

**Cruise Plan**  
**1998 Regional Monitoring Program**  
**Sediment Sampling Cruise #16**  
**February 5-6, 9-11, 1998**

**Objectives**

The objectives of this cruise are:

1. Collect sediment samples at 26 stations for the analysis of:
  - Trace metals and trace organics by BADA
  - As, Hg, Se by BRL
  - Grain size, TOC and total nitrogen by UCSC
  - Pore water pH and ammonia by AMS
  - Pore water sulfides by MPSL
  - Foraminifera by USGS
  - CTD profiles by AMS
2. Collect sediment samples at 13 stations for the analysis of:
  - Toxicity by MPSL
3. Collect sediment samples at nine stations for the analysis of:
  - Benthic infauna by CCSF
4. Collect sediment samples at five stations for the intercalibration analysis of:
  - Trace elements by UCSC
  - Trace organics by GERG
5. Collect sediment samples at three stations for the intercalibration analysis of:
  - As, Hg, Se by BADA
6. Collect sediment samples at one "blind" station for the intercalibration analysis of:
  - Trace metals and trace organics by BADA

A list of samples to be collected at each station may be found in Appendix A.

**Personnel**

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

<u>Name</u>	<u>Affiliation</u>	<u>Duties</u>
David Bell	AMS	Cruise Manager, sediment chemistry, pH; CTD, watershed sampling
Michael Kellogg	CCSF	Benthic samples
Paul Salop	AMS	Sample collection, watershed sampling and CTD
Gordon Smith	UCSC	Vessel skipper
TBA	SFEI	Sample collection
TBA	MPSL	Sample collection of surface cores at select stations

Mr. Bell will oversee sampling operations, compliance with cruise plan and quality assurance guidelines, maintenance the sample field log and chain-of-custody procedures, and operation of the CTD. Mr. Kellogg will oversee benthic sampling and sample processing. Mr. Smith will be responsible for vessel operation and safety. Mr. Salop and personnel from SFEI and MPSL will assist in sample collections and sample processing.

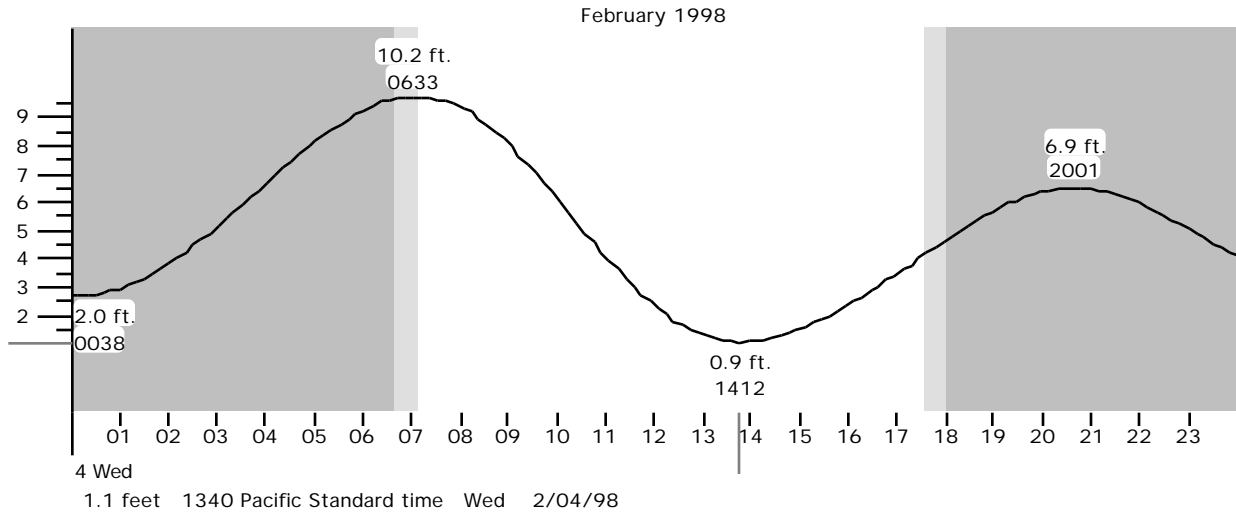
## Cruise Schedule

The following cruise schedule assumes that benthic sampling will require approximately 0.25 hours/grab on site, and that the vessel will be able to proceed at approximately 7 knots during processing of benthic samples. Actual arrival times will depend on conditions on the day of sampling. AMS will notify lab personnel when the vessel will arrive at dock for sample pick up.

