

# 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

April 2009

Technical Report No. 09-15

**INTRODUCTION:**

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

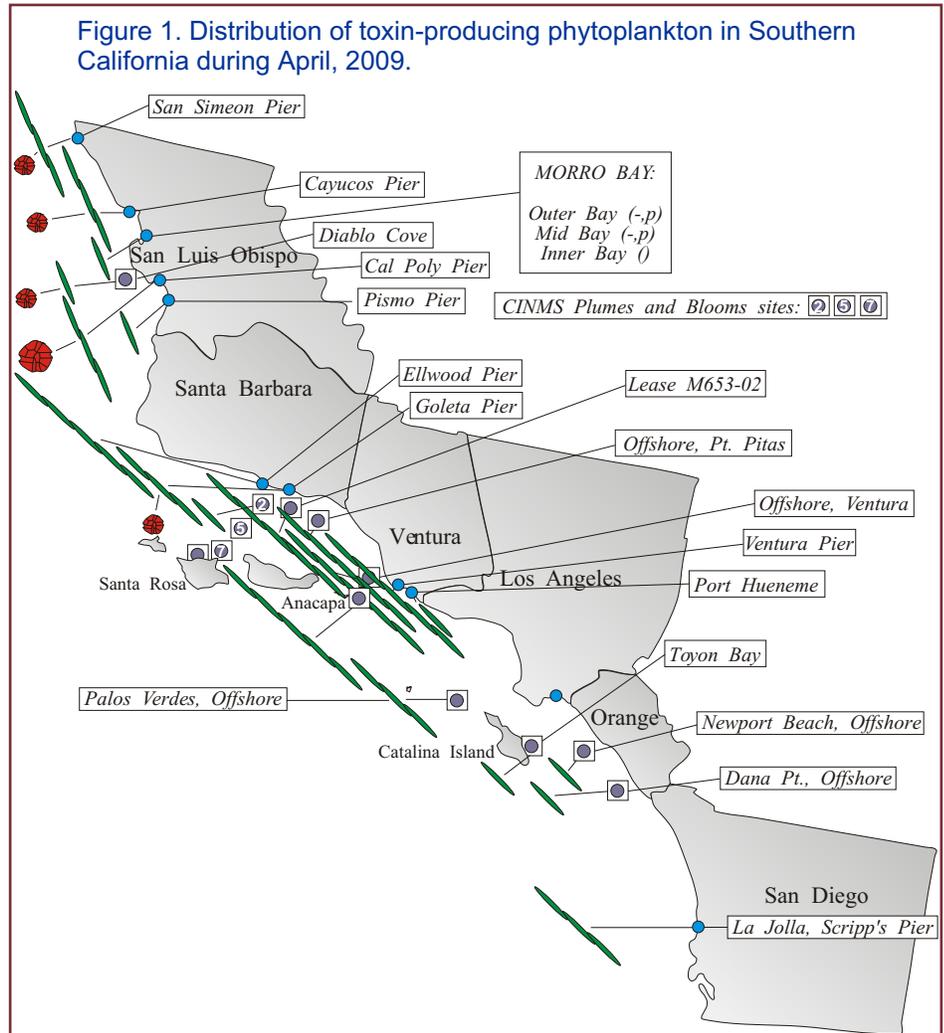
Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All 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 greater number of sites than in recent months, particularly along the San Luis Obispo coast (Figure 1). PSP toxins were not detected in any shellfish samples.

(Continued on Page 2)



