

Cruise Plan

2002 RMP Water Cruise

July 17 – 30, 2002

A P P L I E D
marine
S C I E N C E S

1.0 INTRODUCTION

This report details plans associated with two concurrent water sampling programs being managed by AMS on behalf of the San Francisco Estuary Institute (SFEI): 1) the annual Regional Monitoring Program for Trace Substances in the San Francisco Estuary (RMP) water cruise, and 2) the second of two water sampling cruises conducted in the year 2002 as part of the newly-initiated California Toxics Rule State Implementation Program (CTR). The RMP cruise is redesigned for 2002 to adopt a randomized sampling program design in place of the twenty-six base program stations sampled previously. The CTR sampling was designed to collect samples required pursuant to the California Toxics Rule, but not part of RMP sampling, in a cost-effective fashion by integrating this collection effort with the RMP base program.

2.0 CRUISE PLAN

2.1 Objectives

All sampling will be conducted from the R/V *David Johnston*. The objectives of the sampling effort are to (delineated by relevant cruise):

2.1.1 RMP Sampling

1. Collect water samples from 33 sites for analysis of total and dissolved trace organics by Axys Analytical.
2. Collect water samples from 33 sites for analysis of total dioxins and total chlorpyrifos by CDFG (Extracts from samples collected pursuant to objective 1 above will be provided directly from Axys to CDFG – no separate samples will be collected).
3. Collect water samples from 33 sites for analysis of total and dissolved trace metals by the University of California at Santa Cruz Department of Environmental Toxicology (UCSC).
4. Collect water samples from 33 sites for analysis of ancillary parameters (dissolved organic carbon, dissolved oxygen, pH, phaeophytin, salinity, temperature, total chlorophyll-*a*, total suspended solids, dissolved phosphates, dissolved silicates, dissolved nitrate, dissolved nitrite, and dissolved ammonia) by UCSC.
5. Collect water samples from 33 sites for analysis of total and dissolved arsenic and selenium by Brooks Rand Ltd. (BRL).
6. Collect water samples from 9 sites for analysis of aquatic toxicity by Pacific Eco-Risk (PER).

7. Collect water samples from all stations where salinity is less than 5 ppt for analysis of hardness by Union Sanitary District (USD).
8. Collect real-time data over the duration of sampling for analysis of conductivity, temperature, optical back scatterance, and dissolved oxygen by AMS.
9. Document current and recent weather conditions at each site.

2.1.1 CTR Sampling

1. Collect water samples from 3 sites for analysis of total PCDD/PCDF (dioxins).
2. Collect water samples from 3 sites for analysis of total VOCs.
3. Collect water samples from 3 sites for analysis of total semi-VOCs.
4. Collect water samples from 3 sites for analysis of total Th, Be, Sb.
5. Collect water samples from 3 sites for analysis of total TBT.
6. Collect water samples from 3 sites for analysis of total CN.
7. Collect water samples from 3 sites for analysis of hardness.
8. Collect water samples from 3 sites for analysis of pH.
9. Collect water samples from 3 sites for analysis of total solids.
10. Collect a continuous profile of water column parameters conductivity, temperature, dissolved oxygen, and optical back scatterance.
11. Document current and recent weather conditions at each site.

2.2 Personnel

The scheduled personnel and work assignments for this cruise are as follows:

Name	Affiliation	Duties
Genine Scelfo	UCSC	Trace Metal Chemistry (6/17-19, 6/22-26)
Sharon Hibdon	UCSC	Trace Metal Chemistry (6/22-26)
Eric Grabowski	UCSC	Trace Metal Chemistry (6/22-26, 6/28-30)
Liz Kerin	UCSC	Trace Metal Chemistry (6/17-19)
Anna Gonzalez	UCSC	Trace Metal Chemistry (6/17-19)
Mara Ranville	UCSC	Trace Metal Chemistry (6/22-26, 6/28-30)
Kit Conaway	UCSC	Trace Metal Chemistry (6/22-26)
Alison Luengen	UCSC	Trace Metal Chemistry (6/28-30)
Sharon Squire	UCSC	Trace Metal Chemistry (6/28-30)
Daniel Oros	SFEI	Trace Organic Chemistry
Don Yee	SFEI	Trace Organic Chemistry
Paul Salop	AMS	Cruise Manager (6/17-6/19, 6/29-6/30)
Jordan Gold	AMS	Cruise Manager (6/22-6/26)
Gordon Smith	UCSC	<i>RV David Johnston</i> , Skipper

Representatives of program sponsors may be aboard the *RV David Johnston* during portions of the cruise to observe sampling operations.

