

# 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 2016

Technical Report No. 16-18

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of July, 2016. 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 San Luis Obispo and Los Angeles counties in July (Figure 1). A low level of PSP toxin was detected in a mussel sample from Cal Poly Pier, San Luis Obispo collected the third week of July (Figure 3).

(Continued on Page 2)

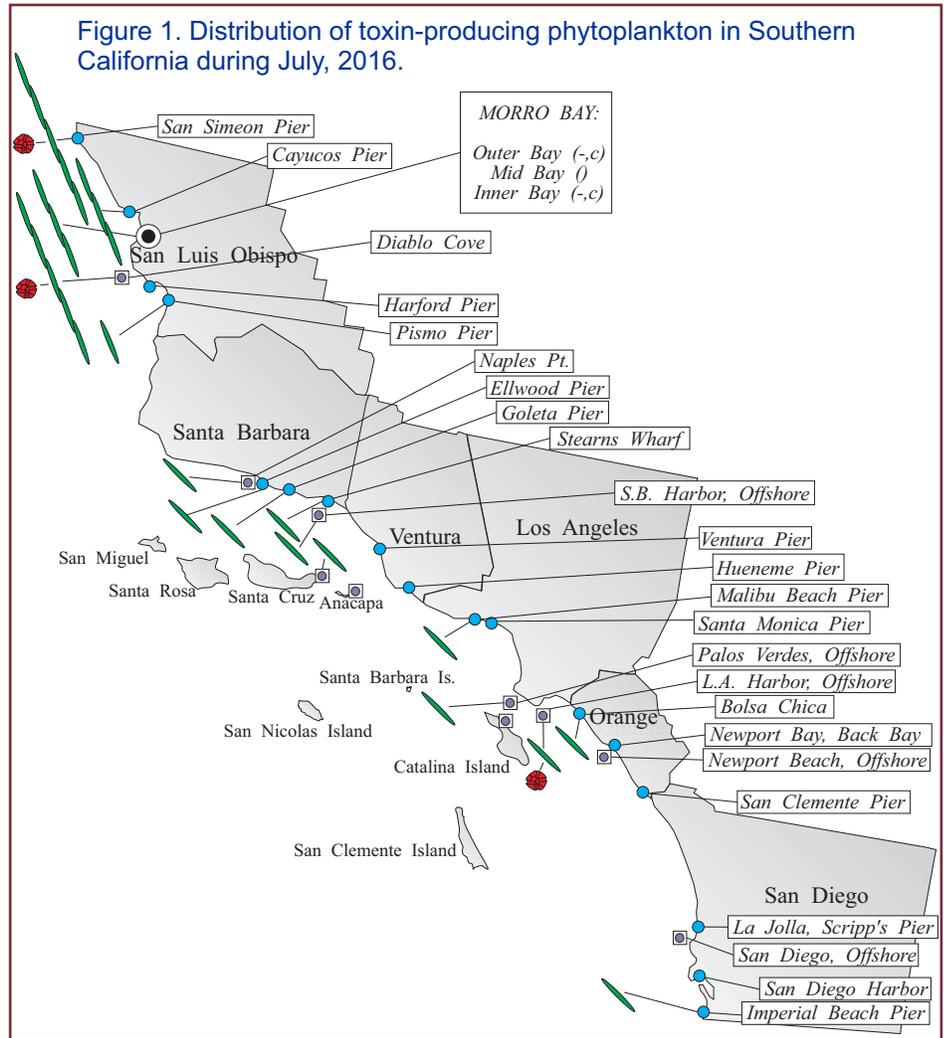


Figure 1. Distribution of toxin-producing phytoplankton in Southern California during July, 2016.

