

# M o n t h l y M a r i n e B i o t o x i n R e p o r t

August 2007

Technical Report No. 07-23

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of August, 2007. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

### Southern California Summary:

#### Paralytic Shellfish Poisoning

*Alexandrium* was observed at a number of sampling stations between San Luis Obispo and Ventura counties during August (Figure

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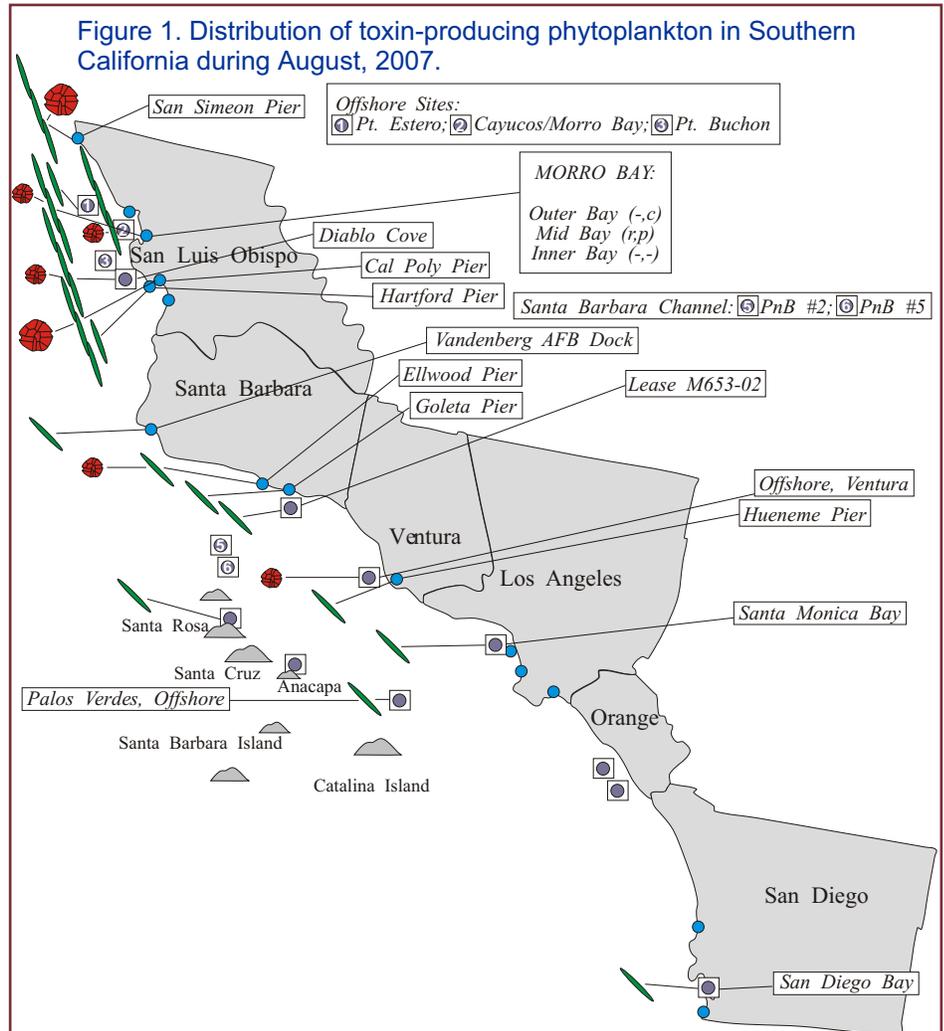
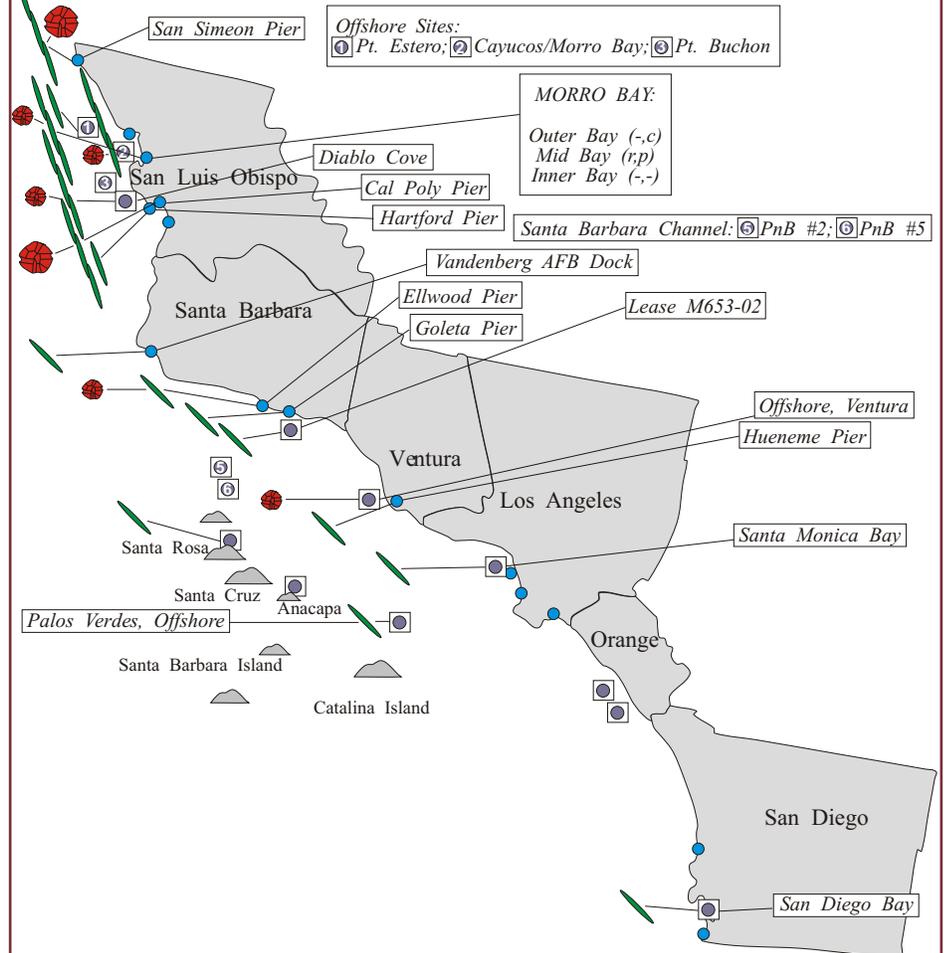


