

# 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

July 2014

Technical Report No. 14-14

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of July, 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 observed at sites in San Luis Obispo and San Diego counties (Figure 1). PSP toxins were not detected in any shellfish samples in July (Figure 3).

#### Domoic Acid

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

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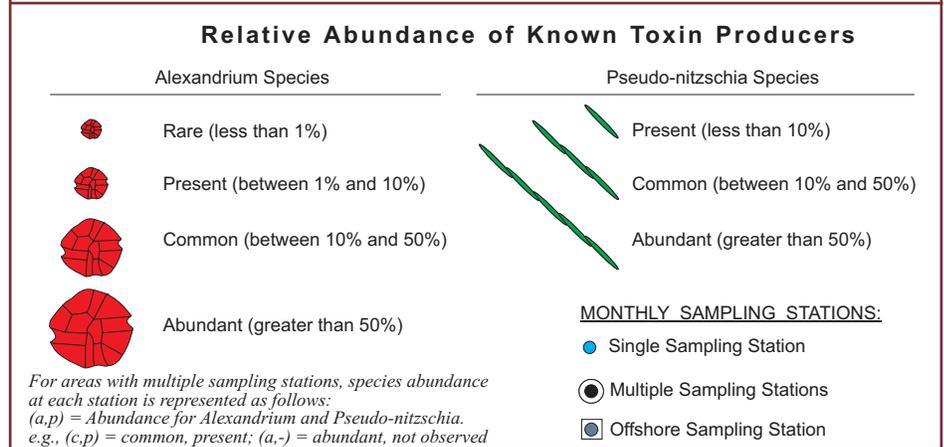
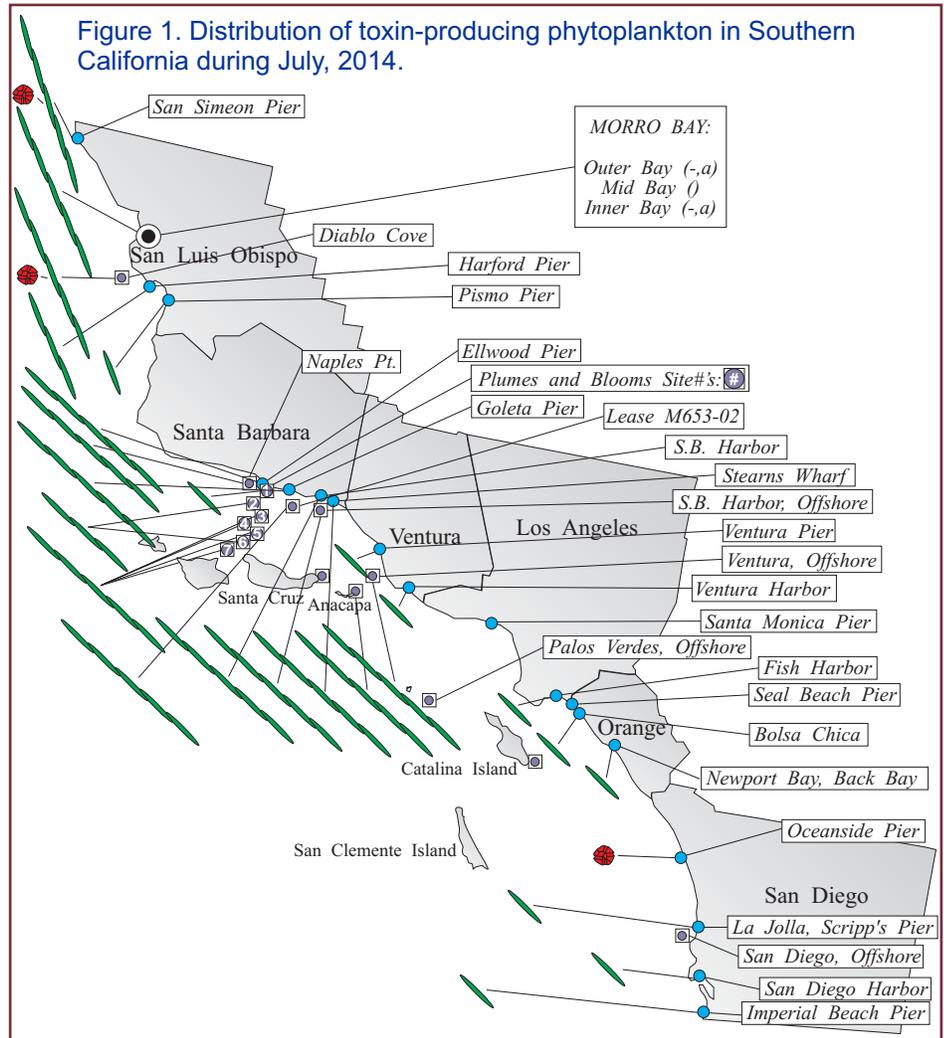
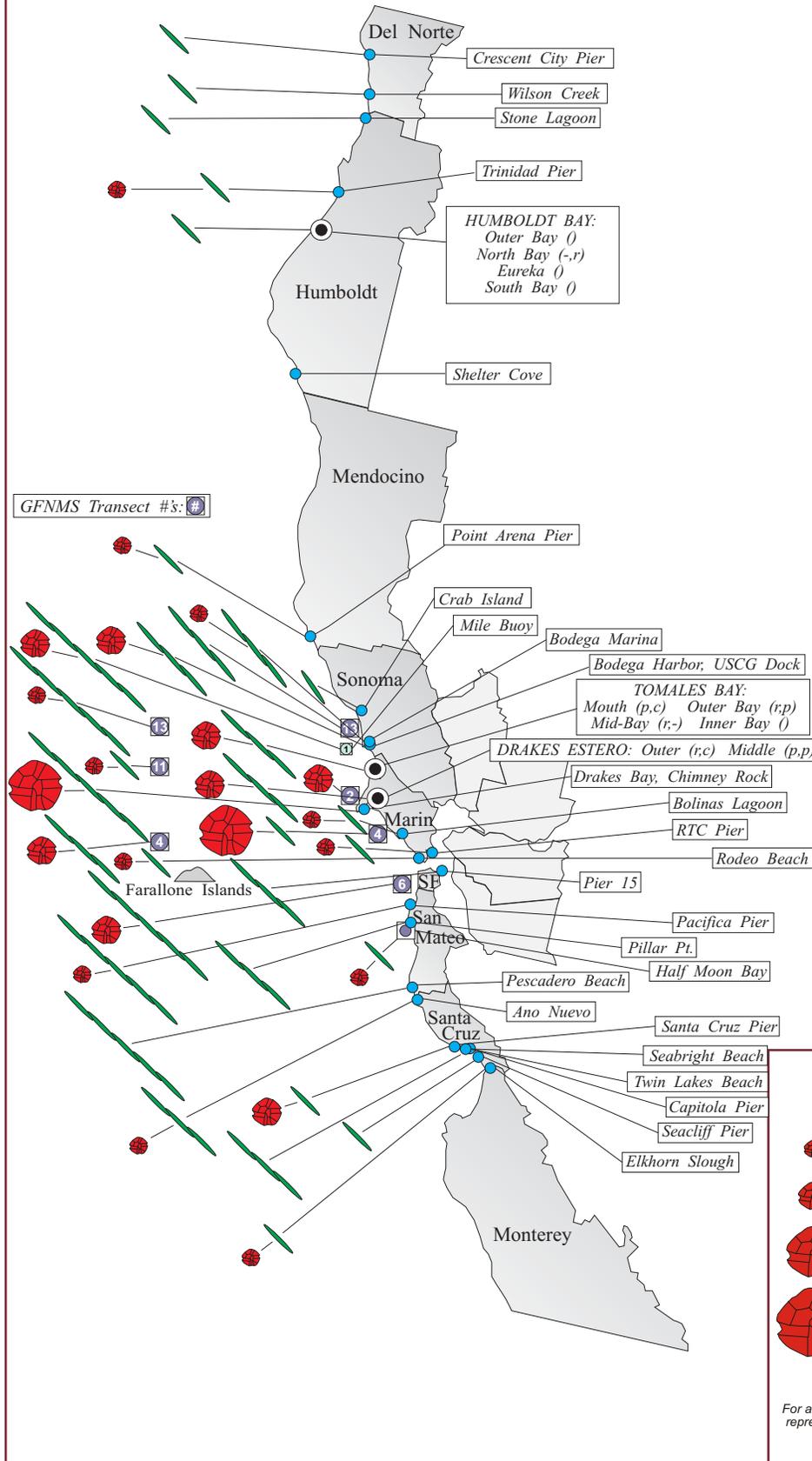


