

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

August 2015

Technical Report No. 15-19

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of August, 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 sites in San Luis Obispo County in August (Figure 1). The percent composition of this dinoflagellate increased at several locations. The highest observed relative abundance was in a sample collected August 18th from Diablo Cove, in which *Alexandrium* accounted for

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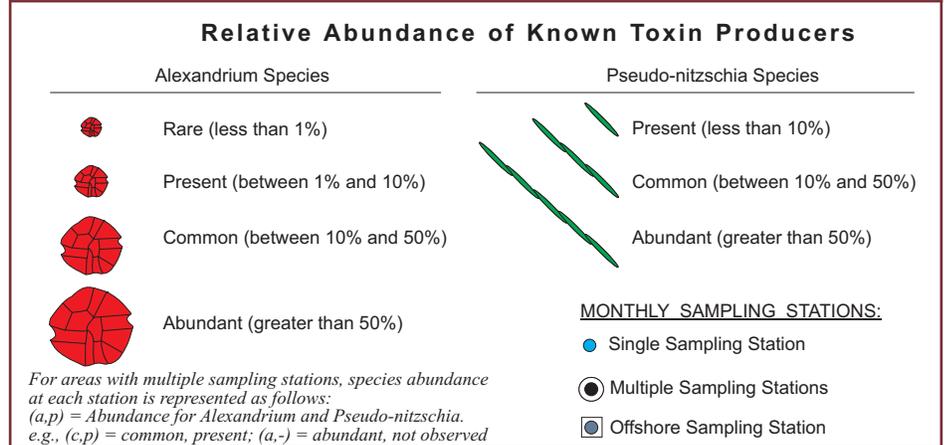
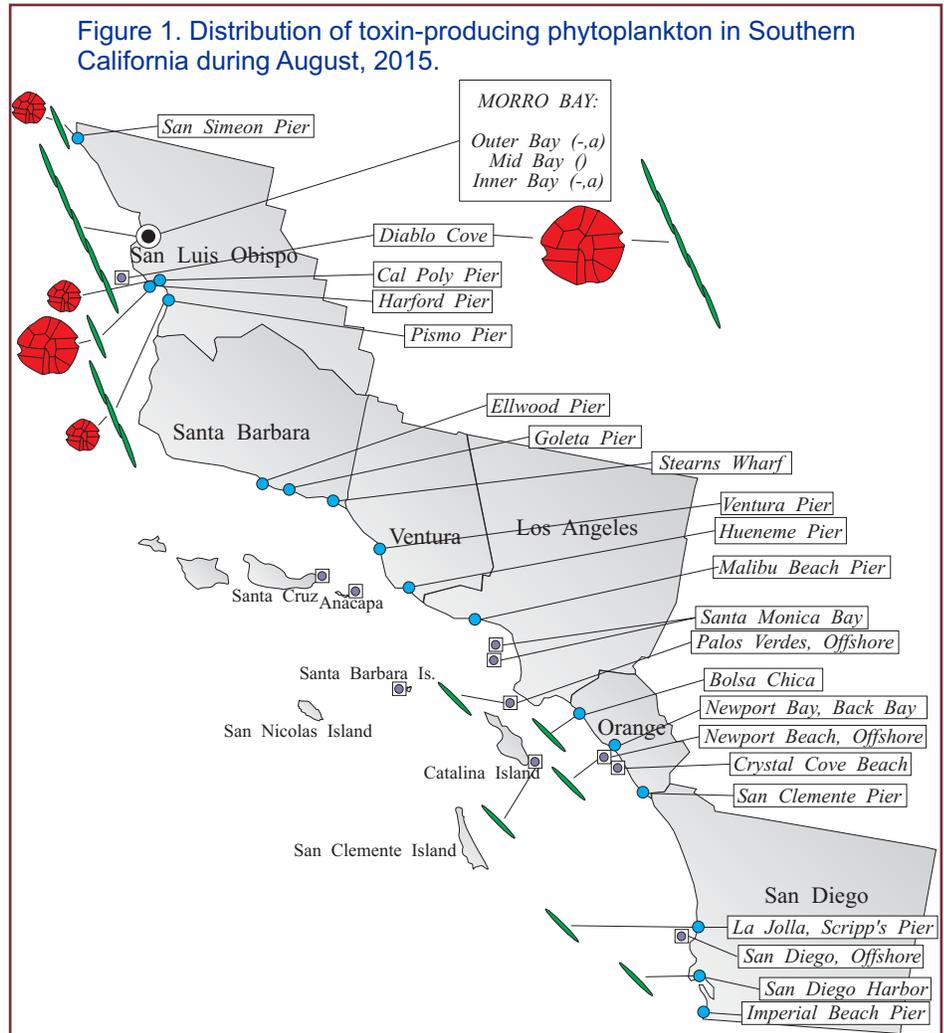
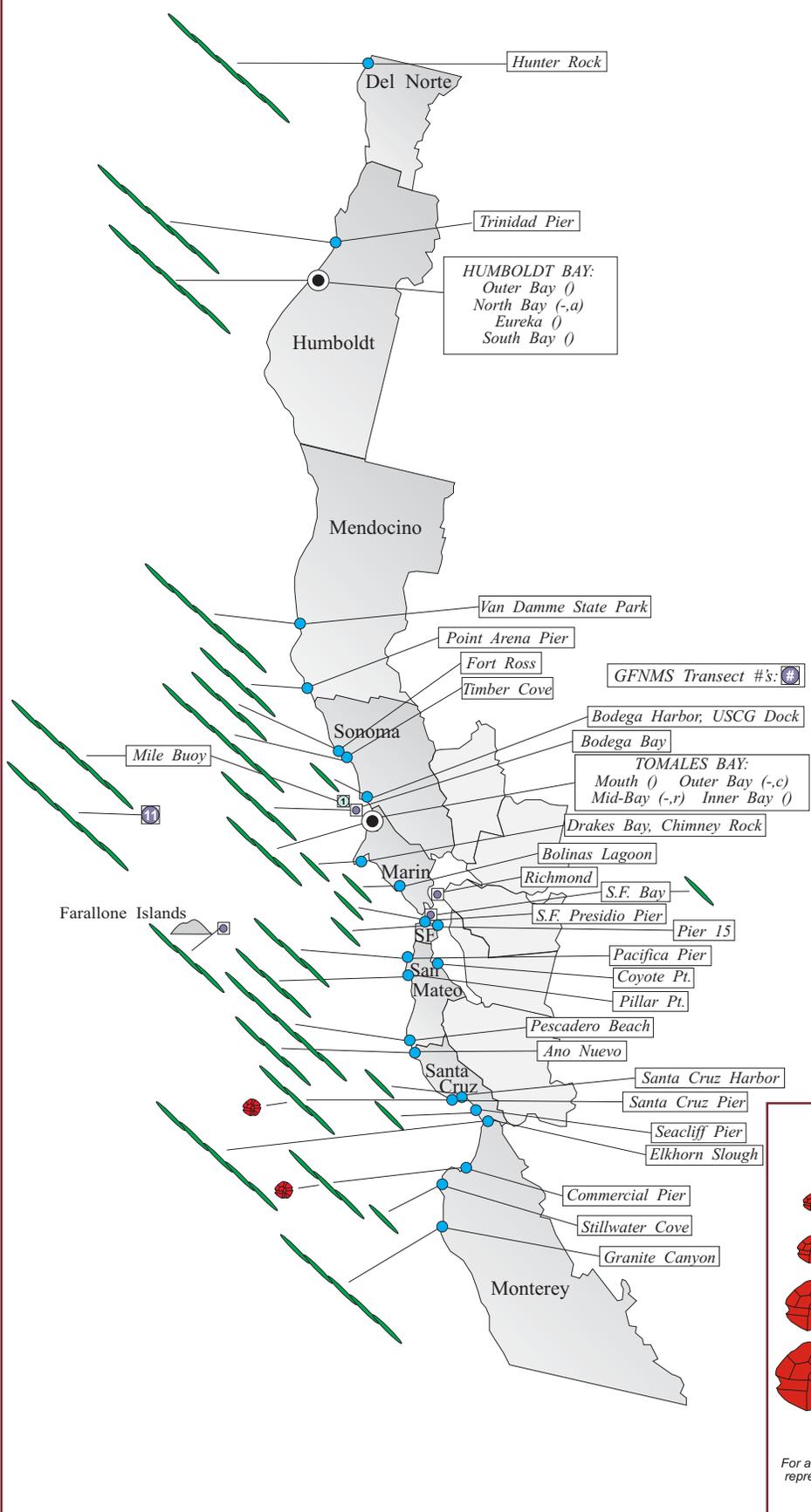


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during August, 2015.