**Relative Abundance of Known Toxin Producers**

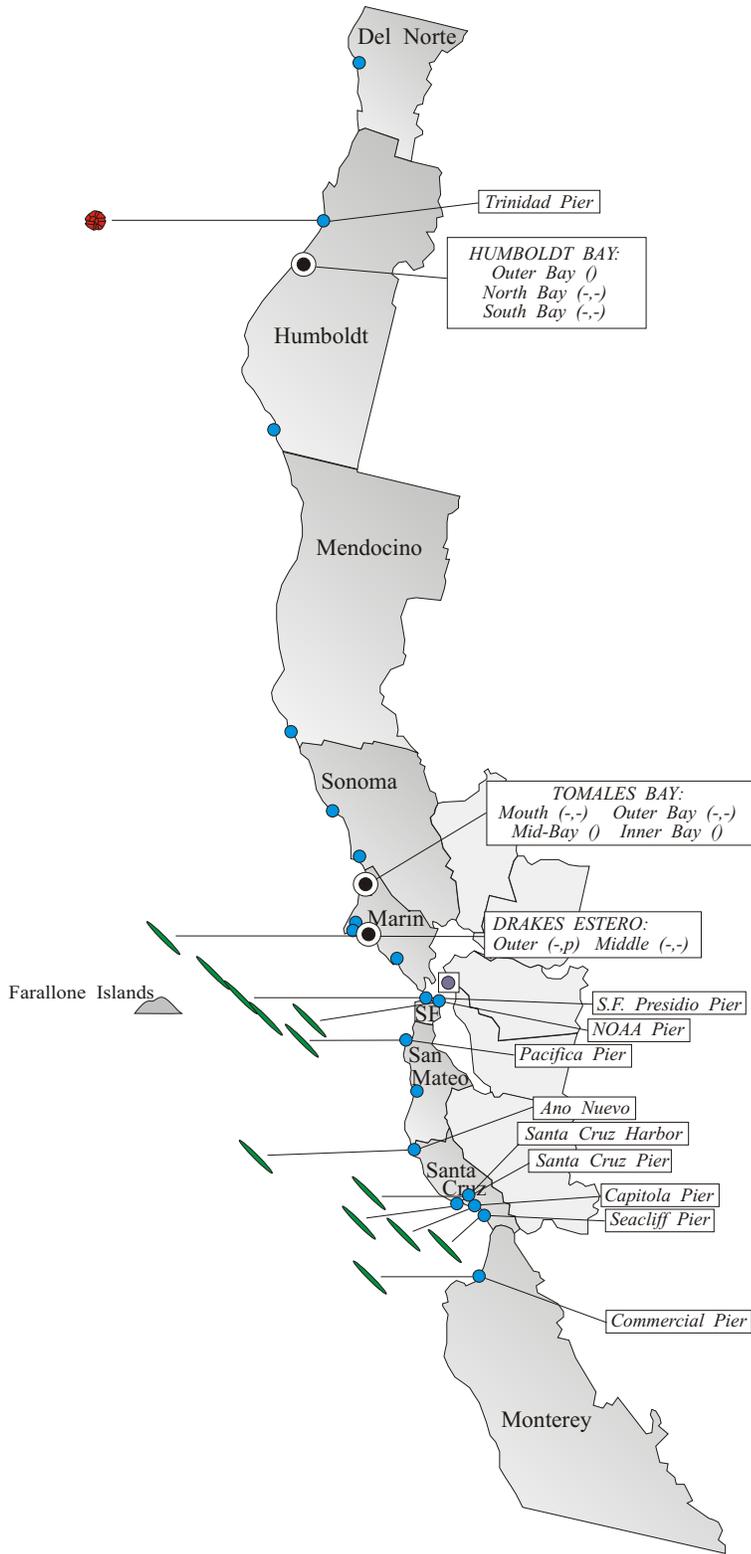
<p><b>Alexandrium Species</b></p> <ul style="list-style-type: none"> <li> Rare (less than 1%)</li> <li> Present (between 1% and 10%)</li> <li> Common (between 10% and 50%)</li> <li> Abundant (greater than 50%)</li> </ul>	<p><b>Pseudo-nitzschia Species</b></p> <ul style="list-style-type: none"> <li> Present (less than 10%)</li> <li> Common (between 10% and 50%)</li> <li> Abundant (greater than 50%)</li> </ul>
--	--

**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 April, 2009.



(Continued from Page 1)

**Domoic Acid**

*Pseudo-nitzschia* was detected at sites along the entire southern California coast during April (Figure 1). This diatom remained abundant at sites along the coast of Santa Barbara and Ventura counties. *Pseudo-nitzschia* was also abundant at sites offshore of these counties and accounted for 95 percent of the species composition in a sample on the west side of Anacapa Island (April 22). The pattern of increase observed in March reversed at the beginning of April as the relative abundance of *Pseudo-nitzschia* declined at many sites but remained common. A second increase in this diatom occurred at sites in Santa Barbara and Ventura counties towards the latter part of April. The greatest relative abundances were observed in samples from Ventura Pier (April 24), Ellwood Pier (April 29), and an aquaculture lease offshore of Santa Barbara (April 28).

