

# 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

September 2010

Technical Report No. 10-15

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of September, 2010. 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.

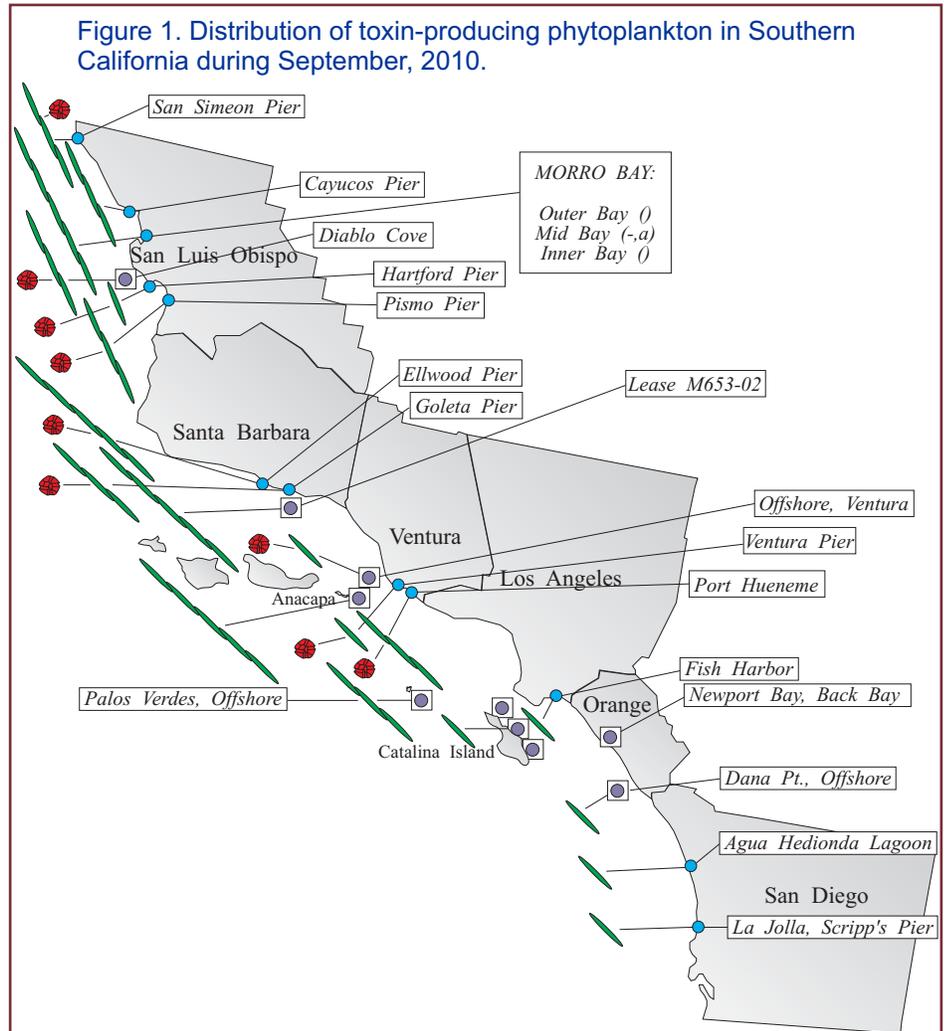
Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All 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 several sampling locations during September (Figure 1). Low numbers of this dinoflagellate were detected at sites between San Luis Obispo and Ventura counties, representing a

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### Relative Abundance of Known Toxin Producers

