

# 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

March 2009

Technical Report No. 09-14

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of March, 2009. 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.

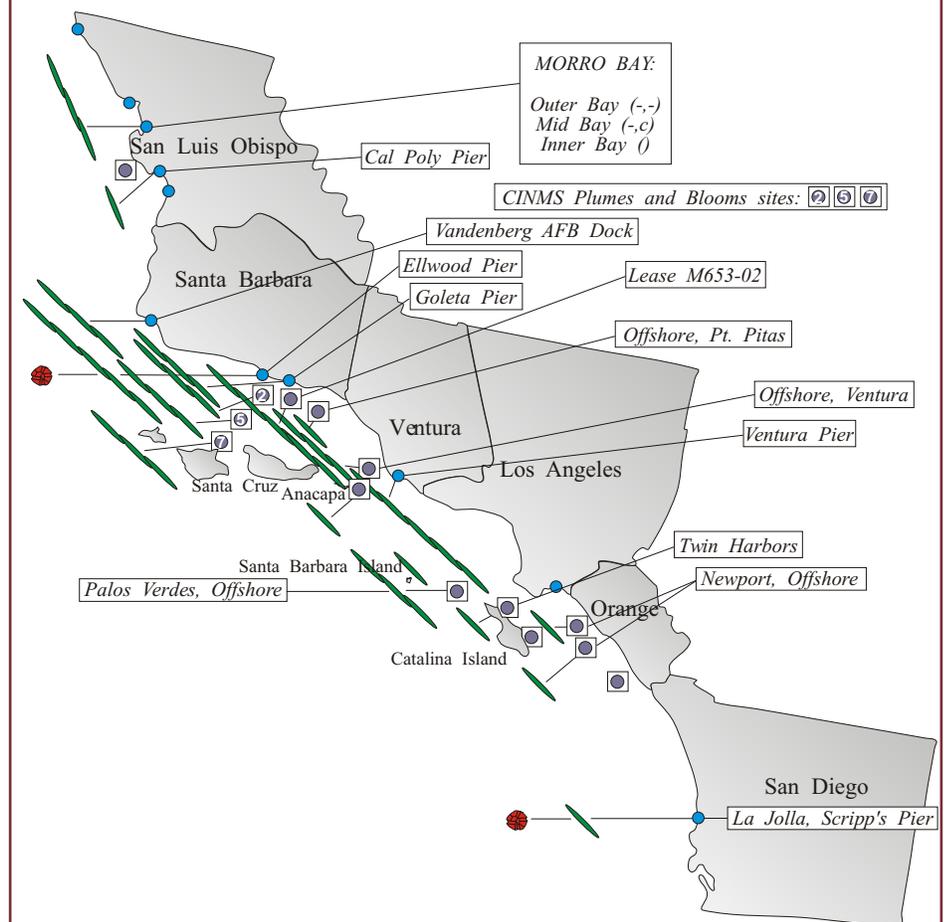
### Southern California Summary:

#### Paralytic Shellfish Poisoning

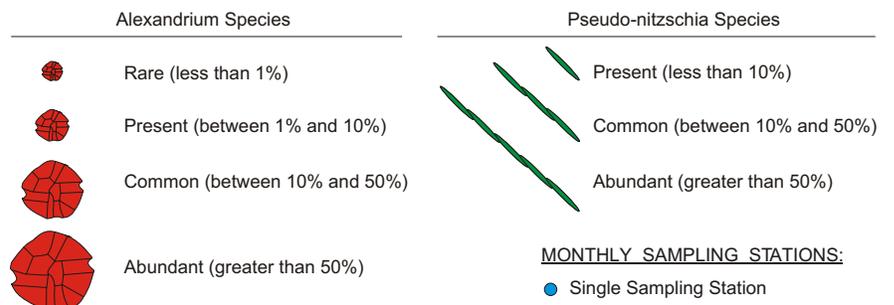
*Alexandrium* was observed at a limited number of sites during March (Figure 1). Low numbers of this dinoflagellate were observed in samples from Ellwood Pier (Santa Barbara) and Scripps Pier (San Diego).

