

# 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

June 2013

Technical Report No. 13-18

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of June, 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 only observed at one sampling location in June (Figure 1). PSP toxins were not detected in any shellfish samples collected during the month (Figure 3).

#### Domoic Acid

*Pseudo-nitzschia* was observed along the entire southern California coast (Figure 1).

(Continued on Page 2)

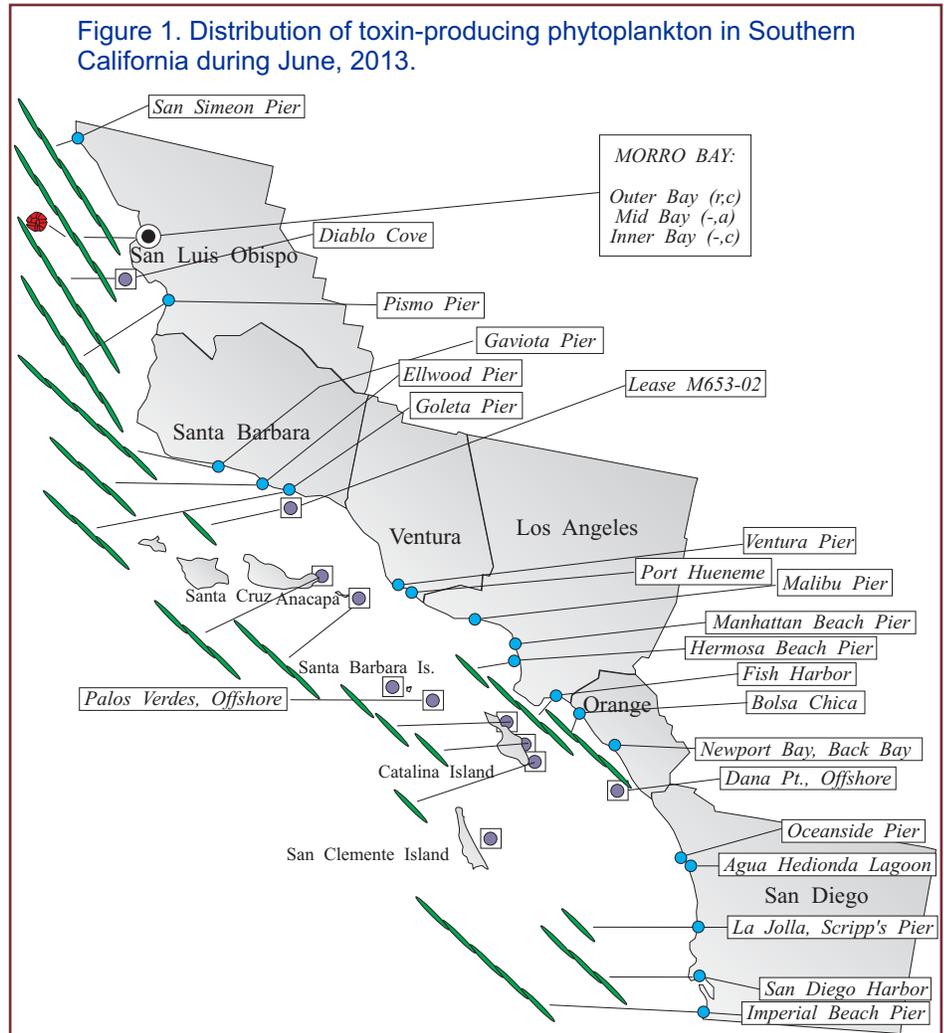


Figure 1. Distribution of toxin-producing phytoplankton in Southern California during June, 2013.

