

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

October 2006

Technical Report No. 06-22

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of October, 2006. 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 sites between San Luis Obispo and San Diego counties during October (Figure 1). The distribution and

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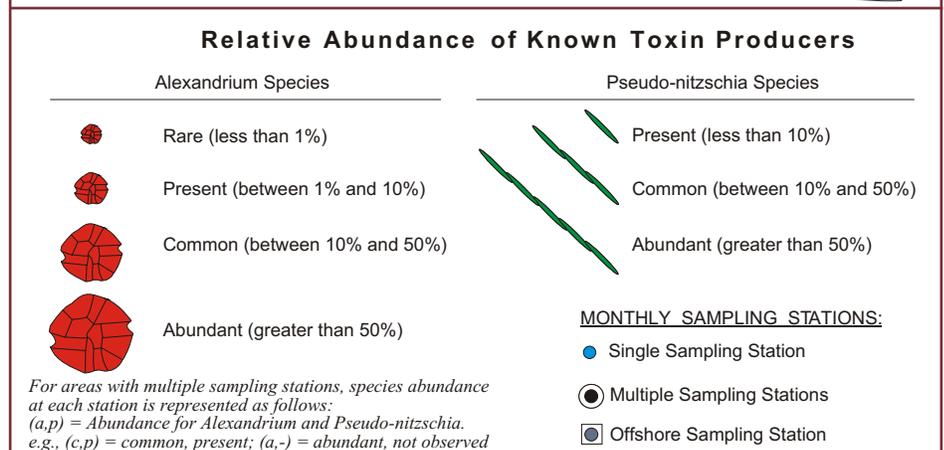
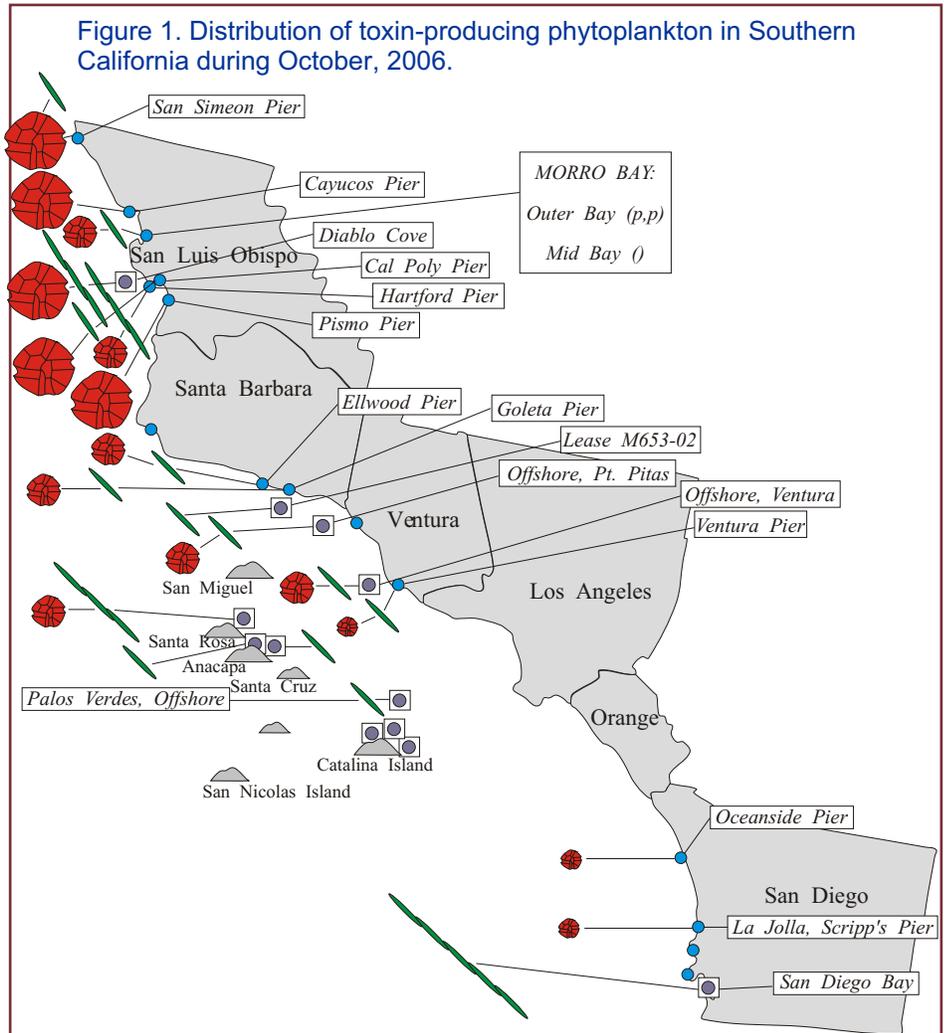
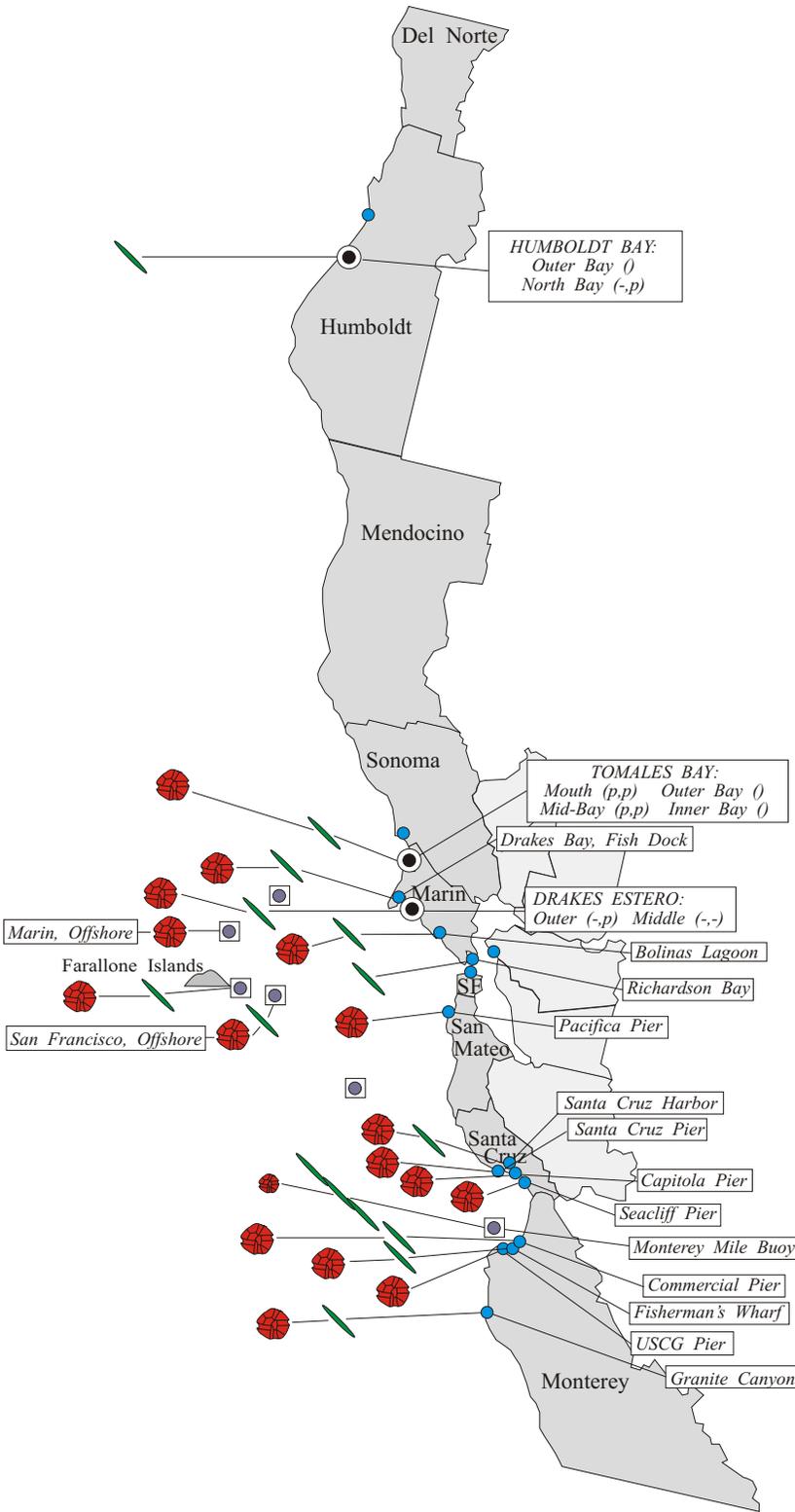