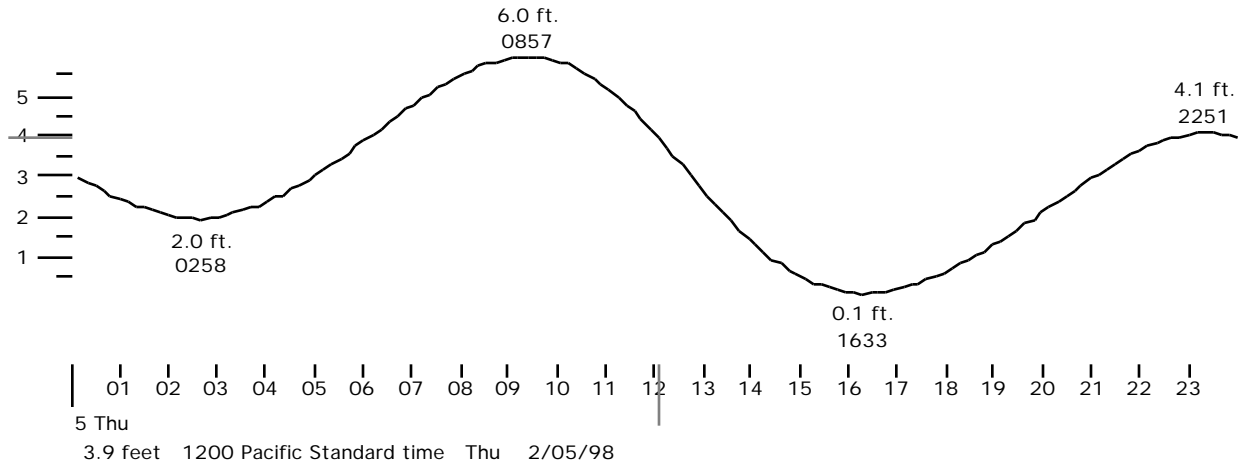
<u>Date</u>	<u>Activity</u>	<u>Time</u>
Day 1 February 4, 1998	Bell and Salop sample Standish Dam and Guadalupe River. High tide at Guadalupe Slough 10.2 ft @ 0633, low tide 0.9 ft @ 1412 (Figure 1).	1300-1700
Day 2 February 5, 1998	Mobilize gear on vessel <i>R/V David Johnston</i> , conduct safety briefing at Martinez Marina. Depart for Grizzly Bay.	0630-0715
	Sample at Grizzly Bay, Honker Bay, Sacramento River, San Joaquin River, and Pacheco Creek. High tide at Point Buckler 6.0 ft @ 0857, low tide 0.1 ft @ 1633 (Figure 2). Drop off crew at Martinez Marina and shuttle cars to Vallejo. Vessel transits to Vallejo Marina.	0715-1630
	Demobilize gear at Vallejo Marina. Load benthic sampling gear onto vessel. All chemistry samples stored on ice on vessel.	1630-1730
Day 3 February 6, 1998	Mobilize gear on vessel <i>R/V David Johnston</i> , conduct safety briefing at Vallejo Marina. Depart for Napa River.	0600-0630
	Sample at Napa River, Davis Point, Petaluma River, San Pablo Bay, Pinole Point and Red Rock. High tide at Petaluma River 6.7 ft @ 0836, low tide 0.0 @ 1620 (Figure 3). Transit to Emeryville Marina.	0630-1700
	Demobilize gear at Emeryville Marina. Toxicity, pore water, trace metal and organic intercalibration samples for UCSC and GERG will be stored on ice and left on vessel. As, Hg, Se samples for BRL will be transferred to AMS for shipment on 2/9. Trace metal and organic samples for BADA will be picked up at the vessel by a BADA representative. Call Patti Tenbrook at EBMUD (510-287-1427) for instructions. Benthic samples will be picked up by CCSF. Crew will shuttle back to Vallejo to retrieve cars.	1700-1900