Mr. Gold and Mr. Salop 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, CTD profiling, and toxicity sampling. Captain Gordon Smith will be responsible for *RV David Johnston* operation and safety. Sharon Hibdon and Genine Scelfo will supervise the trace element and ancillary sample collection activities. Drs. Yee and Oros will perform all trace organics sampling.

2.3 Cruise Schedule

The following cruise schedule assumes that an average of one hour and fifteen minutes will be required for sampling at each station (stations that are both CTR and RMP sampling sites will require approximately three hours). Sampling times will vary depending upon suspended sediment loads and other factors. 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 scheduled time, or for any other reason such as inadequate water depth, will be rescheduled later in the cruise if possible, or will be replaced with the first available site from the current 2003 sampling schedule.

Date	Time	Activity
July 16, 2002	1100-1400	Capt. Smith transits vessel <i>R/V David Johnston</i> from Redwood City to EmeryCove Marina. Trace elements sampling gear previously loaded in Santa Cruz.
	1400-1600	Mrs. Yee, Oros, and Salop mobilize trace organics sampling gear aboard vessel at EmeryCove Marina .
July 17, 2002	0700-0800	Mobilize sampling gear aboard vessel at EmeryCove Marina. Conduct safety briefing. Depart marina. Sample SPB004, SPB002, SPB001, and SPB003. Return to EmeryCove Marina and demobilize vessel. PER to retrieve toxicity samples.
July 18, 2002	0700-1600	Mobilize sampling gear aboard vessel at EmeryCove Marina. Sample BC20, CB003, and CB001. Return to EmeryCove Marina and demobilize vessel. PER to retrieve toxicity samples.
July 19, 2002	0700-1600	Mobilize sampling gear aboard vessel at EmeryCove Marina. Sample CB004, CB002, and BC10 (CTR site only). Return to EmeryCove Marina and demobilize vessel. Drs. Yee and Oros keep possession of appropriate CTR water samples for distribution to laboratories.
July 20, 2002	0800-1200	Capt. Smith transits vessel <i>R/V David Johnston</i> from EmeryCove Marina to MARFAC (USGS facility in Redwood City).
July 22, 2002	0700-1600	Mobilize sampling gear aboard vessel at MARFAC. Sample BA30 (CTR site), LSB002, and LSB006. Return to MARFAC and demobilize vessel.
July 23, 2002	0700-1600	Mobilize sampling gear aboard vessel at MARFAC. Sample C-3-0, C-1-3, LSB005, and SB006. Return to MARFAC and demobilize vessel. AMS personnel (Salop) retrieves CTR water samples for delivery / shipment to appropriate laboratories.
	1600-1700	Mrs. Oros, Yee, and Gold rebuild pumps on Axys sampler.