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during July, 2014.



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The percent composition of this diatom was abundant at most stations in San Luis Obispo and Santa Barbara counties. The cell mass increased at numerous stations in San Luis Obispo but remained low elsewhere. The highest relative abundances were observed at San Simeon Pier (July 3) and Diablo Cove (July 23). Despite the abundance of this diatom, domoic acid was not detected in any shellfish samples (Figure 3).

**Non-Toxic Species**

A mix of diatoms (*Eucampia*, *Thalassiosira*) and dinoflagellates (*Prorocentrum*, *Ceratium*) were common at San Luis Obispo sites. Diatoms dominated the rest of the coast, with *Leptocylindrus*, *Guinardia*, and *Hemialus* common at various locations.

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

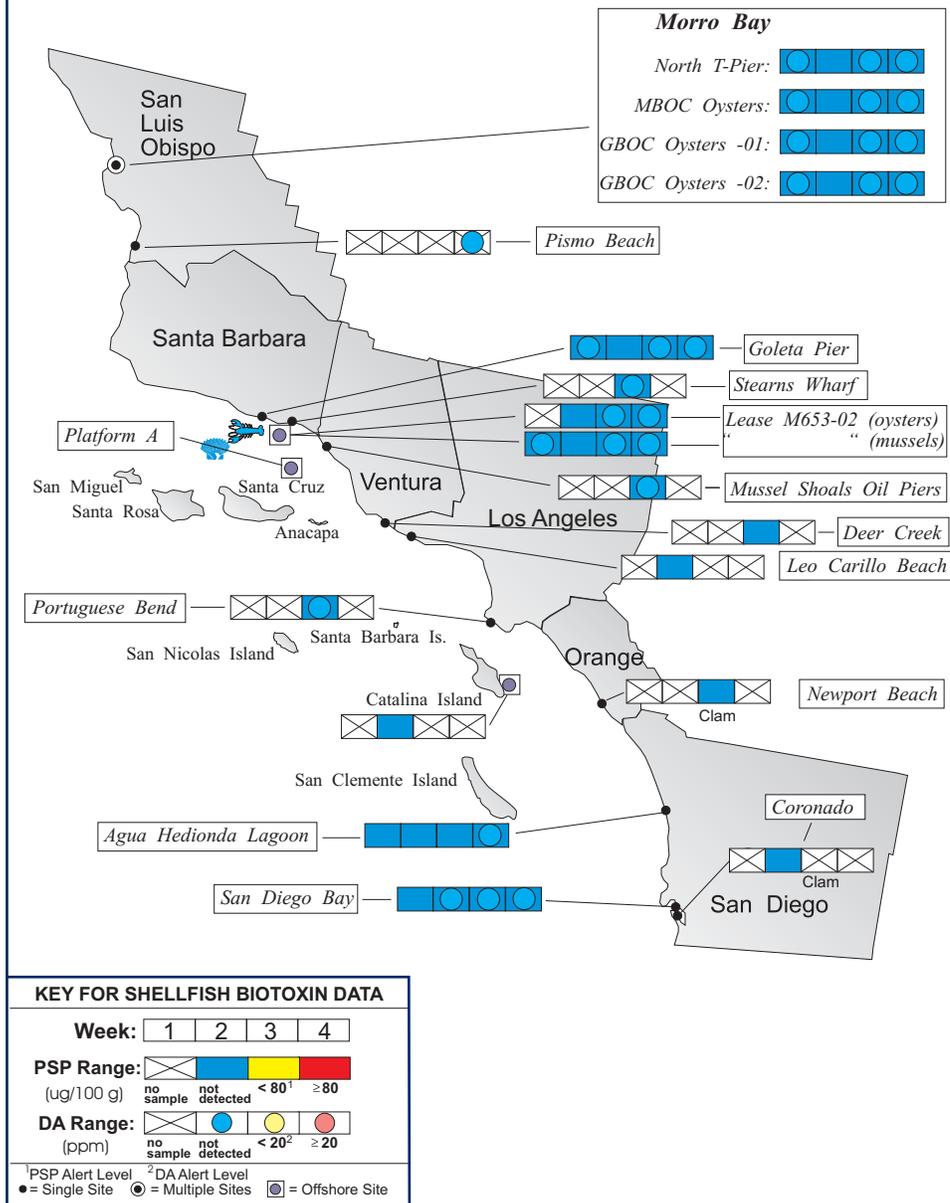
*Alexandrium* was observed at sites in all counties except Del Norte, including most offshore sites sampled by the Applied California Current Ecosystem Studies (ACCESS) partnership (Figure 2). The relative abundance of this dinoflagellate increased significantly at Marin and Sonoma sites. The highest relative abundance of *Alexandrium* was observed at the Drakes Bay sentinel station on July 9.

