Cruise Plan
Regional Monitoring Program
Bivalve Retrieval Cruise #16
April 21-24, 1998

Objectives

The objectives of this cruise are:

1) Retrieve bivalves that were deployed at 12[1] sites in January, 1998.

2) Portion bivalves into three groups for analysis of trace organics (BADA), trace elements (BADA/BRL/UCSC), and condition (AMS).

3) Bivalves for analysis of trace elements will be homogenized at UCSC following the retrieval cruise. Three random split homogenates will be provided to UCSC for intercalibration analysis of trace elements.

During this cruise, mooring integrity will be evaluated by checking for abrasion of lines and security of knots and cable ties. The mesh bags containing the bivalves will be removed from the moorings and brought aboard the vessel where they will be portioned, packaged and frozen on dry ice. BADA personnel will pick up bivalves for analysis of trace organics at the end of the cruise.

Personnel

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

Name	Affiliation	Duties	Contact
David Bell	AMS	Cruise Manager, Dive Master	H(510)833-8670
Jordan Gold	AMS	Vessel Skipper on 4/24	H(510)533-3475
Dave Morgan	Romberg Tiburon Centers	Vessel Skipper	W(415)435-7123 F(510)229-4194
Paul Salop	AMS	Diver, Dive Tender, Bivalve Delivery to BADA on 4/24	H(510)465-6907
Ron Walder	AMS	Diver, Dive Tender	W(408-633-5856) H(408-633-3217)

Mr. Bell will be responsible for all scientific operations and safety. Mr. Morgan will be responsible for vessel operation and safety. Messrs. Salop and Walder will trade off, assisting with mooring examinations and bivalve retrievals, assisting the divers in and out of the water, handing divers' equipment as necessary, and recording data for each station. Mr. Gold will be responsible for vessel operation and safety when using the vessel *M.E. II* on April 24, 1998. Mr. Salop will deliver trace organic bivalve samples to the BADA laboratory (EBMUD) on 4/24/98.

[1] Bivalves were not deployed at the Sacramento and San Joaquin River sites. Bivalves are missing from the Yerba Buena Island site.

Cruise Schedule

The following cruise schedule assumes that a maximum of 1.0 hr will be required for vessel operations at each site. Bivalves will be counted, packaged, and frozen on dry ice as the vessel is underway to the next site.

Date	Time	Activity
Day 1 April 21, 1998	0700-0730	Mobilize gear on vessel *R/V Questuary* at the Emeryville Marina. Conduct safety briefing. Depart for Alameda.
	0730-1200	Examine moorings and retrieve bivalves at, Alameda, Redwood Creek, Dumbarton Bridge, and Coyote Creek. Slack water before ebb at approximately 0859 and slack water before flood at approximately 1346 (Figure 1).
	1330-1500	Vessel transits to the Yerba Buena Island area for a photo reconnaissance search for alternative mooring sites to replace the missing BC10 station. This station will be installed during the bivalve deployment cruise scheduled for June 2, 1998.
	1500-1530	Demobilize gear at Emeryville Marina, fill up SCUBA tanks as necessary. All bivalves will be stored on dry ice aboard the vessel.
Day 2 April 22, 1998	0700-0730	Mobilize gear on vessel *R/V Questuary* at the Emeryville Marina. Conduct safety briefing. Depart for Horseshoe Bay.
	0730-1330	Examine moorings and retrieve bivalves at Horseshoe Bay, Red Rock, Pinole Point, San Pablo Bay, and Petaluma River. Slack water before flood at approximately 0545 and slack water before ebb at approximately 1158 (Figure 2).
	1330-1500	Vessel transits to Martinez Marina. Demobilize gear at Martinez Marina, fill up SCUBA tanks as necessary. All bivalves will be stored on dry ice aboard the vessel. Bell, Salop, and Walder stay overnight at the John Muir Inn, Martinez.
Day 3 April 23, 1998	0700-0730	Mobilize gear on vessel *R/V Questuary* at the Martinez Marina. Conduct safety briefing. Depart for Napa River.

