Cruise Report

2007 RMP Water Cruise

August 7-16, 2007

APPLIED marine SCIENCES
1.0 INTRODUCTION

This report details activities associated with the annual Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) dry season 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 “spine of the Estuary” stations sampled previously. The 2007 annual sampling continued implementation of the randomized strategy, but the number of sites sampled dropped to twenty-two stations.

2.0 CRUISE REPORT

2.1 Objectives

All sampling was conducted from the R/V Endeavor. The objectives of the sampling effort were to:

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 total samples from 22 sites for on-board (field meter) measurement of DO, pH, salinity, conductivity, temperature by SFEI.
3. Water samples from 9 sites for analysis of aquatic toxicity by Pacific Eco-risk (PER).

Unfiltered water samples from 22 (and 2 rep and 1 field blank) sites for Brooks Rand, Ltd. (BRL) for analysis of total:
4. Trace metals (Ag, Al, As, Cd, Co, Cu, Ni, Pb, Zn) by ICP-MS
5. Se by HG-AAS
6. Hg by CVAFS
7. MeHg by ethylation/CVAFS
8. Mn by ICP-MS
9. Fe by colorimetric analysis
10. Whole water samples from 22 (and 2 rep) sites for analysis of SSC by EBMUD
11. Whole water 8L samples from 2 sites for analysis of PAHs by AXYS
12. Whole water 4L samples from 2 sites for analysis of PCBs by AXYS

Unfiltered water samples from 9 sites for intercalibration with the UC Santa Cruz Department of Environmental Toxicology (UCSC) for analysis of total:
13. Trace metals
14. Total Hg
15. MeHg
16. Ancillary measures- particulate organic carbon (POC), DO, pH, phaeophytin, salinity, conductivity, temperature, total chlorophyll-a, and SSC
17. Water particulate (filter) samples from 22 (and 2 rep and 1 field blank) sites for trace organics analysis by AXYS Analytical (150-liter solid phase extraction) (19 to be analyzed as total, 3 for particulate; 2 duplicates particulate; blank total)
18. Particulate (filter) samples from 22 (and 2 rep) sites for POC analysis by AMS Texas (AMS-TX)
19. Particulate (filter) samples from 22 (and 2 rep) sites for pigment (chlorophyll-a, phaeophytin) analysis by EBMUD

20. Water dissolved (XAD) samples from 22 (and 2 rep and 1 field blank) sites (19 for total, 3 for dissolved; 2 duplicate dissolved; blank total) for trace organics analysis by AXYS Analytical (100-liter solid phase extraction)
21. Water dissolved samples from 22(+2rep) sites for dissolved organic carbon (DOC) analysis by AMS-TX

Filtered (using precleaned 0.45µm cartridge filter) water samples from 22 (and 2 rep and 1 field blank) sites for Brooks Rand, Ltd. (BRL) for analysis of dissolved:
22. Trace metals (Ag, Al, As, Cd, Co, Cu, Ni, Pb, Zn) by ICP-MS
23. Se by HG-AAS
24. Hg by CVAFS
25. MeHg by ethylation/CVAFS
26. Mn by ICP-MS
27. Fe by colorimetric analysis

Filtered (using same 0.45µm cartridge as above for BRL) water samples from 22 (and 2 rep) sites for EBMUD for analysis of dissolved:
28. Ammonia
29. Nitrate/nitrite
30. Phosphate
31. Silica
32. Salinity (with Hardness if <5 ppt)

Filtered water samples from 9 sites for intercalibration with the UC Santa Cruz Department of Environmental Toxicology (UCSC) for analysis of dissolved:
33. Trace metals
34. Total Hg
35. MeHg
36. Ancillary parameters (DOC, salinity, dissolved phosphates, dissolved silicates, dissolved nitrate, dissolved nitrite, and dissolved ammonia)

37. Document current and recent weather conditions at each site.

2.2 Personnel

The personnel and work assignments for this cruise are shown in Table 1.
Table 1. Personnel for 2007 RMP Water Cruise

