

# 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

September 2015

Technical Report No. 15-20

**INTRODUCTION:**

This report provides a summary of biotoxin activity for the month of September, 2015. 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 Cal Poly Pier in San Luis Obispo County in September (Figure 1). The percent composition of this dinoflagellate decreased dramatically in San Luis Obispo County compared to August. PSP toxins were detected in the sentinel mussels at

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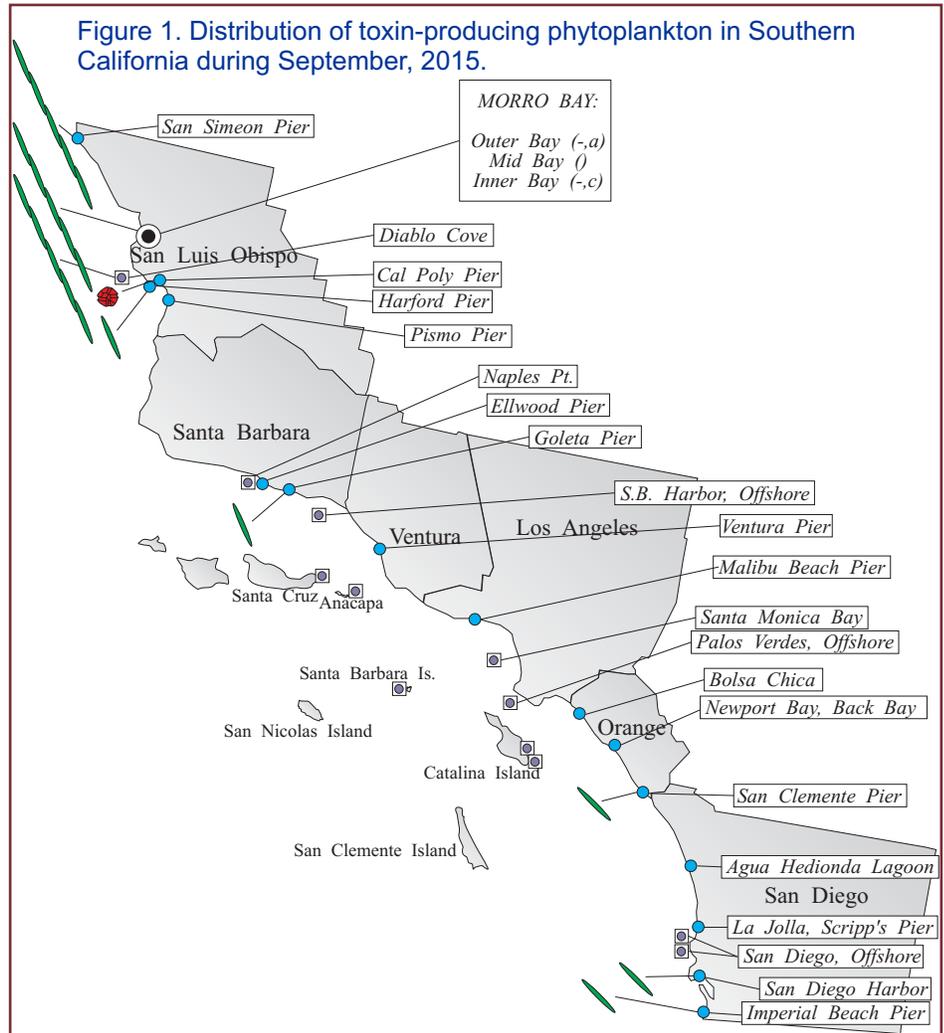
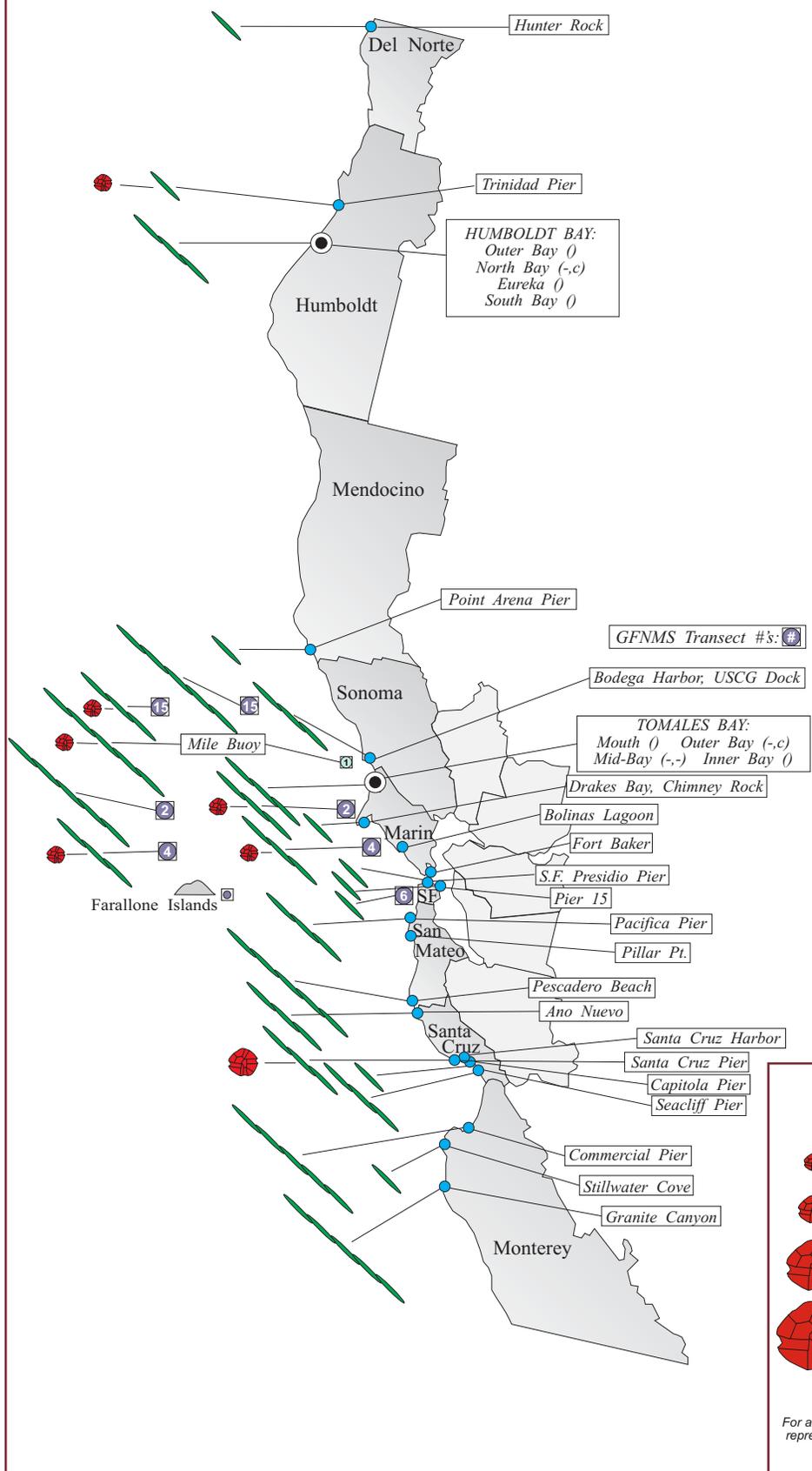