<u>Date</u>	<u>Activity</u>	<u>Time</u>
Day 4 February 9, 1998	Mobilize gear on vessel <i>R/V David Johnston</i> , conduct safety briefing at Emeryville Marina. Depart for Point Isabel.	0700
	Sample at Point Isabel, Richardson Bay, Horseshoe Bay, and Yerba Buena Island. High tide at the Golden Gate 6.3 ft @ 0949, low tide -0.5 ft @ 1625 (Figure 4). Transit to Emeryville.	0730–1500
	Demobilize gear at Emeryville Marina. All chemistry and toxicity samples stored on ice on vessel.	1500–1600
Day 5 February 10, 1998	Mobilize gear on vessel <i>R/V David Johnston</i> , conduct safety briefing at Emeryville Marina. Depart for Alameda.	0700
	Sample at Alameda, Oyster Point, San Bruno Shoal, Redwood Creek, and South Bay. High tide at Oyster Point 7.6 ft @ 1112, low tide -0.4 ft @ 1801 (Figure 5). Transit to Redwood City USGS dock.	0800–1700
	Demobilize gear at Redwood City. Unload benthic sampling gear. Benthic samples will be picked up by CCSF. All chemistry and toxicity samples stored on ice on vessel.	1700-1800
Day 6 February 11, 1998	Mobilize gear on vessel <i>R/V David Johnston</i> , conduct safety briefing at Redwood City USGS dock. Depart for Dumbarton Bridge.	0700
	Sample at Dumbarton Bridge, San Jose, Sunnyvale and Coyote Creek. High tide at Guadalupe Slough 9.9 ft @ 1225, low tide -0.3 ft @ 1947 (Figure 6). Transit to Emeryville.	0830–1700
	Demobilize gear at Emeryville Marina. Toxicity and pore water samples from days 3-5 will be picked up at the vessel by a representative from MPSL. All trace metal and organic intercalibration samples for UCSC and GERG will be transferred to AMS for shipment on 2/16. Trace metal samples for Brooks-Rand will be transferred to AMS for shipment on 2/16. Trace metal and organic samples for BADA will be picked up at the vessel by a BADA representative.	1700–1800

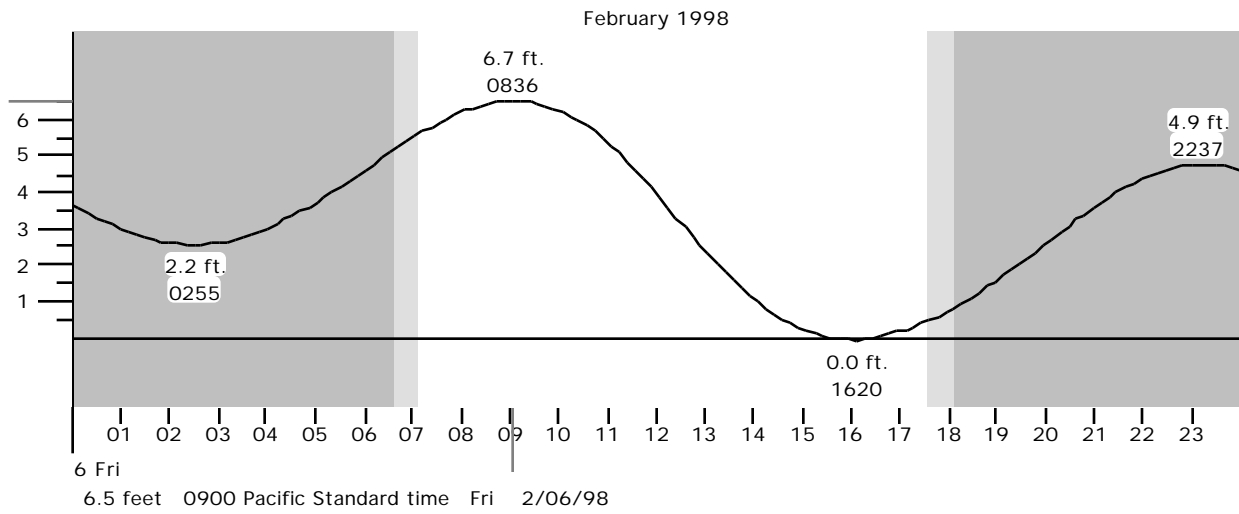
Upper Guadalupe Slough, San Francisco Bay, CALIFORNIA Latitude: 37° 26' N Longitude: 122° 00' W