Date	Time	Activity
	0730-1000	Examine moorings and retrieve bivalves at Napa River and Grizzly Bay. Slack water before flood at approximately 0900 and slack water before ebb at approximately 1506 (Figure 3).
	1000-1200	Vessel transits to Sacramento River. The crew will attempt to collect *C. Fluminea* from the bottom of the Sacramento River in an area close to the current RMP bivalve deployment station. At least 150 specimens are to be collected from each station using a hand-deployable clam dredge operated from the stern of the vessel.
	1200-1400	Vessel transits to San Joaquin River. The crew will attempt to collect *C. Fluminea* from the bottom of the San Joaquin river in an area close to the current RMP bivalve deployment station.
	1400-1600	Vessel transits to Emeryville Marina. Demobilize vessel. All bivalves are stored on dry ice and brought to AMS for holding.
Day 4 April 24, 1998	0700-0800	Mobilize gear on vessel *M.E. II* at the Vallejo public launch ramp. Conduct safety briefing. Depart for Davis Point.
	0800-0930	Divers will conduct tethered sweep-search of the Davis Point mooring site in attempt to locate bivalve mooring. Retrieve bivalves from mooring if located. Slack water before flood at approximately 0832, slack water before ebb at approximately 1410 (Figure 4).
	0930-1030	Vessel transits to Vallejo public launch ramp. Demobilize vessel. All bivalves are stored on dry ice and brought to AMS for holding.
	1400	P. Salop delivers trace organics samples to EBMUD laboratory.

Mooring Examination and Bivalve Retrieval Procedures

All diving operations will be conducted by divers working in pairs and tethered together. The vessel will tie up to the deployment sites and the vessel crew will attach a safety line (floating line with large life ring on end) to the structure. The divers will enter the water, descend to the bottom and locate the ground line to the mooring. When the ground line has been located, its attachment to the piling will be examined by feeling for abrasion and looseness in the knots and cable ties. After this examination, the divers will proceed along the ground line checking its integrity. At the mooring, the earth anchors will be checked to confirm that they have not worked out of the bottom and that serious erosion of bottom sediments has not occurred around them. All knots will be checked for integrity and the presence of intact cable ties. When the integrity of all

lines and knots has been verified and any problems have been corrected, the divers will ascend the mooring line to the bags of bivalves and cut the cable ties holding the bags to the mooring line. The divers will then return to the surface by retracing their route along the ground line and piling.

When the bivalves are onboard the vessel, they will be carefully removed from the bags and packaged for shipment to the analytical laboratories. Initially, the bags of bivalves will be removed from the mesh bags and placed into a cleaned (scrubbed with Alconox and rinsed with ambient water) cooler. Dead bivalves will be counted and discarded. Approximately 80% of the live organisms will be equally divided for trace organic and trace metal analyses, with the remaining 20% being saved for analysis of condition. The bivalves for organic analyses will be wrapped in aluminum foil, placed into Ziploc bags, and frozen on dry ice. Bivalves for trace metal analyses will be placed into doubled Ziploc bags and frozen on dry ice. Bivalves for analysis of condition will be cleaned, sealed shut with cable ties, air-dried, placed into Ziploc bags, and frozen on dry ice. All bags will be labeled by station, date, species and quantity. Bivalves will remain frozen on-board the vessel until the conclusion of the cruise.

At the conclusion of the cruise, the bivalves for trace organics analysis will be picked up by a BADA representative. Bivalves for trace metals analyses will remain with AMS for tissue homogenization scheduled for May 5-7. Homogenized bivalves will be shipped to BADA following the homogenization. Bivalves for condition analyses will be retained by AMS.