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during March, 2009.



### Relative Abundance of Known Toxin Producers

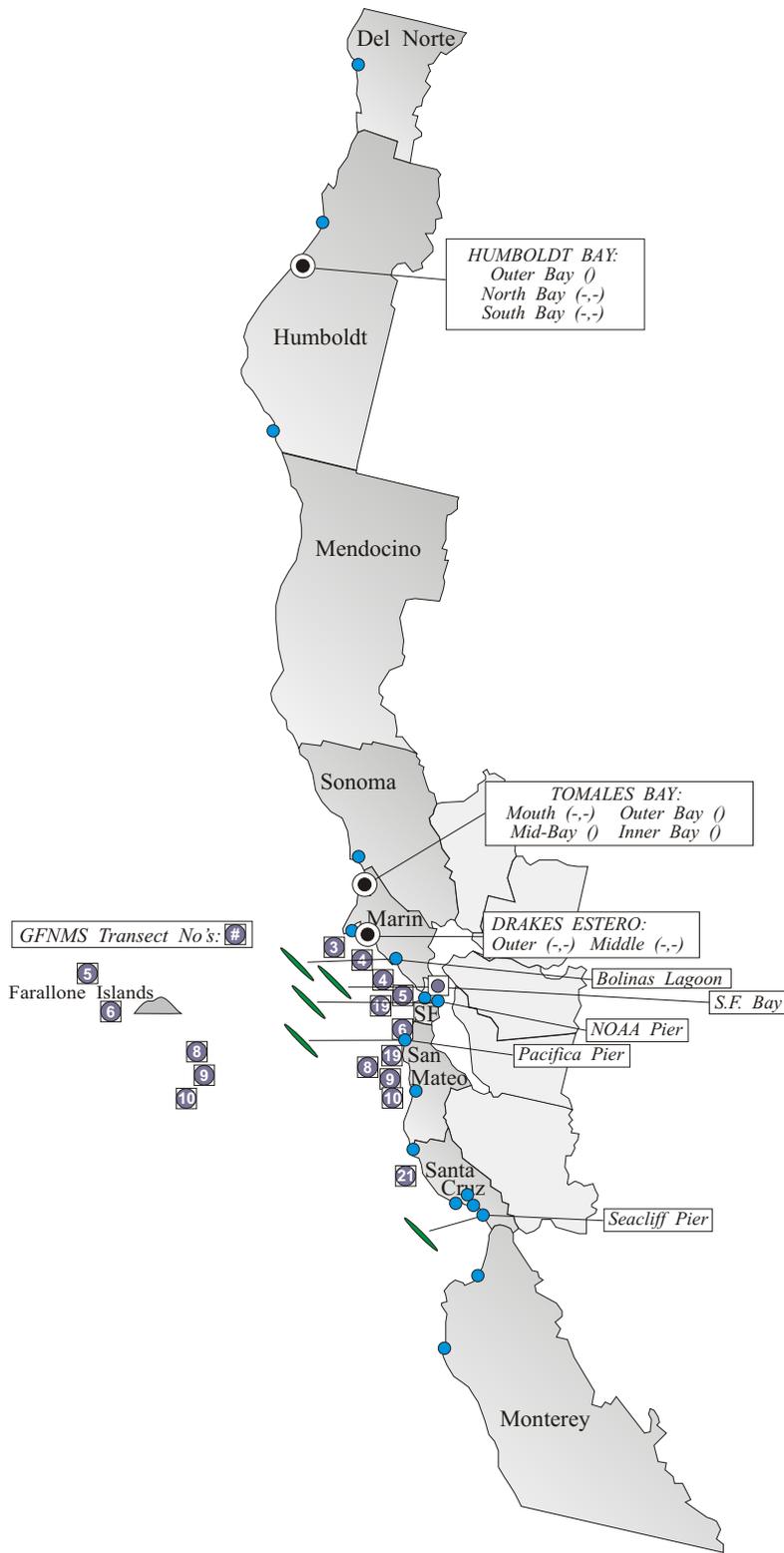


#### MONTHLY SAMPLING STATIONS:

- 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 March, 2009.



