CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
850 Marina Bay Parkway, Richmond, CA 94804

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

June 2008

Technical Report No. 08-21

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of June, 2008. 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 only two sampling stations during June (Figure 1). This dinoflagellate was observed in very low numbers at Elwood Pier throughout the month and at Goleta Pier (June 4) in Santa Barbara.

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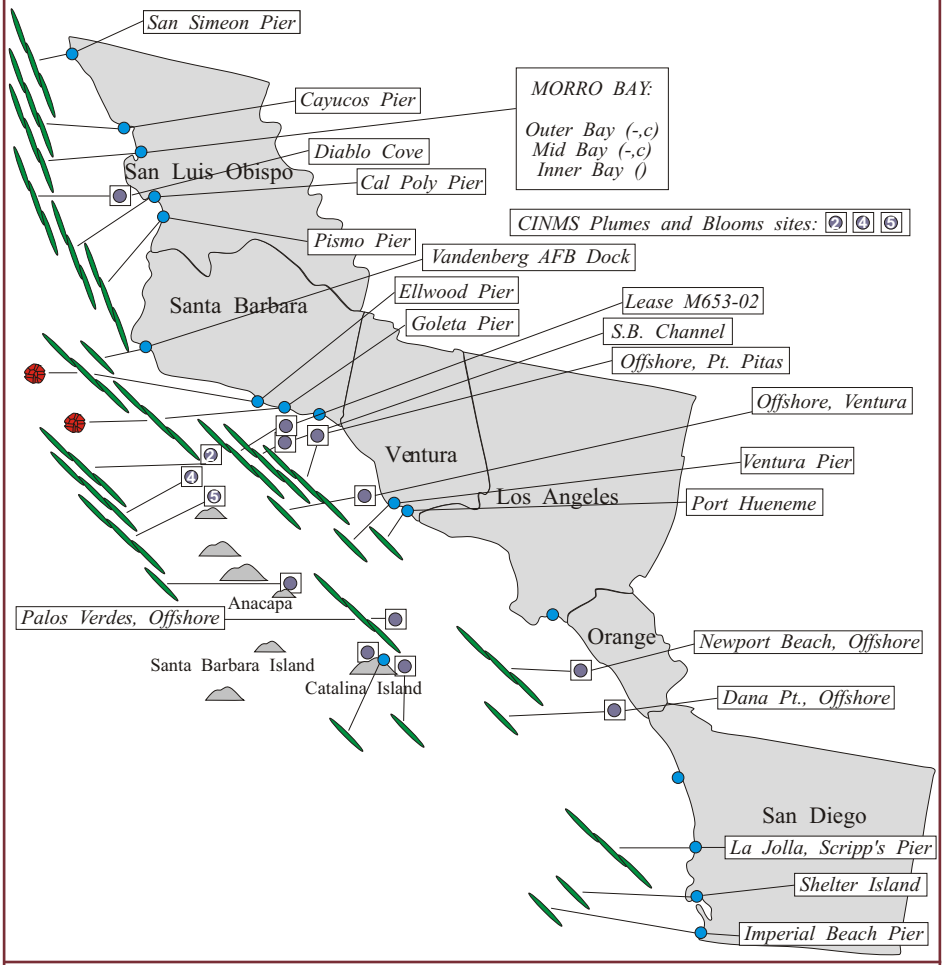
Figure 1. Distribution of toxin-producing phytoplankton in Southern California during June, 2008.