### 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

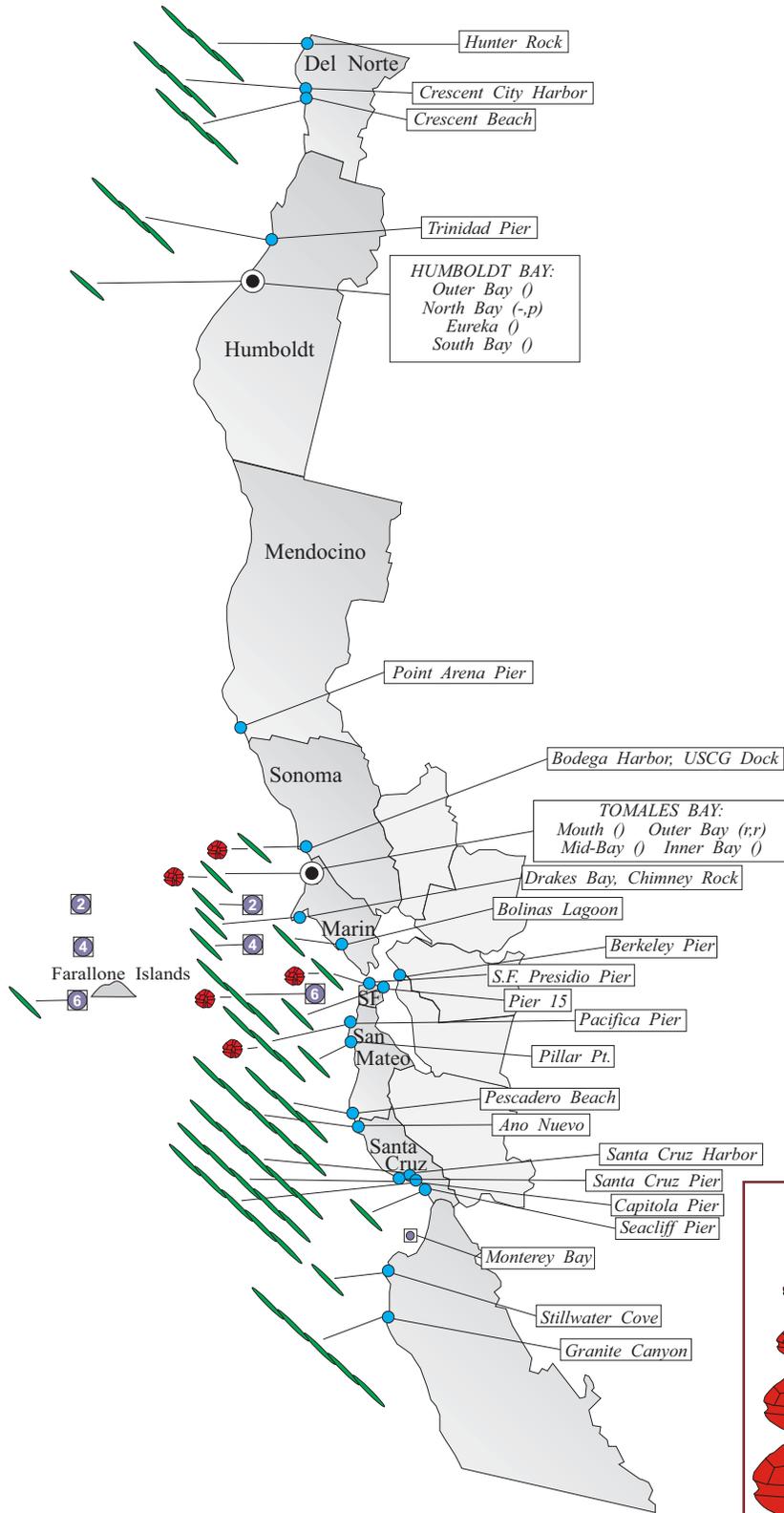
- Present (less than 10%)
- Common (between 10% and 50%)
- Abundant (greater than 50%)

#### 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 2. Distribution of toxin-producing phytoplankton in Northern California during July, 2016.



(Continued from Page 1)

**Domoic Acid**

*Pseudo-nitzschia* was observed in all southern California counties except Ventura in July. The percent composition of this diatom decreased in most southern California counties compared to June. The highest relative abundances were observed at Diablo Cove (San Luis Obispo) during the first and second weeks of July (Figure 1). Domoic acid was not detected in any shellfish samples from southern California in July (Figure 3). A rock crab collected by CDPH Food & Drug Branch (FDB) offshore of San Luis Obispo County tested above the alert level for domoic acid.