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Low concentrations of the PSP toxins were detected in mussels from Agua Hedionda Lagoon (San Diego) during the first three weeks of March and did not exceed 45 ug/100 g.

**Domoic Acid**

*Pseudo-nitzschia* was detected at sites along the entire southern California coast during March (Figure 1). The highest percent composition was observed in samples from various locations in Santa Barbara County. This diatom increased throughout the month at these sites, reaching 70% of all genera observed at Ellwood Pier by March 31. A similar pattern was observed in Ventura County, where *Pseudo-nitzschia* increased to 50% by the end of the month. Although the percent composition of this diatom was lower in samples from offshore of Palos Verdes (Los Angeles) and did not exceed 35%, the cell density was much higher, resulting in the highest recorded relative abundance for *Pseudo-nitzschia* during March (March 5 and March 10).

Domoic acid was detected in shellfish samples from just one location in March (Figure 3). A moderate concentration of domoic acid (11 ppm) was detected in a mussel sample from an aquaculture lease just offshore of Santa Barbara on March 18.

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**Relative Abundance of Known Toxin Producers**

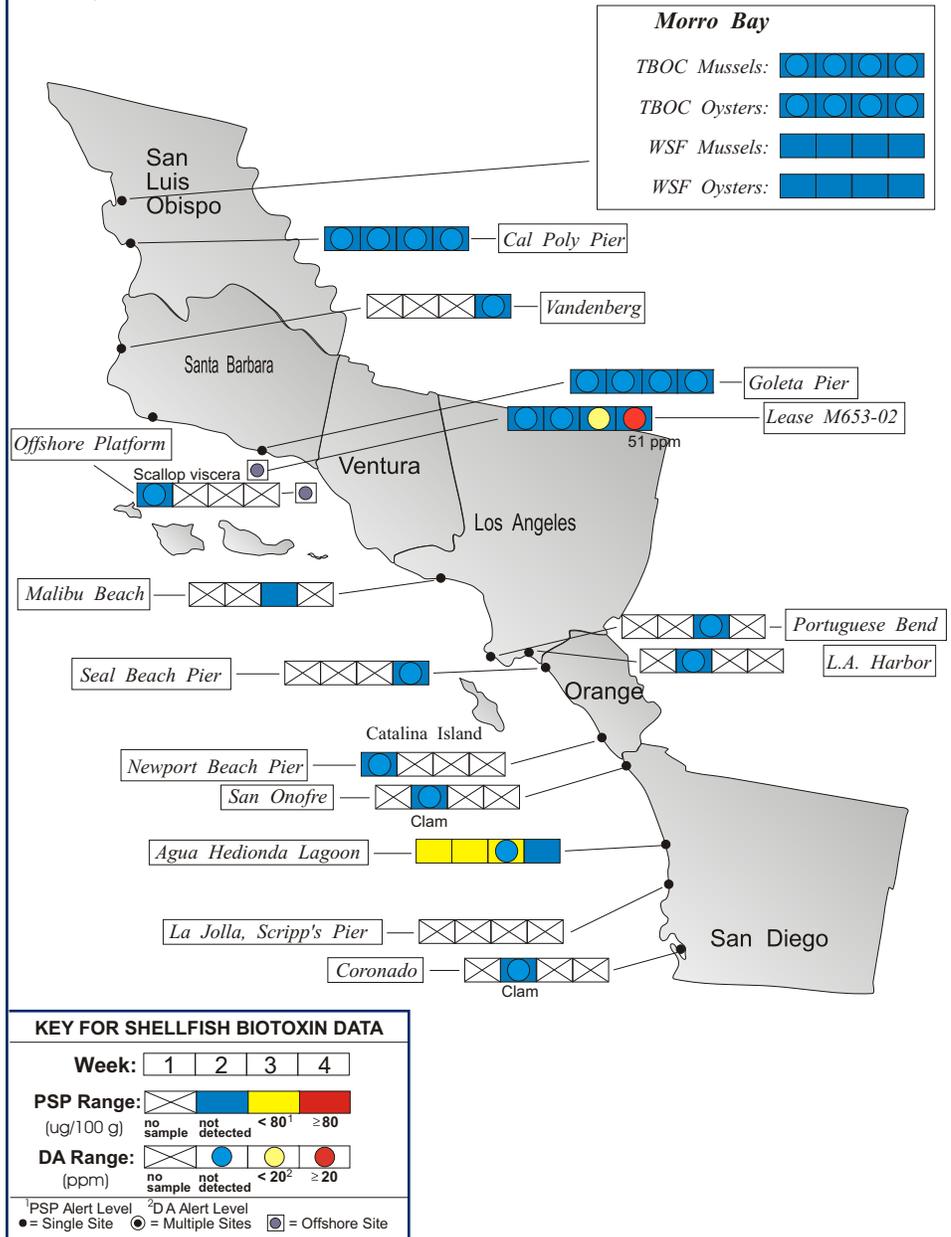
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