The low levels of PSP toxins detected in Marin County in June increased dramatically in July. Concentrations of toxin well above the

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Figure 3. Distribution of shellfish biotoxins in Southern California during July, 2014.



alert level were detected at the Drakes Bay sentinel station (2134 ug/100 g on July 14) and in sentinel mussels and oysters in Drakes Estero. Toxins were not detected in Mid-Estero mussels and oysters on July 1 but increased above the alert level by the following week (681 and 136 ug/100 g, respectively, on July 8), an illustration of how rapidly these toxins can accumulate in shellfish. Similarly the outer channel sentinel mussels increased from 49 to 1127 ug/100 g in the same time interval. High toxin concentrations were also detected in mussels from Stinson Beach and at sites in Sonoma County. Alert levels of toxin persisted throughout the month at the Drakes Bay and Bodega Harbor sentinel stations. Low levels of the PSP toxins were detected in outer and mid Tomales Bay, as far south as Santa Cruz Pier, and northward at sites in Humboldt and Del Norte counties.

**Domoic Acid**

*Pseudo-nitzschia* was observed at sites in most coastal counties in July, increasing significantly at sites from Sonoma to San Mateo (Figure 2). This diatom was common to abundant at several of the ACCESS offshore sites. The highest relative abundances of *Pseudo-nitzschia* were observed at the Drakes Bay sentinel station (July 9, July 22), inside Drakes Estero (July 8), and at the Bodega mile buoy (July 15).

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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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Despite the high numbers of this diatom, domoic acid was not detected in any shellfish samples.

**Non-Toxic Species**

Diatoms dominated the coast, with *Rhizosolenia*, *Skeletonema* and *Chaetoceros* the most commonly observed. The dinoflagellates *Prorocentrum* and *Ceratium furca* were common to abundant at some locations between Sonoma and Santa Cruz.



**QUARANTINES:**

On July 11 CDPH lifted the April 4 and April 28, 2014 health advisories warning consumers not to eat recreationally harvested bivalve shellfish or the internal organs of commercially or recreationally caught anchovy, sardines, or crab taken from Monterey and Santa Cruz counties.

The annual mussel quarantine began on May 1. This annual quarantine applies to sport-harvested mussels along the entire California coastline, including all bays and estuaries.

