

# 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 2013

Technical Report No. 13-13

**INTRODUCTION:**

This report provides a summary of biotoxin activity for the month of March, 2013. 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 in low numbers at several sampling locations, including offshore near Santa Cruz Island, in March (Figure 1). PSP toxins were not detected in any shellfish samples collected during the month (Figure 3).

**Domoic Acid**

*Pseudo-nitzschia* was observed along most of

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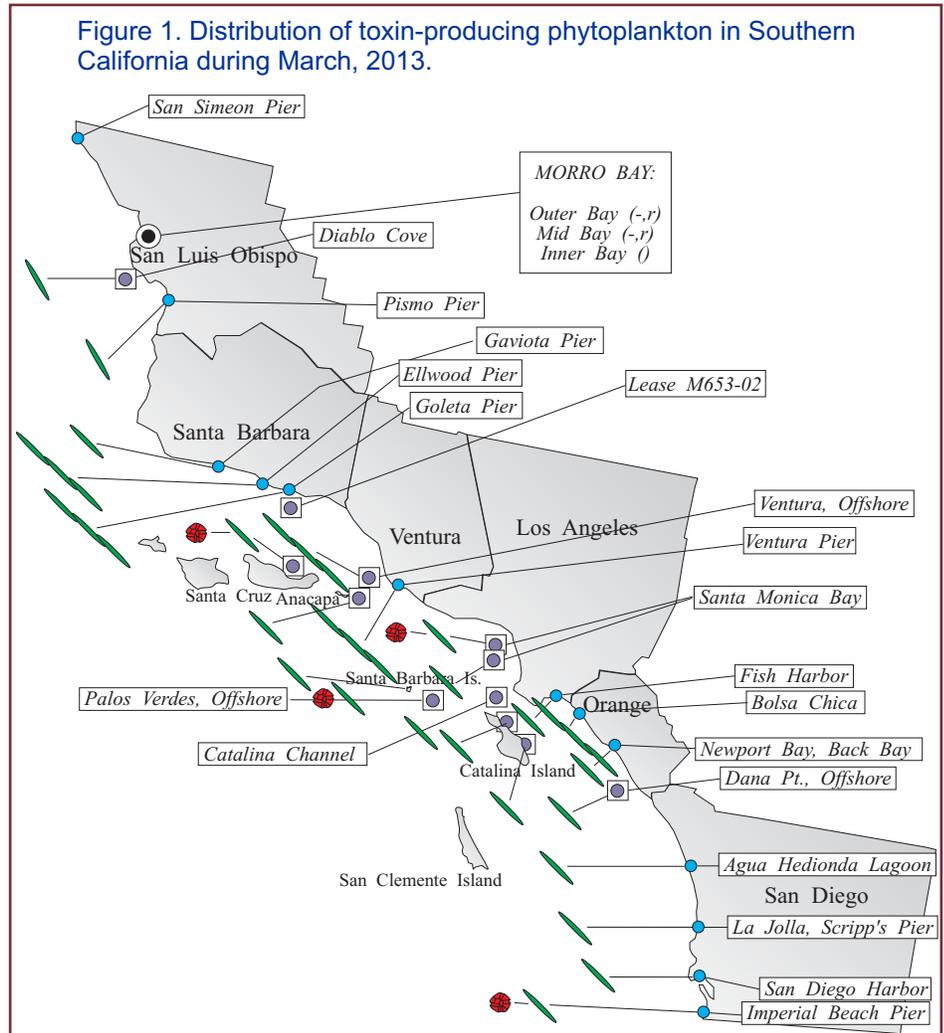


Figure 1. Distribution of toxin-producing phytoplankton in Southern California during March, 2013.