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during October, 2006.



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relative abundance of this dinoflagellate were similar to observations in September. The relative abundance of *Alexandrium* increased dramatically at a number of sites along the San Luis Obispo coast. The highest cell numbers were observed at Cayucos Pier (October 30) and offshore of Diablo Cove (October 19). This marks the eighth consecutive month that *Alexandrium* has been observed along a significant portion of the Southern California coast.

The elevated concentrations of PSP toxins detected in the latter half of September inside Morro Bay (San Luis Obispo County) continued through October (Figure 3). Toxin concentrations reached 490 ug/100 g shellfish tissue (October 9) and 461 ug (October 30) at two different locations in Morro Bay. Low toxin levels were also detected in mussels from Avila and Vandenberg, the latter representing a decrease from elevated levels the last week of September.

Domoic Acid

Pseudo-nitzschia continued to be observed along the entire Southern California coast in October (Figure 1). The distribution was similar to observations in September but the relative abundance decreased noticeably at

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Relative Abundance of Known Toxin Producers

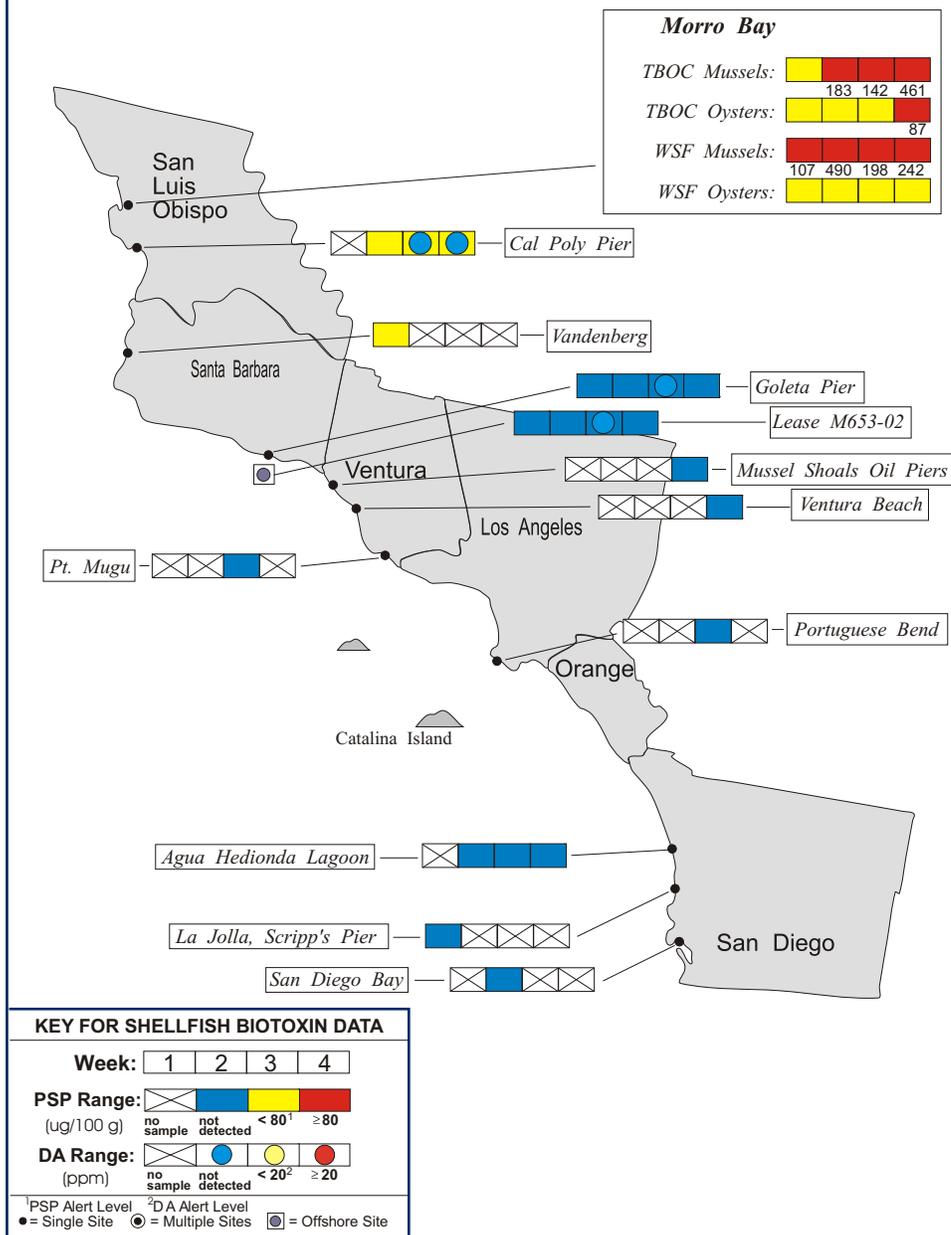
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

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 3. Distribution of shellfish biotoxins in Southern California during October, 2006.