Date	Time	Activity
July 24, 2002	0700-1600	Mobilize gear aboard vessel at MARFAC. Sample LSB003, LSB001, LSB004, and SB002. Return to MARFAC and demobilize vessel. PER to retrieve toxicity samples.
July 25, 2002	0700-1600	Mobilize sampling gear aboard vessel at MARFAC. Sample SB004, SB001, SB008, and SB010. Return to MARFAC and demobilize vessel. PER to retrieve toxicity samples.
July 26, 2002	0700-1600	Mobilize sampling gear aboard vessel at MARFAC. Sample SB007, SB009, SB005, and SB003. Return to MARFAC and demobilize vessel. PER to retrieve toxicity samples.
July 27, 2002	0800-1700	Capt. Smith transits vessel <i>R/V David Johnston</i> from MARFAC, Redwood City to Benicia Marina.
July 29, 2002	0700-1600	Mobilize sampling gear aboard vessel at Benicia Marina. Sample SU003, SU001, SU002, and SU005 (if SU004 not able to be sampled – appears to be on sand bar). Return to Benicia Marina and demobilize vessel.
July 30, 2002	0700-1300	Mobilize sampling gear aboard vessel at Benicia Marina. Sample BG20 (RMP and CTR site) and BG30. Return to Benicia Marina and demobilize vessel. UCSC personnel retain possession of all RMP trace metals samples and transport to UCSC for analysis. Drs. Yee and Oros retain possession of appropriate CTR water samples for distribution to laboratories. AMS personnel (Gold) retain all remaining samples for delivery / shipment to appropriate laboratories.
July 31, 2002	0900-1500	Mr. Gold ships remaining samples to appropriate analytical laboratories and delivers AXYS sampling equipment to SFEI.

2.4 Lodging

Due to potential changes to cruise schedule caused by delays in sampling, AMS will be responsible for making and revising lodging arrangements for all sampling personnel for the cruise. AMS has made the following reservations for sampling crews (Captain Smith will be responsible for his own arrangements as his travel dates do not always coincide with other members of the sampling crew):

Location	Dates	Confirmation No.	Hotel
Emeryville	July 16-18	210216 UCSC 210217 UCSC	Four Points by Sheraton 1603 Powell St. Emeryville, CA (510) 547-7888
Redwood City	July 21-25	135092 UCSC 135093 UCSC 135094 SFEI 135095 AMS	Comfort Inn 1818 El Camino Real Redwood City, CA (650) 599-9636
Benicia	July 28-29	020409R315 UCSC 020409R316 UCSC 020409R317 AMS (7/29 only)	Best Western Heritage Inn 1955 East 2 nd St. Benicia, CA 94510 (707) 746-0401

2.4 Sampling Sites

2002 RMP water program targeted sampling sites and analytes are listed in Table 1. 2002 CTR sites and analytes are listed in Table 2. All potential RMP and CTR water sites, including oversample, or contingency, sites, are listed in Appendix A.