**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 March, 2009.



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By March 31 the concentration of this toxin had increased to 51 ppm at this site and the area was closed to harvest. Domoic acid was not detected in mussels from nearby Goleta Pier, where *Pseudo-nitzschia* was common but at much lower cell densities than observed at other sites in Santa Barbara County.

**Non-toxic Species**

Spring conditions appeared in March and diatoms dominated most of the southern California coast, with *Chaetoceros*, *Lauderia*, and *Skeletonema* the most common genera observed. A mixture of diatoms and dinoflagellates were observed along the Orange County coast and the latter group was dominant at San Diego sites by the second week of the month. *Prorocentrum* increased throughout the month at Scripps Pier to bloom levels. The highest relative abundances of phytoplankton were observed at this site.

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

*Alexandrium* was absent from all sampling stations in March (Figure 2). PSP toxins were not detected in any shellfish samples during the month.

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, 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 effort 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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**Domoic Acid**

*Pseudo-nitzschia* was observed at a small number of locations along the northern California coast in March (Figure 2). Very low numbers of cells were observed at sites in Marin, San Francisco, San Mateo, and Santa Cruz counties. Domoic acid was not detected in any samples analyzed in March.

**Non-toxic Species**

The heavy detritus loads of past months gave way to dramatic increases in phytoplankton densities along the northern California coast in March. Diatoms dominated the assemblage, with *Chaetoceros* the most abundant genera observed. *Skeletonema*, *Lauderia*, and *Thalassiosira* were also common along the coast. The highest relative abundance was observed in a sample collected at Crescent City (Del Norte County) on March 23.