Figure 1. Distribution of toxin-producing phytoplankton in Southern California during August, 2007.



### Relative Abundance of Known Toxin Producers

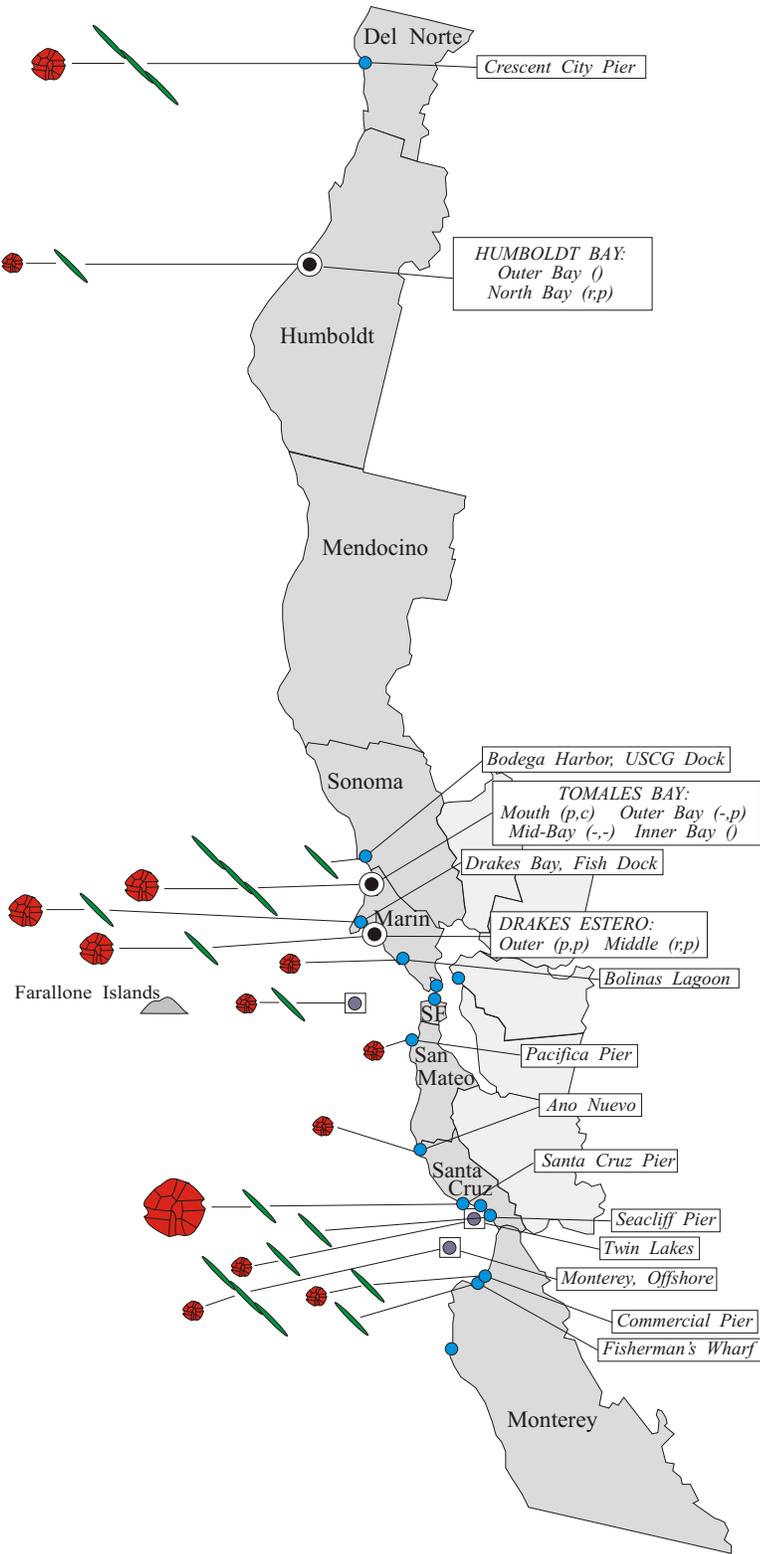
Alexandrium Species	Pseudo-nitzschia Species
 Rare (less than 1%)  Present (between 1% and 10%)  Common (between 10% and 50%)  Abundant (greater than 50%)	 Present (less than 10%)  Common (between 10% and 50%)  Abundant (greater than 50%)

#### MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- ⊙ Multiple Sampling Stations
- ⊙ Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:  
 (a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.  
 e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during August, 2007.



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1). The distribution and relative abundance of this dinoflagellate decreased in most regions compared to observations in July.

Toxicity was detected in only one shellfish sample from any Southern California sampling station during August. A sentinel mussel sample from the Cal Poly Pier in Avila (San Luis Obispo County) contained a PSP toxin concentration of 36 ug/100 g tissue on August 6 (Figure 3).

**Domoic Acid**

*Pseudo-nitzschia* numbers decreased along much of the Southern California coast in August (Figure 1). This diatom was still common at several sites in San Luis Obispo County but the overall cell numbers declined compared to observations in July. The highest relative abundances of *Pseudo-nitzschia* were observed at San Simeon Pier (San Luis Obispo County) on August 24.

Domoic acid was not detected in any shellfish samples collected in August. Two samples of lobster viscera were found to contain varying levels of domoic acid, however. A very high concentration of domoic acid (276 ppm) was detected in a sample from Anacapa Island (August 2) and a low concentration of this toxin was detected in a sample from San Miguel Island on August 6 (Figure 3).

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**Relative Abundance of Known Toxin Producers**

Alexandrium Species

- Rare (less than 1%)
- Present (between 1% and 10%)
- Common (between 10% and 50%)
- Abundant (greater than 50%)

Pseudo-nitzschia Species

- Present (between 1% and 10%)
- Common (between 10% and 50%)
- Abundant (greater than 50%)

MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:

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weeks of August (Figure 4). After a short decline the toxicity increased again at the end of the month in the mid-Estero (185 ug). The PSP toxin concentration also increased at the Drakes Bay sentinel station during the last week of August (119 ug). Low levels of these toxins were detected through most of the month at the sentinel mussel station in outer Humboldt Bay. PSP toxins were also detected during the last week of August in sentinel mussels from the Santa Cruz Pier, coinciding with the increased relative abundance of *Alexandrium* at this site.

**Domoic Acid**

The distribution of *Pseudo-nitzschia* was similar to observations in July, although the relative abundance decreased at most sampling sites (Figure 2). Domoic acid was not detected in any shellfish samples analyzed in August.

**Non-toxic Species**

Diatoms continued to dominate the phytoplankton assemblage along the Northern California coast. *Chaetoceros* continued to be the most common diatom. *Eucampia*, *Thalassiosira*, *Thalassionema*, and *Leptocylindrus* were common at many locations as well.