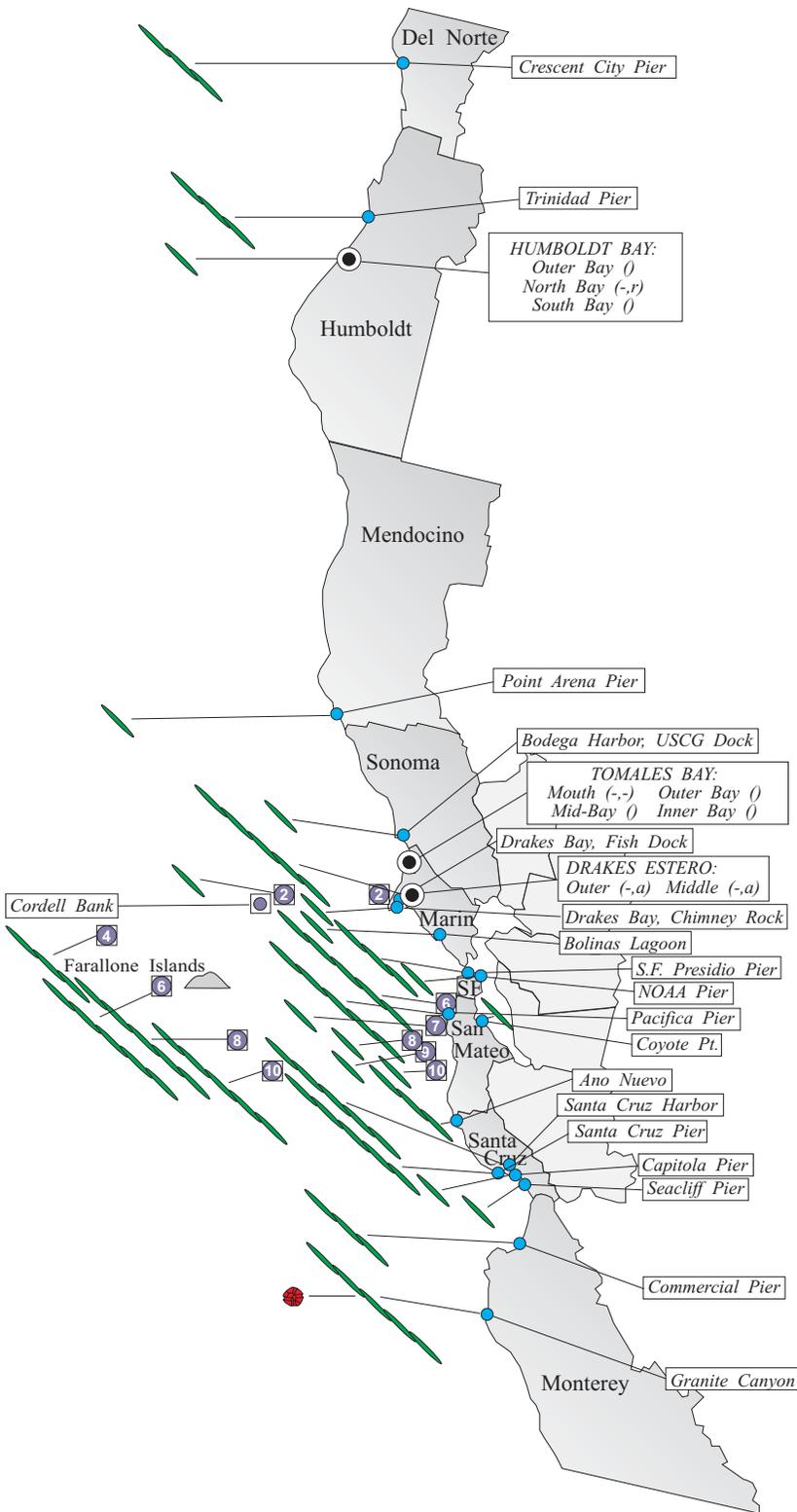
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

#### 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 September, 2010.



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decrease in distribution compared to observations in August.

Low levels of PSP toxins were detected in shellfish samples from an aquaculture site offshore of Santa Barbara and in southern Ventura County (Figure 3).

**Domoic Acid**

*Pseudo-nitzschia* was observed along the entire southern California coast during September (Figure 1). This diatom decreased along the San Luis Obispo coast but remained abundant at sites in Santa Barbara and offshore near Anacapa Island. The highest relative abundances of *Pseudo-nitzschia* were observed offshore of Diablo Cove (September 23) and at Port Hueneme Pier (September 7).

Domoic acid persisted in shellfish samples from an aquaculture lease offshore of Santa Barbara throughout September. Toxin levels exceeded the federal alert level on September 21 at this site but quickly declined below the alert level for the remainder of the month. An elevated level of domoic acid (20 ppm) was also detected in shellfish from an offshore oil platform on September 15.