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approximately 57% of all species observed. PSP toxins detected in the sentinel mussels at Cal Poly Pier reached a peak concentration of 414 ug/100 g on August 25. Low levels of PSP toxins were detected in mussel and oyster samples in Morro Bay during August (Figure 3).

Domoic Acid

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

Non-Toxic Species

The diatom *Chaetoceros* was common to abundant at sites in all Southern California counties. The dinoflagellate *Ceratium* was common to abundant at select sites in San Luis Obispo, Los Angeles, Orange, and San Diego counties. The dinoflagellate *Prorocentrum micans* was common at Harford Pier in San Luis Obispo County.

Northern California Summary:

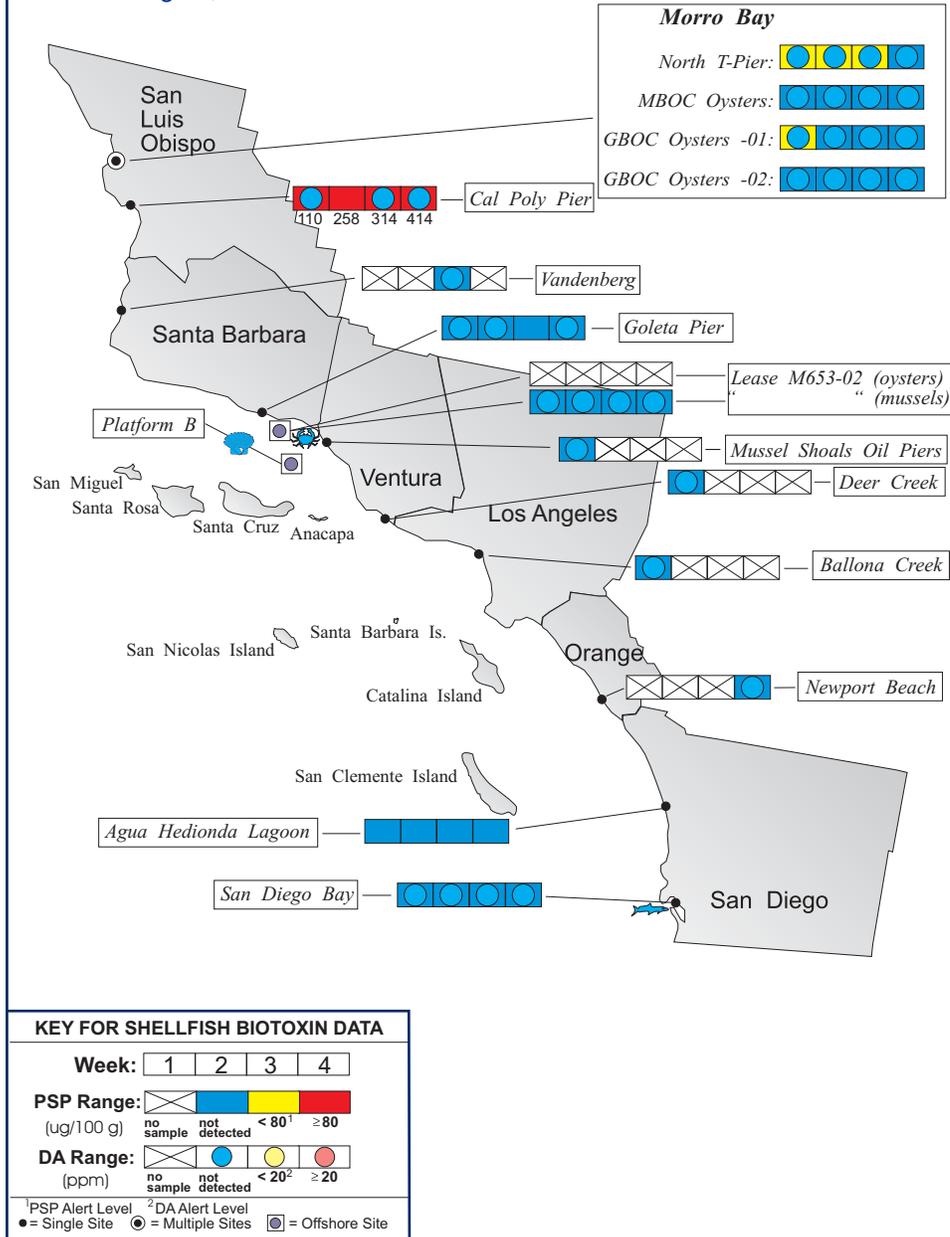
Paralytic Shellfish Poisoning

Alexandrium was observed at sites in Santa

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



Cruz and Monterey counties (Figure 2). Cell numbers were low at all sites. Low levels of PSP toxins were detected in a mussel sample from the Mendocino Headlands and a razor clam sample from Moonstone Beach (Humboldt County) (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at the majority of sampling sites in all Northern California counties (Figure 2). The percent composition of this diatom increased at select sites between Humboldt and Sonoma counties compared to July. The highest