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

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

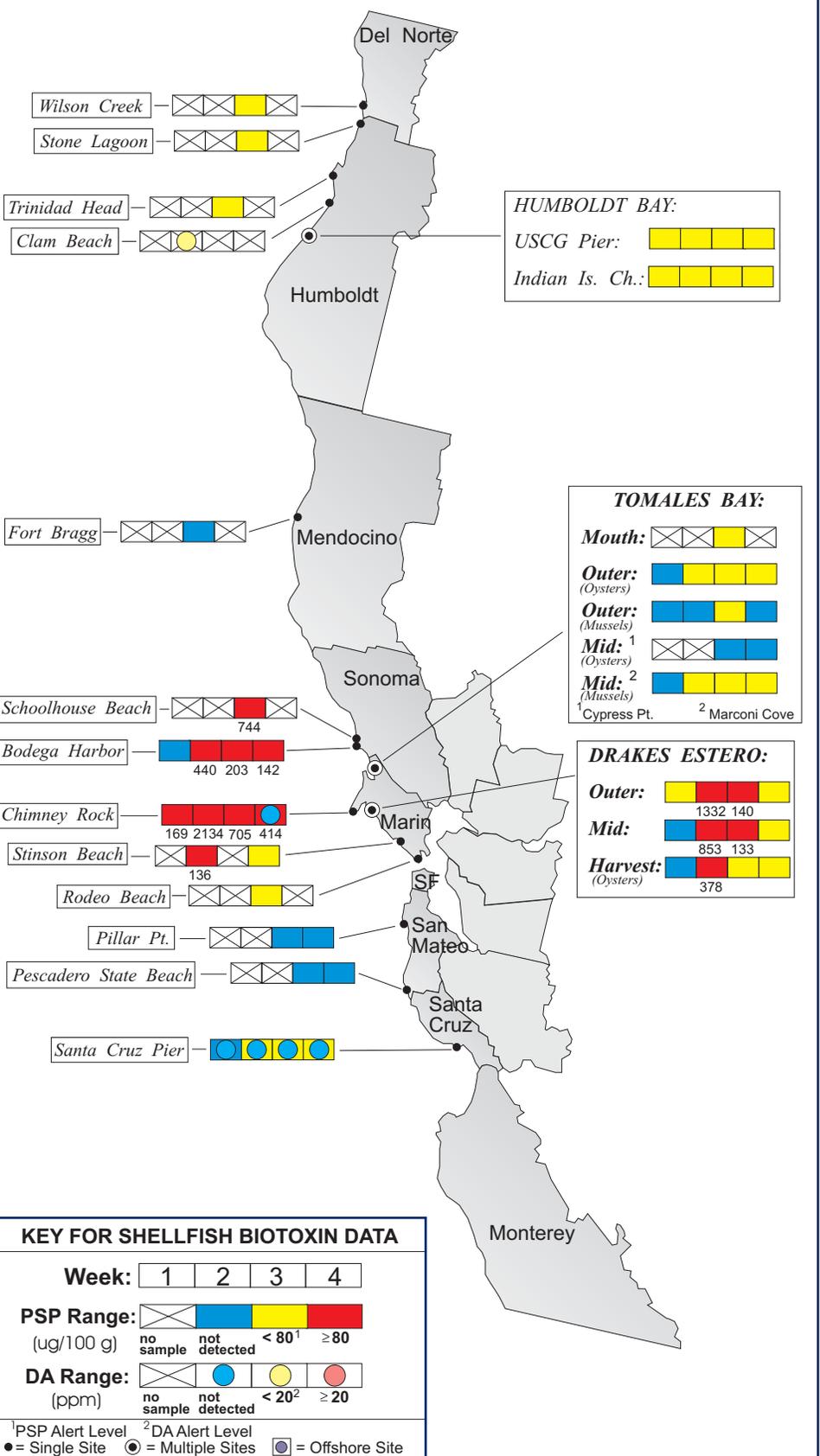


Table 1. Program participants collecting phytoplankton samples during July, 2014. (Continued from Page 4)

