

**Cruise Plan
Regional Monitoring Program
Bivalve Maintenance Cruise #19
March 23-26, 1999**

Objective

The objective of this cruise is to check and maintain bivalve moorings at 12¹ sites in the San Francisco Estuary.

Transplanted bivalves were deployed at 12 sites on January 5-8, 1999. Deployment duration is approximately 100 days. During this cruise, the primary objective will be the evaluation of mooring integrity by checking for abrasion of lines and security of knots and cable ties. The mesh bags containing the bivalves will be gently scrubbed with a nylon brush to remove fouling organisms. Additionally, the data from the thermosalinograph deployed at the Napa River station will be downloaded and the probe will be maintained.

Personnel

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

Name	Affiliation	Duties
David Bell	AMS	Cruise Manager, Dive Master
Jordan Gold	AMS	Diver, Vessel Skipper on 3/26/99
Jay Johnson	AMS	Diver on 3/26/99
Nicole Kleinsinger	AMS	Tender on 3/26/99
David Morgan	Romberg Tiburon Institute	Vessel Skipper 3/23/99, 3/24/99
Paul Salop	AMS	Diver 3/23/99, 3/24/99

Mr. Bell will be responsible for all scientific operations and safety, Mr. Morgan will be responsible for vessel operation and safety on March 23-24, and Messrs. Gold and Salop will alternate daily responsibilities as diver and dive tenders. On March 22nd, Mr. Gold will be responsible for vessel operation and safety.

¹ No bivalves were deployed at the Grizzly Bay, Sacramento River, and San Joaquin River stations.

Cruise Schedule

The following cruise schedule assumes that approximately 0.5 hr will be required for operations at each site.

Date	Activity	Time
Day 1 Mar 23, 1999	Mobilize gear at Emeryville marina, conduct brief safety meeting aboard R/V Questuary, depart for Yerba Buena site.	0830-0900
	Examine and maintain moorings at Yerba Buena, Alameda, Redwood Creek, Dumbarton Bridge, and Coyote Creek. Slack water Oyster Point (Figure 1) before flood is at 1154, slack water before ebb is at 1830.	0930-1430
	Demobilize gear at Emeryville marina and fill SCUBA tanks as necessary.	1400-1430
Day 2 Mar 24, 1999	Mobilize gear at Emeryville marina aboard R/V Questuary, depart for Horseshoe Bay site.	0900-0930
	Examine and maintain moorings at Horseshoe Bay, Red Rock, Petaluma River, San Pablo Bay, and Pinole Point. Slack water at Pinole Point (Figure 2) before ebb is at 0751, slack water before flood is at 1511.	0930-1600
	Demobilize gear at Emeryville marina.	1600-1630
Day 3 Mar 26, 1999	Mobilize gear at Vallejo marina, conduct safety briefing aboard R/V ME II, depart for Napa River site. Examine and maintain mooring at Davis Point.	0900-0930
	Examine and maintain mooring at Davis Point. Examine and maintain mooring and thermosalinograph at Napa River. Slack water at Davis Point (Figure 3) is at 1022.	0930-1130

Oyster Point, 2.8 miles east of, South SAN FRANCISCO BAY Latitude: 37° 40' N Longitude: 122° 19' W