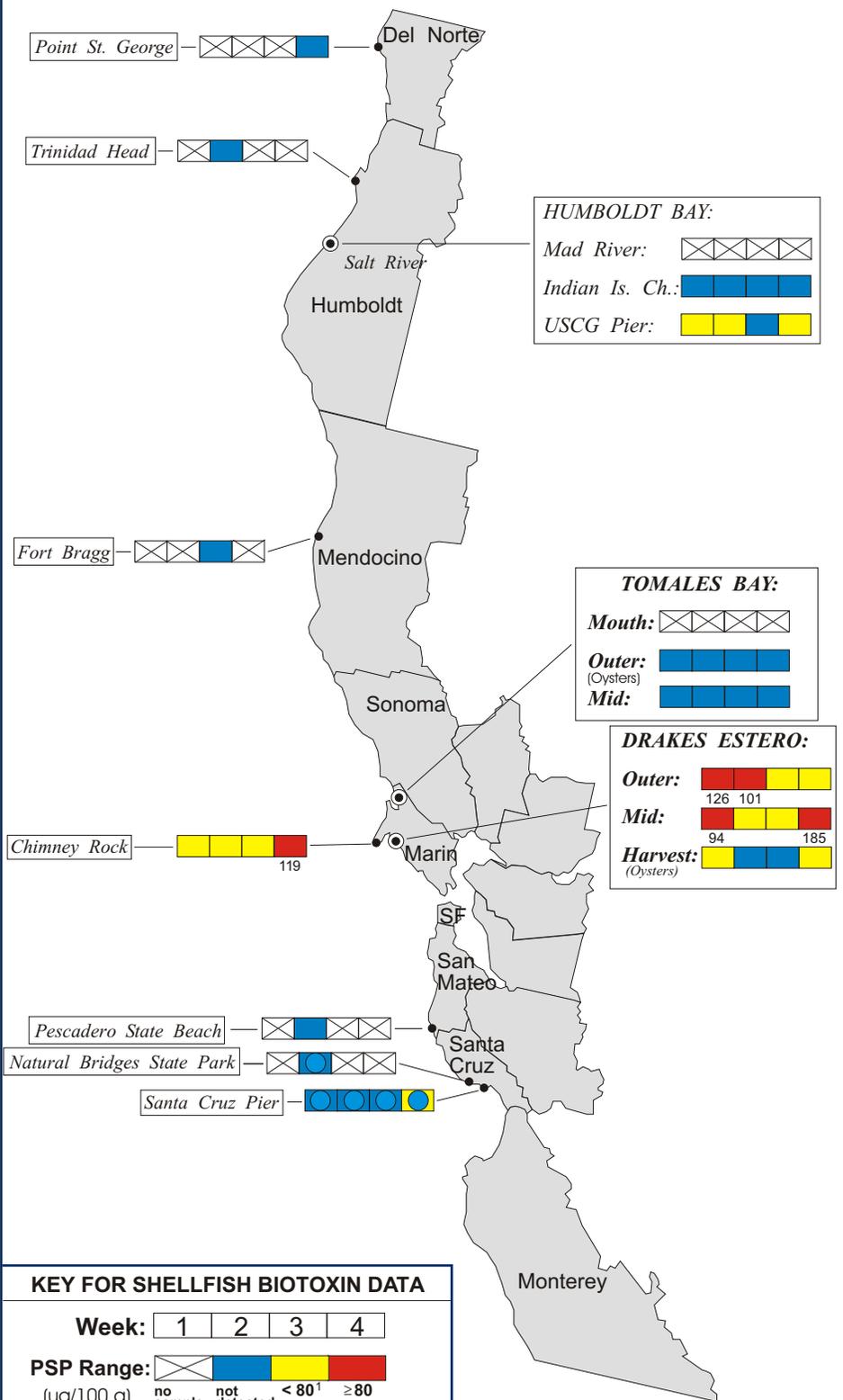


**QUARANTINES:**

The annual mussel quarantine was initiated early, on April 20, due to the widespread increase in domoic acid levels along the coast. The annual quarantine, which normally goes into effect on May 1 of each year, applies specifically to sport-harvested mussels and is in effect for the entire California coastline, including all bays and estuaries. Routine phytoplankton and

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Figure 4. Distribution of shellfish biotoxins in Northern California during August, 2007.