Figure 1. Distribution of toxin-producing phytoplankton in Southern California during September, 2015.

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%)		
<b>MONTHLY SAMPLING STATIONS:</b>			
			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 September, 2015.



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Cal Poly Pier with a concentration of 240 ug/100 g on September 2, declining to below the alert level by September 15 (Figure 3).

**Domoic Acid**

*Pseudo-nitzschia* was observed at select sampling sites in San Luis Obispo, Santa Barbara, Orange and San Diego counties (Figure 1). The percent composition of this diatom increased at sites in San Luis Obispo County. The highest relative abundance was observed at Diablo Cove (San Luis Obispo County) during the first week of September. The cell mass was low at most locations. Domoic acid was not detected in bivalve shellfish samples analyzed during September (Figure 3).

**Non-Toxic Species**

The diatom *Chaetoceros* was common to abundant at sites in all Southern California counties. The dinoflagellate *Ceratium furca* was common to abundant at select sites in San Luis Obispo County.

**Northern California Summary:**

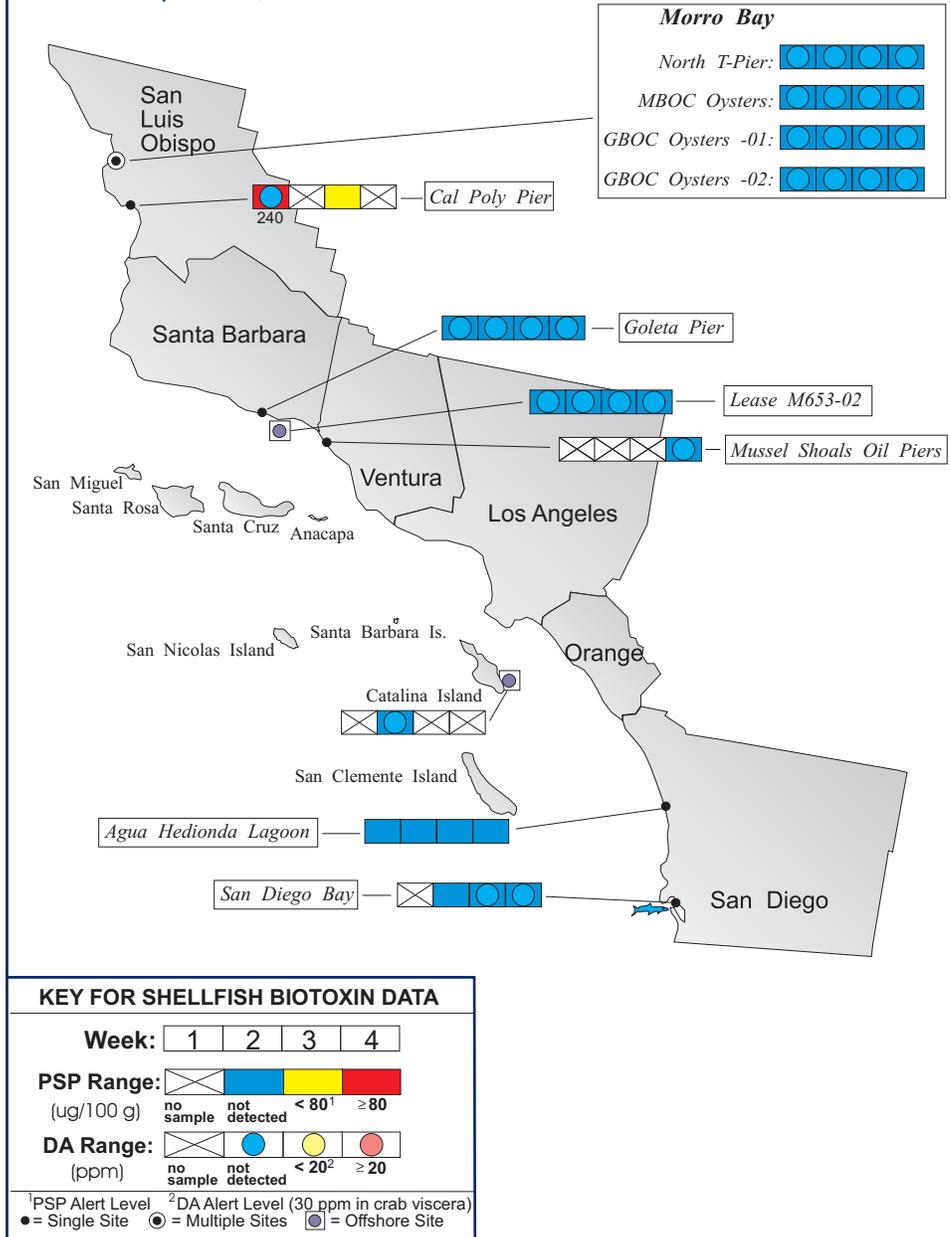
**Paralytic Shellfish Poisoning**

*Alexandrium* was observed at sites in Humboldt, Sonoma, Marin, and Monterey counties (Figure 2). Cell numbers were low at all sites. PSP toxins were not detected in any bivalve shellfish samples in September (Figure 4).

