

Cruise Report
2001 Regional Monitoring Program
Bivalve Deployment Cruise



May 28-29, June 2, 11, 13-15, 20-21, 2001

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1 INTRODUCTION

This report describes activities associated with the 2001 dry-season bivalve deployment cruise of the Regional Monitoring Program for Trace Substances in the San Francisco Estuary (RMP). Bivalves were attached to moorings at 12 sites. Measurement of contaminant bioaccumulation in transplanted bivalves during dry-season deployment is designed to provide long-term data on concentrations of trace metal and organic compounds in tissue throughout the estuary.

Contaminant bioaccumulation in bivalves is being measured by collecting bivalves from sites that are known to have low contaminant concentrations and transplanting them to mooring locations in the Estuary. Three species of bivalves, *Mytilus californianus*, *Mytilus edulis*, and *Crassostrea gigas* were deployed at different locations depending upon the expected salinity. *M. californianus* were collected from Bodega Head, *M. edulis* were collected from Tomales Bay, and *C. gigas* were obtained from a commercial grower in Tomales Bay.

Bivalve cages used in the 2000 summer deployment cruise suggest that these devices can reduce mortality at stations with high predation and bivalve growth is not compromised. The use of cages was expanded to seven stations for the 2001 deployment, with both *M. californianus* and *M. edulis* deployed in cages at selected sites. Deployments at stations where cages were used consisted of: (1) a cage with four compartments, each filled with 20 *M. californianus*; (2) a cage with four compartments, each filled with 20 *M. edulis*; (3) two bags of 40 *M. californianus* and (4) two bags of 40 *M. edulis*.

Bagged bivalves will be used for chemical analyses and caged bivalves will be used for examination of condition. Should sufficient bivalves survive the deployment, a side-by-side analysis of growth in bagged vs. caged bivalves could be performed. In addition, condition could also be measured between mussel species at each station.

2 CRUISE REPORT

2.1 Objectives

The objectives of this cruise were:

- 1) Collect *M. californianus* from Bodega Head and *M. edulis* from Tomales Bay and obtain *C. gigas* from Tomales Bay (Hog Island Oyster Co.) for deployment.
- 2) Replace any missing moorings and perform a thorough examination of existing moorings.
- 3) Build and deploy 14 bivalve cages for deployment at seven selected stations.
- 4) Obtain a CTD cast at each deployment site.

2.2 Personnel

The personnel and work assignments for this cruise are shown in Table 1.

Table 1. Personnel and work assignments for the 2001 Summer Deployment Cruise.

<i>Name</i>	<i>Affiliation</i>	<i>Duties</i>	<i>Contact</i>
Gordon Becker	AMS	Bivalve Collection, Tender	steelie@dnai.com
David Bell	AMS	Bivalve Collection, Cruise Manager, Dive Master	bell@amarine.com
Jordan Gold	AMS	Diver, Vessel Skipper (6/15)	gold@amarine.com
Dave Morgan	Romberg Tiburon Center	Vessel Skipper	cptdavid@aol.com
Paul Salop	AMS	Bivalve Collections, Diver (6/15, 6/21)	salop@amarine.com

2.3 Activities

Cruise activities are listed in Table 2.

Table 2. Cruise schedule for 2001 Summer Deployment Cruise.

<i>Date</i>	<i>Time</i>	<i>Activity</i>
Day 1 5/28/01	1200-1600	Bell purchased <i>Crassostrea gigas</i> from Hog Island Oyster Company and transported to Bodega Marine Laboratory (BML).
Day 2 5/29/01	0930-1630	Bell, Becker, and Salop collected <i>Mytilus californianus</i> at low tide from Bodega Head, Sonoma County. Bivalves were transferred into plastic mesh bags and placed into a filtered seawater tank at BML.
Day 3 6/02/01	0900-1200	Will Borgeson of BML collected <i>Mytilus edulis</i> from Tomales Bay. Bivalves were transferred into plastic mesh bags and placed into a filtered seawater tank at BML.
Day 4 6/11/01	0900-1600	Bell picked up bivalves from BML.
Day 5 6/13/01	1000-1030	Mobilized gear and loaded bivalves aboard <i>RV Questuary</i> , Emeryville Marina. Departed for Alameda site.
	1115-1215	Checked mooring integrity and deployed bivalves at Alameda (BB71). Proceeded to Redwood Creek.
	1300-1340	Checked mooring integrity and deployed bivalves at Redwood Creek (BA40). Proceeded to Dumbarton Bridge.
	1400-1430	Checked mooring integrity and deployed bivalves at Dumbarton Bridge (BA30). Proceeded to Coyote Creek.

