

# 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 2014

Technical Report No. 14-10

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of March, 2014. 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 in a March 8 sample from Santa Monica Pier (Figure 1). PSP toxins were not detected in any shellfish samples in March (Figure 3).

#### Domoic Acid

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

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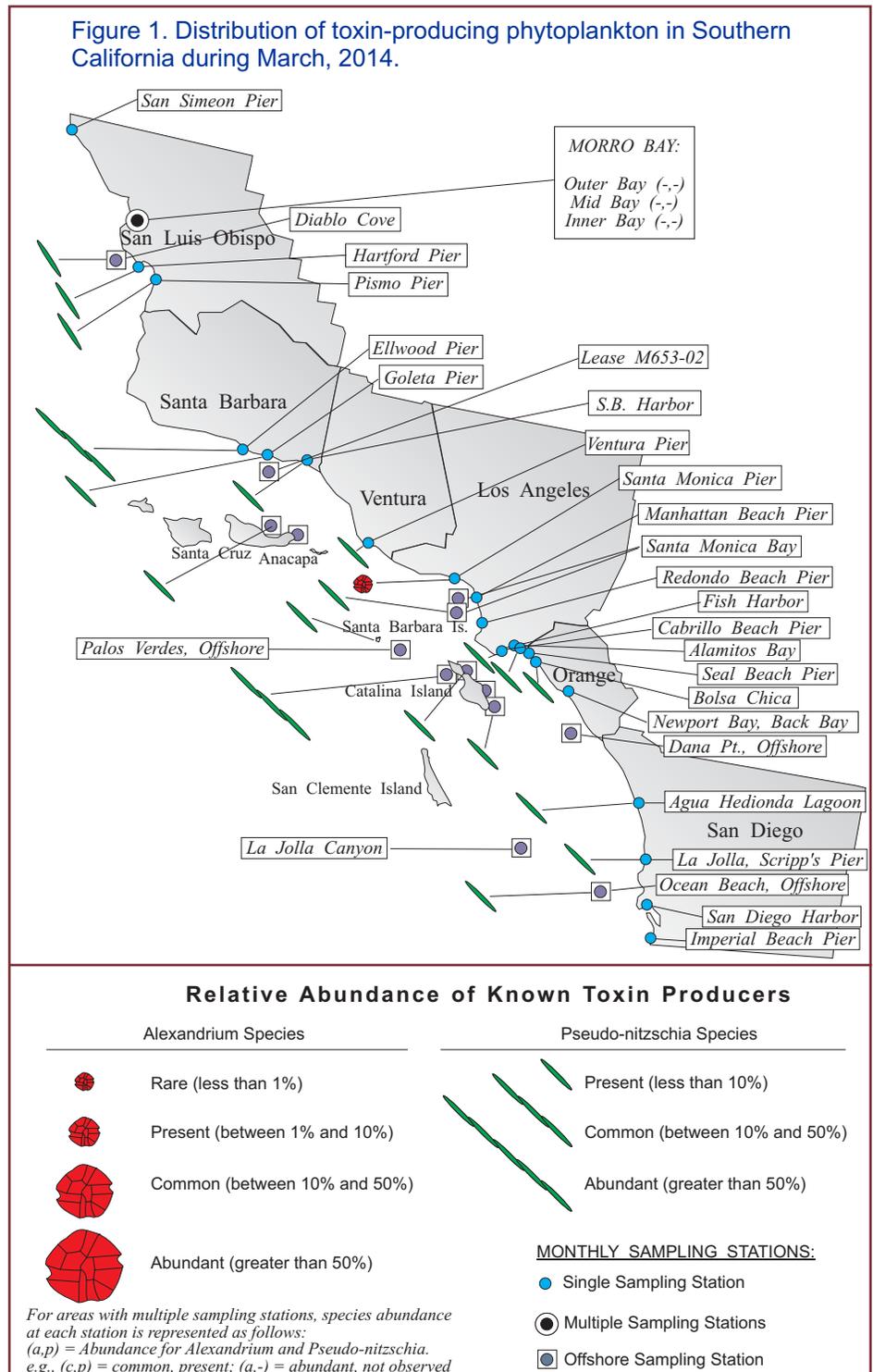
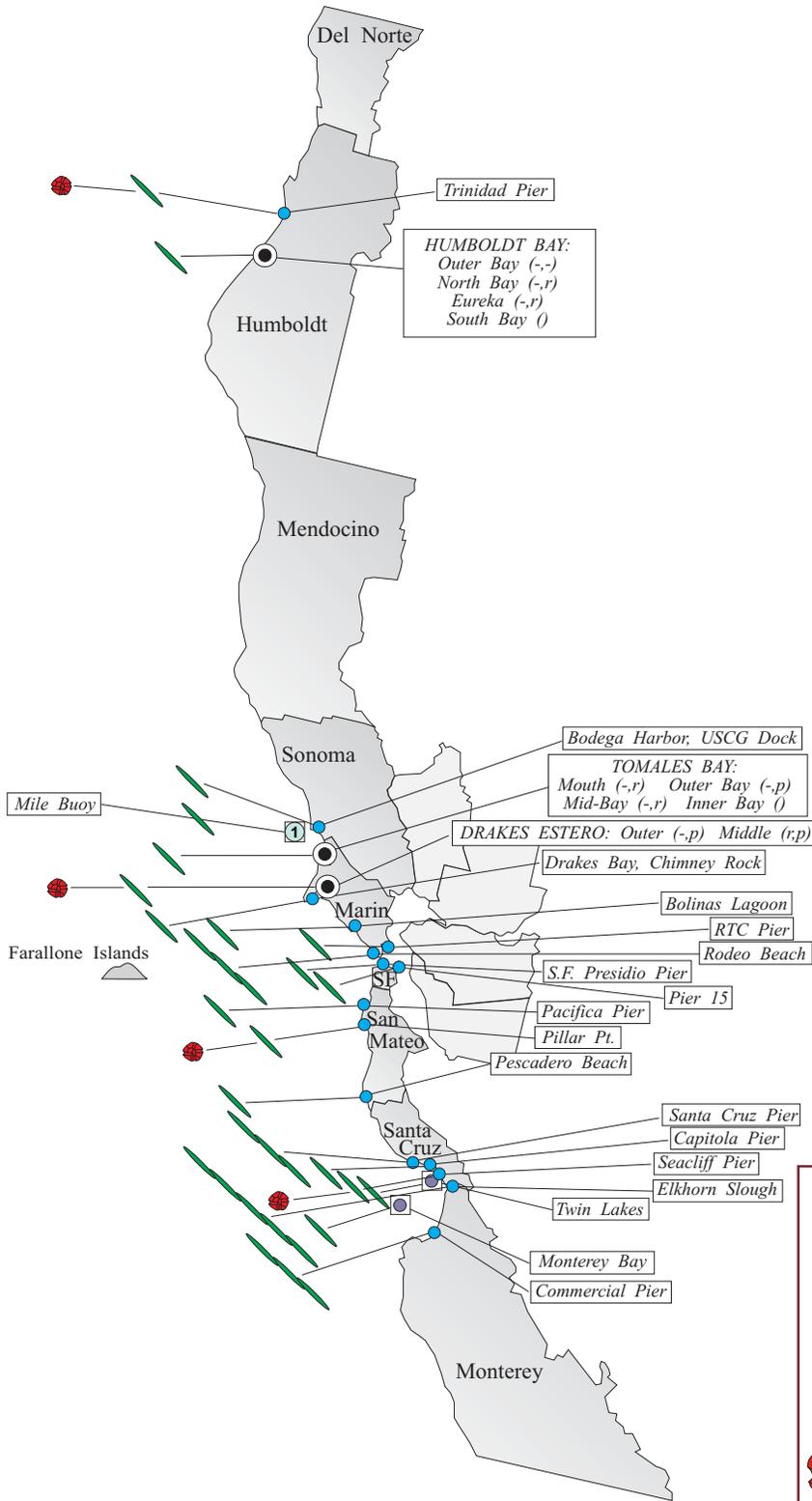


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during March, 2014.



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 The relative abundance of this diatom increased significantly at Ellwood Pier (Santa Barbara County) on March 19 and offshore at Catalina Island on March 24. Domoic acid was not detected in bivalve shellfish during March (Figure 3).