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Figure 3. Distribution of shellfish biotoxins in Southern California during September, 2015.



**Domoic Acid**

*Pseudo-nitzschia* was observed at the majority of sampling sites in all Northern California counties (Figure 2). The percent composition and cell mass decreased at select sites in Del Norte and Humboldt counties compared to August. Cell mass was low at most locations. The highest relative abundance and cell mass was observed at the 1 Mile Buoy offshore of Bodega Bay in Sonoma County during the third week of the month. Low levels of domoic acid were detected in Humboldt, Mendocino, and San Mateo counties. Dungeness and rock crab samples were collected by the California Department of Fish and Wildlife in September. The majority of the dungeness crab samples, four out of six from Del Norte County, eleven of twelve from Humboldt, and one of two from Monterey County, exceeded the alert level in the viscera with concentrations ranging from <2.5-120 ppm, 23-140 ppm, and 6.8-74 ppm respectively. Rock crabs collected inside Humboldt Bay contained low levels or were below the detection limit for domoic acid in the viscera. The majority of rock crabs collected in Monterey Bay were above the alert level with the highest concentration being 190 ppm domoic acid.

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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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**Non-Toxic Species**

The diatom *Chaetoceros* was common to abundant at sites from Humboldt to Santa Cruz counties. An armored dinoflagellate, possibly *Protoceratium*, was common to abundant at sites between Sonoma and Santa Cruz counties.



**QUARANTINES:**

On August 26 the Department issued a Health Advisory warning consumers not to eat recreationally harvested bivalve shellfish from Humboldt and Del Norte counties. Only the white meat of scallops should be consumed and the viscera discarded.

A Health Advisory remains in effect for recreationally harvested mussels and clams, the internal organs of scallops, and the internal organs and meat of commercially or recreationally caught anchovy, sardines, and crabs taken from Monterey, Santa Cruz and Santa Barbara counties. This advisory was issued because of elevated levels of domoic acid in samples from this region.

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.

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

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Figure 4. Distribution of shellfish biotoxins in Northern California during September, 2015.