Relative Abundance of Known Toxin Producers

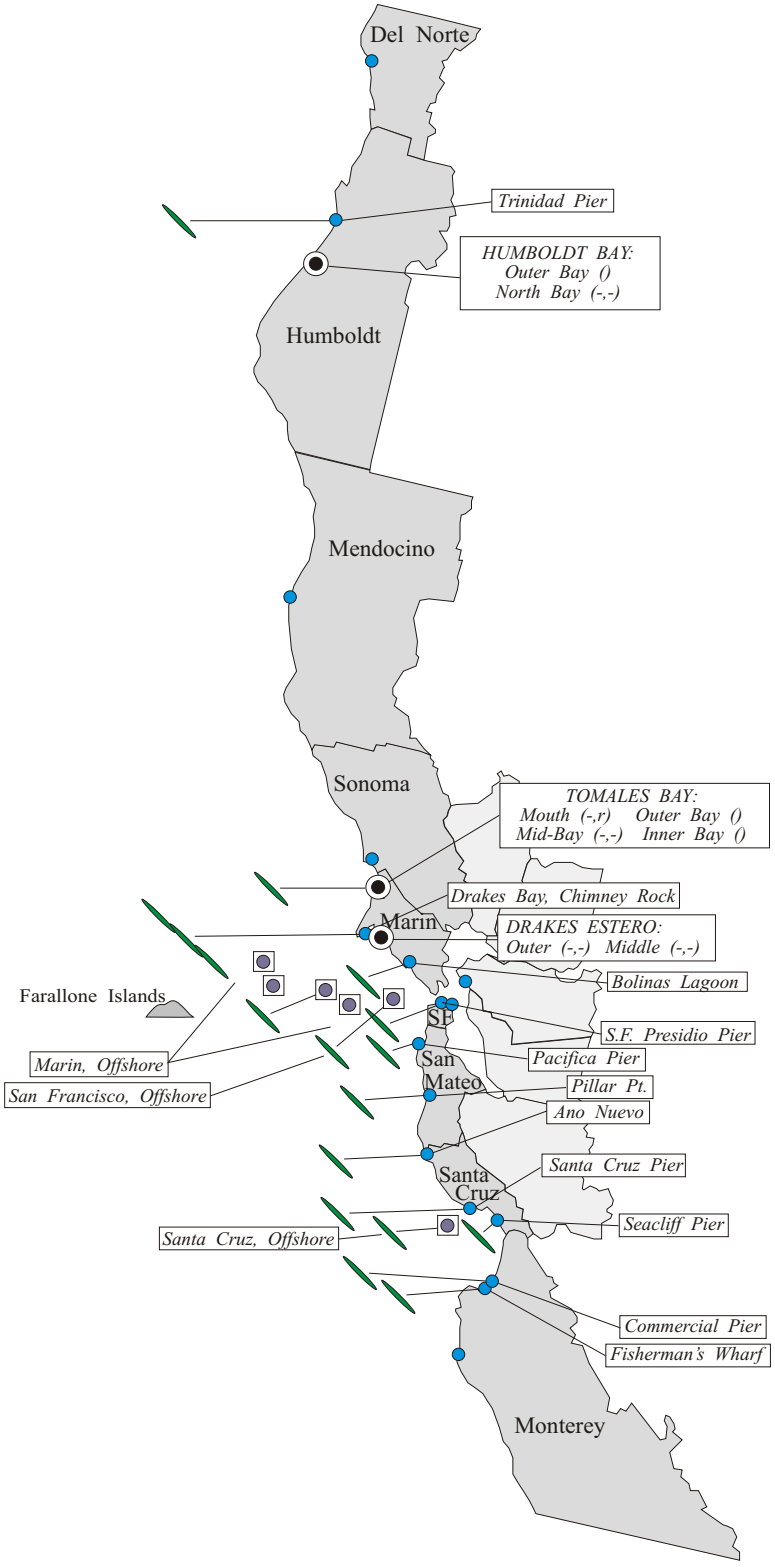
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

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

MONTHLY SAMPLING STATIONS:

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

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during June, 2008.



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The relative abundance was reduced from observations in May for most sites. The distribution of this dinoflagellate shifted, disappearing from sample sites in San Luis Obispo and occurring southward at the Santa Barbara sites.