**Non-Toxic Species**

The diatom *Chaetoceros* was common to abundant along the southern California coast. *Skeletonema* was common at some sites in San Luis Obispo. The dinoflagellate *Prorocentrum* was abundant in Santa Monica Bay and common at Imperial Beach (San Diego County).

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

*Alexandrium* was observed at sites in Humboldt, Marin, San Mateo, and Santa Cruz counties in March (Figure 2). The relative abundance of this dinoflagellate was low at all locations.

Low levels of the PSP toxins persisted at sites in Del Norte, Humboldt, and Marin counties during the first half of the month. By the end of March these low toxin levels were limited to Del Norte and northern Humboldt counties.

**Domoic Acid**

*Pseudo-nitzschia* was observed at most sampling sites in March (Figure 2). There was a significant increase of this diatom in Monterey Bay throughout the month. *Pseudo-nitzschia* was common at the Monterey Commercial Pier by March 3,

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**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%)

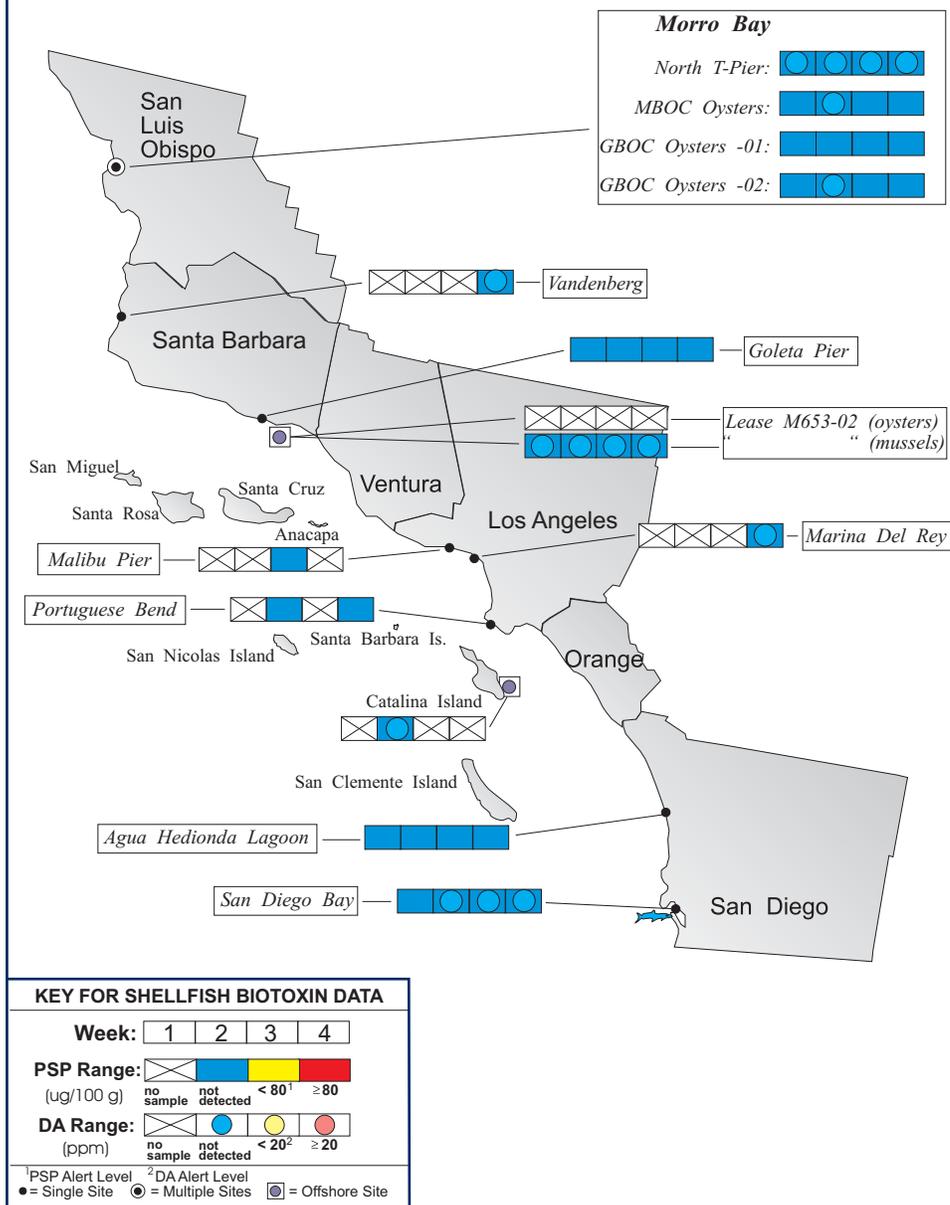
**MONTHLY SAMPLING STATIONS:**

- 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, 2014.



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remaining between 10 and 20 percent of the phytoplankton assemblage throughout the month. This diatom also increased in relative abundance at the Santa Cruz Pier by March 12 and remained common throughout the month. Weekly samples at the entrance to Elkhorn Slough and Moss Landing caught a significant increase in *Pseudo-nitzschia* on March 15, increasing from 2 percent of the assemblage the previous week to 30 percent. By the following week this diatom was abundant at this site and accounted for 75 percent of the phytoplankton genera observed.