relative abundance and cell mass was observed at Hunter Rock in Del Norte County during the first and third weeks of the month. Domoic acid was detected from Del Norte to Sonoma and San Mateo to Monterey counties (Figure 4). Elevated levels of domoic acid were detected in mussels from Hunter Rock (64 ppm), Humboldt Bay USCG Pier (25 ppm), Trinidad Head (29 ppm), and Mendocino Headlands (56 ppm). Domoic acid was detected in a razor clam sample from Moonstone Beach (Humboldt County) on August 14 (340 ppm). Mackerel samples collected by CDPH Food and Drug Branch from offshore Monterey on August 10 had low levels of domoic acid.

Non-Toxic Species

The diatom *Rhizosolenia* was common to abundant at sites in Sonoma County. An

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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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armored dinoflagellate, possibly *Protoceratium*, was common to abundant at sites in Marin, San Francisco and San Mateo counties. The dinoflagellates *Ceratium furca* and *Ceratium divaricatum* were common to abundant in Santa Cruz County.



QUARANTINES:

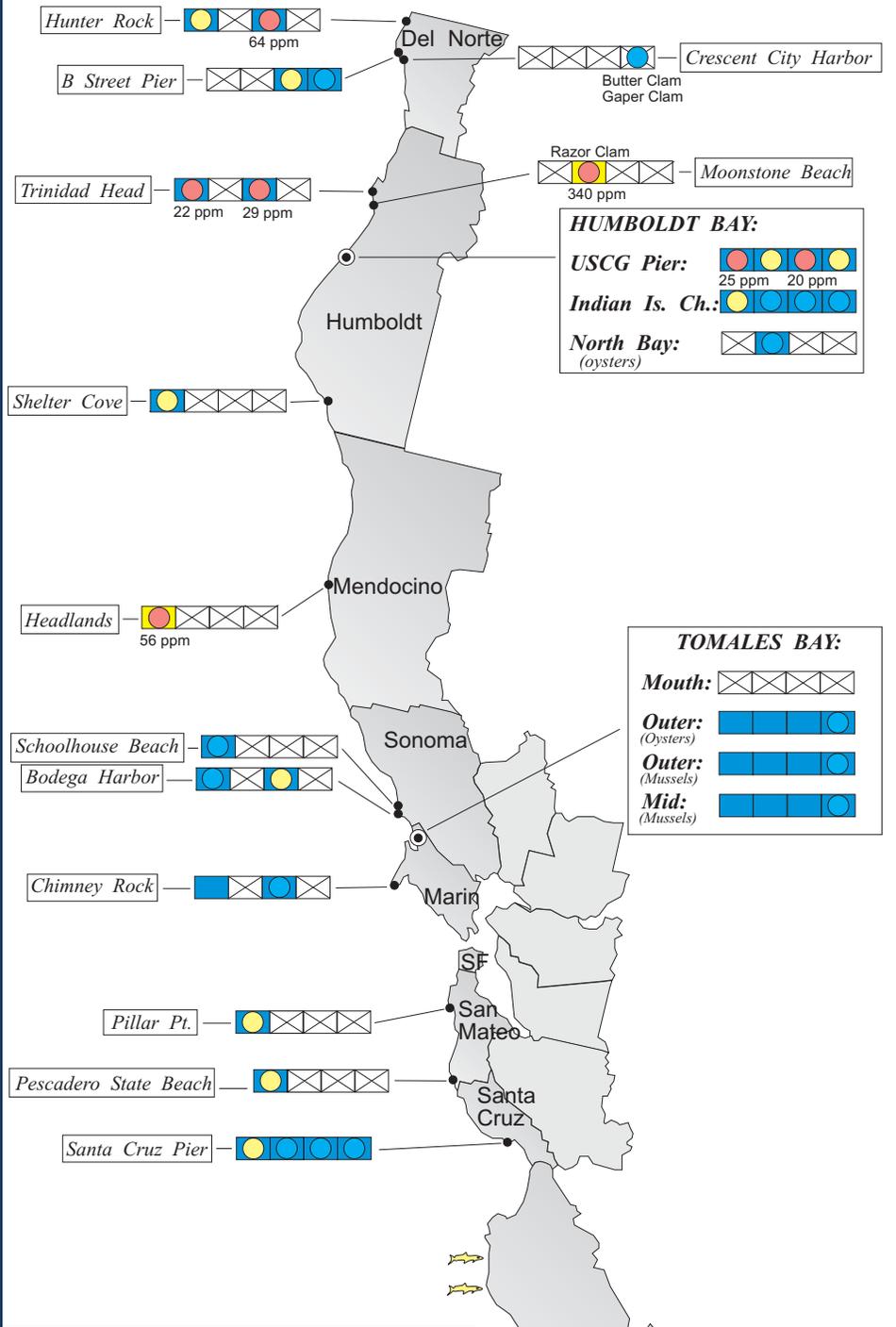
On August 26 the Department issued a Health Advisory warning consumers not to eat recreationally harvested bivalve shellfish from Humboldt and Del Norte counties. Only the white meat of scallops should be consumed and the viscera discarded.