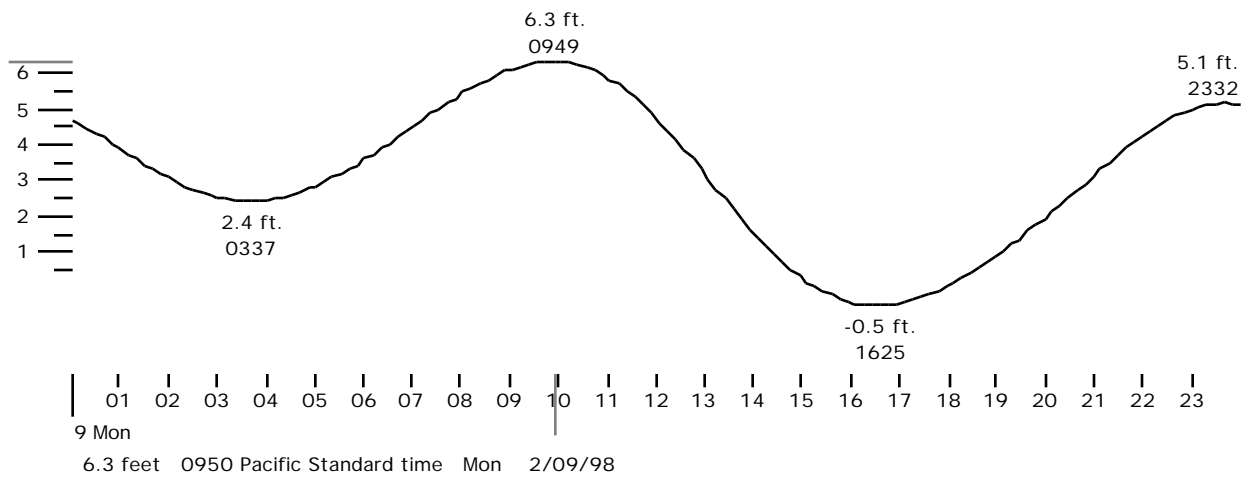
Point Buckler, Suisun Bay, CALIFORNIA Latitude: 38° 06' N Longitude: 122° 01' W



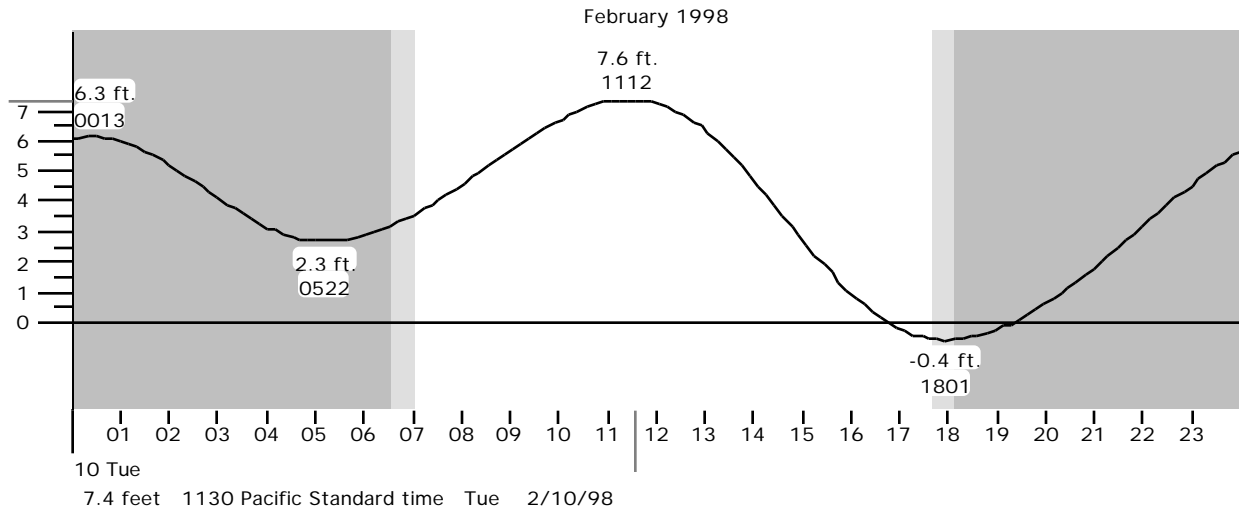
Petaluma River entrance, San Pablo Bay, CALIFORNIA Latitude: 38° 07' N Longitude: 122° 30' W