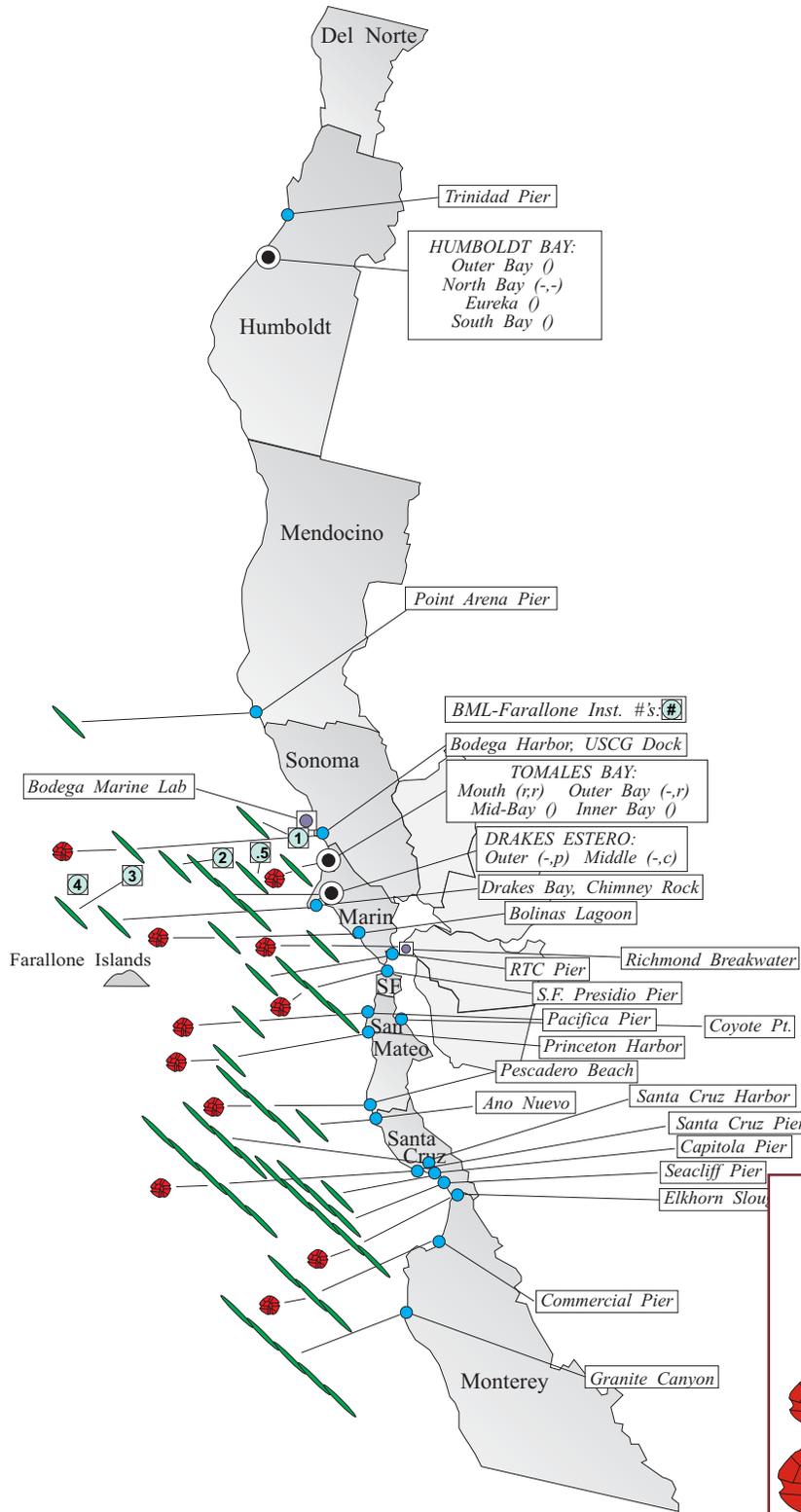
Relative Abundance of Known Toxin Producers			
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

**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 March, 2013.



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 the southern California coast (Figure 1). The relative abundance of this diatom increased at several sites between Santa Barbara and Orange counties. Overall the cell numbers were low. The highest relative abundances of *Pseudo-nitzschia* were observed at Bolsa Chica (March 22), offshore of Palos Verdes (March 6), Santa Cruz Island (March 8), and Gaviota Pier (March 11).

Domoic acid was not detected in any bivalve shellfish samples analyzed during March. This toxin was detected in rock crab samples collected near San Miguel Island, ranging from 27 to 150 ppm (Figure 3).