Low concentrations of PSP toxins continued to be detected in mussels at an aquaculture lease offshore of Santa Barbara. A low level of these toxins was detected during the first two weeks of the month at this site, declining below the detection limit for the remainder of the month (Figure 3). PSP toxicity was not detected in any other samples collected in June.

Domoic Acid

Pseudo-nitzschia was detected at numerous sites between San Luis Obispo and San Diego counties during June (Figure 1). The distribution of this diatom was similar to observations in May but the relative abundance shifted in some areas. There was a slight decrease in the relative abundance of this diatom along the San Luis Obispo coast and a significant increase along the Santa Barbara coast, extending to offshore locations as well. Samples along the southern California coast contained a mix of toxic and nontoxic species, with the latter group slightly more prevalent in most areas.

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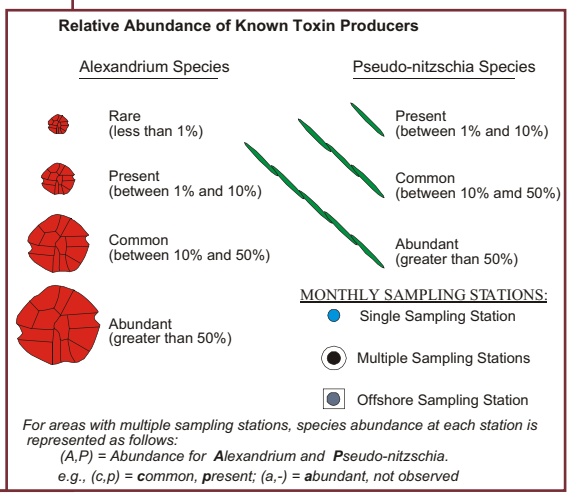
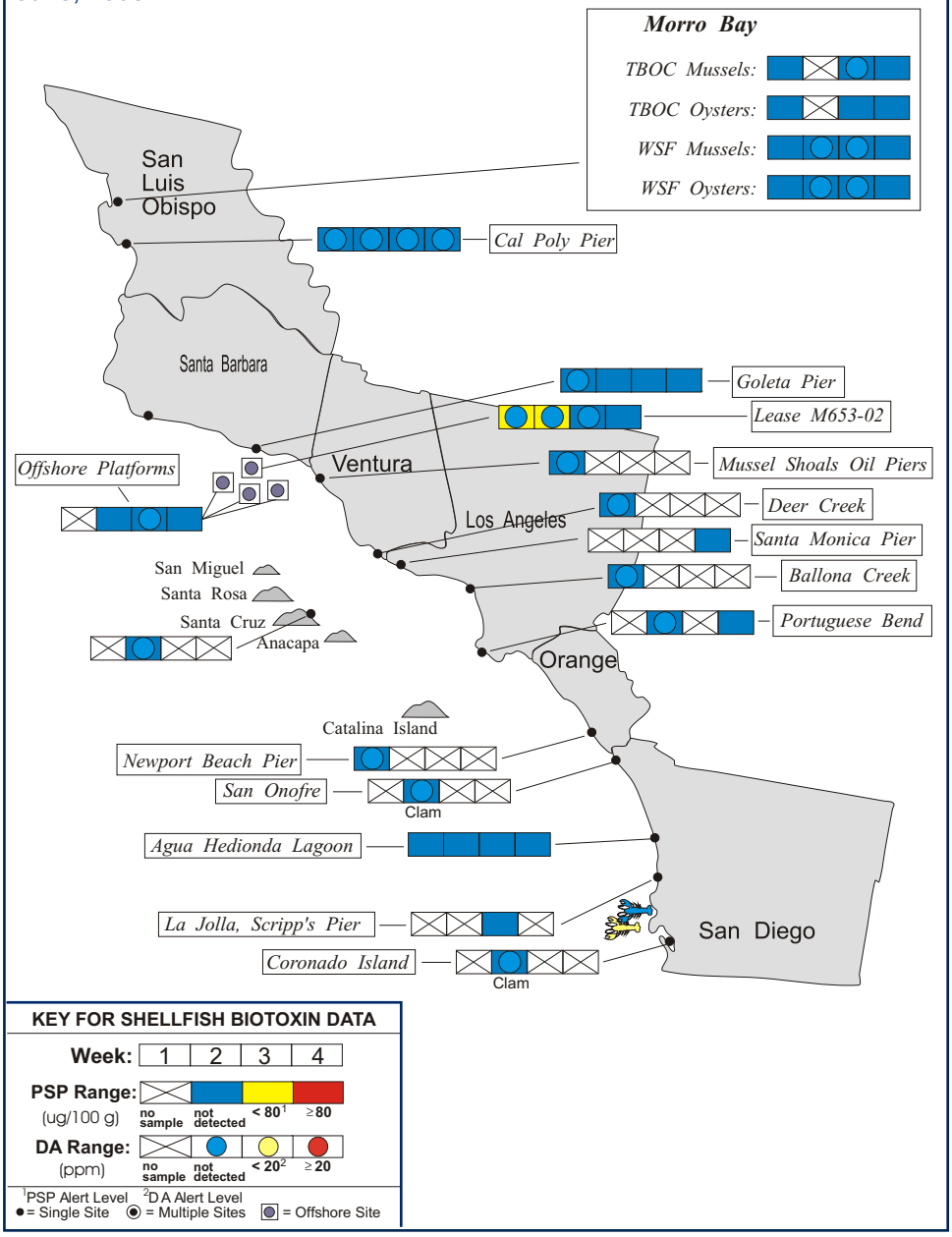