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Duties</th>
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<tbody>
<tr>
<td>Don Yee</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/7-8/10, 8/13-8/14, 8/16</td>
</tr>
<tr>
<td>Amy Franz</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/7-8/8, 8/16</td>
</tr>
<tr>
<td>Susan Klosterhaus</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/7-8/8, 8/16</td>
</tr>
<tr>
<td>John Oram</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/7</td>
</tr>
<tr>
<td>Meredith Williams</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/8</td>
</tr>
<tr>
<td>Michelle Lent</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/9</td>
</tr>
<tr>
<td>Meg Sedlak</td>
<td>SFEI</td>
<td>Trace Metal / Organic Chemistry, 8/9-8/10, 8/13-8/16</td>
</tr>
<tr>
<td>Katie Harrold</td>
<td>SFEI</td>
<td>Trace Metal Chemistry, 8/13, 8/15-8/16</td>
</tr>
<tr>
<td>Jennifer Hunt</td>
<td>SFEI</td>
<td>Trace Organic Chemistry, 8/7, 8/9-8/10, 8/14-8/16</td>
</tr>
<tr>
<td>Aroon Melwani</td>
<td>SFEI</td>
<td>Trace Organic Chemistry, 8/8</td>
</tr>
<tr>
<td>Genine Scelfo</td>
<td>UCSC</td>
<td>Trace Metal Intercal, 8/13-8/15</td>
</tr>
<tr>
<td>Sharon Hibdon</td>
<td>UCSC</td>
<td>Trace Metal Intercal, 8/13-8/15</td>
</tr>
<tr>
<td>Tony Parenti</td>
<td>UCSC</td>
<td>Trace Metal Intercal, 8/13-8/15</td>
</tr>
<tr>
<td>Norman Forsberg</td>
<td>UCSC</td>
<td>Trace Metal Intercal, 8/13-8/15</td>
</tr>
<tr>
<td>Paul Salop</td>
<td>AMS</td>
<td>Cruise Manager 8/7-8/8, 8/13, 8/15; Logistics 8/9, 8/17; Trace Metal Chemistry 8/10</td>
</tr>
<tr>
<td>Bryan Bemis</td>
<td>AMS</td>
<td>Cruise Manager 8/9-8/10,</td>
</tr>
<tr>
<td>Clare Dominik</td>
<td>AMS</td>
<td>Cruise Manager 8/14, 8/16</td>
</tr>
<tr>
<td>Dov Cammack</td>
<td>AMS</td>
<td>Logistics, 8/8, 8/15</td>
</tr>
<tr>
<td>Jay Johnson</td>
<td>AMS</td>
<td>Logistics, 8/10</td>
</tr>
<tr>
<td>Nick Sakata</td>
<td>USBR</td>
<td>RV Endeavor, Skipper</td>
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2.3 Sampling Activities

Sampling activities for the 2007 RMP Water Cruise are shown in Table 2.