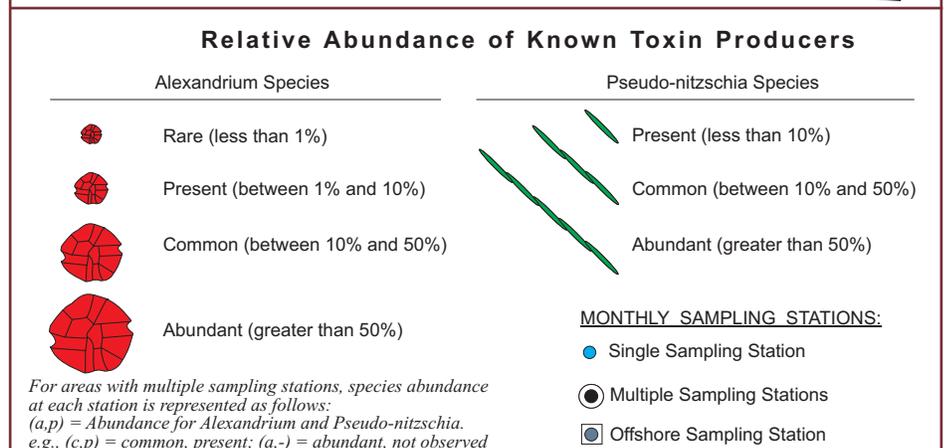
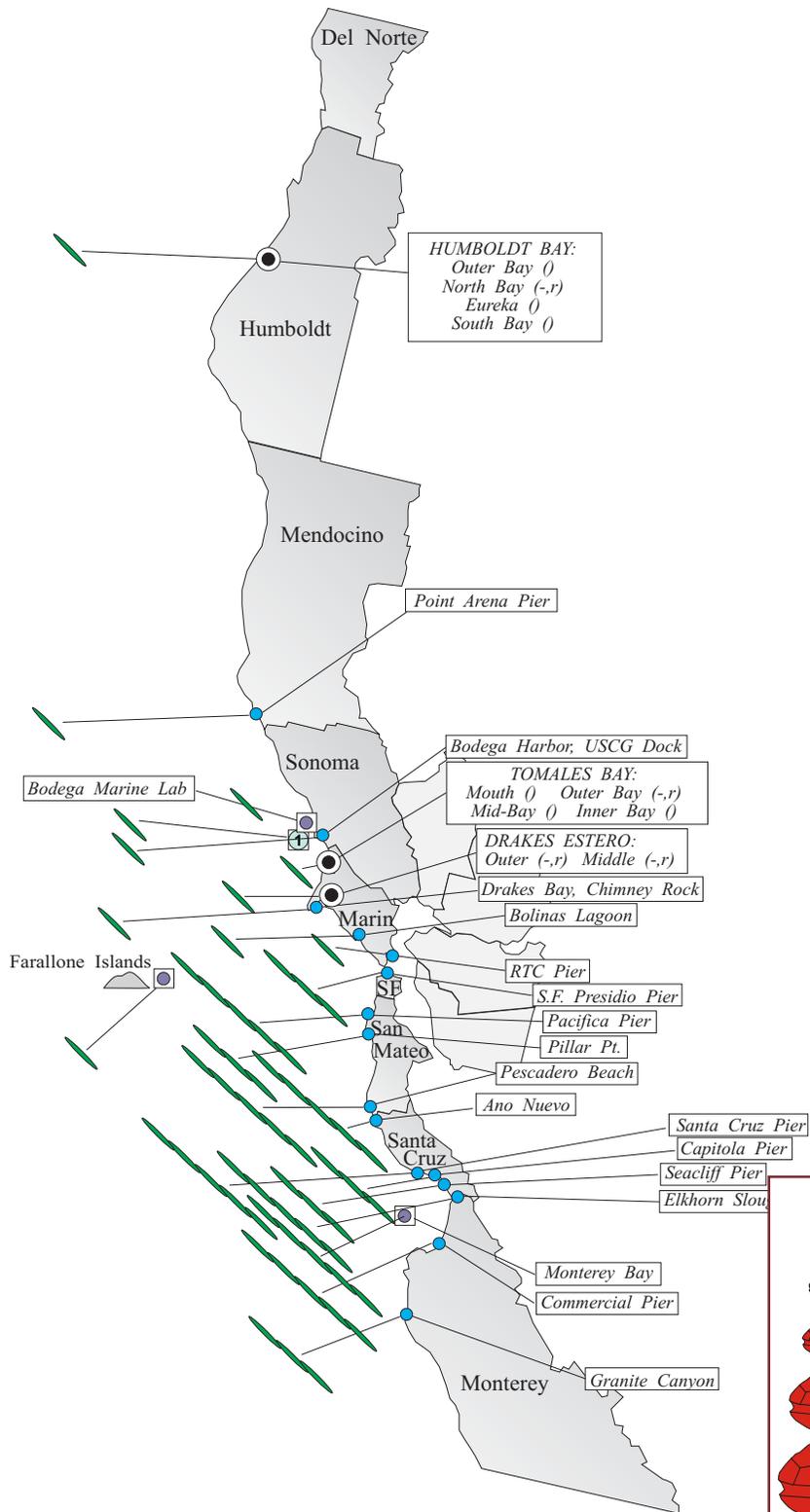


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during June, 2013.



