

Cruise Report
Regional Monitoring Program
Bivalve Deployment Cruise #16
January 20-23, 1998

1.0 INTRODUCTION

This report describes activities associated with the 1998 wet-season bivalve deployment cruise of the Regional Monitoring Program for Toxic Contaminants in the San Francisco Estuary. Bivalves were attached to moorings at 13¹ sites. Measurement of contaminant bioaccumulation in transplanted bivalves during wet-season and dry-season deployments is one component of this program that is designed to provide long-term data on concentrations of trace metals and organic compounds in water, sediments, and tissues, as well as toxicity throughout the estuary.

Contaminant bioaccumulation in bivalves is being measured in this program by attempting to collect bivalves from sites that are known to be clean and transplanting them to 15 separate mooring locations in the Estuary. Three species of bivalves, *Mytilus californianus*, *Crassostrea gigas*, and *Corbicula fluminea* were deployed at different locations depending upon the expected range of salinity. *M. californianus* was deployed at the most saline sites, from San Pablo Bay southward to the Dumbarton Bridge; *C. gigas* was deployed at sites with intermediate salinities between Grizzly Bay and San Pablo Bay and south of the Dumbarton Bridge; and *C. fluminea* was deployed at Grizzly bay. *M. californianus* was collected from Bodega Head, *C. gigas* was obtained from a commercial grower in Tomales Bay. *C. fluminea* were collected from Lake Chabot in Alameda County and held in the lake for four weeks prior to deployment.

2.0 CRUISE REPORT

2.1 Objectives

The objectives of this cruise were:

- 1) Collect *M. californianus* from Bodega Head and deploy them at seven sites, obtain *C. gigas* from Tomales Bay (Hog Island Oyster Co.) and deploy them at five sites and collect *C. fluminea* from Lake Isabella or Lake Chabot and deploy them at three sites.
- 2) Examine the bivalve moorings and make any necessary repairs.

¹ Bivalves were not deployed at the Sacramento and San Joaquin River stations.

2.2 Personnel

The personnel and work assignments for this cruise are shown in the following table:

<u>Name</u>	<u>Affiliation</u>	<u>Duties</u>
David Bell	AMS	Bivalve Collections, Cruise Manager, Dive Master
Jordan Gold	AMS	Bivalve Collections, Diver
Jay Johnson	AMS	Bivalve Collections
David Morgan	Romberg Tiburon Institute	Vessel Skipper
Paul Salop	AMS	Bivalve Collections, Dive Tender

2.3 Activities

<u>Date</u>	<u>Time</u>	<u>Activity</u>
12/23/97	0800-1200	Bell, Gold, and Salop collect <i>C. Fluminea</i> at Lake Chabot. Bivalves are transferred to mesh bags and held "mid-water" in Lake Chabot.
1/9/98	0900-1700	Bell obtains <i>C. gigas</i> from Hog Island Oyster Co. Bell, Johnson and Salop collect <i>M. Californianus</i> at Bodega Head. All bivalves are transferred to mesh bags and placed into holding tanks at Bodega Marine Laboratory (BML).
1/19/98	1200-1800	Gold picks up bivalves from BML and delivers them on ice to Vallejo.
1/20/98	1300-1430	Mobilized gear and conducted safety briefing aboard <i>R/V M.E. II</i> at Vallejo public launch ramp . Departed for Davis Point site (BD40).
	1430-1630	Deployed bivalves at Davis Point, departed for Vallejo public launch ramp.
	1630-1730	Arrived Vallejo public launch ramp, demobilized vessel.

<u>Date</u>	<u>Time</u>	<u>Activity</u>
1/21/98	0600-0635	Mobilized gear and conducted brief safety meeting aboard <i>R/V Questuary</i> , Emeryville Marina. Departed for Yerba Buena Island Site (BC10).
	0635-0715	Deployed bivalves at Yerba Buena Island, departed for Alameda site (BB71).
	0715-0810	Deployed bivalves at Alameda, departed for Redwood Creek site (BA40).
	0810-0955	Deployed bivalves at Redwood Creek, departed for Dumbarton Bridge site (BA30).
	0955-1040	Deployed bivalves at Dumbarton Bridge, departed for Coyote Creek site (BA10).
	1100-1120	Deployed bivalves at Coyote Creek, departed for Emeryville Marina.
	1330	Arrived at Emeryville Marina, demobilized vessel.
1/22/98	0700-0730	Mobilized gear and conducted brief safety meeting aboard <i>R/V Questuary</i> , Emeryville Marina. Departed for Horseshoe Bay site (BC21).
	0730-0820	Deployed bivalves at Horseshoe Bay, departed for Red Rock site (BC60).
	0820-0915	Deployed bivalves at Red Rock, departed for Pinole Point site (BD30).
	0915-1015	Deployed bivalves at Pinole Point, departed for Petaluma River site (BD15).
	1015-1150	Deployed bivalves at Petaluma River, departed for San Pablo Bay site (BD20).
	1150-1250	Deployed bivalves at San Pablo Bay, departed for Martinez Marina.
	1430	Arrived at Martinez Marina, demobilized vessel.