Table 2. Sampling Activities for 2007 RMP Water Cruise

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 7, 2007</td>
<td>0745-0942</td>
<td>SFEI and AMS personnel mobilized all sampling gear aboard vessel R/V Endeavor at Martinez Marina, Martinez. Conducted safety briefing. Departed for BG20 site.</td>
</tr>
<tr>
<td></td>
<td>1053-1415</td>
<td>Sampled BG20, departed for BG30.</td>
</tr>
<tr>
<td></td>
<td>1441-1647</td>
<td>Sampled BG30, departed for Martinez Marina.</td>
</tr>
<tr>
<td></td>
<td>1807-1815</td>
<td>Arrived Martinez Marina, demobilized vessel. SFEI personnel transported whole water PAH and PCB samples to SFEI for shipment to AXYS. All remaining samples left on-board vessel overnight.</td>
</tr>
<tr>
<td>August 8, 2007</td>
<td>0715-0749</td>
<td>Mobilized sampling gear aboard vessel at Martinez Marina. Ms. Cammack retrieved 8/7 toxicity samples for delivery to PER and trace metals samples for delivery to AMS. Conducted safety briefing. Departed for SU024W.</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Activity</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>August 7, 2007</td>
<td>0832-1046</td>
<td>Sampled SU024W, departed for SU025W.</td>
</tr>
<tr>
<td></td>
<td>1111-1306</td>
<td>Sampled SU025W, departed for SU023W.</td>
</tr>
<tr>
<td></td>
<td>1319-1522</td>
<td>Sampled SU023W, departed for Martinez Marina.</td>
</tr>
<tr>
<td></td>
<td>1558-1605</td>
<td>Arrived Martinez Marina, demobilized vessel. Mr. Salop retrieved toxicity samples for 8/9 delivery to PER and trace metals samples for delivery to AMS. All remaining samples left on-board vessel overnight.</td>
</tr>
<tr>
<td>August 9, 2007</td>
<td>0700-0728</td>
<td>Mobilized sampling gear aboard vessel at Martinez Marina. Conducted safety briefing. Departed for SPB022W.</td>
</tr>
<tr>
<td></td>
<td>0815-1034</td>
<td>Sampled SPB022W, departed for SPB021W.</td>
</tr>
<tr>
<td></td>
<td>1105-1302</td>
<td>Sampled SPB021W, departed for SPB023W.</td>
</tr>
<tr>
<td></td>
<td>1347-1546</td>
<td>Sampled SPB023W, departed for Emeryville Marina.</td>
</tr>
<tr>
<td></td>
<td>1703-1745</td>
<td>Arrived Martinez Marina, demobilized vessel. Mr. Salop transported sampling personnel to Martinez Marina to retrieve personal vehicles. All samples left on-board vessel overnight.</td>
</tr>
<tr>
<td>August 10, 2007</td>
<td>0730-0758</td>
<td>Mobilized sampling gear aboard vessel at Emeryville Marina. Mr. Johnson retrieved 8/9 toxicity samples for delivery to PER and all trace metals samples for delivery to AMS. Conducted safety briefing. Departed for BC20.</td>
</tr>
<tr>
<td></td>
<td>0929-1145</td>
<td>Sampled BC20, departed for CB023W.</td>
</tr>
<tr>
<td></td>
<td>1304-1607</td>
<td>Sampled CB023W, departed for Emeryville Marina.</td>
</tr>
<tr>
<td></td>
<td>1635-1710</td>
<td>Arrived Emeryville Marina, demobilized vessel. SFEI personnel transported whole water PAH and PCB samples to SFEI for shipment to AXYS. Mr. Bemis transported all remaining trace metals and trace organics samples to AMS.</td>
</tr>
<tr>
<td>August 12, 2007</td>
<td>1400-1540</td>
<td>UCSC personnel mobilized trace elements intercalibration sampling gear aboard vessel R/V Endeavor at Emeryville Marina.</td>
</tr>
<tr>
<td>August 13, 2007</td>
<td>0730-0815</td>
<td>Mobilized sampling gear aboard vessel at Emeryville Marina. Departed for CB021W.</td>
</tr>
<tr>
<td></td>
<td>0836-1102</td>
<td>Sampled CB021W, departed for BC10.</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Activity</td>
</tr>
<tr>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------------------------------------------</td>
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<tr>
<td>August 7-16, 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1116-1323</td>
<td></td>
<td>Sampled BC10, departed for CB022W.</td>
</tr>
<tr>
<td>1412-1620</td>
<td></td>
<td>Sampled CB022W, departed for Redwood City Marina, Redwood City.</td>
</tr>
<tr>
<td>1736-1945</td>
<td></td>
<td>Arrived Redwood City Marina, demobilized vessel. Mr. Salop retained</td>
</tr>
<tr>
<td></td>
<td></td>
<td>toxicity samples for 8/14 delivery to PER. Ms. Dominik retrieved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>trace metals samples for transport to AMS. Ms. Dominik transfers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sampling personnel to Emeryville Marina to retrieve personal vehicles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and transfer to Redwood City.</td>
</tr>
<tr>
<td>August 14, 2007</td>
<td>0730-0750</td>
<td>Mobilized sampling gear aboard vessel at Redwood City Marina. Conducted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>safety briefing. Departed for SB049W.</td>
</tr>
<tr>
<td></td>
<td>0837-1126</td>
<td>Sampled SB049W, departed for SB047W.</td>
</tr>
<tr>
<td></td>
<td>1155-1400</td>
<td>Sampled SB047W, departed for SB048W.</td>
</tr>
<tr>
<td></td>
<td>1432-1645</td>
<td>Sampled SB048W, departed for Redwood City Marina.</td>
</tr>
<tr>
<td></td>
<td>1716-1730</td>
<td>Arrived Redwood City Marina, demobilized vessel.</td>
</tr>
<tr>
<td>August 15, 2007</td>
<td>0730-0808</td>
<td>Mobilized sampling gear aboard vessel at Redwood City Marina. Ms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cammack retrieved 8/14 toxicity samples for delivery to PER and trace</td>
</tr>
<tr>
<td></td>
<td></td>
<td>metals samples for delivery to AMS. Departed for LSB029W.</td>
</tr>
<tr>
<td></td>
<td>0857-1108</td>
<td>Sampled LSB029W, departed for LSB028W.</td>
</tr>
<tr>
<td></td>
<td>1119-1325</td>
<td>Sampled LSB028W, departed for LSB030W.</td>
</tr>
<tr>
<td></td>
<td>1347-1551</td>
<td>Sampled LSB030W, departed for Redwood City Marina.</td>
</tr>
<tr>
<td></td>
<td>1648-1721</td>
<td>Arrived Redwood City Marina, demobilized vessel. UCSC personnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>off-loaded all trace metals intercalibration sampling equipment and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>samples. Mr. Salop retained all remaining trace metals samples for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>transfer to AMS.</td>
</tr>
<tr>
<td>August 16, 2007</td>
<td>0725-0745</td>
<td>Mobilized sampling gear aboard vessel at Redwood City Marina. Departed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for BA30.</td>
</tr>
<tr>
<td></td>
<td>0820-1125</td>
<td>Sampled BA30, departed for LSB027W.</td>
</tr>
<tr>
<td></td>
<td>1135-1336</td>
<td>Sampled LSB027W, departed for LSB032W, replacement site for LSB031W.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(LSB031W was located within a restricted area associated with a buried</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pipeline area for which wind and</td>
</tr>
</tbody>
</table>
### 2.4 Discussion