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most sites. The elevated levels identified in San Diego Bay by volunteer Paul Sims were of a nontoxic species of *Pseudo-nitzschia*. Nonetheless this observation raised concerns and increased sampling and field identification were conducted until it was determined that cell numbers had declined. Domoic acid was not detected in any shellfish samples collected in October.

Non-toxic Species

Much of the Southern California coast continued to be characterized by a mix of diatoms (*Chaetoceros*) and dinoflagellates (*Ceratium*, *Akashiwo sanguinea*). Dinoflagellates became dominant at coastal sites in San Luis Obispo and San Diego counties. *Cochlodinium* remained common at several sites in San Luis Obispo. This potential red tide-producing dinoflagellate increased in distribution and was observed to be common in samples from Santa Barbara, Ventura, and offshore near Anacapa Island.

Northern California Summary:

Paralytic Shellfish Poisoning

The distribution and relative abundance of *Alexandrium* in October was slightly reduced from observations in September (Figure 2), having disappeared from

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Health Services, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide program designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
 (510) 412-4635

For Recorded Biotoxin Information Call:
 (800) 553 - 4133

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samples collected inside Humboldt Bay. The highest relative abundances of *Alexandrium* again occurred inside Tomales Bay (October 10).

Low levels of PSP toxins continued to be detected at a number of sites along the Northern California coast (Figure 4). By the end of the month the toxin levels increased above the alert level in sentinel mussels from the Monterey commercial pier (165 ug).

Domoic Acid

The distribution and relative abundance of *Pseudo-nitzschia* remained similar to observations in September (Figure 2). Low numbers of this diatom were observed at sampling stations between Humboldt and Monterey counties. Domoic acid was not detected in any shellfish samples collected in October.

Non-toxic Species

Dinoflagellates became more dominant along the Northern California coast in October, although the familiar diatom species (for example, *Chaetoceros*) were still common at some sites. There was a diverse mix of dinoflagellate species, including *Ceratium*, *Akashiwo sanguinea*, *Prorocentrum*, *Dinophysis*, and *Cochlodinium*. The latter was common at all sites inside Monterey Bay, as well as at sites in San Mateo, Marin (inside Tomales Bay), and offshore near the Farallone Islands.

