
2. Dirty puts on a pair of nitrile gloves and opens the outside bag of vinyl gloves, optionally opening the inner bag without directly touching the bag (e.g. using inner face of outside bag to peel apart inner bag opening)
3. Clean puts on nitrile gloves, opens inner bag if needed, and pulls out a pair of vinyl gloves by the cuffs and puts them on carefully, touching a minimum of the glove outside with nitrile (e.g. touch the cuff only on the first glove, then once one hand is in vinyl, to be sure to minimize touching the cuff of the second glove, which was semi-dirtied by touching with nitrile).
4. Once Clean puts vinyl gloves on – DO NOT TOUCH ANYTHING – HANDS OFF EVERYTHING EXCEPT INSIDE THE TUBING BAG AND TUBING ENDS
5. Dirty opens outside tubing bag.
6. Clean opens inside tubing bag and pulls out the tubing by grabbing both ends (2-3 inches from the ends) and holding the middle loops. Be careful not to allow either end of the tubing to touch other surfaces on the boat (personnel, clothing, etc). Do not let go of tubing.
7. Dirty attaches outtake side of tubing (rubbery end) to the pump (near the join with teflon tubing) and stand (handling only the stand, clamp, and tubing 6" or more from the end - only Clean touches the last 3 inches of tubing).
8. Super dirty gets the bag with the floats weights and ties from storage spot and opens the bag. Dirty gets the floats, weights and ties out of the bag and attaches the intake end of the tubing to the float and weight using the ties. Leave at least 1.5 feet free at the end of the teflon tubing to avoid contamination by the float or weight. Orient the weight such that the free end is pointing towards the end of the tubing. Clean should continue holding the end of the tubing during this process.
9. Super dirty wraps plastic tape around the tubing and maneuvers pole upward and outward over edge of boat.
10. When ready to deploy, clean hands releases intake end of tubing.
11. Dirty covers the pump face (switches etc) with the now empty tubing bag, tucking under bungees, taking care not to touch exposed tubing end.
12. Dirty opens cooler. Super Dirty secures cooler open with duct tape or bungee, and arranges coolers/buckets/seats to suit Dirty & Clean preferences.
13. Run the pump at least one minute to flush. Dirty should rinse off gloves in the flush stream, taking care not to touch exposed tubing.
14. Super dirty fills POC/DOC bottle and takes to filtering station
15. For each sample, Dirty opens outside bag.
16. Clean opens inside bag and handles & fills bottle with Dirty controlling the pump on/off switch.
17. Fill all total fraction bottles.
18. Dirty opens the outer bag of the filter.
19. Clean pulls out filter and attaches it to the end of the tubing.
20. Dirty arranges the clamp jaws to hold the filter. Dirty closes and drops the empty filter bag into the cooler - this bag will be later used to cover the teflon tubing end during transit.
21. Run the pump one minute to flush. Especially at stations where the water looks cloudy/dark in the POC and other bottles, don't run too long, or filter will clog and blow itself off from backpressure.
22. Fill all dissolved fraction bottles.
23. Once done with all samples, Super dirty pulls pole up and Dirty grabs the weight careful not to let the intake end strike anything, and covers intake in plastic glove or empty filter bag. Weight and intake are placed in the overflow sink. (Clean at this point can also take on any tasks assigned to Dirty)
24. At the end of the day, the weight and ties are removed from the tubing, with the tubing stored in the discarded inner bag from the days tubing, and the weight and ties placed in used outer bag.

RMP Water Cruise Metals Sampling Instructions

Pump set up – see Clean Hands/Dirty Hands Instructions

Sample tubing will be pre-cleaned by BRL, and used with a low-flow pump provided by SFEI. Use a new tubing set at the beginning of each sampling day.

Clean hands/dirty hands

- Clean hands must wear vinyl gloves (optionally with nitrile gloves inside)
- Dirty hands should wear vinyl gloves if available (optionally nitrile gloves)
- DOC/POC filterer must wear nitrile gloves

Bottle Filling

- Rinse tubing with site water for at least 1 minute before sampling.
- All bottles without preservative are rinsed 3 times with site water before filling
- Bottles with preservative are filled directly, without overflowing
- Between taking total and dissolved water samples:
 1. Clean hands attaches filter to end of tubing
 2. Dirty hands uses clamp to hold the filter in place
 3. Flush the filter for at least 1 minute before collecting first dissolved sample

Bottle labels

- Printed labels are dropped inside outer bag
- Use sharpie to write site code and fraction (T or D) on label on the outer bag
- Attach label directly to bottles without bags, and write site code, analyte, and fraction on lid. Wrap label on the bottle in tape in order to avoid becoming dissociated with the sample bottle.