All cruise objectives were met with the following exceptions:

- The field duplicate for analysis of chlorophyll/phaeophytin at site CB021S was broken in cold storage at AMS and made unusable.
- The nitrate/nitrite sample collected at site SB047W was mistakenly refrigerated in the field instead of quick-frozen on dry ice. This oversight was not discovered until approximately 18 hours later, when it was frozen and the laboratory notified.

There were multiple changes to the cruise plan incorporated into sampling operations over the course of the field work:

- Additional intercalibration samples not identified in the cruise plan were added mid-cruise in an attempt to isolate the sample collection process from the sample analysis process within the intercalibration exercise. At site LSB029W, dissolved fraction field samples for analysis of (1) trace metals, (2) Hg, (3) meHg, and (4) manganese and iron, were collected by UCSC personnel for analysis by BRL.
- Samples for analysis of PAHs and PCBs were added at two sites not listed in the cruise plan, LSB029W and BA30.
- Field duplicates for analysis of all trace metal samples, both total and dissolved fraction, originally identified to be collected at LSB029W were instead collected at SB049W to minimize the sample volume that was being collected at LSB029W, which was also a duplicate site for POC.

Sample containers supplied for collection of monomethyl mercury (meHg) were delivered to AMS containing 1-2 ml 50% HCl as the preservative. BRL notified SFEI midway through the cruise that these containers should have contained 0.2% H₂SO₄ as the preservative instead. To investigate the effect of the preservation method, AMS was requested to send total Hg and meHg samples collected 8/16/07 (total and dissolved fraction samples from sites BA30, LSB027W, and LSB032W) via overnight delivery for BRL to preserve a subsample of the total Hg aliquot with H₂SO₄, analyze for meHg, and compare with the results for the meHg aliquot preserved with HCl.
Site LSB031W was unable to be sampled due to its location within a restricted zone around a buried pipeline and railroad bridge. Wind and current conditions did not allow safe anchorage in the area around the target coordinates and the site was replaced with LSB032W.