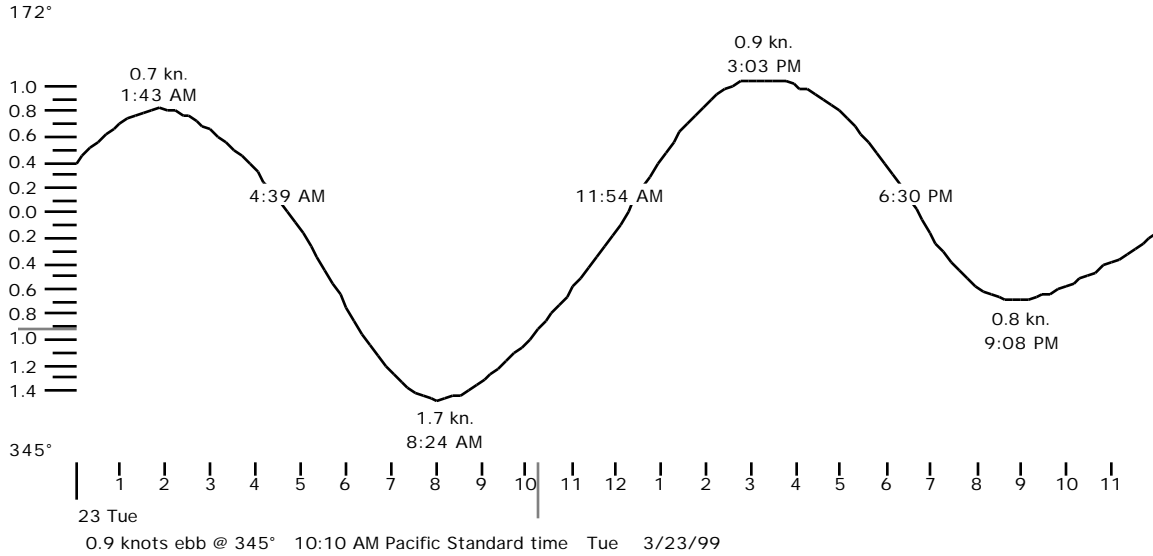


Figure 1. Currents near Oyster Point on March 23, 1999

Pinole Point, 1.2 miles off, SAN PABLO BAY Latitude: 38° 02' N Longitude: 122° 23' W

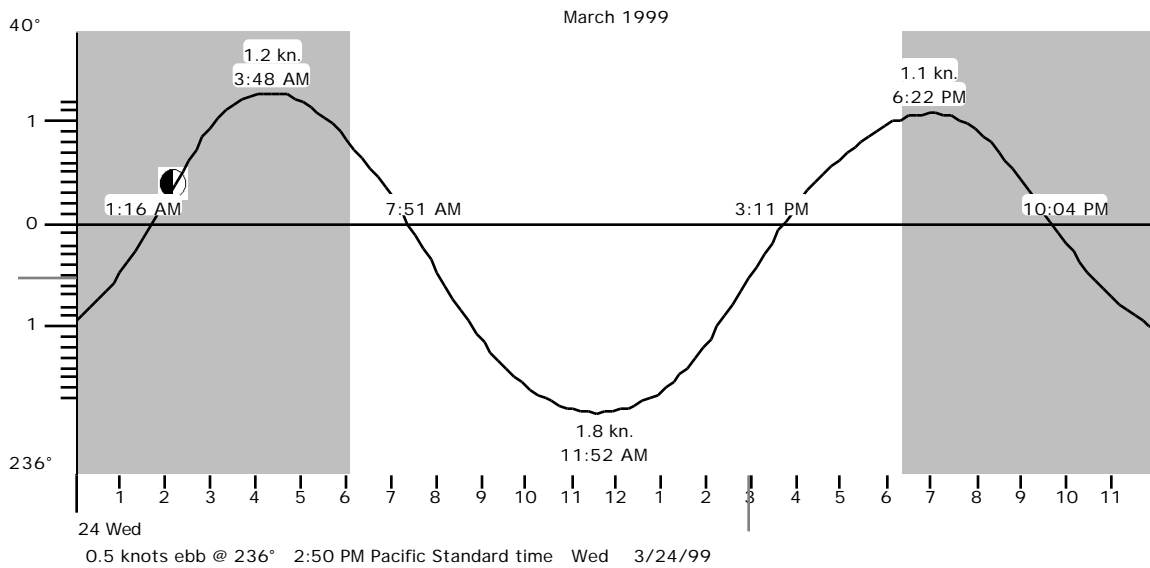


Figure 2. Currents near Pinole Point on March 24, 1999.