Species Deployed and Site Locations

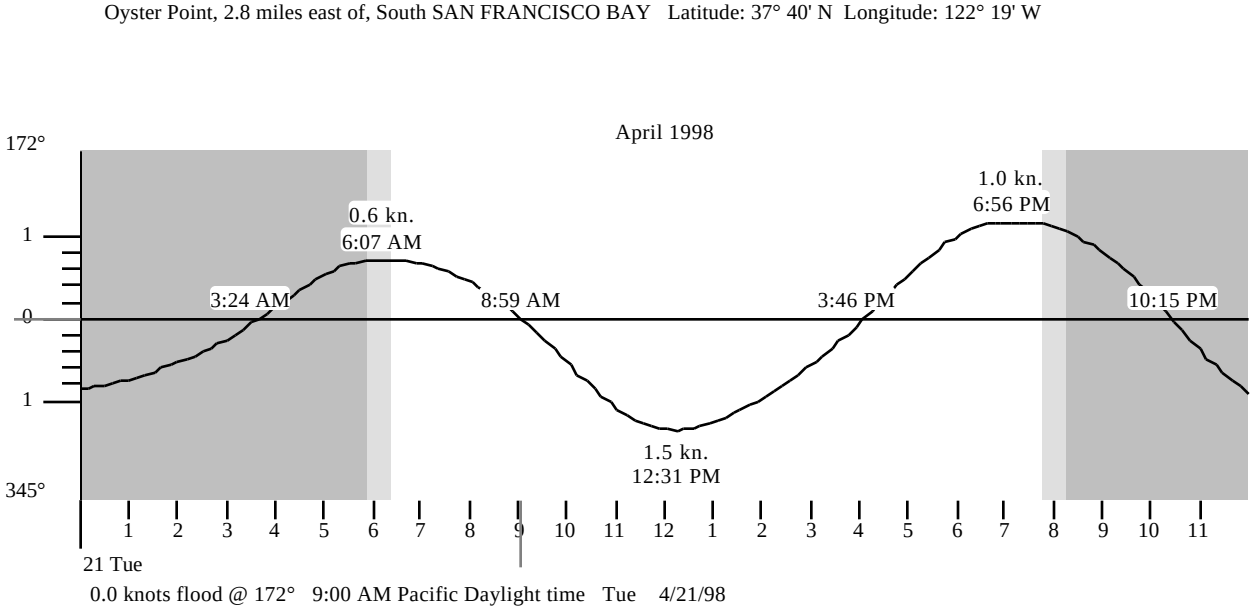
The number and species of bivalves deployed at each site are shown in Table 1. The location (Latitude, Longitude) for the deployment sites are listed in Table 2.

Table 1. Bivalve species deployed at each site.

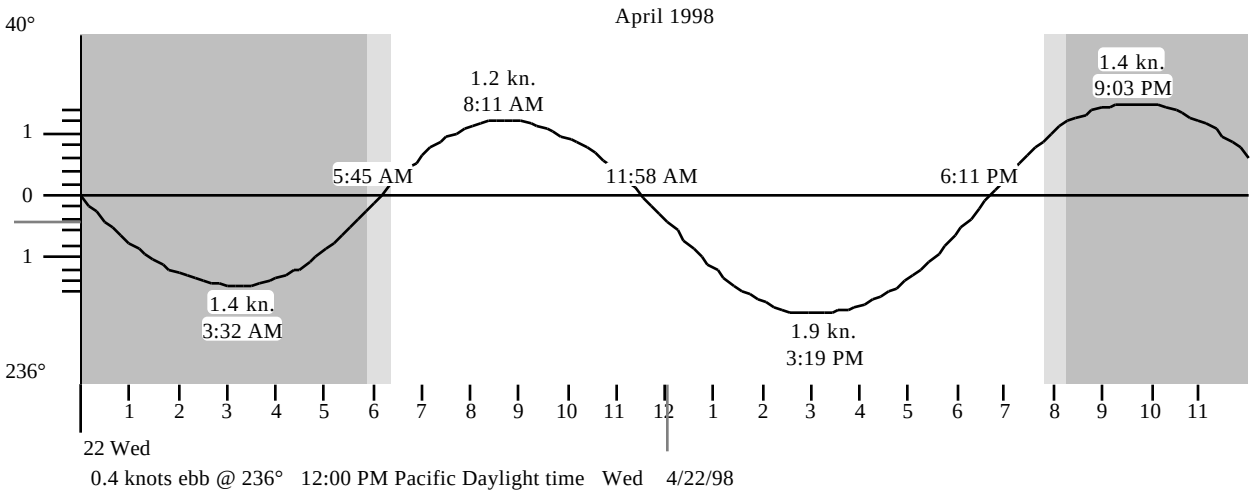
Site Name/Code	Date	Number/Species
Coyote Creek/BA10	1/21/98	156 *M. californianus*
Dumbarton Bridge/BA30	1/21/98	160 *M. californianus*
Redwood Creek/BA40	1/21/98	160 *M. californianus*
Alameda/BB71	1/21/98	160 *M. californianus*
Yerba Buena Island/BC10	1/21/98	160 *M. Californianus* deployed but the piling was not located during the previous maintenance cruise and is assumed to be destroyed
Horseshoe Bay/BC21	1/22/98	160 *M. californianus*
Red Rock/BC60	1/22/98	160 *M. californianus*
Pinole Point/BD30	1/22/98	160 *M. californianus* 117 *C. gigas*
San Pablo Bay/BD20	1/22/98	117 *C. gigas*
Petaluma River/BD15	1/22/98	117 *C. gigas*
Davis Point/BD40	1/23/98	156 *M. Californianu*s deployed but the mooring was not located during the previous maintenance cruise due to sand accumulation over the site
Napa River/BD50	1/23/98	117 *C. gigas*
Grizzly Bay/BF20	1/23/98	80 *C. fluminea*
Sacramento River/BG20	-	None Deployed
San Joaquin River/BG30	-	None Deployed