At four sites, BA30, BG20, CB023W, and LSB029W, separate whole-water samples were collected for analysis of PAHs and PCBs. Due to relatively short sample hold times, space requirements, and attempts to minimize in-field breakage, all whole water samples were transferred to SFEI the day of sampling for shipment to the laboratory.

The sample ID system for all samples was as follows:

\[ \text{RMP07WC}_{-}\text{XXXX} \]

Where:

- \text{RMP} = \text{Project}
- \text{07} = \text{Cruise Year}
- \text{WC} = \text{Matrix (Water Cruise)}
- \text{XXXX} = \text{Unique ID number}

Due to equipment malfunctions, no CTD data was collected at sites SPB021W and LSB028W. This was likely due to high suspended sediment in the water column clogging pump and preventing activation. The CTD intake was thoroughly cleaned after both stations and CTD worked satisfactorily at all other stations.

### 2.5 Sampling Sites

2007 RMP Water Cruise sampling sites are listed in Table 3. All samples collected are listed in Table 4. Sample containers and sample handling procedures are summarized in Table 5. Weather conditions encountered at time of sampling are shown in Table 6. Snapshot of water quality parameters recorded from SFEI YSI meter are shown in Table 7.
**Table 3. 2007 RMP Water Cruise Site Coordinates and Water Depth.** Sample depths are not corrected for tidal action.

<table>
<thead>
<tr>
<th>Site Code</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Depth (m)</th>
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<tbody>
<tr>
<td></td>
<td>Target</td>
<td>Actual</td>
<td>Target</td>
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<tr>
<td>BA30</td>
<td>37.51375</td>
<td>37.51373</td>
<td>-122.13462</td>
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<td>BC10</td>
<td>37.82158</td>
<td>37.82250</td>
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<td>37.79150</td>
<td>37.79307</td>
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<tr>
<td>BG20</td>
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<td>BG30</td>
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<td>LSB029W</td>
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<td>LSB031W</td>
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<td>SU025W</td>
<td>38.10777</td>
<td>38.10725</td>
<td>-122.05313</td>
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Table 4. 2007 RMP Water Samples Collected by Site.

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<tr>
<th>SITECODE</th>
<th>CTD-AMS</th>
<th>pH,cond,Temp.-SEFI</th>
<th>Toxicity - PER</th>
<th>Trace Elements, T - BRL</th>
<th>Hg, T - BRL</th>
<th>mgHg, T - BRL</th>
<th>Fe/Mn, T - BRL</th>
<th>POC, Trace Elements, T - UCSC</th>
<th>Hg, T - UCSC</th>
<th>mgHg, T - UCSC</th>
<th>Organics, P(Filter)</th>
<th>Organics, D(AXYS)</th>
<th>DOC – AMX-TX</th>
<th>Trace Elements, D - BRL</th>
<th>CTC, D - BRL</th>
<th>Se, D - BRL</th>
<th>Hg, D - BRL</th>
<th>mgHg, D - BRL</th>
<th>Fe, Mn, D - BRL</th>
<th>Ammonia, D - EBMUD</th>
<th>Nitrate/nitrite, D - EBMUD</th>
<th>Orthophosphate, D - EBMUD</th>
<th>Silica, D - EBMUD</th>
<th>Salinity, Hardness</th>
<th>Trace Elements, D - UCSC</th>
<th>Hg, D - UCSC</th>
<th>mgHg, D - UCSC</th>
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1 FB collected
2 FD collected
3 Sample collected by UCSC for BRL analysis
4 Blind sample collected
**Table 5. Containers and Sample Handling for RMP Water Cruise.** This list does not include UCSC intercalibration samples. (T=total, P=particulate, D=dissolved)