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SITECODE	LATITUDE	LONGITUDE	DEPTH (ft.)	As, Se (Diss) – BRL	As, Se (Total) – BRL	TE (Diss) – UCSC	TE (Total) – UCSC	TO - AXYS	ANCIL – UCSC	TOX - PERL	HARDNESS (Diss)	CTD	CTR SITE
BC10	37° 49.36	122° 20.96	12+										X
BC20	37° 51.81	122° 32.2	12+	1	1	1	1	1	1			1	
CB001W	37° 53.495	122° 20.968	3 to 6	1	1	1	1	1	1	1		1	
CB002W	37° 41.323	122° 16.792	12+	1	1	1	1	1	1			1	
CB003W	37° 51.073	122° 28.091	12+	1	1	1	1	1	1			1	
CB004W	37° 46.179	122° 21.018	12+	1	1	1	1	1	1			1	
LSB001W	37° 29.441	122° 6.31	3 to 6	1	1	1	1	1	1	1		1	
LSB002W	37° 28.923	122° 4.669	12+	1	1	1	1	1	1			1	
LSB003W	37° 30.128	122° 6.725	12+	1	1	1	1	1	1			1	
LSB004W	37° 29.202	122° 5.343	3 to 6	1	1	1	1	1	1	1		1	
LSB005W	37° 29.45	122° 5.717	12+	1	1	1	1	1	1			1	
LSB006W	37° 28.318	122° 3.824	12+	1	1	1	1	1	1			1	
BG20	38° 3.576	121° 48.59	12+	1	1	1	1	1	1			1	X
BG30	38° 1.4	121° 48.45	12+	1	1	1	1	1	1			1	
SPB001W	38° 5.745	122° 21.81	3 to 6	1	1	1	1	1	1	1		1	
SPB002W	38° 3.312	122° 19.054	12+	1	1	1	1	1	1			1	
SPB003W	38° 5.242	122° 26.601	3 to 6	1	1	1	1	1	1	1		1	
SPB004W	38° 0.991	122° 22.783	12+	1	1	1	1	1	1			1	
C-1-3	37° 26.08	122° 0.64	3 to 6	1	1	1	1		1			1	
C-3-0	37° 27.85	122° 1.6	3 to 6	1	1	1	1	1	1			1	
BA30	37° 33.53	122° 12.55	12+										X
SB001W	37° 35.397	122° 17.326	3 to 6	1	1	1	1	1	1	1		1	
SB002W	37° 33.699	122° 11.923	12+	1	1	1	1	1	1			1	
SB003W	37° 35.636	122° 18.813	3 to 6	1	1	1	1	1	1	1		1	
SB004W	37° 36.046	122° 13.961	6 to 12	1	1	1	1	1	1			1	
SB005W	37° 36.46	122° 14.675	6 to 12	1	1	1	1	1	1			1	
SB006W	37° 31.817	122° 9.165	12+	1	1	1	1	1	1			1	
SB007W	37° 39.939	122° 13.93	6 to 12	1	1	1	1	1	1			1	
SB008W	37° 35.99	122° 12.282	3 to 6	1	1	1	1	1	1	1		1	
SB009W	37° 40.172	122° 13.351	6 to 12	1	1	1	1	1	1			1	
SB010W	37° 33.769	122° 13.564	3 to 6	1	1	1	1	1	1	1		1	
SU001W	38° 6.183	122° 3.226	12+	1	1	1	1	1	1			1	
SU002W	38° 3.37	121° 58.484	12+	1	1	1	1	1	1			1	
SU003W	38° 3.419	122° 6.227	12+	1	1	1	1	1	1			1	
SU005W	38° 4.663	122° 3.602	6 to 12	1	1	1	1	1	1			1	
Total Samples				33	33	33	33	32	33	9	NA	33	3

Table 1. Location of 2002 RMP Water Cruise Target Sampling Sites. Numbers of samples to be collected at each site are indicated. Hardness to be collected only at sites where salinity is less than 1ppt. All analytes are for total fraction unless otherwise indicated. Analytes for CTR sites indicated in Table 2.

REGION_NAME	SITECODE	LATITUDE	LONGITUDE	DEPTH (FT)	DIOXINS - AIYS (100 l)	DIOXINS - ALTA (4 l)	VOCS - PA (50 ml)	VOCS - CCCSD (50 ml)	SEMI-VOCS - PA (1 l)	SEMI-VOCS - CCCSD (4 l)	SEMI-VOCS - CCCSD (1 l)	TE - UCSC (1 l)	TE - CALTEST (250 ml)	TBT - TOISCAN (1 l)	TBT - EBMUD (1 l)	CYANIDE - CCCSD (1 l)	HARDNESS - CCCSD (250 ml)	TOTAL SOLIDS - CCCSD (1 l)	PH - AMS	CTD - AMS
Central Bay	BC10	37° 49.36	122° 20.96	12+	1	1	3	4	3	2	2	2	1	2	3	2	2	1	3	1
Rivers	BG20	38° 3.576	121° 48.59	12+	1	1	3	4	3	2	2	2	1	2	3	2	2	1	3	1
South Bay	BA30	37° 33.53	122° 12.55	12+	1	1	3	4	3	2	2	2	1	2	3	2	2	1	3	1
Total Samples					3	3	9	12	9	6	6	6	3	6	9	6	6	3	9	3

Table 2. Location of 2002 CTR Sampling Sites. Numbers of samples to be collected at each site are indicated. All samples, with the exception of hardness, are collected for total fraction.