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

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



KEY FOR SHELLFISH BIOTOXIN DATA

Week: 1 2 3 4

PSP Range: (ug/100 g) no sample not detected < 80¹ ≥ 80

DA Range: (ppm) no sample not detected < 20² ≥ 20

¹PSP Alert Level ²DA Alert Level
 ● = Single Site ○ = Multiple Sites ◐ = Offshore Site

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

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

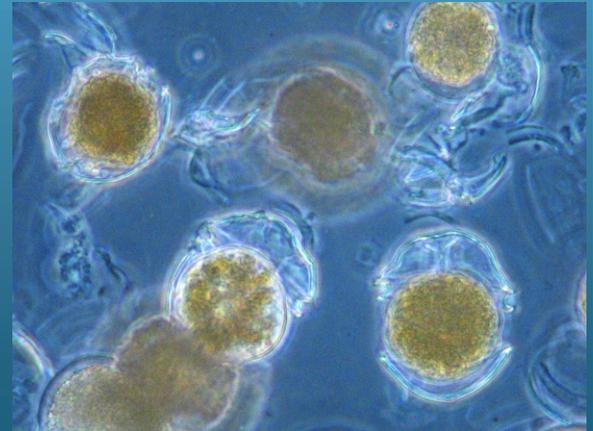
Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.



Table 2. CDPH program participants submitting shellfish samples during August, 2015.

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	3
	Tolowa Dee-ni' Nation	2
	CDPH Volunteer (<i>Harriet Jenesky</i>)	2
Humboldt	Coast Seafood Company	9
	California Department of Fish and Wildlife	1
	Humboldt County Environmental Health Department	1
	CDPH Volunteers (<i>Georgianna Wood, Steve Fox</i>)	3
Mendocino	CDPH Volunteer (<i>Charlie Lorenz</i>)	2
Sonoma	CDPH Marine Biotoxin Program	3
Marin	Cove Mussel Company	5
	Hog Island Oyster Company	10
	CDPH Marine Biotoxin Program	2
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	4
Monterey	CDPH Food and Drug Branch	2
San Luis Obispo	Grassy Bar Oyster Company	12
	Morro Bay Oyster Company	8
	CDPH Marine Biotoxin Program	1
	California Polytechnic State University	3
Santa Barbara	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	5
	Vandenberg AFB	1
	Sea Grant, U.C. Santa Barbara	2
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department Sims	1
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	5

PHYTOPLANKTON GALLERY



Cysting cells of the PSP producing dinoflagellate Alexandrium in San Luis Obispo County in August.



The chain diatom Thalassiosira. Pictured here is a chain of two cells and a singular cell. Note there are faint spines radiating from each cell.



The chain diatom Grammatophora is a rare sighting. The cells are connected in a zig-zag pattern.