**Non-toxic Species**

Diatoms remained dominant at most sites along the San Luis Obispo coast, with

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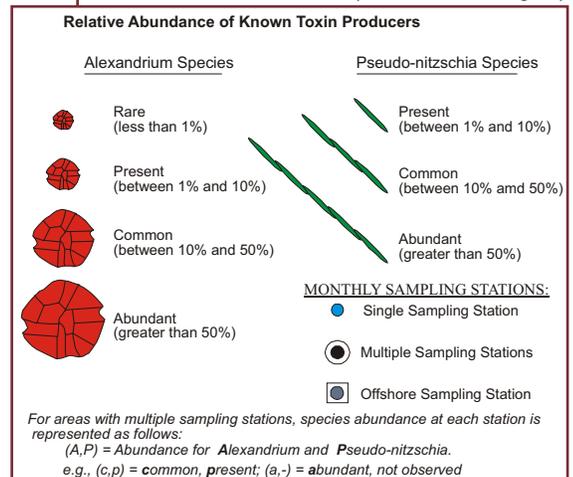
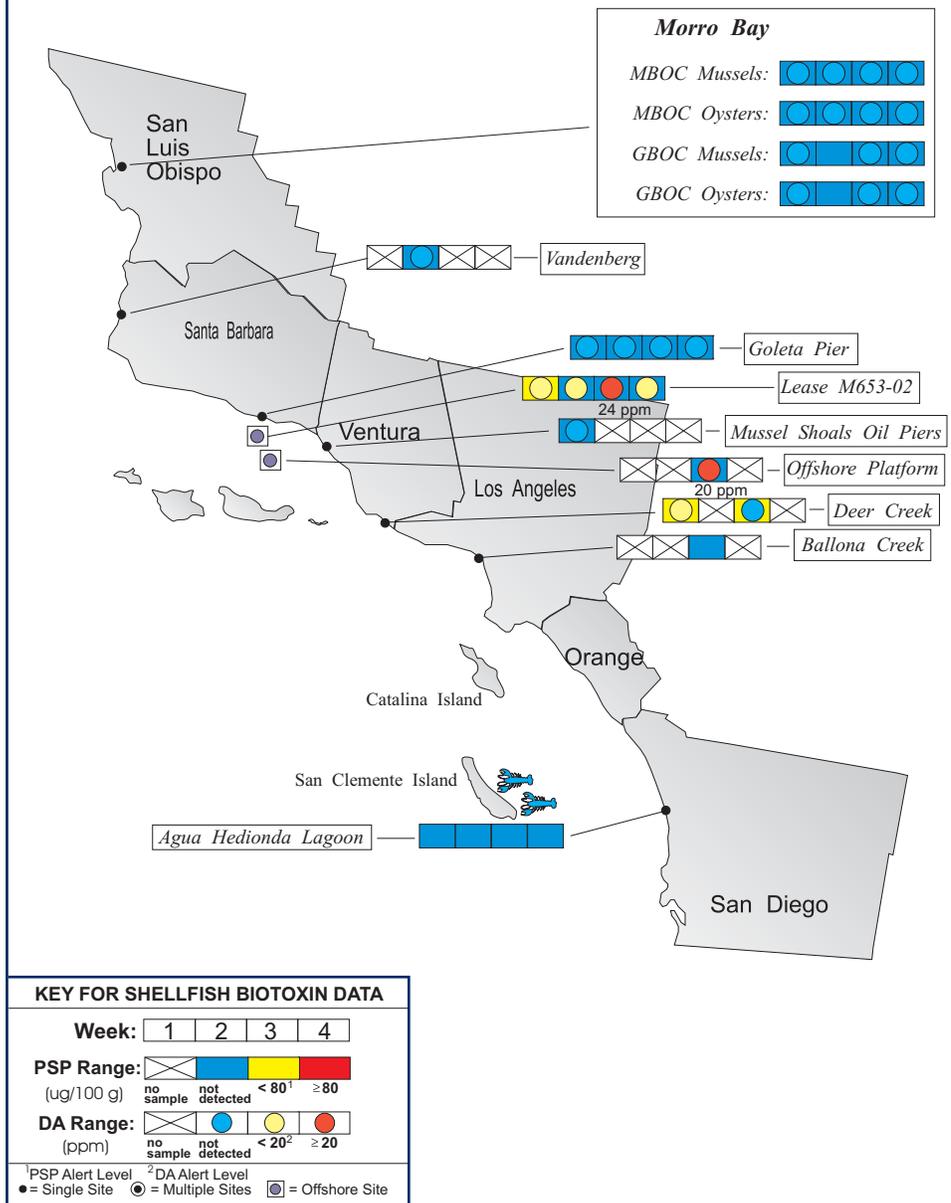