Domoic acid was detected in shellfish samples from several sites in Santa Barbara and Ventura counties (Figure 3). Low concentrations of domoic acid (3 to 6 ppm) were detected in mussels from sampling stations in Ventura County at the beginning of April. A moderate concentration (12 ppm) of this toxin was detected in mussels from

(Continued on Page 3)

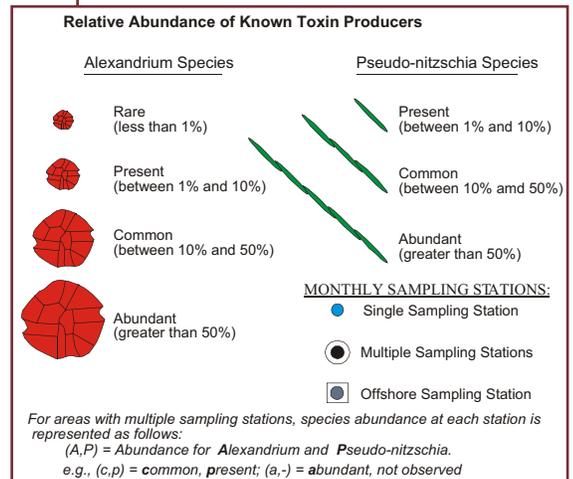
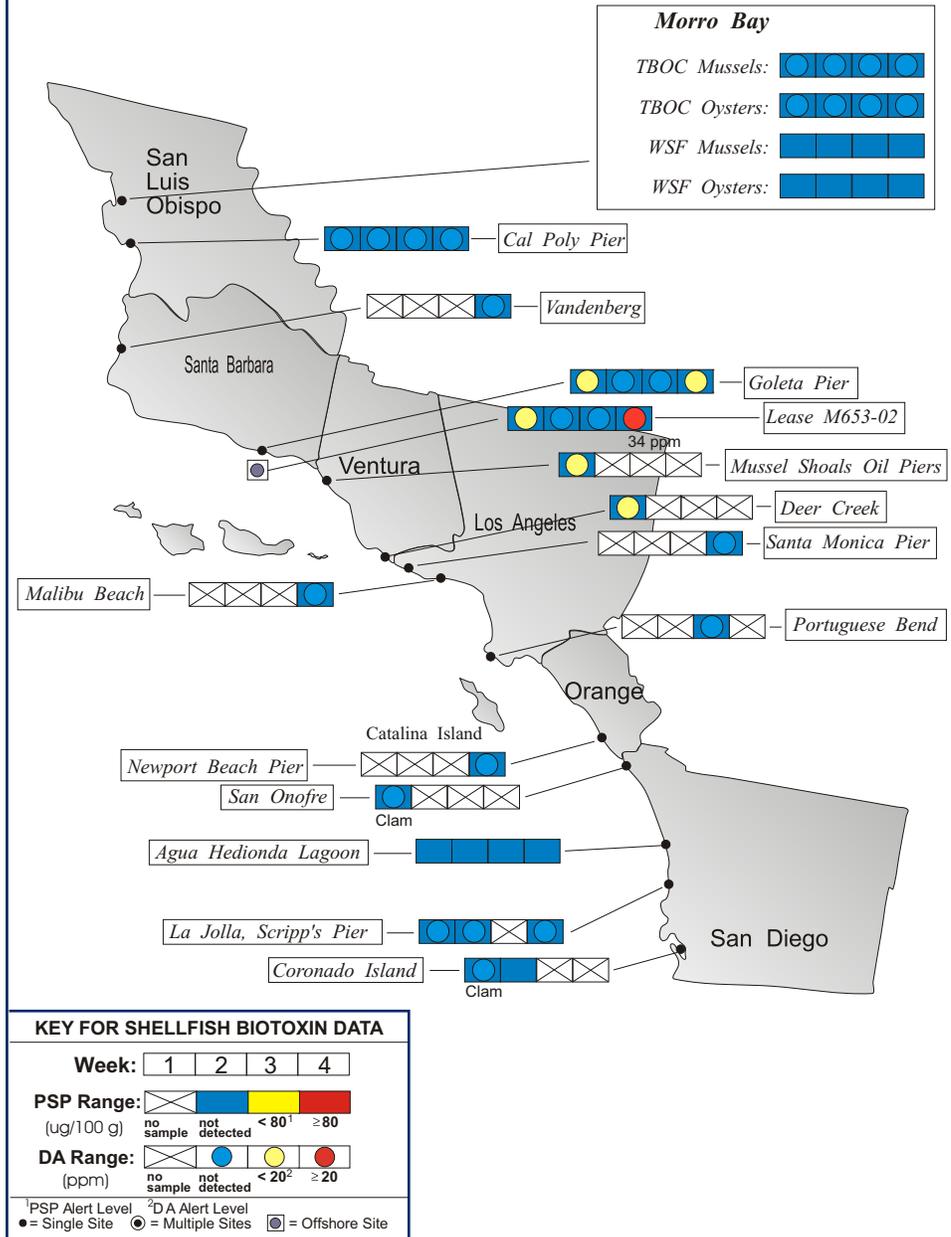