In mid-March the Marine Mammal Center in Sausalito reported receiving several California sea lions with symptoms consistent with domoic acid poisoning. Concurrent with the March 12 increase in *Pseudo-nitzschia* at the Santa Cruz Pier, U.C. Santa Cruz reported a low level of domoic acid in sentinel mussels from that site. Based on these two reports, CDPH increased surveillance activity at sites in Santa Cruz and Monterey. Sentinel mussels from Santa Cruz Pier increased to the alert level of 20 ppm by March 26. Mussels from the Monterey commercial wharf reached 170 ppm by March 27. A sample of mussels collected on March 29 at the nearby Monterey Fisherman's Wharf contained 27 ppm of domoic acid. A sample of mussels collected on March 30 just outside of

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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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Monterey Bay at 4 Mile Beach in Santa Cruz County contained 15 ppm of this toxin.

**Non-Toxic Species**

The diatom *Skeletonema* was common at several sites between southern Sonoma and San Mateo counties. *Chaetoceros* was common to abundant in Tomales Bay and at Pacifica Pier in San Mateo County.



**QUARANTINES:** On February 19 the Department lifted the December 20, 2013 Health Advisory warning consumers not to eat recreationally harvested bivalve shellfish (i.e., mussels, clams and scallops) from the Los Angeles County coastline between Cabrillo Point and the Los Angeles-Orange county line. This advisory was due to elevated levels of the PSP toxins in this region.