Figure 3. Distribution of shellfish biotoxins in Southern California during June, 2008.



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Domoic acid was not detected in any shellfish samples collected along the southern California coast in June (Figure 3). The lack of toxin in the presence of relatively high cell densities may reflect the predominance of the nontoxic species, which made up a significant portion of the overall assemblage.

Non-toxic Species

Diatoms dominated the phytoplankton assemblage along the coast of San Luis Obispo and Santa Barbara, while dinoflagellates were the dominant group between Ventura and San Diego counties. *Chaetoceros*, *Skeletonema*, *Leptocylindrus*, and *Thalassiosira* remained the dominant diatoms. Common dinoflagellates included *Ceratium*, *Prorocentrum*, *Lingulodinium*, and *Akashiwo*.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was not observed at any northern California sampling stations in June (Figure 2). PSP toxicity was not detected in any shellfish samples from this region during the month (Figure 4). It is rare, if not unprecedented, that these toxins have

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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.

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(510) 412-4635

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

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been completely absent from Marin sampling sites during the first half of the year.

Domoic Acid

Pseudo-nitzschia was observed at several sites between Marin and Monterey counties, as well as at one site in Humboldt County, in June (Figure 2). The distribution of this diatom decreased slightly compared to observations in May, disappearing at sites in Del Norte and Mendocino counties. A low concentration of domoic acid (1.2 ppm) was detected in one of six razor clam samples collected by the U.C. Sea Grant office at Endert's Beach (Del Norte County) between June 3-5.

Non-toxic Species

The phytoplankton assemblage along the northern California coast continued to be dominated by diatoms. The most common genera included *Chaetoceros* and *Thalassiosira*. *Asterionella*, *Eucampia,* and *Odontella* were common locally.

QUARANTINES:

The annual mussel quarantine went into effect on May 1. The annual quarantine applies specifically to sport-harvested mussels and is in effect for 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 submit at least weekly samples of

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Figure 4. Distribution of shellfish biotoxins in Northern California during June, 2008.