Figure 3. Distribution of shellfish biotoxins in Southern California during September, 2010.



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*Chaetoceros* the most common genus. A mix of diatoms and dinoflagellates was observed at sites between Santa Barbara and Orange counties. Common dinoflagellates included *Prorocentrum*, *Ceratium*, and *Lingulodinium*.

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

*Alexandrium* was observed at only one sampling site during September, representing a minor decrease compared to observations in August (Figure 2). PSP toxins were not detected in any shellfish samples collected during September (Figure 4).

**Domoic Acid**

*Pseudo-nitzschia* was observed at most sampling locations along the northern California coast during September (Figure 2). The distribution and relative abundance of this diatom was similar to observations in August, remaining abundant between Monterey and San Mateo counties. The highest relative abundances of *Pseudo-nitzschia* were observed at Santa Cruz Pier (September 1), Granite Canyon (September 10), and at several offshore sites along the San Mateo coast. An interesting pattern of phytoplankton

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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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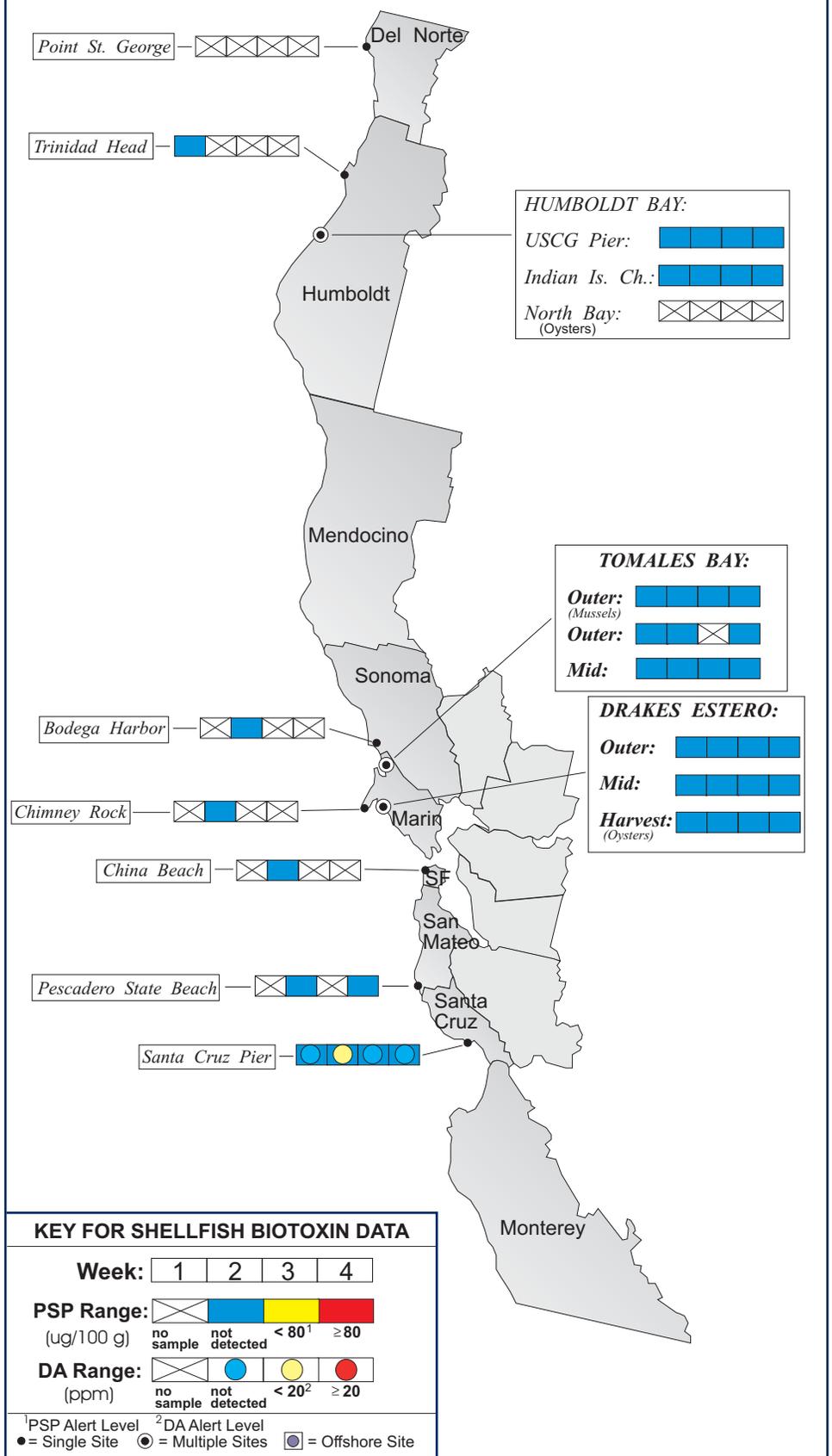
distribution was observed in a series of nearshore and offshore samples collected by the Applied California Current Ecosystems Studies (ACCESS), a monitoring program involving numerous organizations (for more information go to <http://www.accessoceans.org/>). Offshore sampling locations were dominated by the diatom *Pseudo-nitzschia*, with the highest relative abundance occurring at station 8W. In contrast, the nearshore sites contained mostly dinoflagellates associated with several reported red tides, as discussed in the next section.