**Non-Toxic Species**

The diatom *Chaetoceros* was common to abundant between San Luis Obispo and San Diego counties. The diatom *Thalassiosira* was common to abundant in San Luis Obispo and the diatom *Hemiaulus* was common in Santa Barbara, Orange, and San Diego counties. The dinoflagellate *Prorocentrum* was also common in Santa Barbara, Orange and San Diego counties.

**Northern California Summary:**

**Paralytic Shellfish Poisoning**

Low numbers of *Alexandrium* were observed at several sampling sites ranging from Sonoma to San Mateo counties in July (Figure 2). PSP toxins below the alert level were detected in the sentinel mussels at

(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%)

**MONTHLY SAMPLING STATIONS:**

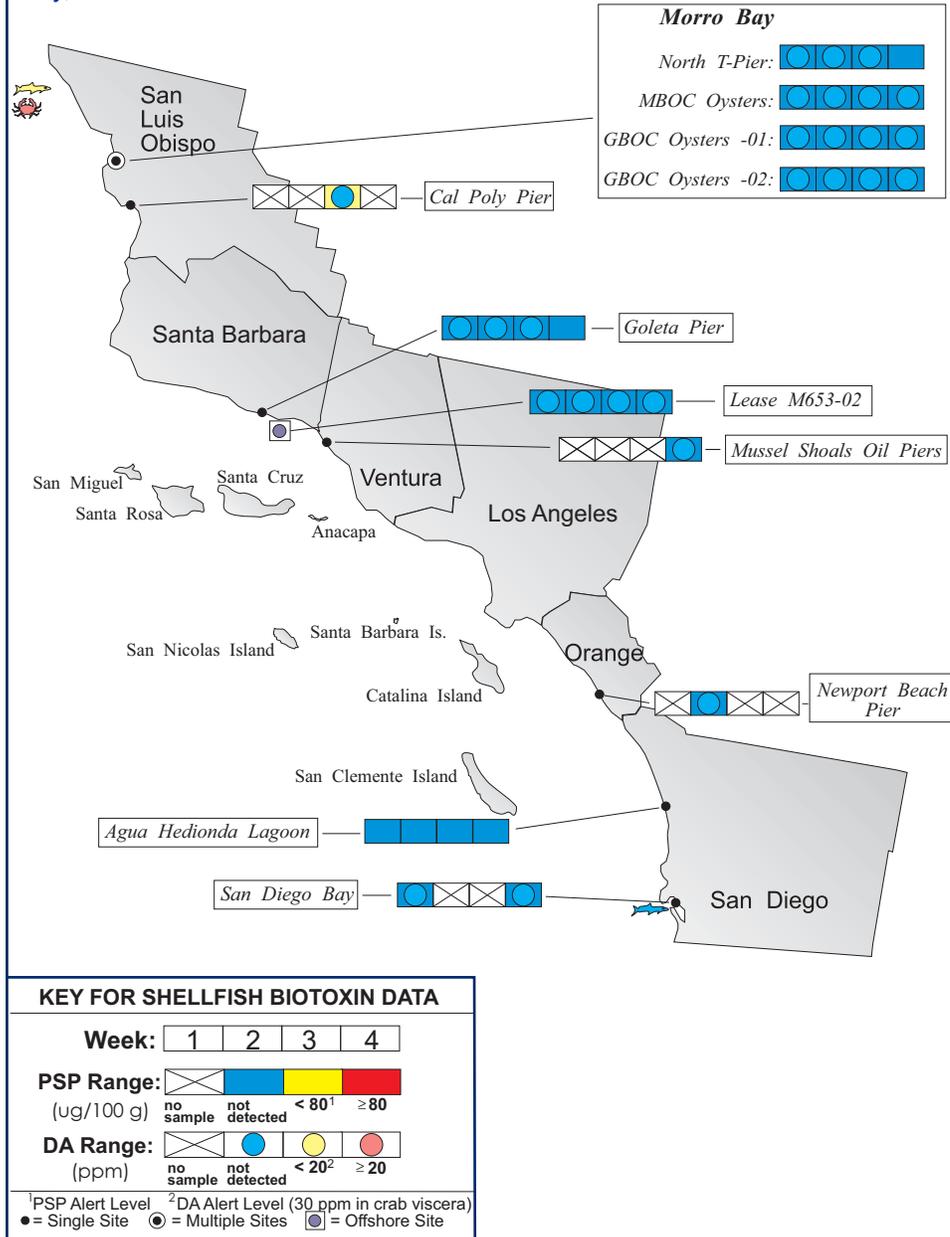
- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