**Non-toxic Species**

Diatoms (*Chaetoceros*, *Lauderia*) continued to be the most common genera observed along the southern California coast. There were other locally-common genera as well, including *Stephanopyxis* (Pismo Pier) and *Thalassionema* (Palos Verdes). The only dinoflagellate observed to be common was *Prorocentrum* in a March 20 sample from offshore of Palos Verdes.

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

*Alexandrium* was observed at many sites along the northern California coast in March (Figure 2). The percent composition of this dinoflagellate was low at all locations.

PSP toxins were detected in shellfish

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**Relative Abundance of Known Toxin Producers**

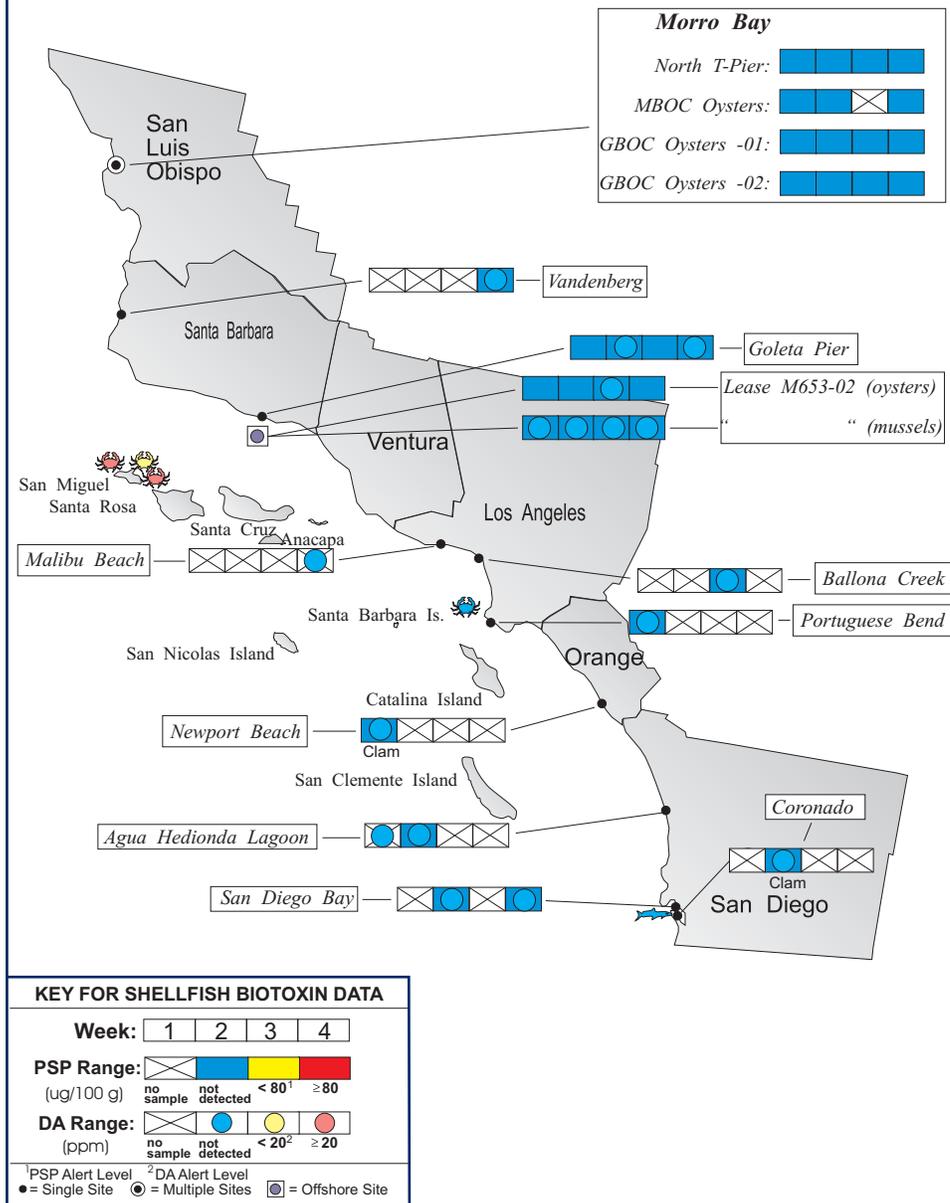
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