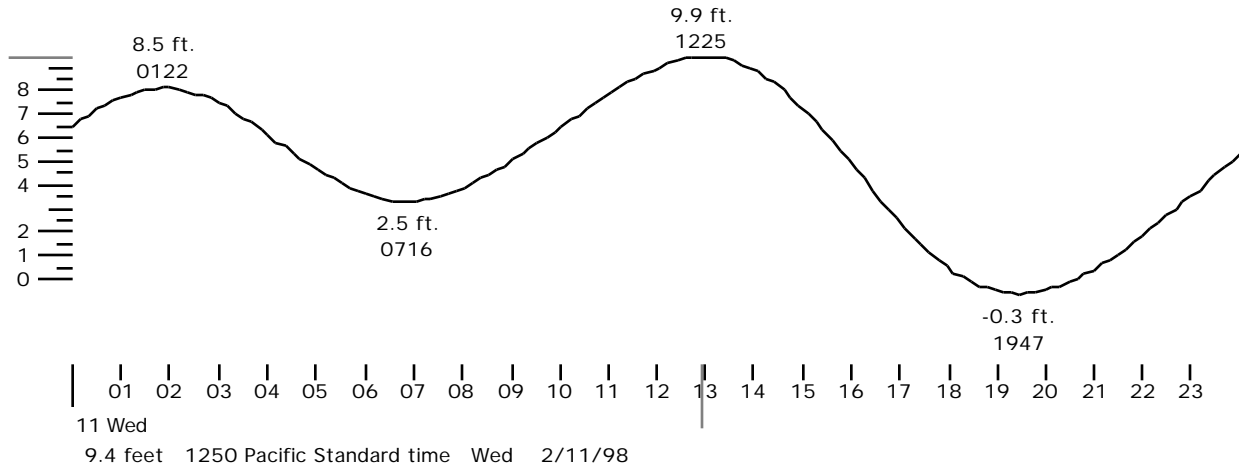
SAN FRANCISCO (Golden Gate), San Francisco Bay, CALIFORNIA Latitude: 37° 48' N Longitude: 122° 28' W



Oyster Point Marina, San Francisco Bay, CALIFORNIA Latitude: 37° 40' N Longitude: 122° 23' W



Upper Guadalupe Slough, San Francisco Bay, CALIFORNIA Latitude: 37° 26' N Longitude: 122° 00' W



## Lodging

Each sampling team will be responsible for arranging their own lodging. The following are suggested facilities:

<u>Dates</u>	<u>Location</u>	<u>Hotel</u>
February 4	Martinez	John Muir Inn 445 Muir Station Road Martinez, CA (510) 229-1010
February 5	Vallejo	Ramada Inn 1000 Admiral Callaghan Ln. Vallejo, CA (707) 643-2700
February 8-9	Emeryville	Holiday Inn - Bay Bridge 1800 Powell Street Emeryville, CA (510) 658-9300
February 10	Redwood City	Comfort Inn 1818 El Camino Real Redwood City (415)599-9636

## Sampling Procedures

Prior to sampling, all equipment will be thoroughly cleaned. The cleaning process will begin with a thorough washing with Alconox® detergent. The scoops and stirrers will be soaked in detergent for two days before washing. Following the detergent wash, the grab and compositing bucket will be rinsed with tap water, followed by three rinses with de-ionized water, a rinse with 10% HCl, and a rinse with petroleum ether. The utensils will be rinsed three times with de-ionized water, soaked three days with 10% HCl, and rinsed with petroleum ether. Cleaned utensils will be sealed in Ziploc® bags until used in the field.

Sampling procedures will ensure that samples are collected from a localized area at each sites to reduce uncontrolled temporal and spatial variation. In the field, the vessel will be anchored at the coordinates listed in Table 1. The coordinates will be checked throughout sampling to ensure that the anchor has not dragged. Coordinates will be recorded for two grabs from each site.

The first sampling operation at each site will be the collection of the benthic sample with the Ponar grab. After the required benthic samples have been collected, the Ponar grab will be replaced with the Van Veen grab for collection of chemistry samples. After being sieved, benthic samples will be preserved in buffered 10% formalin/seawater.

When the Van Veen grab is brought on deck, sediment will be carefully removed for compositing. After any overlying water has been siphoned off, a small amount of sediment will be removed using a dropper and placed into a jar with algal culture medium. Then, a single scoop will be taken from each grab for foraminifera sampling and cores will be removed for measurement of pH, ammonia, and total sulfides in pore water. Finally, the remaining top 5-cm of sediment will be

scooped from each of two replicate grabs and mixed in the bucket to provide a single composite sample for each site for analysis of chemistry, TOC, grain size, and toxicity. Portions of the composited sample will be placed into containers provided by each laboratory. Duplicate chemistry samples will be collected from this composite for archival. Cores collected for analysis of pore water will be centrifuged onboard the vessel, with some of the supernatant being preserved for analysis of sulfides in the Marine Pollution Studies Laboratory at Granite Canyon and the remainder being analyzed for ammonia onboard the vessel.