AGENCY	#	AGENCY	#
<b>DEL NORTE COUNTY</b>			
Del Norte County Health Department	1	Yurok Tribe Environmental Program	1
<b>HUMBOLDT COUNTY</b>			
Coast Seafood Company	5	Humboldt State University Marine Lab	3
Bureau of Land Management	1	Yurok Tribe Environmental Program	1
<b>MENDOCINO COUNTY</b>			
		CDPH Volunteer ( <i>Marie DeSantis</i> )	2
<b>SONOMA COUNTY</b>			
Gulf Farallones National Marine Sanctuary	4	Bodega Marine Lab	5
CDPH Marine Biotoxin Program	4	Sonoma Coast Watch	1
<b>MARIN COUNTY</b>			
		Marine Biotoxin Program CDPH	6
Golden Gate National Rec. Area	1	CDPH Volunteer ( <i>Anderson, Clyde</i> )	6
SFSU, Romberg Tiburon Center	2	Hog Island Oyster Company	3
Drakes Bay Oyster Company	11	Gulf Farallones National Marine Sanctuary	6
<b>SAN FRANCISCO COUNTY</b>			
Gulf Farallones National Marine Sanctuary	2	Exploratorium	4
<b>SAN MATEO COUNTY</b>			
San Mateo County Environmental Health Dept.	6	U.C. Santa Cruz - Ano Nuevo	3
The Marine Mammal Center ( <i>Stan Jensen</i> )	4	CDPH Volunteer ( <i>John Lo</i> )	1
<b>SANTA CRUZ COUNTY</b>			
		U.C. Santa Cruz	5
Santa Cruz County Environmental Health Dept	3	California Department of Parks and Recreation	2
<b>MONTEREY COUNTY</b>			
		Friends of the Sea Otter ( <i>Janis Chaffin</i> )	2
<b>SAN LUIS OBISPO COUNTY</b>			
Morro Bay National Estuary Program	3	Morro Bay Oyster Company	4
Coastal Discovery Center, San Simeon	5	Tenera Environmental	5
Friends of the Sea Otter ( <i>Kelly Cherry</i> )	5	CDPH Volunteer ( <i>Al Guild</i> )	5
<b>SANTA BARBARA COUNTY</b>			
		National Park Service	1
HABNet/CDPH Volunteers ( <i>Amiri</i> )	9	Ty Warner Sea Life Center/HABNet	2
Santa Barbara Channel Keeper	3	Santa Barbara Mariculture Company	4
CDPH Volunteer ( <i>Sylvia Short</i> )	4	U.C. Santa Barbara	5
<b>VENTURA COUNTY</b>			
CDPH Volunteer ( <i>Fred Burgess</i> )	4	National Park Service	2
Tole Mour	1	Ventura County Environmental Health Dept.	1
<b>LOS ANGELES COUNTY</b>			
Tole Mour	2	Southern California Marine Institute	1
Los Angeles County Sanitation District	2	CDPH Volunteers ( <i>Cal Parsons, Kai Xu</i> )	3
<b>ORANGE COUNTY</b>			
California Department of Fish and Wildlife	5	National Oceanic and Atmospheric Admin.	1
CDPH Volunteer ( <i>Truong Nguyen</i> )	2	Amigos de Bolsa Chica	5
<b>SAN DIEGO COUNTY</b>			
		CDPH Volunteer ( <i>Cynthia Hall</i> )	1
Scripps Institute of Oceanography	5	Sea Camp/HABNet	2
U.S. Navy Marine Mammal Program	5	Tijuana River National Estuary Research	5

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.