**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, 2013.



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samples throughout the month between Santa Cruz and Del Norte counties (Figure 4). The elevated levels of PSP toxins detected the previous month inside Drakes Estero persisted through March at the sentinel mussel stations, although the concentrations declined steadily throughout the month. By the last week of March the toxin level had declined below the alert level in Drakes Estero. Toxin concentrations above the alert level were also detected in mussels at the Chimney Rock sentinel station and at Muir Beach, both along the Marin County coast. Low levels of the PSP toxins were also detected throughout the month in sentinel mussels from outer Tomales Bay. Samples of gaper clams (*Tresus nuttalli*) collected near the mouth of the bay did not contain a measurable level of these toxins.

**Domoic Acid**

*Pseudo-nitzschia* was observed at sampling sites between Mendocino and Monterey counties during March (Figure 2). The high densities observed at Monterey Bay sites in February persisted in March. There was also an increase in the relative abundance of *Pseudo-nitzschia* spp. at several sites between Marin and San Mateo counties, as well as farther down the Monterey coast near Soberanes Pt. The

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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

highest relative abundances of this diatom were observed at the Santa Cruz Pier, the Monterey Commercial Pier, and at the entrance to Elkhorn Slough, all inside Monterey Bay. Domoic acid was not detected in any shellfish samples in March.

**Non-toxic Species**

Diatoms continued to dominate the phytoplankton assemblage. *Skeletonema*, *Thalassiosira*, and *Chaetoceros* were common to abundant along the entire northern California coast.



**QUARANTINES:** On March 15 CDPH terminated both the November 6 health advisory for all bivalve shellfish in Del Norte County and the October 31 extension of the annual mussel quarantine for Humboldt and Del Norte counties. Both of these control measures had been taken due to dangerous levels of the PSP toxins throughout this region.

The September 14 health advisory for the northern Channel Islands remained in effect. This alert was issued due to high levels of domoic acid in samples of crab viscera, also known as ‘crab butter’. The advisory warned consumers to avoid eating bivalve shellfish or the internal organs of crab, lobster, and small finfish like sardines and anchovies from the affected region.

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

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Figure 4. Distribution of shellfish biotoxins in Northern California during March, 2013.