(Continued from Page 1)

The relative abundance of this diatom decreased at sites between Santa Barbara and Orange counties, but remained abundant at all San Luis Obispo County sites and at Gaviota in Santa Barbara County. The highest relative abundances of *Pseudo-nitzschia* were observed at San Simeon Pier (June 14 and 28), mid-Morro Bay (June 24), and Pismo Pier (June 6 and 28).

Domoic acid was detected in only one sample in June (Figure 3). A low concentration of toxin was detected in a June 4 oyster sample from an aquaculture lease offshore of Santa Barbara.

**Non-Toxic Species**

Aside from the prevalence of *Pseudo-nitzschia* along the San Luis Obispo coast, the diatom *Chaetoceros* was common at several sites. A mix of diatoms and dinoflagellates was observed at sites between Santa Barbara and San Diego. Common dinoflagellates included *Ceratium furca* and *Lingulodinium polyedrum*.

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

*Alexandrium* was absent from all northern California sampling locations in June (Figure 2). Nonetheless we detected low levels of PSP toxins in shellfish samples from several sites in Humboldt and Del Norte counties during the last week of the month (Figure 4). All three positive samples were just above the method detection limit.

(Continued on Page 3)

**Relative Abundance of Known Toxin Producers**

**Alexandrium Species**

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

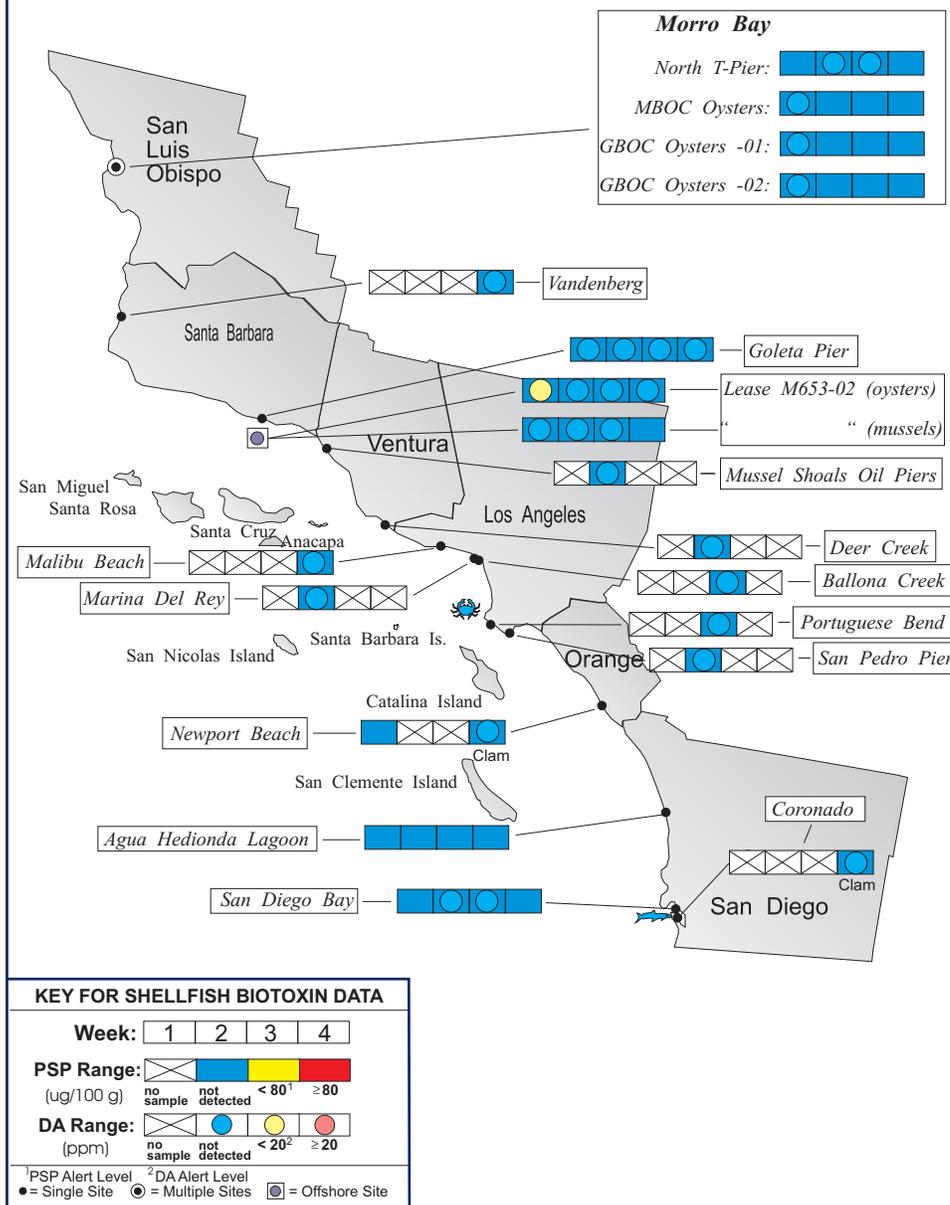