The quality of grab samples will be ensured by requiring each sample to satisfy a set of criteria concerning the depth of penetration and disturbance of the sediment within the grab. In this way, each sample will normally contain the top 10-cm of sediment within the area of the grab jaws. Samples will be rejected for the following conditions:

- There is a rock or shell fragment wedged between the jaws of the grab allowing the sample to wash out.
- The surface of the sample is significantly disturbed.
- The sample is uneven from side to side, indicating that the grab was tilted when it penetrated the sediment.
- The surface of the sample is in contact with the top doors of the grab, indicating over-penetration of the grab and possible loss of material around the doors.

Samples will be collected from each site and placed into containers, as indicated in Table 2.

**Table 1. Coordinates of Regional Monitoring Program Sediment Sampling Sites**

<u>Site Name/Code</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth (m)</u>	<u>Sediment Description from 2/94</u>
Standish Dam/BW10	37° 27.20'	121° 55.45'	shore	silty sand
Guadalupe River/BW15	-	-	shore	silty sand
San Jose/ C-3-0	37° 27.72'	121° 58.53'	3	approximately 5 cm of coarse sand with shell debris over mud
Sunnyvale/C-1-3	37° 26.13'	122° 00.67'	2.5	soft to semi-soft light brown sediment with some plant debris
South Bay/BA20	37° 29.64'	122° 05.25'	5.5	top 8–10 cm of sediment very soft light brown with <i>Potamocorbula</i>
Coyote Creek/BA10	37° 28.20'	122° 03.80'	5	Shell debris and sandy silt over gray clay
Dumbarton Bridge/BA30	37° 30.87'	122° 08.08'	7	soft brown sediment with shell debris and numerous polychaete tubes near surface over dark gray clayey sediment
Redwood Creek/BA41	37° 33.67'	122° 12.62'	2.5	shell debris near the surface with numerous polychaete tubes over dark gray clayey sediment
San Bruno Shoal/BB15	37° 37.00'	122° 17.00'	12	sandy mud with shell debris over gray clay

<u>Site Name/Code</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth (m)</u>	<u>Sediment Description from 2/94</u>
Oyster Point/BB30	37° 40.21'	122° 19.77'	9	soft brown sediment with shell debris and numerous polychaete tubes near the surface over very firm dark gray clay
Alameda/BB70	37° 44.84'	122° 19.40'	10	soft brown sediment with numerous polychaete tubes near the surface over gray clay
Yerba Buena Island/BC11	37° 49.44'	122° 20.93'	6	mixed soft sediment with shell debris over clay
Horseshoe Bay/BC21	37° 49.98'	122° 28.43'	12	very soft light brown sediment with sulfide pockets, over gray clay
Richardson Bay/BC32	37° 51.82'	122° 28.72'	1	soft light brown surficial sediment over firm dark clay
Point Isabel/BC41	37° 53.34'	122° 20.55'	1.5	soft dark brown surficial sediment with dense polychaete tubes over firm, dark clay
Red Rock/BC60	37° 55.00'	122° 25.97'	11	heavy shell debris and coarse sand
Petaluma River/BD15	38° 06.66'	122° 29.00'	4	soft light brown surficial sediment over dark gray mud/clay
San Pablo Bay/BD22	38° 02.86'	122° 25.24'	3	soft light brown surficial sediment over dark gray mud/clay
Pinole Point/BD30	38° 01.49'	122° 21.71'	6.5	soft light brown surficial sediment over dark gray clay
Davis Point/BD41	38° 03.11'	122° 16.65'	6.5	sandy silt with shell debris
Napa River/BD50	38° 05.79'	122° 15.61'	4	soft light brown silty mud with high density of <i>Potamocorbula</i>
Pacheco Creek/BF10	38° 02.85'	122° 05.66'	4	sandy sediments with layers of soft fine material, with occasional oil droplets
Grizzly Bay/BF21	38° 06.97'	122° 02.35'	3	very soft light brown sediment
Honker Bay/BF40	38° 04.00'	121° 56.00'	3	very soft light brown sediment
Sacramento River/BG20	38° 03.36'	121° 48.63'	8	soft light brown silty sand with high densities of <i>Potamocorbula</i> , over sandier sediments
San Joaquin River/BG30	38° 01.36'	121° 48.44'	5	sandy sediments with plant debris and <i>Corbicula</i>