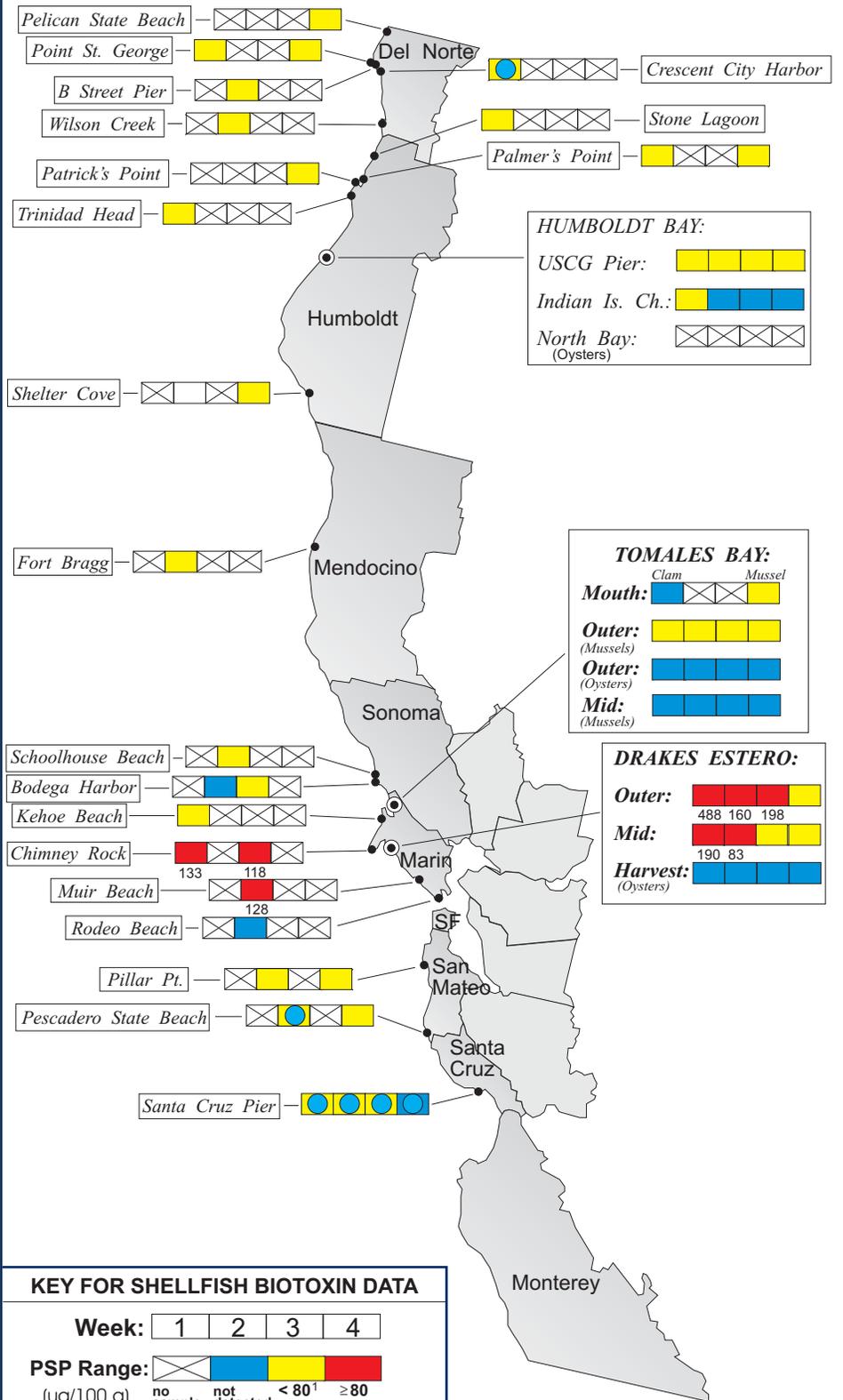


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during March, 2013.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	2
	CDPH Volunteer ( <i>Harriet Jenesky</i> )	1
	California Department of Fish and Wildlife	2
	Del Norte County Environmental Health Department	1
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
	California Department of Fish and Wildlife	2
	CDPH Volunteers ( <i>Brett Stacy</i> )	2
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
Marin	Cove Mussel Company	5
	Drakes Bay Oyster Company	32
	Hog Island Oyster Company	5
	Point Reyes Oyster Company	4
	CDPH Marine Biotoxin Program	3
	CDPH Volunteer ( <i>Rand Dobleman, Peter Schmidt, Chris Starbird</i> )	3
	Lawson's Resort	3
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	4
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	5
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	None Submitted	
Los Angeles	Los Angeles County Health Department, Burke	1
	Los Angeles County Health Department, Torrance	1
	CDPH Volunteer ( <i>Vladimir Ogoshin</i> )	1
	HABNET/Voyager Excursions	1
Orange	CDPH Volunteer ( <i>Steve Crooke</i> )	1
San Diego	Carlsbad Aquafarms, Inc.	1
	CDPH Volunteer ( <i>Steve Crooke</i> )	1
	U.S. Navy Marine Mammal Program	5

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during March, 2013.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
	CDPH Volunteer ( <i>Brett Stacy</i> )	1
Mendocino	CDPH Volunteer ( <i>Marie DeSantis</i> )	3

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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.

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.