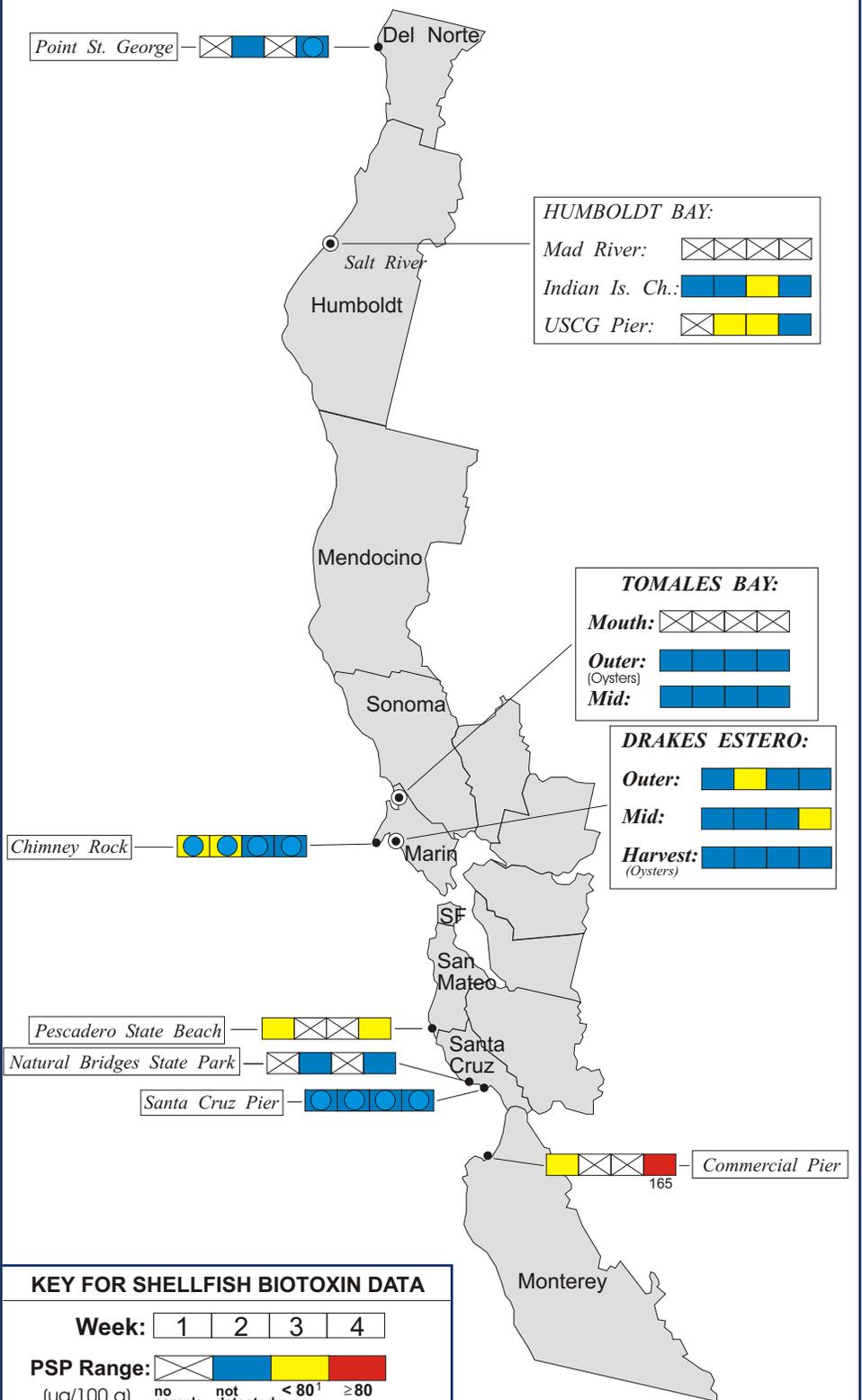


QUARANTINES:

The annual quarantine on the sport-harvesting of mussels was rescinded at midnight on October 31 for all coastal counties *except* San Luis Obispo. The

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Figure 4. Distribution of shellfish biotoxins in Northern California during October, 2006.



KEY FOR SHELLFISH BIOTOXIN DATA

Week: 1 2 3 4

PSP Range: [X][Blue][Yellow][Red]
 (ug/100 g) no sample not detected < 80¹ ≥ 80

DA Range: [X][Blue][Yellow][Red]
 (ppm) no sample not detected < 20² ≥ 20

¹PSP Alert Level ²DA Alert Level
 ● = Single Site ○ = Multiple Sites ◐ = Offshore Site

Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during October, 2006.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	9
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	CDHS Marine Biotoxin Monitoring Program	5
	Marin Oyster Company	3
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	2
Monterey	Monterey Abalone Company	4
San Luis Obispo	Williams Shellfish Company	18
	California Polytechnic State University	3
	Tomales Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
	Vanderberg AFB	1
	CDHS Volunteer (Bill Weinerth)	1
Ventura	Ventura County Environmental Health Department	2
	Naval Air Station, Pt. Mugu	1
Los Angeles	Los Angeles County Health Department	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	3
	U.S. Navy Marine Mammal Program	1
	Scripps Institute of Oceanography	1

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presence of high PSP toxin levels and elevated numbers of the toxin-producing dinoflagellate required an extension of the mussel quarantine for this county. The annual mussel quarantine applies only to sport-harvested mussels along the entire California coastline, including all bays and estuaries. Routine biotoxin monitoring is maintained throughout this 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.

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.

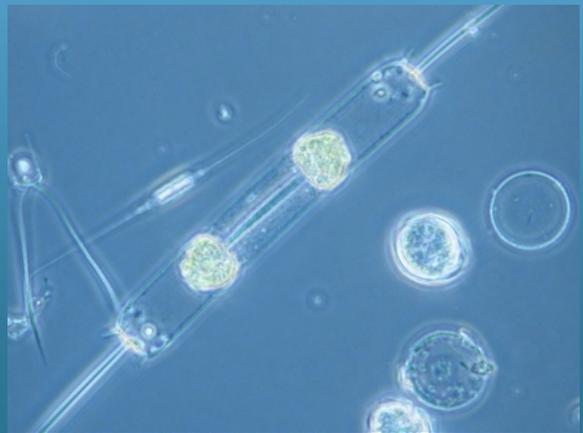
Consumers are also advised that cooking does not eliminate the toxins from the shellfish tissue. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.