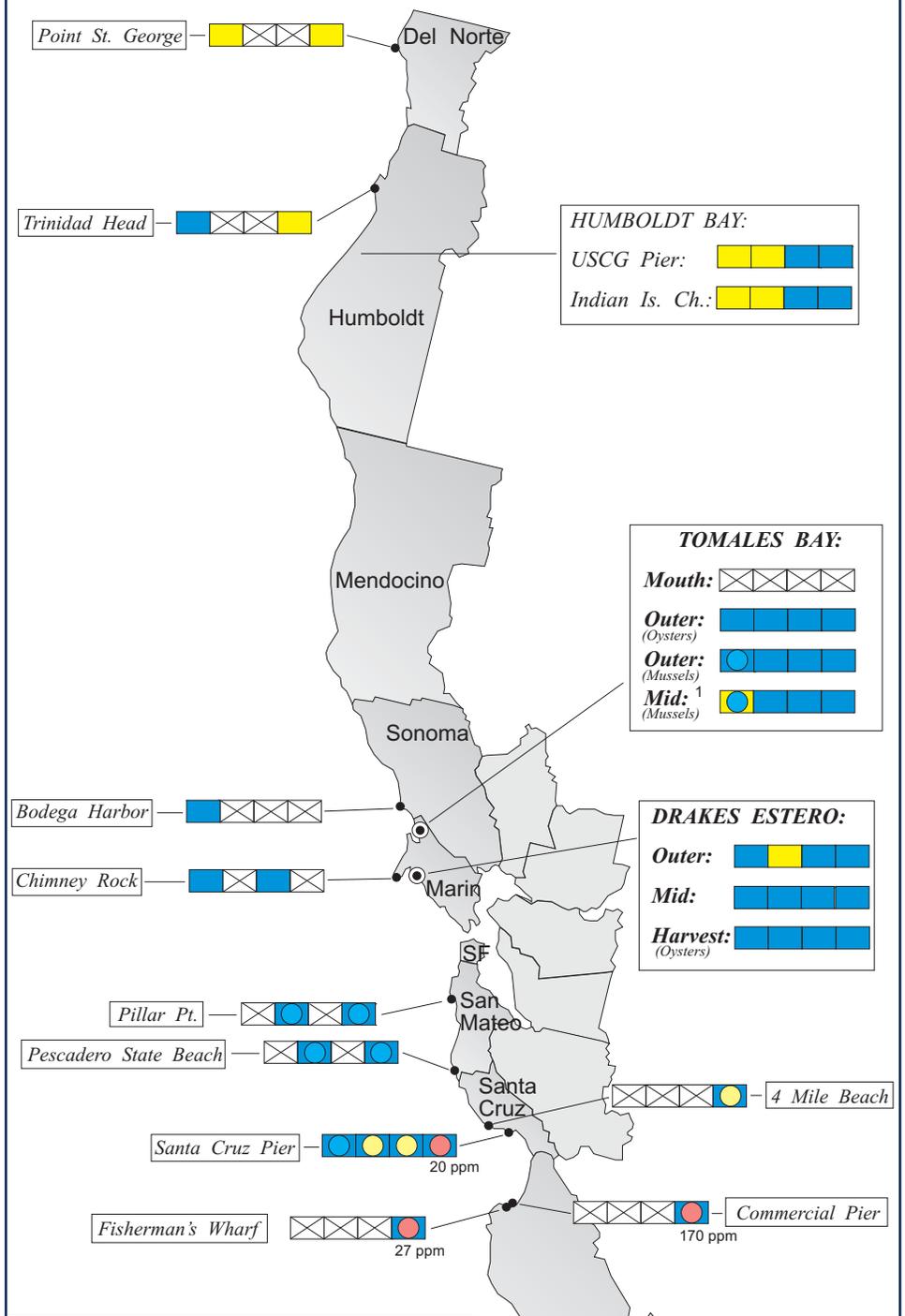
On January 24 the Department lifted the Health Advisory for all sporharvested shellfish from Monterey Bay and Tomales Bay that was established due to elevated PSP levels.

The annual mussel quarantine ended at midnight on October 31 for all coastal counties except for northern Humboldt County. The quarantine on sport-harvested mussels was extended from the northern jetty at the entrance to Humboldt Bay to the Humboldt-Del Norte county line as a result of persistent high levels of the PSP toxins.

The September 14 health advisory for the northern Channel Islands remained in effect. 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 due to persistent elevated levels of domoic acid in crab

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Figure 4. Distribution of shellfish biotoxins in Northern California during March, 2014.