**KEY FOR SHELLFISH BIOTOXIN DATA**

**Week:** [1] [2] [3] [4]

**PSP Range:** [X][Blue][Yellow][Red]  
 (ug/100 g) no sample not detected < 80<sup>1</sup> ≥ 80

**DA Range:** [X][Blue][Yellow][Red]  
 (ppm) no sample not detected < 20<sup>2</sup> ≥ 20

<sup>1</sup>PSP Alert Level <sup>2</sup>DA Alert Level  
 ● = Single Site ○ = Multiple Sites ◐ = Offshore Site

Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during August, 2007.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	None Submitted	
	Cove Mussel Company	4
	Drakes Bay Oyster Company	37
	Hog Island Oyster Company	5
Marin	CDPH Marine Biotoxin Monitoring Program	8
	None Submitted	
San Francisco	None Submitted	
	San Mateo County Environmental Health Department	1
	U.C. Santa Cruz	5
San Mateo	Santa Cruz County Environmental Health Department	1
	None Submitted	
Monterey	None Submitted	
	Cal Poly	6
	Tomales Bay Oyster Company	10
San Luis Obispo	Williams Shellfish Farms	10
	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	5
Santa Barbara	Ventura County Environmental Health Department	2
	Los Angeles County Health Department	3
Ventura	Orange County Health Care Agency	2
Los Angeles	Orange County Health Care Agency	2
	San Diego	Carlsbad Aquafarms, Inc.
Orange	CDPH Volunteer (Steve Crooke)	2
	San Diego	Scripps Institute of Oceanography

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biotoxin monitoring is maintained throughout the quarantine period. The annual quarantine does not affect the certified commercial shellfish growing areas in California. All certified shellfish growers are required to submit at least weekly samples of shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health.

On April 27 the State Public Health Officer warned the public to avoid eating sport-harvested species of bivalve shellfish, sardines and anchovies, or the organs or viscera of sport-harvested or commercially sold lobster or crab taken from the coast between San Luis Obispo and Orange counties. This advisory was the result of the Department's monitoring efforts, which detected elevated levels of domoic acid in a variety of seafood species.

Consumers of Washington clams, also known as butter clams, are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat.

Consumers are also advised that cooking does not eliminate the toxins from the shellfish tissue. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity



Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during August, 2007.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	3
Mendocino	None Submitted	
Sonoma	CDPH Volunteer (Cathleen Cannon)	1
Marin	Audubon California	1
	CDPH Volunteers ( <i>Brent Anderson, Cal Strobel, Marjorie Siegel, Mary Von Tolksdorf, Richard Plant</i> )	11
	Drakes Bay Oyster Company	10
	CDPH Marine Biotoxin Monitoring Program	5
	Hog Island Oyster Company	2
Contra Costa	CDPH Marine Biotoxin Monitoring Program	1
San Francisco	CDPH Volunteer ( <i>Eugenia McNaughton</i> )	1
	Gulf of the Farallones National Marine Sanctuary	1
	CDPH Volunteer ( <i>Carol Keiper</i> )	2
San Mateo	San Mateo County Environmental Health	2
	The Marine Mammal Center ( <i>Stan Jensen</i> )	4
	U.C. Santa Cruz	4
Santa Cruz	California Department of Parks and Recreation	1
	Marine Mammal Center ( <i>Nancy Scarborough</i> )	2
	Santa Cruz County Environmental Health Dept.	2
	U.C. Santa Cruz	4
Monterey	CDPH Volunteer ( <i>Jerry Norton</i> )	1
	Marine Life Studies	1
	Marine Pollution Studies Laboratory	2
	Monterey Abalone Company	3
	The Marine Mammal Center ( <i>Aubrey St. Marie</i> )	2
San Luis Obispo	CDPH Volunteer ( <i>Renee and Auburn Atkins</i> )	3
	Cal Poly	12
	Monterey Bay National Marine Sanctuary	4
	Morro Bay National Estuary Program	3
	Tenera Environmental	5
	Marine Mammal Center ( <i>Tim Lytsell, P.J. Webb</i> )	7
	Tomales Bay Oyster Company	1
Santa Barbara	CDPH Volunteers ( <i>Sylvia Short, Dennis Carlson</i> )	6
	Channel Islands National Marine Sanctuary	1
	National Park Service	2
	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	5
	Vandenberg AFB	2
Ventura	CDPH Volunteer ( <i>Dennis Carlson</i> )	2
	National Park Service	1
	Ventura County Environmental Health Department	1
Los Angeles	City of Los Angeles Env. Monitoring Division	2
	Los Angeles County Health Department	6
	Los Angeles County Sanitation District	6
	Southern California Marine Institute	1
Orange	Orange County Health Care Agency	1
	Ocean Institute	1
San Diego	Avian Research Associates	1
	CDPH Volunteer ( <i>Paul Sims</i> )	4
	Scripps Institute of Oceanography	3

## PHYTOPLANKTON GALLERY



Diatoms such as *Ditylum* were common along the Northern California coast.



The diatom *Leptocylindrus* was common to abundant at sites between Santa Cruz and San Luis Obispo counties.



Occasionally our samplers capture a few zooplankton like this calanoid copepod.