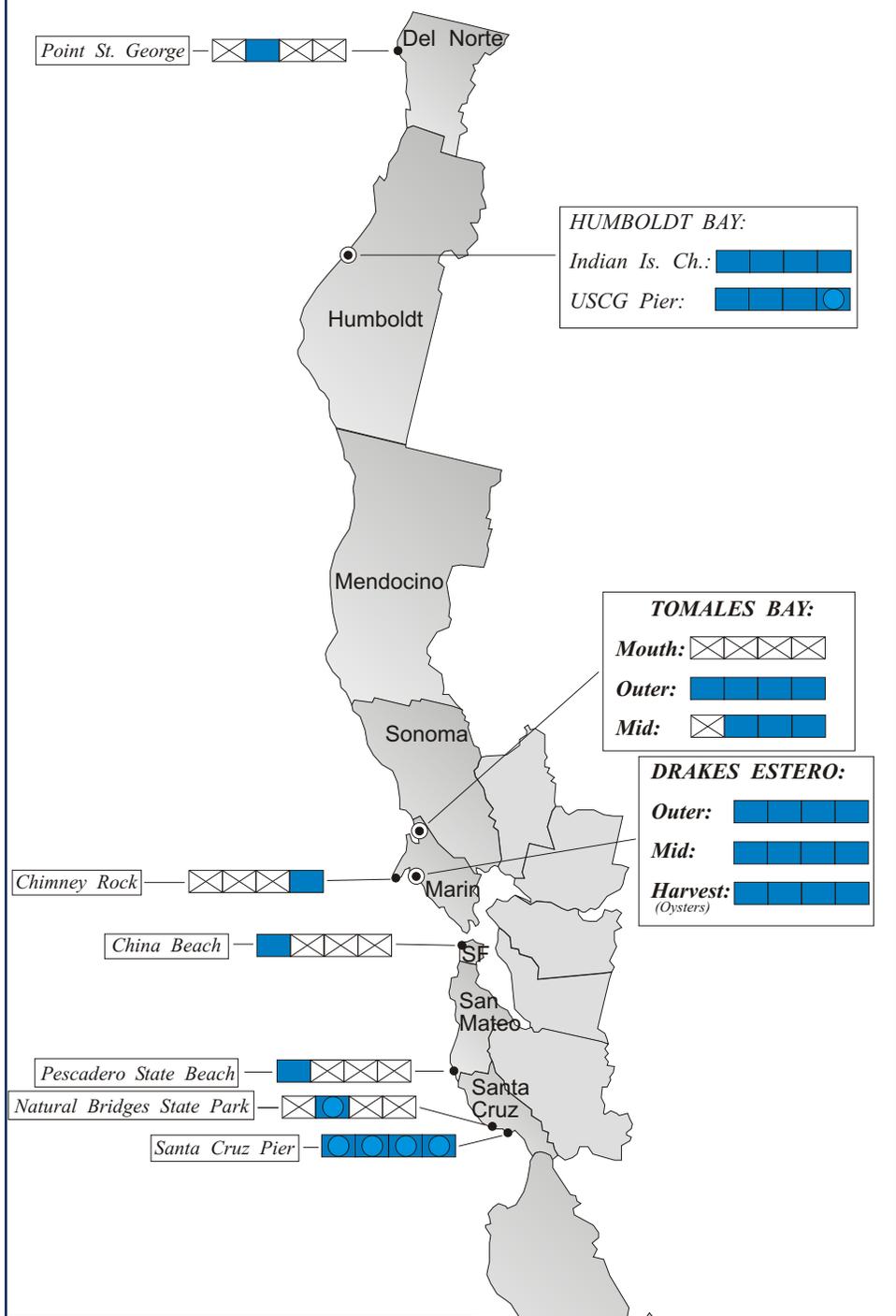


**QUARANTINES:**

There were no quarantines or health advisories in effect in February. The annual quarantine is scheduled to go in effect on May 1. This quarantine applies specifically to the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. Routine phytoplankton and biotoxin monitoring is maintained throughout the year, not just within the quarantine period. This allows the detection of unexpected increases in biotoxin activity outside of the routine quarantine period. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively. All certified shellfish growers are required to

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Figure 4. Distribution of shellfish biotoxins in Northern California during March, 2009.



**KEY FOR SHELLFISH BIOTOXIN DATA**

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

**PSP Range:** [white bar with X] [blue bar] [yellow bar] [red bar]  
 (ug/100 g) no sample not detected < 80<sup>1</sup> ≥ 80

**DA Range:** [white bar with X] [blue circle] [yellow circle] [red circle]  
 (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 March, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	10
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	CDPH Marine Biotoxin Monitoring Program	1
	Marin Oyster Company	3
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	1
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	1
Monterey	None Submitted	
San Luis Obispo	Cal Poly	5
	Tomales Bay Oyster Company	8
	Williams Shellfish Farms	10
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	CDPH Volunteer ( <i>Bill Weinerth</i> )	1
Los Angeles	Los Angeles County Health Department	2
Orange	Orange County Health Care Agency	2
San Diego	Carlsbad Aquafarms, Inc.	8
	Scripps Institute of Oceanography	1
	CDPH Volunteer ( <i>Steve Crooke</i> )	2

the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. 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.