Figure 3. Distribution of shellfish biotoxins in Southern California during April, 2009.



(Continued from Page 2)

Goleta Pier on April 1. By the second week of April there was no domoic acid detected in any samples along the southern California coast, consistent with the decline in overall numbers of *Pseudo-nitzschia*. During the last week of the month, as cell numbers increased, domoic acid was again detected in mussels from Goleta Pier (11 ppm on April 29) and the offshore aquaculture lease (34 ppm on April 28).

**Non-toxic Species**

Diatoms dominated the southern California coast in terms of species diversity and biomass. *Chaetoceros* was the most abundant species, with *Lauderia* also common at many sites. The highest relative abundances were observed at sites in San Luis Obispo (Avila Pier, offshore of Diablo Cove, and Pismo Pier).

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

*Alexandrium* was observed at only one sampling station, Trinidad Pier in Humboldt County, in April (Figure 2). PSP toxins were not detected in any shellfish samples during the month.

**Domoic Acid**

*Pseudo-nitzschia* was observed at several

(Continued on Page 4)

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

(Continued from Page 3)

sites in April (Figure 2). The highest relative abundance was observed at the San Francisco Presidio Pier. Domoic acid was not detected in any samples analyzed in April.

**Non-toxic Species**

Diatoms continued to dominate the phytoplankton assemblage along the northern California coast. *Chaetoceros* remained the most abundant genera observed. *Thalassiosira* was common at sites in Del Norte and Humboldt counties, *Licmophora* was common at sites in Mendocino, Sonoma and Marin counties, and *Skeletonema* was common between San Francisco and Monterey counties. The highest relative abundances observed were in Bodega Harbor (*Chaetoceros*, April 22) and in San Francisco Bay at the Richmond breakwater (*Skeletonema*, April 22).