Table 2. Locations of bivalve moorings for Regional Monitoring Program.

Site Name/Code	Latitude	Longitude	Comments
Coyote Creek/BA10	37°28.19’	122°03.83’	Channel marker “18”
Dumbarton Bridge/BA30	37°30.80’	122°08.08’	Channel marker “14”
Redwood Creek/BA40	37°32.82’	122°11.70’	Channel marker “4”
Alameda/BB70	37°41.73’	122°20.38’	Channel marker “1” 1.65 nmi SE of Hunters Point
Yerba Buena Island/BC10	-	-	*Piling Missing*
Horseshoe Bay/BC21	37°49.87’	122°28.65’	Dolphin 100 ft W of fishing pier
Red Rock/BC60	37°55.70’	122°28.13’	Channel marker “2” for Larkspur ferry terminal
Pinole Point/BD30	38°01.00’	122°22.05’	Channel marker “P”
San Pablo Bay/BD20	38°02.72’	122°25.71’	Channel marker “1”
Petaluma River/BD15	38°06.77’	122°30.05’	NE end of railroad bridge
Davis Point/BD40	38°03.26’	122°15’.63	E side of UNOCAL loading dock
Napa River/BD50	38°04.84’	122°14.82’	Mare Island Strait adjacent to General Foods facility, 0.7 nmi from channel marker “2”
Grizzly Bay/BF20	38°06.49’	122°03.37’	Channel marker “9” 1.0 nmi NW of Garnet Point
Sacramento River/BG20	38°03’.58	121°47.50’	Channel marker “8” N of Sherman Island
San Joaquin River/BG30	38°01.27’	121°48.32’	Channel marker “8” 0.75 nmi E of Antioch Marina