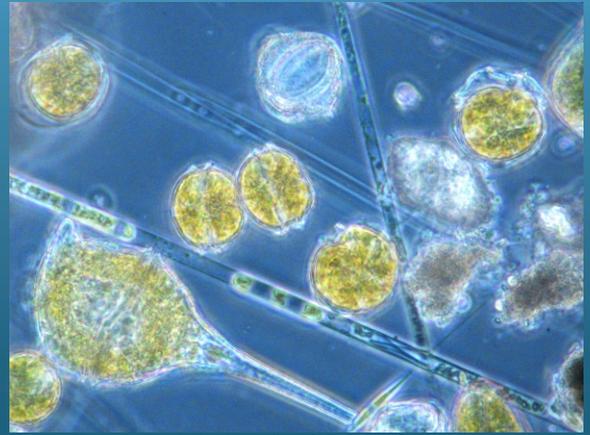
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of seafood species such as crab, lobster, and 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.



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

COUNTY	AGENCY	#	
Del Norte	Yurok Tribe Environmental Program	1	
Humboldt	Coast Seafood Company	10	
	Humboldt State University Marine Lab	1	
	Humboldt County Environmental Health Department	1	
	Yurok Tribe Environmental Program	1	
	Mendocino County Environmental Health Department	1	
Mendocino	Mendocino County Environmental Health Department	1	
Sonoma	CDPH Marine Biotoxin Program	5	
	Cove Mussel Company	4	
Marin	Drakes Bay Oyster Company	39	
	CDPH Marine Biotoxin Program	5	
	Hog Island Oyster Company	6	
	Tomales Bay Oyster Company	6	
	Starbird Mariculture	1	
	Point Reyes Oyster Company	2	
	CDPH Volunteer ( <i>Peter Schmidt</i> )	1	
	CDPH Volunteer ( <i>Jamie Sutton</i> )	2	
	San Francisco	None Submitted	
	San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	5	
Monterey	None Submitted		
San Luis Obispo	Grassy Bar Oyster Co.	10	
	Morro Bay Oyster Company	7	
	CDPH Volunteer ( <i>Chris Peterson</i> )	1	
Santa Barbara	Santa Barbara Mariculture Company	7	
	U.C. Santa Barbara	6	
	Sea Grant, U.C. Santa Barbara	1	
	Ty Warner Sea Life Center/HABNet	1	
Ventura	Ventura County Environmental Health Department	2	
Los Angeles	CDPH Volunteer ( <i>Cal Parsons</i> )	1	
	CDPH Volunteer ( <i>Steven Field</i> )	1	
	Los Angeles County Health Department Torrance	1	
Orange	CDPH Volunteer ( <i>Steve Crooke</i> )	1	
San Diego	Carlsbad Aquafarms, Inc.	5	
	U.S. Navy Marine Mammal Program	4	
	CDPH Volunteer ( <i>Steve Crooke</i> )	1	

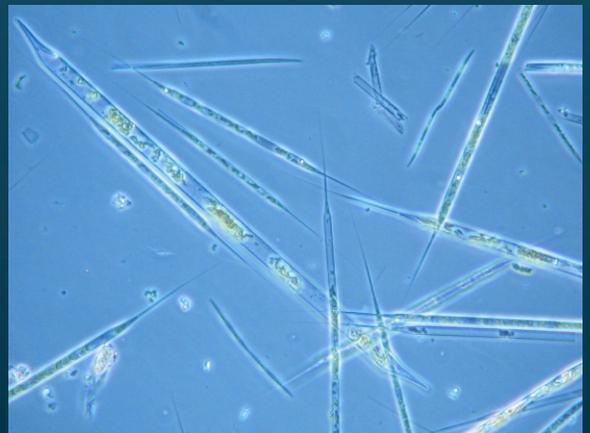
## PHYTOPLANKTON GALLERY



Two cell chain and single cells of the dinoflagellate *Alexandrium* with *Ceratium divaricatum* and diatom *Rhizosolenia*.



The dinoflagellate *Alexandrium* in a sample from Chimney Rock in Marin county. Note most of the cells are forming cysts.



Multiple species of the elongated cylindrical diatom *Rhizosolenia*.