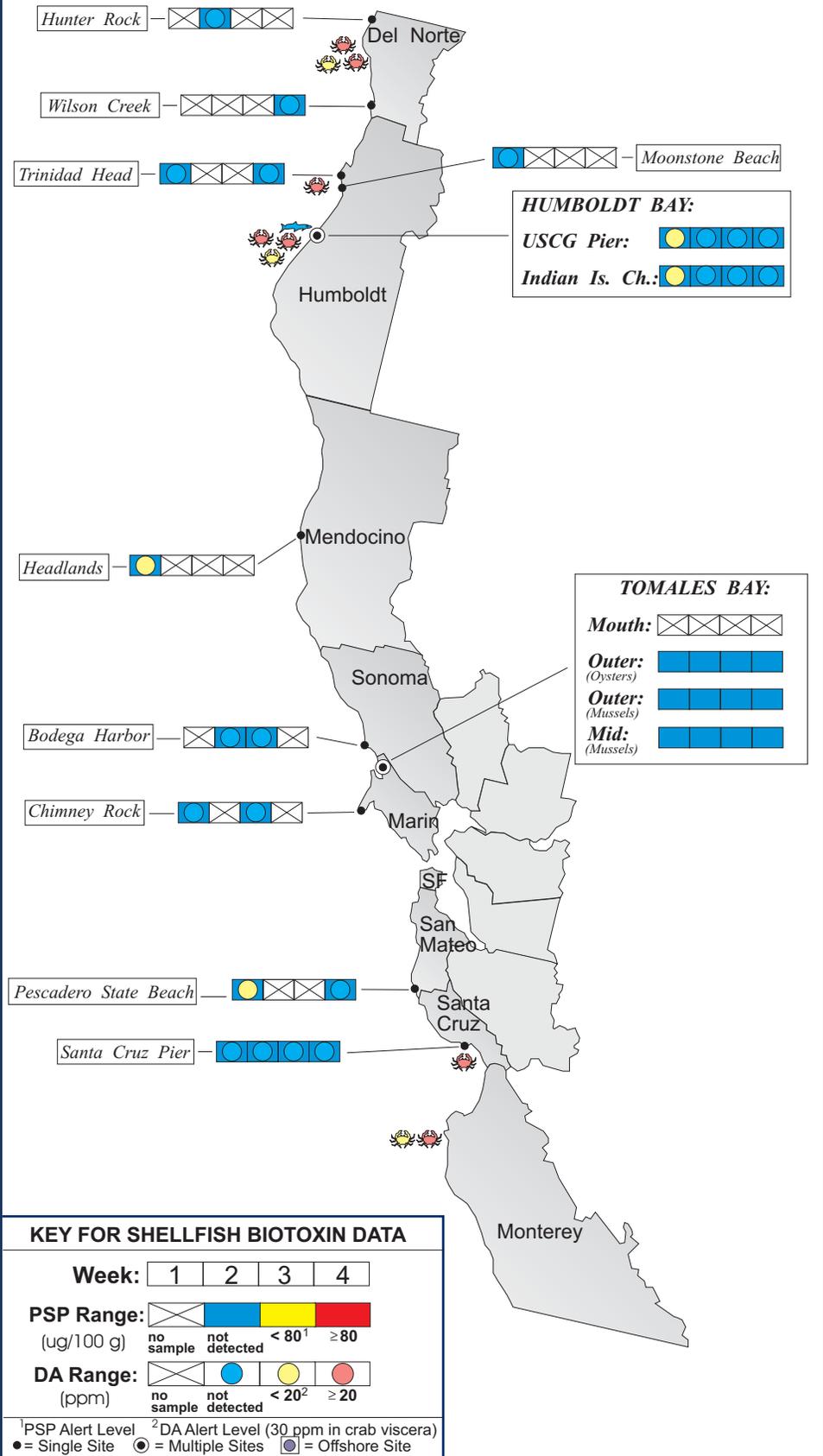


Table 1. Program participants collecting phytoplankton samples during September, 2015.

AGENCY	#	AGENCY	#
<b>DEL NORTE COUNTY</b>		Tolowa Dee-ni' Nation	1
<b>HUMBOLDT COUNTY</b>			
Coast Seafood Company	5	Humboldt State University Marine Lab	2
<b>MENDOCINO COUNTY</b>		CDPH Volunteer ( <i>Marie DeSantis</i> )	3
<b>SONOMA COUNTY</b>		Gulf Farallones National Marine Sanctuary	2
CDPH Marine Biotoxin Program	2	Bodega Marine Lab & Farallone Institute	4
<b>MARIN COUNTY</b>		CDPH Volunteers ( <i>Anderson, Clyde</i> )	4
CDPH Marine Biotoxin Program	3	Hog Island Oyster Company	4
Gulf Farallones National Marine Sanctuary	7	NatureBridge	1
<b>SAN FRANCISCO COUNTY</b>		Gulf Farallones National Marine Sanctuary	2
CDPH Volunteer ( <i>Eugenia McNaughton</i> )	2	Exploratorium	3
San Francisco Bay Whale Watching Company	1	Monte Vista High School	1
<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>			
U.C. Santa Cruz	5	San Lorenzo Valley High School	1
Santa Cruz County Envir. Health Department	3	The Otter Project ( <i>Jeff Palsgaard</i> )	4
<b>MONTEREY COUNTY</b>			
The Otter Project ( <i>Rose, Noke</i> )	4	Marine Pollution Studies Laboratory	1
Monterey Abalone Company	2	CDPH Volunteer ( <i>Jerry Norton</i> )	1
<b>SAN LUIS OBISPO COUNTY</b>		CDPH Volunteer ( <i>Alison Plemons</i> )	3
Morro Bay National Estuary Program	2	Morro Bay Oyster Company	3
Coastal Discovery Center, San Simeon	4	Tenera Environmental	3
Friends of the Sea Otter ( <i>Carducci</i> )	1	CDPH Marine Biotoxin Program	1
<b>SANTA BARBARA COUNTY</b>			
CDPH Volunteer ( <i>Sylvia Short</i> )	2	U.C. Santa Barbara	5
National Park Service	3	Santa Barbara Channel Keeper	2
<b>VENTURA COUNTY</b>			
National Park Service	1	CDPH Volunteer ( <i>Fred Burgess</i> )	1
<b>LOS ANGELES COUNTY</b>		Catalina Island Marine Institute	2
Los Angeles County Sanitation District	4	CDPH Volunteers ( <i>Cal Parsons</i> )	2
Los Angeles County Health Department	1	City of Los Angeles Envir Monitoring Division	2
<b>ORANGE COUNTY</b>		CDPH Volunteer ( <i>Truong Nguyen</i> )	1
California Department of Fish and Wildlife	5	Amigos de Bolsa Chica	4
<b>SAN DIEGO COUNTY</b>		Carlsbad Aquafarms, Inc.	1
Scripps Institute of Oceanography	1	Sea Camp/HABNet	2
U.S. Navy Marine Mammal Program	4	Tijuana River National Estuary Research	4