Additional samples

- A field blank will be collected prior to field sample collection at station SB070W, using DI water provided by BRL
- A field duplicate sample will be collected at SPB039W

Collection order

Sample	# Bottles	Bottle Type	Preservation*
DOC/POC	1	2 L (transfer for DOC/POC filtration)	
Total Fraction			
Trace Metals (Cu, Se, Sb, Be, Tl)	1	2 L HDPE	
MeHg	1	250 mL FLPE	1-2 mL 50% H2SO4
CN	1	500 mL HDPE	NaOH
SSC	1	1 L**	
Dissolved Fraction			
Trace Metals (Cu, Se)	1	2 L HDPE	
MeHg	1	250 mL FLPE	1-2 mL 50% H2SO4
Salinity/Hardness	1	500 mL PE	

* Samples will be placed in coolers with ice for field storage. Hold times are listed in the 2015 RMP Water Cruise Plan

**Fill completely full if clear water, half full at cloudy water sites, and a quarter full at turbid sites

Cloudy = you can easily read something on opposite side of filled POC bottle

Turbid = difficult to read fine print through POC bottle

Clear stations are often 15-20ft depth or deeper. Cloudy stations are about 6-15ft depth. Turbid stations are about 6ft or less, or deeper but with lots of wave/wind action. Water will be more tan/brown from suspended sediments than green/yellow from algae, although really high algal blooms contribute to SSC too.

Most stations will be slightly cloudy. Clear water is expected in Central Bay and outside the Golden Gate.

RMP Water Cruise – POC/DOC Sampling Instructions

- Wear nitrile gloves
- Filter samples inside the boat cabin to protect bottles from the sun

Particulate organic carbon

1. Collect samples into clean 2 L sample bottles (metals sampling station)
2. Place pre-ashed filter on the filter apparatus with the rough side facing up. ****remove filters from packaging using forceps only**** “non-rough” side will have a faint imprint or crosshatching from resting on a screen during manufacture. That side should stay down in sampling.
3. Swirl sample and pour out measured volume of water using graduated cylinders
4. Swirl graduated cylinder and add water in 50-100 mL increments until filter clogs.
****Do not let filter run dry between additions, turn off pump well in advance as residual vacuum continues to pull quickly especially when filter is not clogged. Do not add water too quickly or in large volumes: water may become trapped on top of clogged filter. On final addition for a given filter, filter can run dry.****
5. Keep track of amount of water filtered and record this amount on the field sheet. Also record the pre-assigned number of the filter on the field sheet
6. Carefully lift filter chimney/funnel straight up to avoid knocking off filtered material. Leaving filter pump on can help prevent filter lifting with chimney.
7. Fold filter in half carefully to not expose any filtered material, and taking care not to touch filtered material with forceps. Use a second pair of forceps or the filter chimney if necessary to flatten/fold filter. Try and observe dominant grain of fibers, filter will fold more easily along that direction
8. Individually wrap filters in foil pouches provided by ALS using forceps, and place these pouches inside ziplock bags along with pre-printed label.
9. Label the ziplock bags with the filtered volume and immediately freeze the sample on dry ice.

Dissolved organic carbon

1. Pour some of the filtrate (water in the bottom of the flask after the POC sample has been collected on the filter) into 250-mL bottles (this will be the DOC fraction).
***Make sure there is no head space, but do not overfill to keep preservative intact.**
2. Refrigerate the DOC, do not freeze.
3. Rinse filtration apparatus with DI between stations, and wipe off and rinse with DI any material accidentally left on forceps when done.



Figure 1. Filter setup for DOC/POC

RMP Water Cruise CTR Sampling Instructions

Pump set up – see Clean Hands/Dirty Hands Procedure

Sample tubing will be pre-cleaned by Caltest, and used with a low-flow pump provided by SFEI. Use a new tubing set at the beginning of each sampling day.

Clean hands/dirty hands

- Clean hands and dirty hands must wear nitrile or vinyl gloves

Bottle Filling

- Rinse tubing with site water for at least 1 minute before sampling
- Bottles without preservative are rinsed with site water before filling – organics bottles are rinsed 1 time, all other bottles are rinsed 3 times.
- Bottles with preservative are filled directly, without overflowing. Make sure VOA vials are not filled too quickly, causing preservative to be rinsed out.
- All bottles are filled with whole (not dissolved) water, with minimal to no headspace as practicable

Bottle labels

- Printed labels are dropped inside outer bag
- Use sharpie to write site code and fraction (T or D) on label on the outer bag
- Attach label directly to bottles without bags, and write the 4 digit ID number on the lid. Wrap label on the bottle in tape in order to avoid becoming dissociated with the sample bottle.