**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 collecting phytoplankton samples during March, 2014.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		None Submitted	
HUMBOLDT COUNTY		Coast Seafood Company	4
		Humboldt State University Marine Lab	8
MENDOCINO COUNTY		CDPH Volunteer ( <i>Marie DeSantis</i> )	2
SONOMA COUNTY		Bodega Marine Lab & Farallone Institute	1
		CDPH Marine Biotoxin Program	1
MARIN COUNTY		Drakes Bay Oyster Company	12
CDPH Marine Biotoxin Program	3	CDPH Volunteer ( <i>Anderson, Clyde</i> )	6
SFSU, Romberg Tiburon Center	3	Hog Island Oyster Company	5
Sonoma State University	4	Golden Gate National Recreation Area	2
SAN FRANCISCO COUNTY		CDPH Volunteer ( <i>Eugenia McNaughton</i> )	3
		Exploratorium	4
SAN MATEO COUNTY		The Marine Mammal Center ( <i>Stan Jensen</i> )	4
San Mateo County Environmental Health Dept.	6	U.C. Santa Cruz	1
		CDPH Volunteer ( <i>John Lo</i> )	1
SANTA CRUZ COUNTY		U.C. Santa Cruz	4
California Department of Parks and Recreation	2	Santa Cruz Co. Environmental Health Dept.	3
MONTEREY COUNTY		Friends of the Sea Otter ( <i>Janis Chaffin</i> )	5
Marine Life Studies	1	Monterey Abalone Company	3
SAN LUIS OBISPO COUNTY		Friends of the Sea Otter ( <i>Kelly Cherry</i> )	4
Morro Bay National Estuary Program	3	Grassy Bar Oyster Company	5
Coastal Discovery Center, San Simeon	3	Tenera Environmental	4
The Marine Mammal Center ( <i>Webb</i> )	4		
SANTA BARBARA COUNTY		CDPH Volunteer ( <i>Sylvia Short</i> )	2
HABNet/CDPH Volunteers ( <i>Boyd Grant</i> )	4	Island Packers/HABNet	1
National Park Service	1	Santa Barbara Mariculture Company	5
Santa Barbara Channel Keeper	1	U.C. Santa Barbara	4
Tole Mour	1		
VENTURA COUNTY		CDPH Volunteer ( <i>Fred Burgess</i> )	4
LOS ANGELES COUNTY		CDPH Volunteers ( <i>Kai Xu, Cal Parsons</i> )	4
Catalina Island Marine Institute	2	Long Beach Marine Institute	2
City of L.A. Environmental Monitoring Division	3	Los Angeles County Health Department	4
Los Angeles County Sanitation District	1	Southern California Marine Institute	1
		Tole Mour	6
ORANGE COUNTY		Amigos de Bolsa Chica	4
California Department of Fish and Wildlife	3	CDPH Volunteer ( <i>Jennifer McCarthy</i> )	1
		Ocean Institute	1
SAN DIEGO COUNTY		Carlsbad Aquafarms, Inc.	1
Scripps Institute of Oceanography	4	Sea Camp/HABNet	2
U.S. Navy Marine Mammal Program	4	Tijuana River National Estuary Research	4

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viscera samples.

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 can produce a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms can be 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.

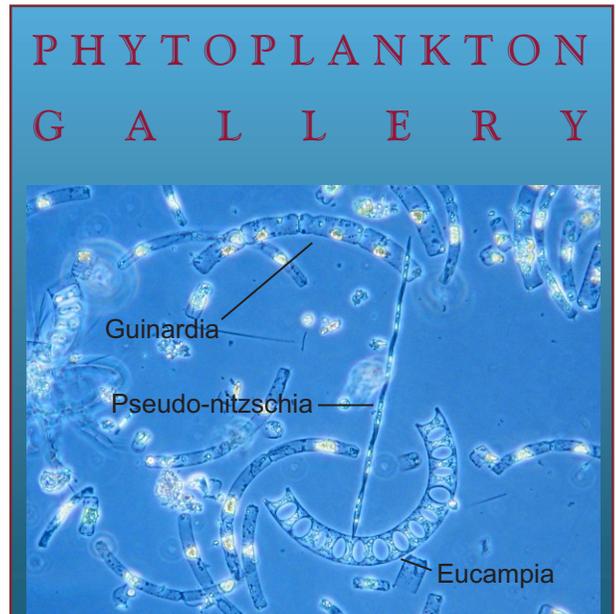
Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, 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

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Table 2. CDPH program participants submitting shellfish samples during March, 2014.

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	2
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	1
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	16
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	5
	Tomales Bay Oyster Company	4
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer ( <i>Michael Wolcott</i> )	1
Monterey	Monterey Abalone Company	1
	CDPH Volunteer ( <i>Josh Smith</i> )	1
San Luis Obispo	Grassy Bar Oyster Co.	13
	Morro Bay Oyster Company	7
Santa Barbara	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	5
	Vandenberg AFB	1
Ventura	None Submitted	
Los Angeles	CDPH Volunteer ( <i>Cal Parsons</i> )	1
	Los Angeles County Health Department Torrance	1
	Los Angeles County Health Department Sims	1
	Los Angeles County Health Department Commerce	2
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	6



A variety of common chained diatoms.



The single-celled diatom *Corethron*.



The dinoflagellate *Ceratium platycorne* is a rare occurrence in our samples.

QUARANTINES (Continued from Page 5)

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.