APPENDIX A

RMP 2002 WATER SAMPLING PROGRAM
 TARGET, OVERSAMPLE, AND CTR SITE COORDINATES

SITECODE	TARGET_LONG	TARGET_LAT	DEPTH	OVERSAMPLE	TARGET_YEAR
BC10	122.349333	37.822667	6 to 12		CTR
BC20	122.536667	37.863500	12+		1
CB001W	122.349470	37.891587	3 to 6	0	1
CB002W	122.279880	37.688717	12+	0	1
CB003W	122.468190	37.851220	12+	0	1
CB004W	122.350300	37.769651	12+	0	1
CB005W	122.340140	37.838270	6 to 12	1	2
CB006W	122.254150	37.694625	6 to 12	1	2
CB007W	122.399230	37.916713	6 to 12	1	2
CB008W	122.365760	37.633000	3 to 6	1	2
LSB001W	122.105170	37.490680	3 to 6	0	1
LSB002W	122.077820	37.482058	12+	0	1
LSB003W	122.112090	37.502129	12+	0	1
LSB004W	122.089050	37.486694	3 to 6	0	1
LSB005W	122.095300	37.490830	12+	0	1
LSB006W	122.063750	37.471969	12+	0	1
LSB007W	122.106760	37.495153	12+	1	2
LSB008W	122.081950	37.488332	12+	1	2
LSB009W	122.104860	37.495971	12+	1	2
LSB010W	122.078440	37.487550	3 to 6	1	2
LSB011W	122.118300	37.504012	12+	1	2
LSB012W	122.096370	37.486562	3 to 6	1	2
BG20	121.809833	38.059333	12+		1
BG30	121.807500	38.023333	12+		1
SPB001W	122.363500	38.095752	3 to 6	0	1
SPB002W	122.317570	38.055195	12+	0	1
SPB003W	122.443360	38.087373	3 to 6	0	1
SPB004W	122.379720	38.016511	12+	0	1
SPB005W	122.396250	38.047271	6 to 12	1	2
SPB006W	122.296940	38.026318	6 to 12	1	2

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SITECODE	TARGET_LONG	TARGET_LAT	DEPTH	OVERSAMPLE	TARGET_YEAR
SPB007W	122.446630	38.028058	6 to 12	1	2
SPB008W	122.315660	38.088247	3 to 6	1	2
C-1-3	122.010667	37.446667	6 to 12		1
C-3-0	122.026667	37.464167	6 to 12		1
BA30	122.134550	37.513900	6 to 12		CTR
SB001W	122.288780	37.589955	3 to 6	0	1
SB002W	122.198720	37.561651	12+	0	1
SB003W	122.313550	37.593928	3 to 6	0	1
SB004W	122.232700	37.600760	6 to 12	0	1
SB005W	122.244590	37.607672	6 to 12	0	1
SB006W	122.152760	37.530288	12+	0	1
SB007W	122.232180	37.665654	6 to 12	0	1
SB008W	122.204710	37.599835	3 to 6	0	1
SB009W	122.222520	37.669528	6 to 12	0	1
SB010W	122.226080	37.562822	3 to 6	0	1
SB011W	122.340410	37.596570	3 to 6	1	2
SB012W	122.200280	37.649982	3 to 6	1	2
SB013W	122.276280	37.594429	6 to 12	1	2
SB014W	122.168370	37.565103	3 to 6	1	2
SB015W	122.275300	37.625960	12+	1	2
SB016W	122.207930	37.608114	3 to 6	1	2
SB017W	122.268410	37.616040	6 to 12	1	2
SB018W	122.178420	37.596348	3 to 6	1	2
SB019W	122.273440	37.636606	12+	1	2
SB020W	122.229000	37.588484	6 to 12	1	2
SU001W	122.053780	38.103051	12+	0	1
SU002W	121.974740	38.056166	12+	0	1
SU003W	122.103790	38.056985	12+	0	1
SU004W	122.047360	38.057639	6 to 12	0	1
SU005W	122.060030	38.077716	6 to 12	0	2
SU006W	121.943550	38.058906	12+	1	2
SU007W	122.083560	38.073909	6 to 12	1	2
SU008W	122.016090	38.059335	6 to 12	1	2
SU009W	122.064340	38.081769	12+	0	3