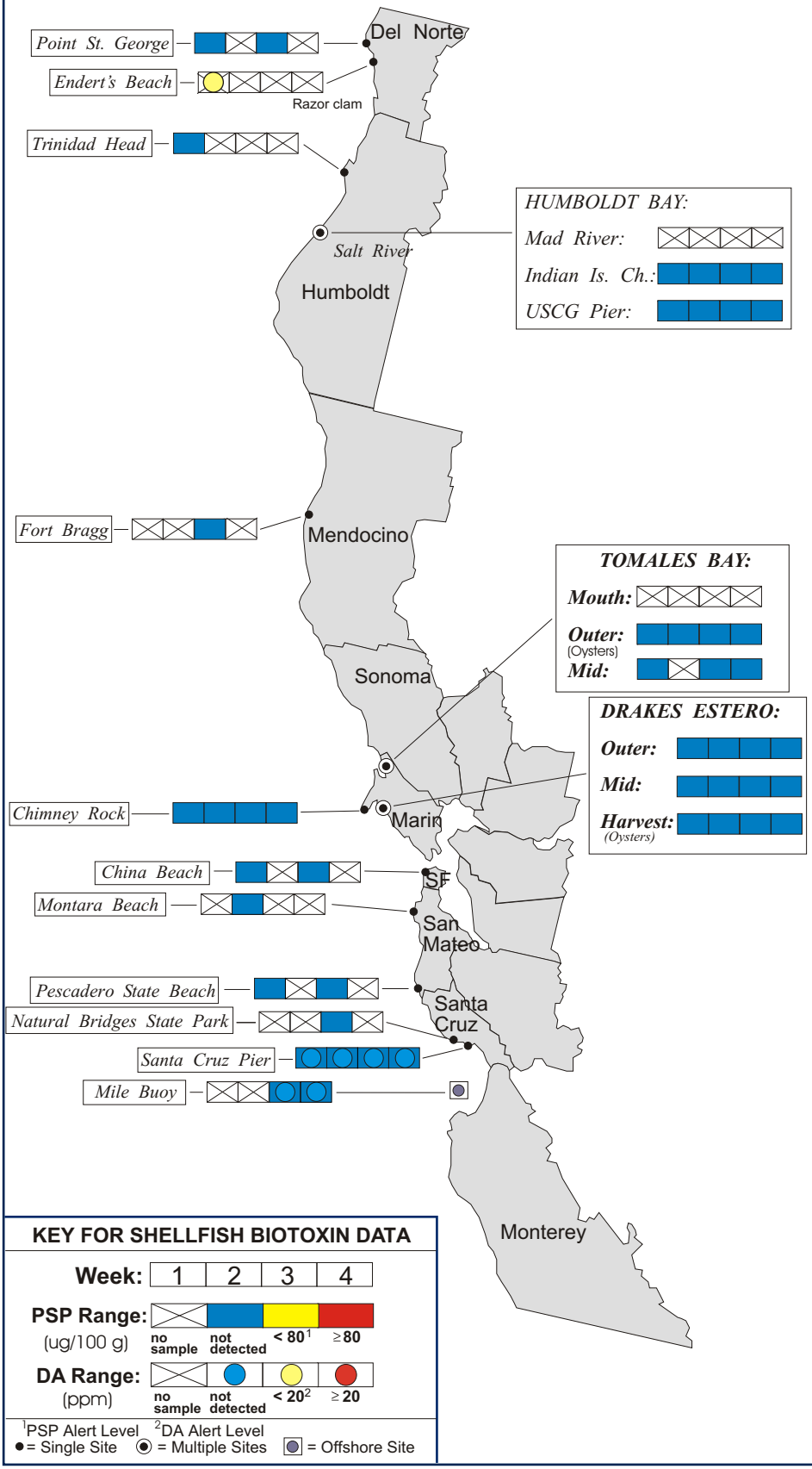


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during June, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
	U.C. Sea Grant Program	6
Humboldt	Coast Seafood Company	6
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	None Submitted	
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	12
	Hog Island Oyster Company	4
	Marin Oyster Company	3
	CDPH Marine Biotoxin Monitoring Program	10
San Francisco	San Francisco County Health Department	2
San Mateo	San Mateo County Environmental Health Department	2
	CDPH Volunteer (*Kathleen Abadie*)	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	6
	Williams Shellfish Farms	10
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	8
Ventura	Ventura County Environmental Health Department	2
	CDPH Volunteer (*Bill Weinerth, Island Packers*)	1
Los Angeles	Los Angeles County Health Department	4
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	6
	Scripps Institute of Oceanography	1
	CDPH Volunteer (*Steve Crooke*)	2

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., 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. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies.