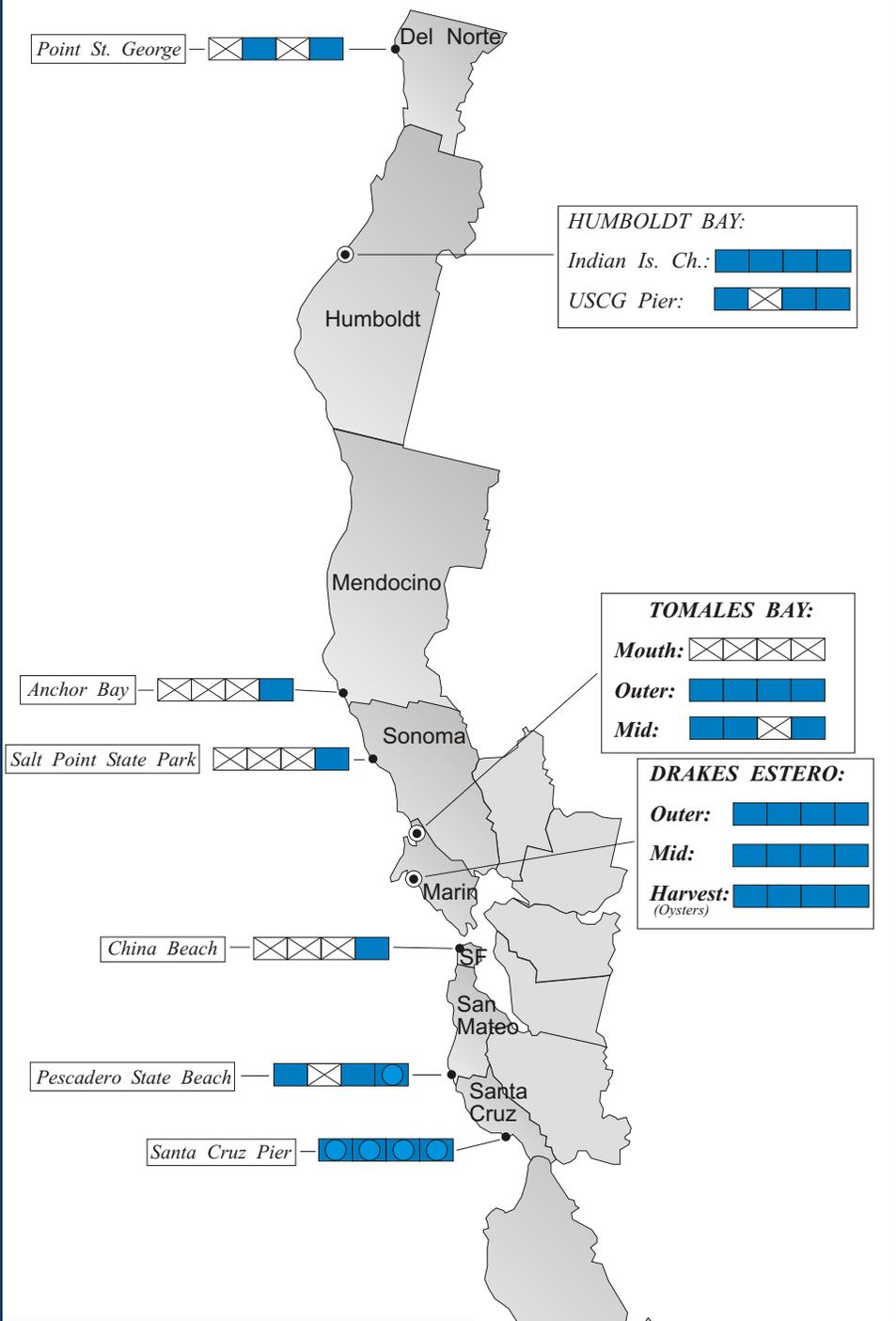


**QUARANTINES:**

There were no quarantines or health advisories in effect in April. 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

(Continued on Page 5)

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



**KEY FOR SHELLFISH BIOTOXIN DATA**

**Week:** 1 | 2 | 3 | 4

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

**DA Range:** [White 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 April, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	7
Mendocino	CDPH Volunteer (Marie De Santis)	1
Sonoma	CDPH Marine Biotoxin Monitoring Program	2
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	4
	Marin Oyster Company	4
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	3
Santa Cruz	U.C. Santa Cruz	5
Monterey	None Submitted	
San Luis Obispo	Cal Poly	4
	Tomales Bay Oyster Company	8
	Williams Shellfish Farms	8
Santa Barbara	Santa Barbara Mariculture Company	16
	U.C. Santa Barbara	5
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department	3
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	4
	CDPH Volunteer ( <i>Steve Crooke</i> )	2
	Scripps Institute of Oceanography	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.