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 (*Saxidomus nuttalli*), 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.,

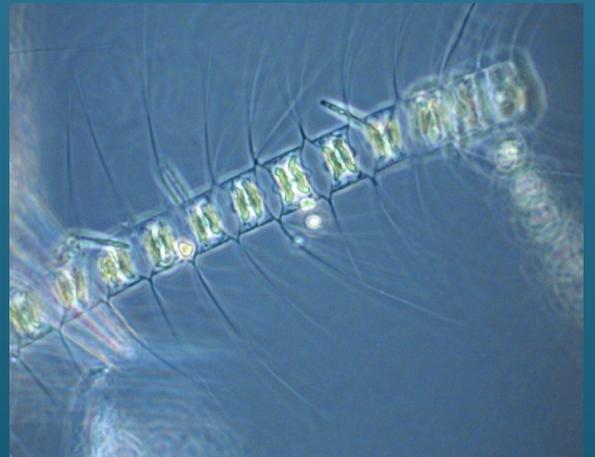
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during March, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	5
	Bureau of Land Management	1
	Humboldt State University	3
	Fortuna High School	2
Mendocino	None Submitted	
Sonoma	CDPH Volunteer ( <i>Cathleen Cannon</i> )	1
Marin	CDPH Volunteers ( <i>B. Anderson, C. Strobel, M. Siegel</i> )	7
	CDPH Marine Biotoxin Program	1
	Drakes Bay Oyster Company	12
	Gulf of the Farallones National Marine Sanctuary	6
San Francisco	CDPH Volunteer ( <i>E. McNaughton, C. Keiper</i> )	4
	Gulf of the Farallones National Marine Sanctuary	6
	San Francisco Health Department	3
San Mateo	CDPH Volunteer ( <i>Kathleen Abadie</i> )	1
	Gulf of the Farallones National Marine Sanctuary	9
	San Mateo County Environmental Health Dept.	1
	The Marine Mammal Center ( <i>Stan Jensen</i> )	5
Santa Cruz	U.C. Santa Cruz	1
	Gulf of the Farallones National Marine Sanctuary	3
	U.C. Santa Cruz	5
	San Lorenzo Valley High School	1
	Santa Cruz County Environmental Health Dept.	3
Monterey	The Marine Mammal Center ( <i>Nancy Scarborough</i> )	1
	Monterey Abalone Company	2
	CDPH Volunteer ( <i>Jerry Norton</i> )	1
San Luis Obispo	Cal Poly	10
	Monterey Bay National Marine Sanctuary	3
	Morro Bay National Estuary Program	1
	Tenera Environmental	4
	The Marine Mammal Center ( <i>Tim Lytsell, P.J. Webb</i> )	6
Santa Barbara	Tomales Bay Oyster Company	
	CDPH Volunteer ( <i>Sylvia Short</i> )	6
	Channel Islands National Marine Sanctuary	5
	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	4
Ventura	Vandenberg AFB	1
	CDPH Volunteer ( <i>Fred Burgess</i> )	4
	Channel Islands National Marine Sanctuary	3
Los Angeles	Catalina Island Marine Institute	2
	Los Angeles County Sanitation District	4
	Southern California Marine Institute	1
	Guided Discoveries, Tole Mour	5
Orange	Ocean Institute	1
	Orange County Health Care Agency	2
	Orange County Sanitation District	4
San Diego	Scripps Institute of Oceanography	5

## PHYTOPLANKTON GALLERY



A chain of the diatom *Grammatophora*, a somewhat uncommon genus in our samples.



The diatom *Chaetoceros* remained common along most of the California coast in March.



A rare sighting of a beautiful brittlestar larvae (*echiopluteus* larvae of *Ophiothrix* sp.).