Domoic acid was only detected in one shellfish sample. A sentinel mussel sample from Santa Cruz Pier contained a low level of this toxin by the second week of the month (Figure 4).

**Non-toxic Species**

Diatoms continued to dominate the phytoplankton assemblage along the northern California coast between Del Norte and Marin counties. Dinoflagellates became more prevalent at sites between San Francisco and Santa Cruz. The series of ACCESS samples indicated that *Gonyaulax spinifera* was the most abundant dinoflagellate, although *Noctiluca scintillans* was common at some sites. Both species likely contributed to the reported red tides. The highest relative abundances were observed at nearshore stations 7 and 10.

Figure 4. Distribution of shellfish biotoxins in Northern California during September, 2010.



**QUARANTINES:**

The annual mussel quarantine went into effect on May 1. This quarantine prohibits the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. The annual quarantine does not apply to the certified

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Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during September, 2010.

COUNTY	AGENCY	# SAMPLES
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Monitoring Program	1
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	17
	Hog Island Oyster Company	4
	Marin Oyster Company	3
	CDPH Marine Biotoxin Monitoring Program	1
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	5
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	8
	Morro Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	12
	U.C. Santa Barbara	6
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	3
Los Angeles	Los Angeles County Health Department	1
	California Department of Fish and Game	7
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4

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.



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 commercial shellfish growing areas in California, which are monitored intensively throughout the year. 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. In addition, routine coastal phytoplankton and biotoxin monitoring is maintained throughout the quarantine period. Special quarantines or health advisories may be

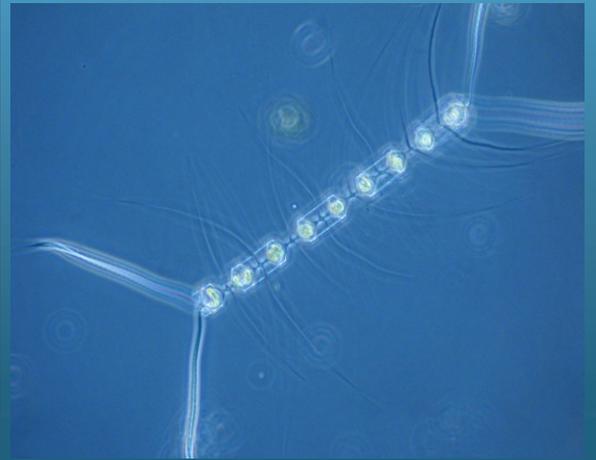
issued for additional seafood species as warranted by increasing toxin levels.