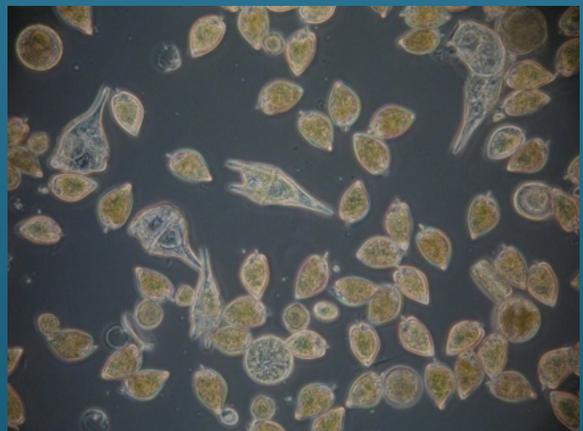
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during October, 2006.

COUNTY	AGENCY	# SAMPLES
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	5
	Sea Grant Extension	1
Mendocino	None Submitted	
Sonoma	CDHS Volunteer (Cathleen Cannon)	1
	Cordell Bank National Marine Sanctuary	1
Marin	CDHS Volunteers (Brent Anderson, Mary Von Toksdorf, Marjorie Siegel, Cal Strobel, Richard Plant)	14
	Drakes Bay Oyster Company	9
	Gulf of the Farallones National Marine Sanctuary	2
	CDHS Marine Biotxin Monitoring Program	7
	Audubon California	4
Contra Costa	CDHS Marine Biotxin Monitoring Program	1
San Francisco	CDHS Volunteers (Eugenia McNaughbn, Carol Keiper)	4
	Gulf of the Farallones National Marine Sanctuary	1
San Mateo	Marine Mammal Center Volunteer (Stan Jensen)	3
	San Mateo County Environmental Health Department	2
	Gulf of the Farallones National Marine Sanctuary	1
Santa Cruz	U.C. Santa Cruz	4
	Marine Mammal Center Volunteers (Nancy Scarborough, Marie Braymar)	5
	Santa Cruz County Environmental Health Department	7
Monterey	Marine Mammal Center Volunteer (Aubrey St. Marie)	2
	Monterey Abalone Company	5
	Marine Pollution Studies Laboratory	6
	CDHS Volunteer (Jerry Norton)	1
	Pacific Cetacean Group	1
San Luis Obispo	Morro Bay National Estuary Program	3
	CDHS Volunteers (Renee and Aubun Atkins)	3
	California Polytechnic State University	3
	NOAA Coastal Discovery Center San Simeon	4
	Terera Environmental	4
Santa Barbara	Marine Mammal Center Volunteers (Debby Davis, P.J. Webb)	3
	Tomales Bay Oyster Company	1
	Channel Islands National Marine Sanctuary	1
	National Park Service	5
	Santa Barbara Mariculture Company	1
Ventura	U.C. Santa Barbara	4
	Vandenberg AFB	2
	CDHS Volunteer (Sylvia Short)	6
	CDHS Volunteer (Fred Burgess)	5
	Channel Islands National Marine Sanctuary	3
Los Angeles	National Park Service	2
	Ventura County Environmental Health Department	1
	Los Angeles County Sanitation District	4
	Catalina Island Marine Institute	2
Orange	Top More (Guided Discoveries)	4
	None Submitted	
San Diego	Scripps Institute of Oceanography	5
	DHS Volunteer (Paul Sims, Claire Sims)	5

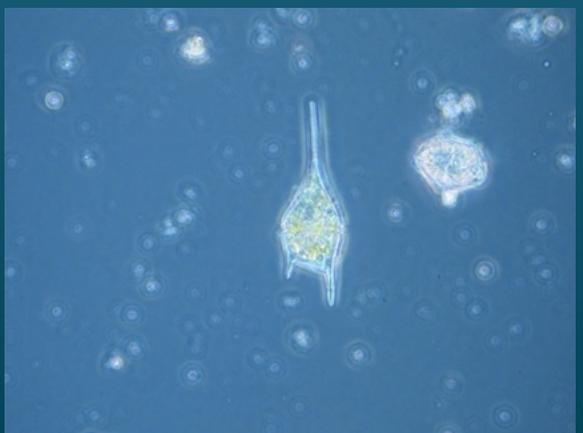
PHYTOPLANKTON GALLERY



The diatom *Ditylum* was common inside Drakes Bay.



The dinoflagellates *Ceratium* and *Prorocentrum* were common at numerous sampling sites.



A variety of *Ceratium* species were present along the coast in October.