<table>
<thead>
<tr>
<th>Sample</th>
<th>T/P/D</th>
<th>Lab</th>
<th>Containers per station</th>
<th>Handling Requirements</th>
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<tbody>
<tr>
<td>DO, cond, pH, temp, OBS</td>
<td>none</td>
<td>AMS</td>
<td>None</td>
<td>CTD deployment</td>
</tr>
<tr>
<td>DO, cond, pH, temp, sal</td>
<td>T</td>
<td>SFEI</td>
<td>None</td>
<td>Grab measurement recorded on board vessel</td>
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<tr>
<td>Toxicity</td>
<td>T</td>
<td>PER</td>
<td>2x 10L</td>
<td>Placed on wet ice, delivered to lab within 24 hours</td>
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<tr>
<td>Trace Elements (Ag, As, Cd, Co, Ni, Pb, Zn)</td>
<td>T</td>
<td>BRL</td>
<td>3x 1L Acid-cleaned</td>
<td>Refrigerated</td>
</tr>
<tr>
<td>Se</td>
<td>T</td>
<td>BRL</td>
<td>500 mL HDPE</td>
<td>Refrigerated</td>
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<tr>
<td>MeHg</td>
<td>T</td>
<td>BRL</td>
<td>250 ml FPE</td>
<td>No rinse performed; has 1-2 ml 50% HCl, 4C</td>
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<tr>
<td>Hg</td>
<td>T</td>
<td>BRL</td>
<td>250 ml FPE</td>
<td>Refrigerated</td>
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<tr>
<td>Trace Elements (Mn, Fe)</td>
<td>T</td>
<td>BRL</td>
<td>250 mL Acid-cleaned HDPE</td>
<td>Refrigerated</td>
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<tr>
<td>PAH, whole</td>
<td>T</td>
<td>Axys</td>
<td>2x 4L glass</td>
<td>No rinse performed; stored on ice at 4C</td>
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<tr>
<td>PCB, whole</td>
<td>T</td>
<td>Axys</td>
<td>4L glass</td>
<td>No rinse performed; stored on ice at 4C</td>
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<tr>
<td>SSC</td>
<td>T</td>
<td>EBMUD</td>
<td>1L PE</td>
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<tr>
<td>Trace Organics</td>
<td>P</td>
<td>Axys</td>
<td>Filters</td>
<td>150 L pumped; refrigerated</td>
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<td>POC</td>
<td>P</td>
<td>Axys-TX</td>
<td>40 ml glass</td>
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<td>Chlorophyll, phaeophytin (pigments)</td>
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<td>EBMUD</td>
<td>40 ml amber vial</td>
<td>Refrigerated</td>
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<tr>
<td>Trace Organics</td>
<td>D</td>
<td>Axys</td>
<td>Columns</td>
<td>100 L pumped, refrigerated</td>
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<tr>
<td>DOC</td>
<td>D</td>
<td>EBMUD</td>
<td>40 ml glass</td>
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<tr>
<td>Trace Elements (Ag, As, Cd, Co, Ni, Pb, Zn)</td>
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<td>3x 1L Acid-cleaned HDPE</td>
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<tr>
<td>Se</td>
<td>D</td>
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<td>500 mL HDPE</td>
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<tr>
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<td>BRL</td>
<td>250 ml FPE</td>
<td>No rinse performed; has 1-2 ml 50% HCl, 4C</td>
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<td>Salinity, Hardness (&lt;5ppt)</td>
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<td>Ammonia, D</td>
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<td>1L PE</td>
<td>No rinse performed, has H2SO4, 4C</td>
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<td>Nitrate, nitrite</td>
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<td>125 ml PE</td>
<td>Quick Frozen on dry ice</td>
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<td>500 ml PE</td>
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<td>Silica</td>
<td>D</td>
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<td>1L PE</td>
<td>No rinse performed, has HNO3, 4C</td>
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<th>Sea State</th>
<th>Tide Stage &amp; Current (kts)</th>
<th>Wind Speed (kts)</th>
<th>Wind Dir.</th>
<th>Cloud Cover, % Overcast</th>
<th>Comments</th>
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<td>BA30</td>
<td>&lt;1’</td>
<td>Ebb, 1/2 kt</td>
<td>10</td>
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<td>W</td>
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<td>4’ swell</td>
<td>1/4 kt N Calm</td>
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<td>Slack</td>
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<td>W</td>
<td>0%, low haze</td>
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<td>SW</td>
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### Table 7. Recorded Water Quality Parameters

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<th>pH</th>
<th>Salinity (ppt)</th>
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**NOTES:**
All results reported from SFEI YSI meter. There was consistent disagreement between results recorded by SFEI and UCSC meters at nine intercal sites for DO.