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

(Continued from Page 2)

Figure 3. Distribution of shellfish biotoxins in Southern California during July, 2016.



Chimney Rock in Marin County, and from a mussel sample collected at Pillar Point (Half Moon Bay) (Figure 4). A low concentration of PSP was detected in a razor clam sample collected from Crescent Beach (Del Norte County).

**Domoic Acid**

*Pseudo-nitzschia* was observed in all northern California counties in July except Mendocino (Figure 2). The percent composition of this diatom decreased in Del Norte, Humboldt, Mendocino, and Marin counties, and increased slightly in San Mateo County compared to June. The highest relative abundance was seen at Crescent Beach (Del Norte County) in the first week of July. A mussel sample from Monterey Commercial Pier tested above the alert level for domoic acid in the fourth week of July (Figure 4). Low levels of domoic acid were detected in mussels from Del Norte, Humboldt, San Mateo, and Santa Cruz counties. Concentrations of domoic acid in razor clam meat and viscera remained above the alert level in samples from Clam Beach in Humboldt County. Concentrations of domoic acid ranged from 78-91 ppm in meat samples, and 78-89 ppm in the viscera (Figure 4). Razor clams from Crescent Beach in Del Norte County also had increasing concentrations of domoic acid compared to June, ranging from 97-230 ppm in meat, and 85-170 in the viscera. The

(Continued on Page 4)

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

(Continued from Page 3)

health advisory and fishery closure for razor clams remains in effect. Low levels of domoic acid were detected in a sardine and northern anchovy sample collected by FDB from Monterey Bay in the third week of July. FDB obtained rock crab samples from Pillar Point (San Mateo County), in the fourth week of July. FDB obtained rock crab samples from Pillar Point (San Mateo County), in the fourth week of July. Concentrations of domoic acid in the viscera ranged from 17 to 48 ppm. Summaries of crab sample data can be found here:

<http://www.cdph.ca.gov/HealthInfo/Pages/fdbDomoicAcidInfo.aspx>

**Non-Toxic Species**

The diatoms *Chaetoceros* and *Skeletonema* were common to abundant in most Northern California counties. The diatom *Rhizosolenia* was abundant offshore of Marin County and the diatom *Cerataulina* was abundant offshore of San Francisco. The dinoflagellate *Gonyaulax* was abundant at Pillar Point Harbor (San Mateo County).



**QUARANTINES:**

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

The December 9 Health Advisory warning consumers not to eat recreationally harvested razor clams from Humboldt and Del Norte counties remains in effect due to persistent elevated levels of domoic acid.

Current information for rock crab Health Advisories is located at:

<http://www.cdph.ca.gov/HealthInfo/Pages/fdbDomoicAcidInfo.aspx>

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

(Continued on Page 5)

Figure 4. Distribution of shellfish biotoxins in Northern California during July, 2016.