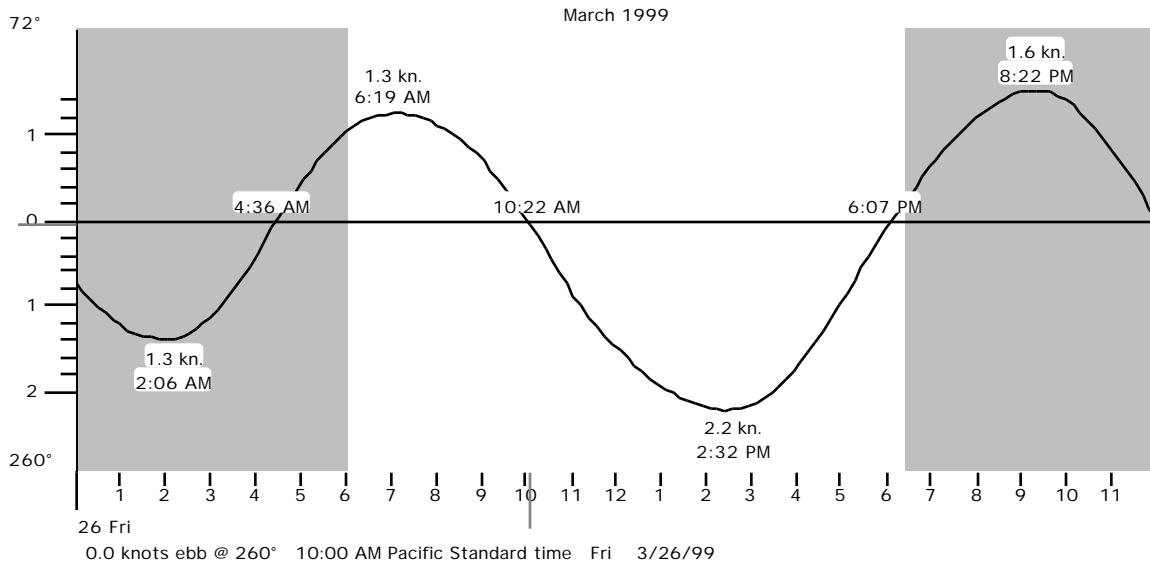


Figure 3. Currents near Davis Point on March 26, 1999.

Mooring Examination and Maintenance Procedures

All diving operations will be conducted by divers working in pairs and tethered together. The vessel will be tied to the surface marker for each mooring. The divers will 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 secureness 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 bivalve bags and use nylon brushes to gently scrub all debris and fouling organisms from the bags. After the bags have been scrubbed, the divers will return to the surface by retracing their route along the ground line and piling. Spare line, earth anchors and buoys will be onboard the vessel if replacements are required.

After completion of the bivalve mooring maintenance at the Napa River station, the divers will return to the piling and proceed with the thermosalinograph maintenance. The divers will proceed out the thermosalinograph ground line until reaching its mooring. The lead diver will detach the thermosalinograph at its shackles, and the divers will then return to

the ME II with the unit. Onboard the vessel, the divers will download the data and perform required maintenance. The divers will then return the thermosalinograph back to its mooring to complete the dive.

Site Locations

The geographic coordinates for the sites are listed in Table 1.

Table 1. Coordinates of Regional Monitoring Program Bivalve Deployment

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/BB71	37° 41.73'	122° 20.38'	Channel marker "1" 1.65 nmi SE of Hunters Point
Yerba Buena Island/BC10	37° 48.35'	122° 22.25'	Dolphin 0.1 nmi. S of Bay Bridge
Horseshoe Bay/BC21	37° 49.87'	122° 28.65'	Dolphin 100 ft W of fishing pier
Red Rock/BC61	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	-NA-	-NA-	Channel marker "8" N of Sherman Island
San Joaquin River/BG30	-NA-	-NA-	Channel marker "8" 0.75 nmi E of Antioch Marina

Bivalve Deployments

Bivalves deployed during the previous cruise are indicated in Table 2.

Table 2. Bivalve deployments from January 5-8, 1999.

Site Name/Code	Quantity and Species Deployed
Coyote Creek/BA10	144 <i>C. gigas</i> (diploid) 144 <i>C. gigas</i> (triploid) 160 <i>M. californianus</i> 160 <i>M. edulis</i> 144 <i>O. lurida</i>
Dumbarton Bridge/BA30	160 <i>M. californianus</i>
Redwood Creek/BA40	160 <i>M. californianus</i>
Alameda/BB71	160 <i>M. californianus</i>
Yerba Buena Island/BC10	144 <i>C. gigas</i> (diploid) 144 <i>C. gigas</i> (triploid) 160 <i>M. californianus</i> 160 <i>M. edulis</i> 144 <i>O. lurida</i>
Horseshoe Bay/BC21	160 <i>M. californianus</i>
Red Rock/BC60	160 <i>M. californianus</i>
Pinole Point/BD30	160 <i>M. Californianus</i> 144 <i>C. gigas</i>
San Pablo Bay/BD20	144 <i>C. gigas</i>
Petaluma River/BD15	144 <i>C. gigas</i>
Davis Point/BD40	144 <i>C. gigas</i>
Napa River/BD50	144 <i>C. gigas</i> (diploid) 144 <i>C. gigas</i> (triploid) 160 <i>M. californianus</i> 160 <i>M. edulis</i> 144 <i>O. lurida</i>
Grizzly Bay/BF20	No bivalves deployed
Sacramento River/BG20	No bivalves deployed
San Joaquin River/BG30	No bivalves deployed