**Pseudo-nitzschia Species**

- Present (between 1% and 10%)
- Common (between 10% and 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

(Continued from Page 2)

Figure 3. Distribution of shellfish biotoxins in Southern California during June, 2013.



**Domoic Acid**

*Pseudo-nitzschia* was observed at most sampling locations in June (Figure 2). The relative abundance of this diatom declined at sites in Marin and Sonoma counties but remained abundant at sites between San Mateo and Monterey counties. The highest relative abundance of *Pseudo-nitzschia* was observed at an offshore site in Monterey Bay (June 3), at the Monterey Commercial Pier (June 17), and the entrance to Elkhorn Slough (June 22).

As noted in the April and May reports, domoic acid was not detected in shellfish samples from this region despite this persistent *Pseudo-nitzschia* bloom inside Monterey Bay and along the coast between Monterey and San Mateo.

**Non-Toxic Species**

Diatoms dominated the northern California coast in June. *Chaetoceros* was common to abundant at sites between Humboldt and San Mateo counties. *Skeletonema* and *Thalassiosira* were also common at sites between Sonoma and San Mateo counties.



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

**QUARANTINES:** The annual mussel quarantine began early, on April 24, as a result of increasing levels of domoic acid and *Pseudo-nitzschia* abundance over a wide region.

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.