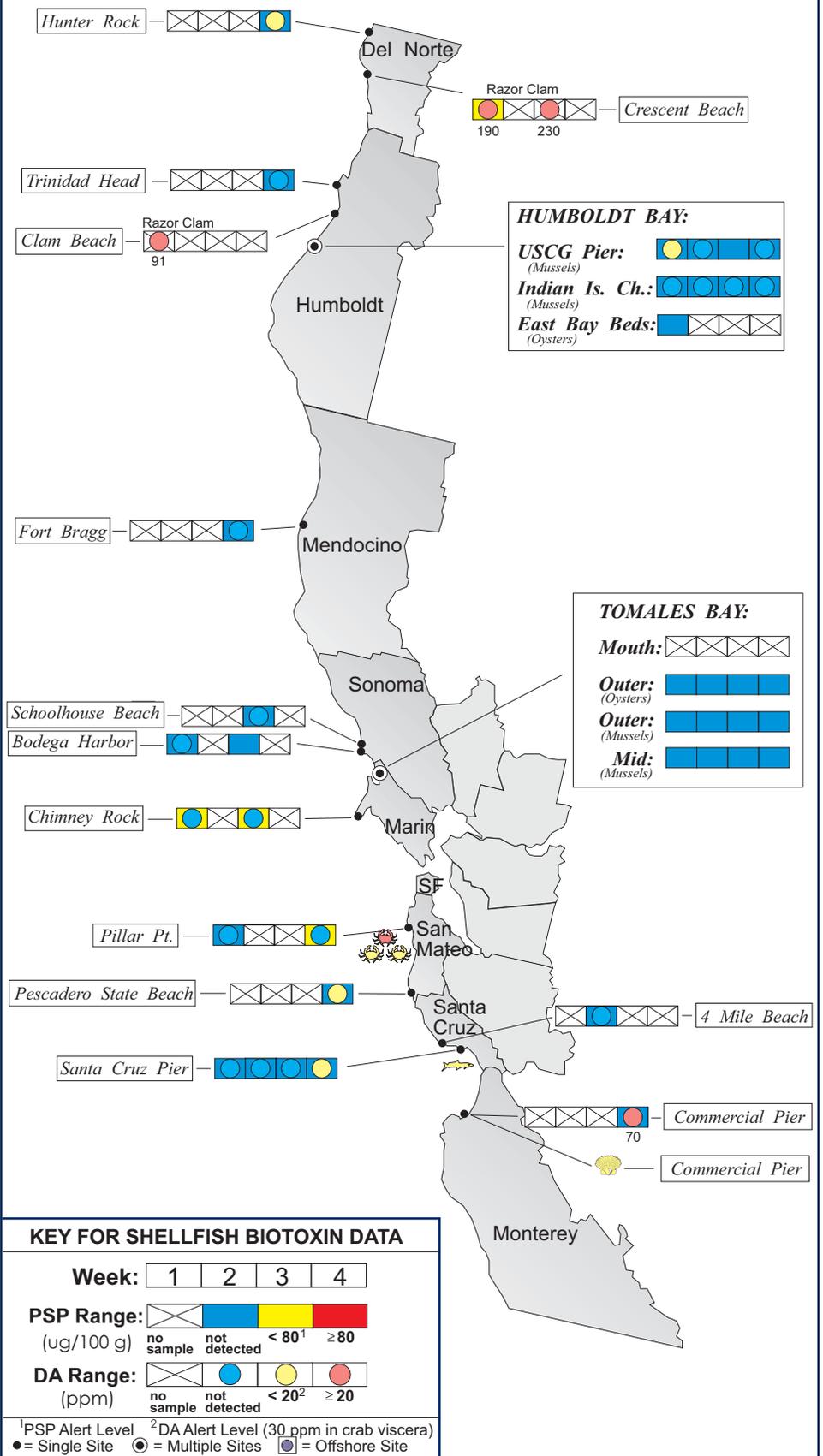


Table 1. Program participants collecting phytoplankton samples during July, 2016.