<u>Date</u>	<u>Time</u>	<u>Activity</u>
1/23/98	0700-0715	Mobilized gear and conducted brief safety meeting aboard <i>R/V Questuary</i> , Martinez Marina. Departed for Napa River site (BD50).
	0715-0850	Deployed bivalves at Napa River, departed for Grizzly Bay site (BF20).
	0850-0950	Deployed bivalves at Grizzly Bay, departed for Emeryville Marina.
	1330	Arrived at Emeryville Marina, demobilized vessel.

2.4 Discussion

Site Locations

The coordinates for all bivalve moorings are listed in the following table:

<u>Site Name/Code</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>	<u>Comments</u>
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 0.1 nmi. N 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
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"

<u>Site Name/Code</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>	<u>Comments</u>
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

Bivalve Species at Each Site

Bivalve species were deployed at each site according to the following table:

<u>Site Name/Code</u>	<u>Date</u>	<u>Number per Species²</u>
Coyote Creek/BA10	1/21/98	156 <i>C. gigas</i>
Dumbarton Bridge/BA30	1/21/98	160 <i>M. californianus</i>
Redwood Creek/BA40	1/21/98	160 <i>M. californianus</i>
Alameda/BB71	1/21/98	158 <i>M. californianus</i>
Yerba Buena Island/BC10	1/21/98	160 <i>M. californianus</i>
Horseshoe Bay/BC21	1/22/98	160 <i>M. californianus</i>
Red Rock/BC60	1/22/98	160 <i>M. californianus</i>
Pinole Point/BD30	1/22/98	160 <i>M. Californianus</i> 117 <i>C. gigas</i>
San Pablo Bay/BD20	1/22/98	117 <i>C. gigas</i>
Petaluma River/BD15	1/22/98	116 <i>C. gigas</i>
Davis Point/BD40	1/20/98	156 <i>C. gigas</i>
Napa River/BD50	1/23/98	117 <i>C. gigas</i>
Grizzly Bay/BF20	1/23/98	80 <i>C. fluminea</i>
Sacramento River/BG20	-	No bivalves deployed
San Joaquin River/BG30	-	No bivalves deployed

General Comments

² Number deployed depends on size and mortality at time of deployment.

An extensive search for populations of *Corbicula* was conducted with close interaction between Dr. Rainer Hoenicke and AMS staff. The search was necessitated due to difficulty in obtaining clams from historically sampled populations, and due to the high contaminant loads in T-0 clams collected from the San Joaquin River and Putah Creek (the most recently sampled populations). In addition to the locations listed in Table 1, Stafford Reservoir, Lake Hennessey, Lake Berryessa, The Garcia and Gualala Rivers, and Lake Del Valle have been previously investigated, without finding useable clam populations. There are still many more local water bodies which are good candidates, however difficulty in obtaining access has so far precluded further investigations.

Approximately 150 *Corbicula* were collected from Lake Chabot prior to the deployment cruise. Because of the small number of specimens available, *Corbicula* were not deployed at the Sacramento and San Joaquin River stations. Instead, *Corbicula* will be collected from the resident populations at these two stations during the Bivalve Retrieval Cruise scheduled for April, 1998. All other cruise objectives were achieved.

Table 1. Summary of *Corbicula* collections and investigations.

<u>Date</u>	<u>Location</u>	<u>Population</u>	<u>Search Method</u>	<u>Potential for future collection</u> <u>s</u>
9/30/97	Jamison Pond (UCD), and Putah Creek	no clams in pond, extremely dense population in creek	searched along shoreline, Putah Creek clams too high in contaminants to use	high
10/10/97	Russian River	small population, too few for study	searched 15 miles of river along shoreline	low
10/13/97	San Antonio Reservoir	much shell, but no live clams	searched along shoreline	high
10/16/97	Lake Sonoma	small population, too few for study	searched along shoreline	low
10/23/97	Lake Chabot	good populations	searched with clam dredge (boat)	high
12/9/97	Jewell lake, Anza Lake	no clams	searched along shoreline	none
12/19/97	Lake Mendocino/ Russian River	small population, too few for study	searched with clam dredge (boat), along shoreline and below dam	high

<u>Date</u>	<u>Location</u>	<u>Population</u>	<u>Search Method</u>	<u>Potential for future collection^s</u>
12/23/97	Lake Chabot	clams taken for deployment	collected by diving	high
1/13/98	Briones Reservoir	some shell, no live clams	searched with clam dredge (boat), along shoreline and below dam	high
1/16/98	Lake Chabot	too muddy to sample	diving	high
1/5-6/98	Lake Isabella	small population, too few for study	searched with clam dredge (boat) and below dam	high