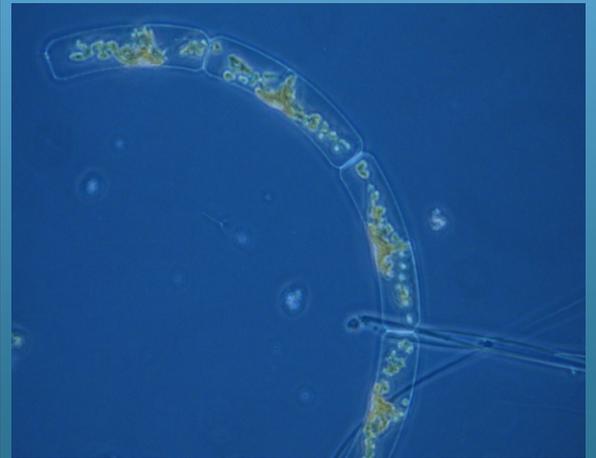
Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the

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.,

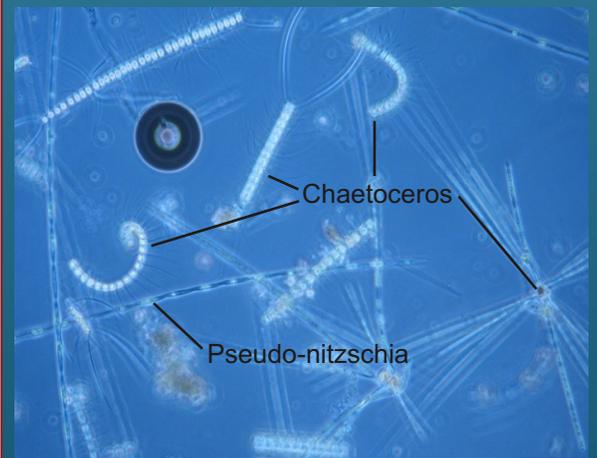
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during April, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	4
Humboldt	Coast Seafood Company	4
	Bureau of Land Management	1
	Humboldt State University	4
	Fortuna High School	2
Mendocino	CDPH Volunteer (Marie De Santis)	1
Sonoma	CDPH Volunteer (Cathleen Cannon)	1
	CDPH Marine Biotoxin Program	1
Marin	CDPH Volunteers (B. Anderson, C. Strobel, M. Siegel)	6
	Drakes Bay Oyster Company	8
	Hog Island Oyster Company	2
San Francisco	CDPH Volunteer (E. McNaughton)	4
	San Francisco Health Department	3
San Mateo	CDPH Volunteer (Kathleen Abadie)	2
	San Mateo County Environmental Health Dept.	2
	The Marine Mammal Center (Stan Jensen)	2
	U.C. Santa Cruz	1
Santa Cruz	San Lorenzo Valley High School	1
	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Dept.	2
Monterey	Monterey Abalone Company	3
	CDPH Volunteer (Jerry Norton)	1
San Luis Obispo	CDPH Volunteer (Renee and Auburn Atkins)	2
	Cal Poly	7
	Monterey Bay National Marine Sanctuary	2
	Morro Bay National Estuary Program	1
	Tenera Environmental	4
	The Marine Mammal Center (Tim Lytsell, P.J. Webb)	9
	Tomales Bay Oyster Company	4
Santa Barbara	CDPH Volunteer (Sylvia Short)	3
	Channel Islands National Marine Sanctuary	5
	Santa Barbara Mariculture Company	7
	U.C. Santa Barbara	6
Ventura	National Park Service	1
	CDPH Volunteer (Fred Burgess)	3
	Channel Islands National Marine Sanctuary	5
Los Angeles	National Park Service	1
	Ventura County Environmental Health Department	1
	Catalina Island Marine Institute	3
	Los Angeles County Sanitation District	3
	Southern California Marine Institute	1
Orange	Guided Discoveries, Tole Mour	1
	Ocean Institute	2
San Diego	Orange County Health Care Agency	1
	Scripps Institute of Oceanography	4

## PHYTOPLANKTON GALLERY



The diatom *Guinardia* was often observed in low numbers, particularly at southern California sampling sites.



Most April samples contained a mix of diatoms, dominated by *Chaetoceros* but containing a noticeable amount of *Pseudo-nitzschia*. Note the dark, perfectly round *Aeris ebullo* (air bubble!).



Zooplankton such as this barnacle nauplius became more common in April samples.