AGENCY	#	AGENCY	#
<b>DEL NORTE COUNTY</b>			
CDPH Volunteer ( <i>Jim Hooper</i> )	1	Tolowa Dee-ni' Nation	2
<b>HUMBOLDT COUNTY</b>			
Coast Seafood Company	4	Humboldt State University Marine Lab	1
<b>MENDOCINO COUNTY</b>			
		CDPH Volunteer ( <i>Marie DeSantis</i> )	2
<b>SONOMA COUNTY</b>			
		CDPH Marine Biotoxin Program	2
<b>MARIN COUNTY</b>			
CDPH Volunteers ( <i>Anderson, Clyde</i> )	5	Hog Island Oyster Company	4
CDPH Marine Biotoxin Program	2	Gulf Farallones National Marine Sanctuary	6
<b>CONTRA COSTA COUNTY</b>			
		City of Berkeley	1
<b>SAN FRANCISCO COUNTY</b>			
CDPH Volunteer ( <i>Eugenia McNaughton</i> )	2	Exploratorium	5
Monte Vista High School	1	Gulf Farallones National Marine Sanctuary	3
<b>SAN MATEO COUNTY</b>			
		U.C. Santa Cruz - Ano Nuevo	2
San Mateo County Environmental Health Dept.	4	The Marine Mammal Center ( <i>Stan Jensen</i> )	4
<b>SANTA CRUZ COUNTY</b>			
Santa Cruz County Envir. Health Department	3	CDPH Volunteer ( <i>Jeff Palsgaard</i> )	5
San Lorenzo Valley High School	2	U.C. Santa Cruz	4
<b>MONTEREY COUNTY</b>			
		Marine Life Studies	1
The Otter Project ( <i>Connie Rose</i> )	2	Marine Pollution Studies Laboratory	1
<b>SAN LUIS OBISPO COUNTY</b>			
Morro Bay National Estuary Program	2	Morro Bay Oyster Company	4
Monterey Bay National Marine Sanctuary	6	Tenera Environmental	4
Friends of the Sea Otter ( <i>Kelly Cherry</i> )	3	CDPH Volunteers ( <i>Hoskins, Plemons</i> )	4
<b>SANTA BARBARA COUNTY</b>			
Santa Barbara Channel Keeper	4	CDPH Volunteer ( <i>Sylvia Short</i> )	1
SB Museum Natural History, Sea Center	2	U.C. Santa Barbara	4
HABNet Volunteers	1	National Park Service	5
<b>VENTURA COUNTY</b>			
		National Park Service	1
Ventura County Environmental Health Dept	1	CDPH Volunteer ( <i>Fred Burgess</i> )	3
<b>LOS ANGELES COUNTY</b>			
		Los Angeles County Sanitation District	3
City of Los Angeles Envir. Monitoring Division	2	Los Angeles County Health Department	2
<b>ORANGE COUNTY</b>			
		Orange County Health Care Agency	1
California Department of Fish and Wildlife	4	Amigos de Bolsa Chica	5
Crystal Cove Alliance	1	CDPH Volunteer ( <i>Truong Nguyen</i> )	2
<b>SAN DIEGO COUNTY</b>			
		Crystal Cove Alliance	1
Scripps Institute of Oceanography	4	Tijuana River National Estuary Research	4
Sea Camp/HABNet	1	U.S. Navy Marine Mammal Program	4

(Continued from Page 4)

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 domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in seafood species such as crab, lobster, and small finfish like sardines and anchovies.

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, 2016.

COUNTY	AGENCY	#
Del Norte	Tolowa Dee-ni' Nation	2
	CDPH Volunteer ( <i>Ken Graves</i> )	12
Humboldt	Coast Seafood Company	9
	Humboldt County Environmental Health Department	1
	California Department of Fish and Wildlife	4
	Mendocino County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
Marin	Cove Mussel Company	4
	Hog Island Oyster Company	5
	Starbird Mariculture	4
	CDPH Marine Biotoxin Program	2
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	3
	CDPH Food and Drug Branch	6
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer ( <i>Michael Wolcott</i> )	1
Monterey	Monterey Abalone Company	3
San Luis Obispo	Grassy Bar Oyster Company	10
	Morro Bay Oyster Company	6
	California Polytechnic State University	1
Santa Barbara	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	4
Ventura	Ventura County Environmental Health Department	1
Los Angeles	None Submitted	
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarm, Inc.	4
	U.S. Navy Marine Mammal Program	3

## PHYTOPLANKTON GALLERY



Members of the chainforming diatom *Pseudonitzschia seriata* group which can produce the neurotoxin domoic acid.



The dinoflagellate *Dinophysis caudata* in the process of dividing into two cells.



The chainforming diatom *Hemiaulus* was common to abundant in several Southern California counties in July.