Collection Sites

- Samples will be collected at BC10, BG20, and BA30 ONLY. Asbestos samples will not be collected at BC10 or BA30.
- A field blank will be collected prior to field sample collection at station SB070W, using DI water provided by Caltest. No field blank will be collected for Asbestos.
- No field duplicate samples will be collected

Collection order

Sample	# Bottles	Bottle Type	Preservation*
Organics – EPA 624	4	40 mL VOA vials	2 preserved with HCl; 2 unpreserved
Organics – EPA 625	4 (2 for field blank)	1 L amber glass	
Organics – Pesticides	4 (2 for field blank)	1 L amber glass	
Tributyltin	1	1 L amber glass	
Asbestos – site BG20 ONLY	1	1 L amber glass	
Total Solids	1	1 pint PE	

*Samples will be placed in coolers with ice for field storage. Hold times are listed in the 2015 RMP Water Cruise Plan.

AMS will arrange for a Caltest courier to pick up samples from the AMS office in Livermore the morning after sampling (pickup dates on 8/27, 8/28, 9/1)

RMP Water Cruise Toxicity Sampling Instructions

Pump set up – see Clean Hands/Dirty Hands Instructions

Sample tubing will be pre-cleaned by Pacific Eco-Risk, and used with a high-flow pump provided by AMS. Use a new tubing set at the beginning of each sampling day.

Clean hands/dirty hands

- Samplers should wear nitrile or vinyl gloves while handling the pump and tubing

Bottle Filling

- Rinse tubing for at least 1 minute with site water before sampling
- Rinse bottles 3 times with site water before filling
- Bottles should be left with some headspace after filling

Bottle labels

- Attach label directly to the bottles, and write the site code, analyte, and fraction on the bottle lid. Wrap label on the bottle in tape in order to avoid becoming dissociated with the sample bottle.

Additional samples

- No field blanks or duplicates will be collected
- Samples will be collected at nine sites ONLY:
 - BC10
 - BG20
 - BG30
 - BA30
 - LSB061W
 - SB067W
 - CB040W
 - SPB039W
 - SU048W

Sample Shipping

- Call Pacific EcoRisk Labs (PERL) by noon on the date of sampling
- AMS will arrange for a courier to deliver samples to PERL the morning after the date of sampling

Collection order

Sample	# Bottles	Bottle Type	Preservation
Toxicity	1	20 L carboy	

RMP Water Cruise Bisphenols Cheat Sheet

Step 1: Attach a 4L (recycled, pre-cleaned, no preservative) glass container to the “tool holder” plastic device (Figure 1):

- a) Unscrew one of the end wingnuts (careful, they can go flying!) and remove that screw. (Upper screw may be best option.)
- b) Re-insert that screw into the tool holder handle, through the sample container’s loop handle, and the outer plastic mount’s hole, and screw the wingnut back on.
- c) As a backup, you can slip a ziptie through the loop handle and around the second screw.
- d) To prevent loss of the container in the event that the tool holder or the pole break, tie a piece of string to the loop handle, and anchor it somewhere on board.
- e) NOTE: We have backup tool holders and wingnuts onboard.

Step 2: Screw “tool holder” onto the telescoping pole.

Step 3: Unscrew top and dunk container into water to fill between $\frac{1}{2}$ and $\frac{3}{4}$ full

- a) Raising the container into the air and allowing it to fall with gravity into the water may help submerge and fill the container more quickly.
- b) Torquing the pole handle towards the current (the tool handle screws on clockwise, so better if you can sample with the current flowing from your right to left, otherwise rotating the pole counterclockwise may unscrew the tool) to keep the bottle mouth pointed slightly up while dunking the bottle will help avoid pouring out already collected water.
- c) If you are on land and can’t change orientation, tape the tool holder onto the pole so that counterclockwise rotation of the pole to dunk the bottle body won’t unscrew it.

Step 4: Bring container on board, screw on top and label with Sample Site, Date, and Time.

- a) Do not brace the sampling pole against the boat rail to use as a lever, which will cause the pole to break. Slowly pull the sampling pole directly out of the water and into the boat with the non-sampling end angled upwards until the bottle can be reached.
- b) Store in coolers with ice in the field. Store refrigerated but NOT frozen for at most 3 days before shipping overnight. Do not ship on Thursdays or Fridays (no weekend shipments).

QC Sample collection

- A field blank will be collected prior to field sample collection at station SB070W, using DI water provided by BRL
- No field duplicate samples will be collected



Figure 1: 4L recycled glass container attached to "tool holder" and telescoping grab sampler. String not included.