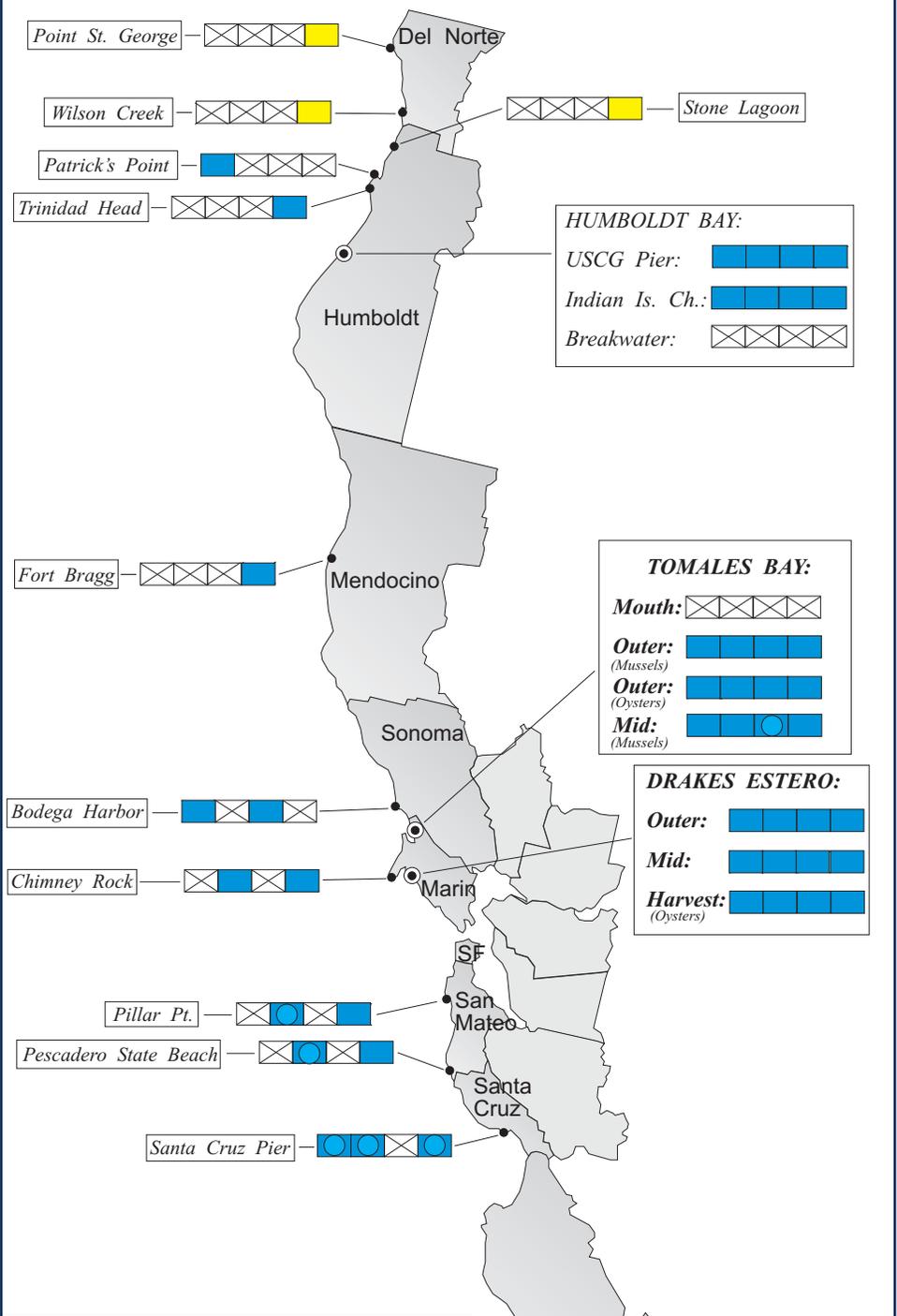
The September 14 health advisory for the northern Channel Islands remained in effect. This alert was issued due to high levels of domoic acid in samples of crab viscera, also known as ‘crab butter’. The advisory warned consumers to avoid eating bivalve shellfish or the internal organs of crab, lobster,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

(Continued on Page 5)

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



**KEY FOR SHELLFISH BIOTOXIN DATA**

**Week:** 1 2 3 4

**PSP Range:** (ug/100 g) no sample not detected < 80<sup>1</sup> ≥ 80

**DA Range:** (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. Program participants submitting shellfish samples during June, 2013.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	2
	Del Norte County Environmental Health Department	1
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
	Humboldt State University	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	2
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	5
	Point Reyes Oyster Company	4
	CDPH Marine Biotoxin Program	3
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	3
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	6
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department, Burke	1
	City of Los Angeles County Environmental Monitoring Division	1
	Los Angeles County Health Department, Commerce	1
	CDPH Volunteer ( <i>Vladimir Ogoshin, Lee Jones</i> )	2
Orange	CDPH Volunteer ( <i>Steve Crooke</i> )	1
San Diego	Carlsbad Aquafarms, Inc.	4
	CDPH Volunteer ( <i>Steve Crooke</i> )	1
	U.S. Navy Marine Mammal Program	5

Table 2. Program participants collecting phytoplankton samples during June, 2013.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
Mendocino	CDPH Volunteer ( <i>Marie DeSantis</i> )	1
Sonoma	CDPH Marine Biotoxin Program	2
	Bodega Marine Lab & Farallone Institute	8
Marin	Drakes Bay Oyster Company	11
	CDPH Volunteer ( <i>Brent Anderson</i> )	3
	SFSU, Romberg Tiburon Center	1
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	1

(Continued on Page 6)

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.