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.

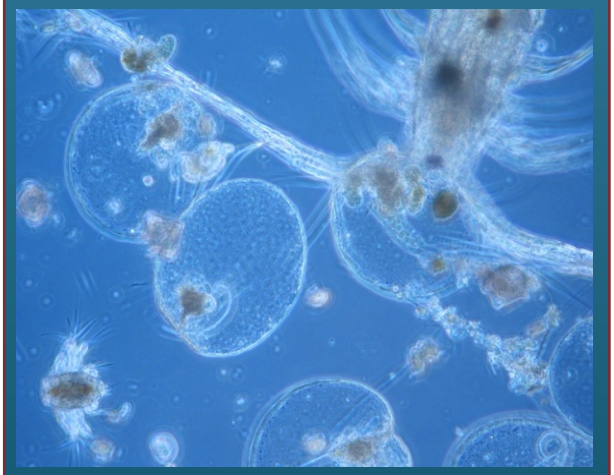
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 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 June, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	4
	Humboldt State University	1
Mendocino	California Department of Fish and Game	1
Sonoma	CDPH Volunteer (*Cathleen Cannon*)	1
Marin	CDPH Volunteers	6
	(*Brent Anderson, Richard Plant, Cal Strobel)*	
	Drakes Bay Oyster Company	8
	CDPH Marine Biotoxin Program	6
	Gulf of the Farallones National Marine Sanctuary	4
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	4
	Gulf of the Farallones National Marine Sanctuary	2
	San Francisco Health Department	3
San Mateo	CDPH Volunteer (*Kathleen Abadie*)	4
	San Mateo County Environmental Health Dept.	1
	The Marine Mammal Center (*Stan Jensen*)	3
	U.C. Santa Cruz	3
Santa Cruz	U.C. Santa Cruz	4
	The Marine Mammal Center (*Nancy Scarborough*)	1
	California Department of Parks and Recreation	2
Monterey	Marine Pollution Studies Laboratory	1
	Monterey Abalone Company	5
San Luis Obispo	CDPH Volunteer (*Renee and Auburn Atkins*)	1
	Cal Poly	12
	Monterey Bay National Marine Sanctuary	4
	Morro Bay National Estuary Program	4
	Tenera Environmental	4
	The Marine Mammal Center (*Tim Lytsell*)	11
	Tomales Bay Oyster Company	1
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	4
	Channel Islands National Marine Sanctuary	5
	Santa Barbara Channel Keeper	1
	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	4
	National Park Service	1
	Vandenberg AFB	1
Ventura	CDPH Volunteer (Fred Burgess)	3
	Channel Islands National Marine Sanctuary	2
	National Park Service	1
	Ventura County Environmental Health Department	4
Los Angeles	Los Angeles County Sanitation District	3
	Catalina Island Marine Institute	1
	Guided Discoveries, Tole Mour	2
	Southern California Marine Institute	1
Orange	Orange County Health Care Agency	1
	Ocean Institute	1
San Diego	Avian Research Associates	4
	Scripps Institute of Oceanography	5
	CDPH Volunteer (*Paul Sims*)	1

PHYTOPLANKTON GALLERY

The diatom Thalassiosira continued to be a dominant member of the phytoplankton community along the California coast.



Noctiluca, a bioluminescent dinoflagellate, was present in low numbers along the entire coast.

Zooplankton such as this copepod were often observed in our phytoplankton samples.