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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 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 September, 2015.

COUNTY	AGENCY	#
Del Norte	California Department of Fish and Wildlife	6
	Tolowa Dee-ni' Nation	1
	Yurok Tribe Environmental Program	1
Humboldt	Coast Seafood Company	10
	California Department of Fish and Wildlife	17
	Humboldt County Environmental Health Department	2
Mendocino	CDPH Volunteer ( <i>Charlie Lorenz</i> )	1
Sonoma	CDPH Marine Biotoxin Program	2
Marin	Cove Mussel Company	4
	Hog Island Oyster Company	8
	CDPH Marine Biotoxin Program	2
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	2
	California Department of Fish and Wildlife	2
Santa Cruz	U.C. Santa Cruz	5
Monterey	California Department of Fish and Wildlife	6
	Grassy Bar Oyster Company	13
San Luis Obispo	Morro Bay Oyster Company	6
	CDPH Marine Biotoxin Program	1
	California Polytechnic State University	1
	Santa Barbara Mariculture Company	4
Santa Barbara	U.C. Santa Barbara	5
	Ventura County Environmental Health Department	1
Los Angeles	CDPH Volunteer ( <i>Cal Parsons</i> )	1
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	5
	U.S. Navy Marine Mammal Program	4

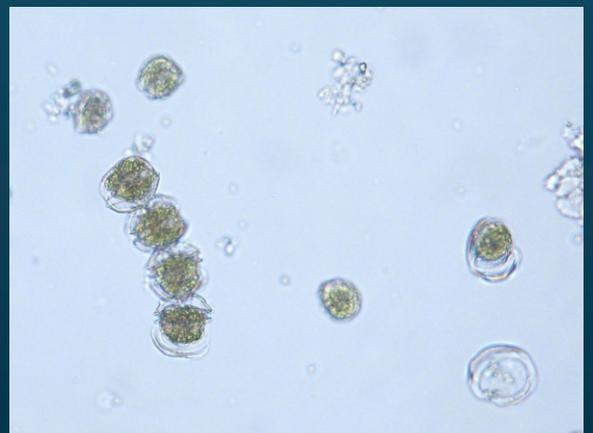
## PHYTOPLANKTON GALLERY



*The singular unarmored dinoflagellate Akashiwo sanguinea.*



*Chains of the domoic acid producing diatom Pseudo-nitzschia with the PSP producing dinoflagellate Alexandrium.*



*A chain of four Alexandrium cells with singular and cysting cells. Alexandrium is the dinoflagellate that produces PSP toxins.*