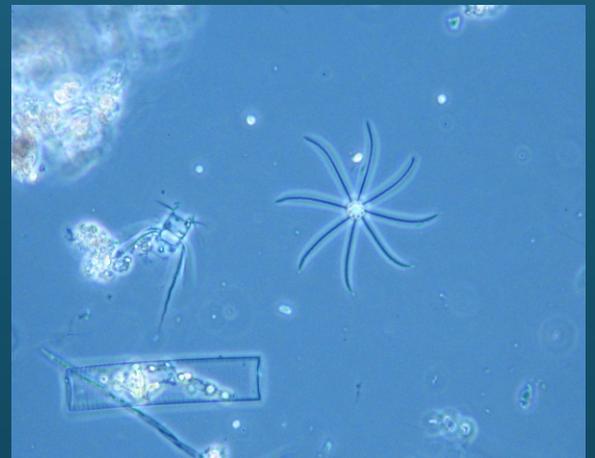
(Continued from Page 5)

San Francisco	CDPH Volunteer ( <i>Eugenia McNaughton</i> )	2
	San Francisco Bay Whale Watching Company	1
San Mateo	The Marine Mammal Center ( <i>Stan Jensen</i> )	4
	San Mateo County Environmental Health Department	3
	U.C. Santa Cruz	2
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	3
Monterey	Friends of the Sea Otter ( <i>Janis Chaffin</i> )	3
	Monterey Abalone Company	1
	Marine Pollution Studies Laboratory	2
	CDPH Volunteer ( <i>Jerry Norton</i> )	1
	Marine Life Studies	1
San Luis Obispo	Friends of the Sea Otter ( <i>Kelly Cherry, Al Guild</i> )	3
	Grassy Bar Oyster Company	4
	Morro Bay National Estuary Program	2
	Tenera Environmental	3
	The Marine Mammal Center ( <i>Tim Lytsell</i> )	1
Santa Barbara	CDPH Volunteer ( <i>Sylvia Short</i> )	3
	HABNet/CDPH Volunteer ( <i>Boyd Grant</i> )	5
	National Park Service	1
	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	4
	Tole Mour	2
Ventura	CDPH Volunteer ( <i>Fred Burgess</i> )	2
	National Park Service	2
	Tole Mour	1
	Ventura County Environmental Health Department	1
Los Angeles	CDPH Volunteer ( <i>Cal Parsons, Kai Xu</i> )	3
	Los Angeles County Sanitation District	3
	Southern California Marine Institute	1
	Los Angeles County Health Department	5
	Tole Mour	4
Orange	California Department of Fish and Wildlife	4
	Amigos de Bolsa Chica	4
	Ocean Institute	1
San Diego	Carlsbad Aquafarms, Inc.	3
	CDPH Volunteer ( <i>Cynthia Hall</i> )	1
	Scripps Institute of Oceanography	4
	Tijuana River National Estuary Research Reserve	4
	U.S. Navy Marine Mammal Program	3

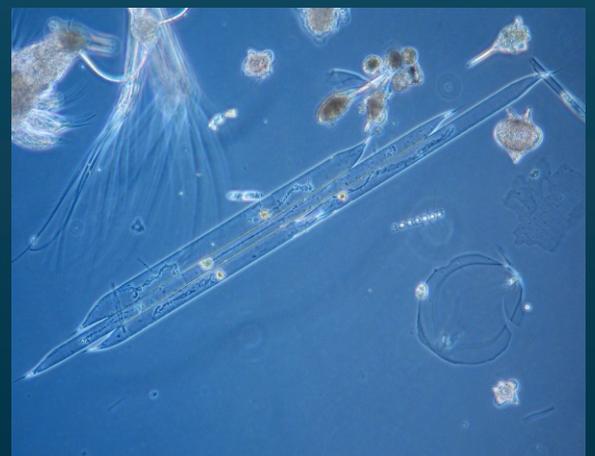
## PHYTOPLANKTON GALLERY



The diatom *Leptocylindrus mediterraneus* (formerly *Dactyliosolen*) with clusters of the flagellate *Solenicola setigera*, alternatively described as an epiphyte, parasite, or symbiont of the diatom.



*Bacteriastrum* is a long-chained diatom similar in appearance to *Chaetoceros*, however viewed from the 'top down' it looks like a pinwheel.



Three separate cells of the diatom *Rhizosolenia*, indicating the variability that exists in cell width and length.