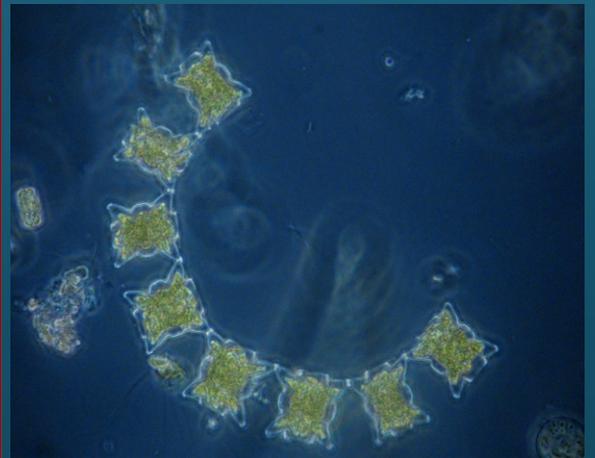
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

Sonoma	CDPH Marine Biotoxin Program	2
	Bodega Marine Lab & Farallone Institute	6
Marin	Drakes Bay Oyster Company	18
	CDPH Volunteer ( <i>Brent Anderson</i> )	4
	SFSU, Romberg Tiburon Center	1
	CDPH Marine Biotoxin Program	3
	Hog Island Oyster Company	1
Contra Costa	CDPH Marine Biotoxin Program	1
Alameda	None Submitted	
San Francisco	CDPH Volunteer ( <i>Eugenia McNaughton</i> )	3
San Mateo	The Marine Mammal Center ( <i>Stan Jensen</i> )	4
	Friends of the Sea Otter Volunteers ( <i>Aric Bickel, Diane Larson</i> )	2
	San Mateo County Environmental Health Department	6
	U.C. Santa Cruz	2
Santa Cruz	Santa Cruz County Environmental Health Department	3
	U.C. Santa Cruz	4
Monterey	Friends of the Sea Otter ( <i>Janis Chaffin</i> )	4
	Monterey Abalone Company	2
	Marine Pollution Studies Laboratory	3
San Luis Obispo	Friends of the Sea Otter ( <i>Kelly Cherry, Al Guild</i> )	4
	Grassy Bar Oyster Company	4
	Morro Bay National Estuary Program	2
	Monterey Bay National Marine Sanctuary	1
	Tenera Environmental	4
	The Marine Mammal Center ( <i>P.J. Webb, Tim Lytsell</i> )	2
Santa Barbara	HABNet/CDPH Volunteer ( <i>Boyd Grant</i> )	3
	HABNet/Island Packers	2
	National Park Service	1
	Santa Barbara Mariculture Company	4
	Tole Mour	1
	U.C. Santa Barbara	6
Ventura	CDPH Volunteer ( <i>Fred Burgess</i> )	3
	Channel Island National Marine Sanctuary	1
	National Park Service	2
Los Angeles	Catalina Island Marine Institute	1
	Los Angeles County Sanitation District	3
	Southern California Marine Institute	1
	HABNet/Voyager Excursions	2
	Tole Mour	8
Orange	California Department of Fish and Game	4
	Amigos de Bolsa Chica	2
	Ocean Institute	3
San Diego	Carlsbad Aquafarms, Inc.	2
	Scripps Institute of Oceanography	4
	Tijuana River National Estuary Research Reserve	4
	U.S. Navy Marine Mammal Program	4

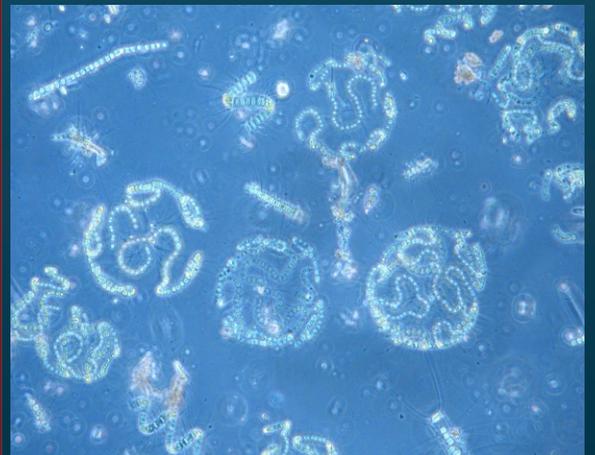
## PHYTOPLANKTON GALLERY



*Alexandrium* persisted along the northern California coast in March.



A chain of the diatom *Odontella*.



Spheres of the colonial diatom *Chaetoceros socialis*. Each cell produces an extremely long spine that intertwines with those from other cells.