Table 2, continued.

	1500-1530	Attempt to deploy bivalves at Coyote Creek (BA10) failed due to missing mooring and strong currents at the site. It was decided to replace mooring the following week. Departed for Yerba Buena Island site.
	1720-1750	Checked mooring integrity and deployed bivalves at Yerba Buena Island, (BC11). Departed for Emeryville Marina.
	1800	Arrived Emeryville Marina, demobilized vessel and refilled SCUBA tanks.
Day 6 6/14/01	0900-9030	Mobilized gear and loaded bivalves aboard <i>RV Questuary</i> , Emeryville Marina. Departed for Horseshoe Bay site.
	1045-1120	Checked mooring integrity and deployed bivalves at Horseshoe Bay (BC21). Departed for Red Rock site.
	1240-1300	Checked mooring integrity and deployed bivalves at Red Rock (BC60). Departed for Pinole Point.
	1330-1350	Checked mooring integrity and deployed bivalves at Pinole Point (BD30). Proceeded to Petaluma River site.
	1420-1445	Checked mooring integrity and deployed bivalves at Petaluma River (BD15). Proceeded to San Pablo Bay site.
	1510-1535	Checked mooring integrity and deployed bivalves at San Pablo Bay (BD20). Proceeded to Emeryville Marina.
	1700	Arrived Emeryville Marina, demobilized vessel and refilled SCUBA tanks.
Day 7 6/15/01	0900-1000	Mobilized gear and loaded bivalves aboard <i>ME II</i> , Vallejo Marina. Departed for Napa River.
	1020-1100	Checked mooring integrity and deployed bivalves at Davis Point (BD40). Proceeded to Napa River site.
	1115-1200	Checked mooring integrity and deployed bivalves at Napa River (BD50). Proceeded to Vallejo Marina.
	1230	Arrived Vallejo Marina, demobilized vessel and returned SCUBA equipment.
Day 8 6/20/01	1200-1800	Bell picked up additional bivalves from BML.
Day 9 6/21/01	1200-1300	Mobilized gear and loaded bivalves aboard <i>ME II</i> , Redwood City Marina. Departed for Coyote Creek site.
	1300-1400	Installed new mooring at Coyote Creek site and deployed bivalves. Proceeded to Redwood City Marina.
	1500	Demobilized vessel, processed "Time Zero" bivalves and returned SCUBA equipment.

Site Locations

The coordinates for all bivalve moorings are listed in Table 3.¹

Table 3. Bivalve deployment coordinates.

<i>Site Name/Code</i>	<i>Latitude (N)</i>	<i>Longitude (W)</i>	<i>Comments</i>
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° 49.12'	122° 20.81'	Dolphin 0.2 nmi. SW of Bay Bridge
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
Point Pinole 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

¹ No bivalves were deployed at BF20, BG20, BG30 sites.

Bivalve Species at Each Site

Bivalve species were deployed at each site according to Table 4.

Table 4. Bivalve deployment summary

<i>Site Name</i>	<i>Site Code</i>	<i>#MCAL</i>	<i>#MEDU</i>	<i>#CGIG</i>	<i>Total #Bags</i>	<i>Total #Cages</i>
Coyote Creek	BA10	160	160	144	7	2
Dumbarton Bridge	BA30	160	160		8	
Redwood Creek	BA40	160	160		4	2
Alameda	BB71	160	160		8	
Yerba Buena Island	BC10	160	160		4	2
Horseshoe Bay	BC21	160	160		4	2
Red Rock	BC61	160	160		4	2
Petaluma River	BD15	160	160	144	11	
San Pablo Bay	BD20	160	160	144	11	
Pinole Point	BD30	160	160		8	
Davis Point	BD40	160	160	144	7	2
Napa River	BD50	160	160	144	7	2
Totals		1920	1920	720	83	14

2.4 Discussion

General Comments

All cruise objectives were achieved. Bivalve cages were deployed at seven sites and CTD casts were recorded at all deployment sites. The bivalve mooring was replaced at the Coyote Creek site, requiring an extra day be added to the length of the cruise.