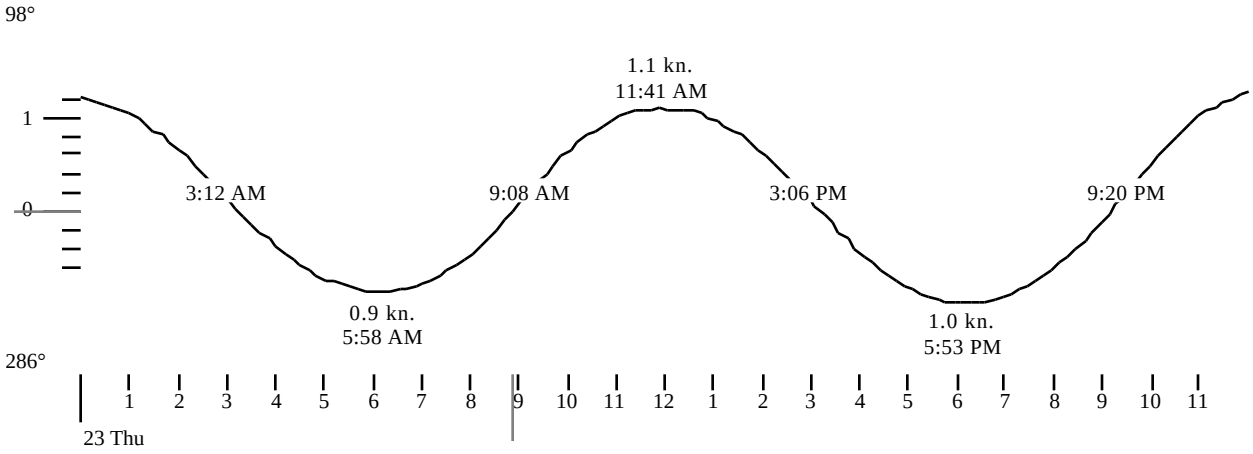


Pinole Point, 1.2 miles off, SAN PABLO BAY Latitude: 38° 02' N Longitude: 122° 23' W Zihua Software (860) 295-0044



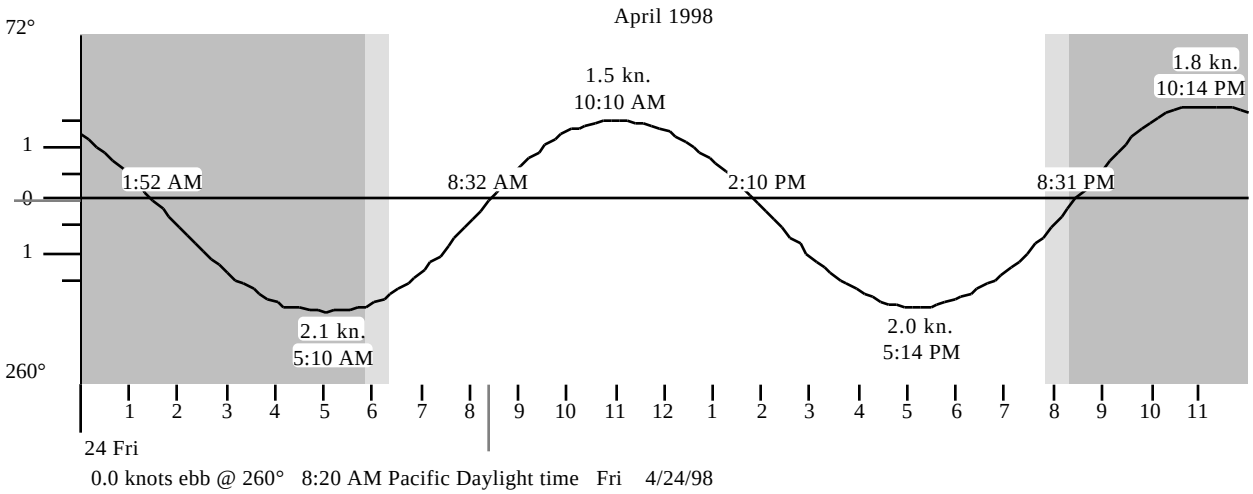
0.4 knots ebb @ 236° 12:00 PM Pacific Daylight time Wed 4/22/98

Point Sacramento, 0.3 mile NE OF, SACRAMENTO RIVER Latitude: 38° 04' N Longitude: 121° 50' W



0.0 knots ebb @ 286° 8:50 AM Pacific Daylight time Thu 4/23/98

Davis Point, 1.0 nmi. NW of, SAN PABLO BAY Latitude: 38° 04' N Longitude: 122° 17' W



0.0 knots ebb @ 260° 8:20 AM Pacific Daylight time Fri 4/24/98