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.,

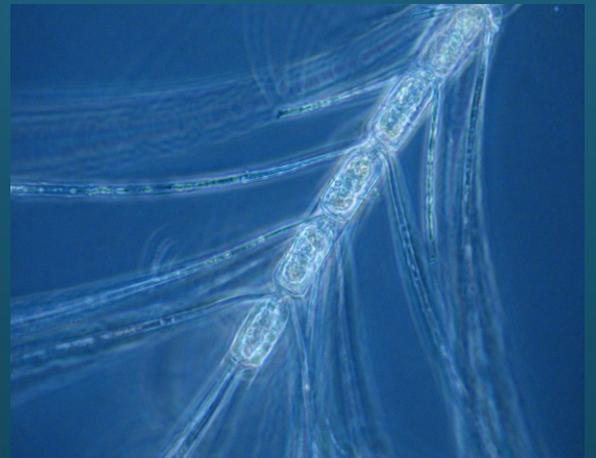
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during September, 2010.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	4
Humboldt	Coast Seafood Company	4
	Humboldt State University Marine Lab	2
Mendocino	CDPH Volunteer ( <i>Marie De Santis</i> )	2
Sonoma	CDPH Marine Biotoxin Program	1
	CDPH Volunteer ( <i>Cathleen Cannon</i> )	1
Marin	CDPH Volunteer ( <i>B. Anderson, C. Strobel, M. Siegel</i> )	6
	Applied California Current Ecosystem Studies	7
	Drakes Bay Oyster Company	11
	CDPH Marine Biotoxin Program	1
San Francisco	Applied California Current Ecosystem Studies	5
	CDPH Volunteer ( <i>Eugenia McNaughton</i> )	1
	San Francisco Health Department	4
San Mateo	Applied California Current Ecosystem Studies	8
	The Marine Mammal Center ( <i>Stan Jensen</i> )	4
	Friends of the Sea Otter ( <i>Diane Larsen</i> )	1
	San Mateo County Environmental Health Dept.	2
Santa Cruz	U.C. Santa Cruz	2
	California Department of Parks and Recreation	1
	San Lorenzo Valley High School	2
Santa Cruz	Santa Cruz County Environmental Health Dept.	3
	U.C. Santa Cruz	5
	CDPH Volunteer ( <i>Jerry Norton</i> )	1
	Marine Pollution Studies Laboratory	1
San Luis Obispo	Monterey Abalone Company	1
	Friends of the Sea Otter ( <i>Kelly Cherry</i> )	3
	Monterey Bay National Marine Sanctuary	2
	Morro Bay Oyster Company	4
Santa Barbara	Tenera Environmental	4
	The Marine Mammal Center ( <i>Tim Lytsell, P.J. Webb</i> )	8
	CDPH Volunteer ( <i>Sylvia Short</i> )	4
	Santa Barbara Mariculture Company	5
Ventura	U.C. Santa Barbara	6
	CDPH Volunteer ( <i>Fred Burgess</i> )	2
	Channel Islands National Marine Sanctuary	1
Los Angeles	National Park Service	2
	Ventura County Environmental Health Department	2
	Los Angeles County Sanitation District	5
	Catalina Island Marine Institute	1
	Guided Discoveries ( <i>Balboa Elementary, Valley Oaks Charter, Brighton Adventist Academy</i> )	5
Orange	Southern California Marine Institute	1
	California Department of Fish and Game	9
San Diego	Ocean Institute	2
	Carlsbad Aquafarms, Inc.	3
	Scripps Institute of Oceanography	4

## PHYTOPLANKTON GALLERY



Multiple species of the diatom *Chaetoceros* were observed along the California coast.



Another species of *Chaetoceros*, which was common along the Marin County coast.



The dinoflagellates *Gonyaulax spinifera* (small cells) and *Noctiluca scintillans* were responsible for visible blooms along the San Mateo coast.