

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

October 2013

Technical Report No. 13-24

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of October, 2013. 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 only one sampling location in October (Figure 1). PSP toxins were not detected in any shellfish samples during the month (Figure 3).

Domoic Acid

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

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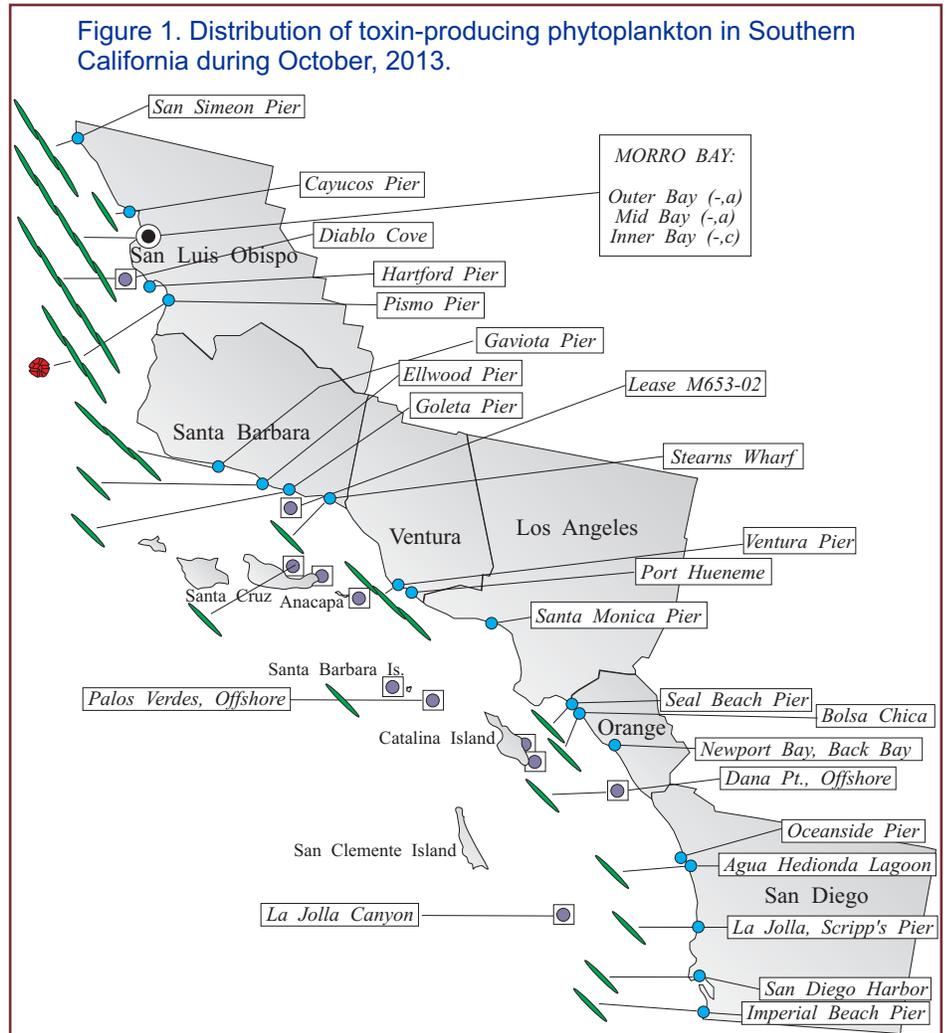
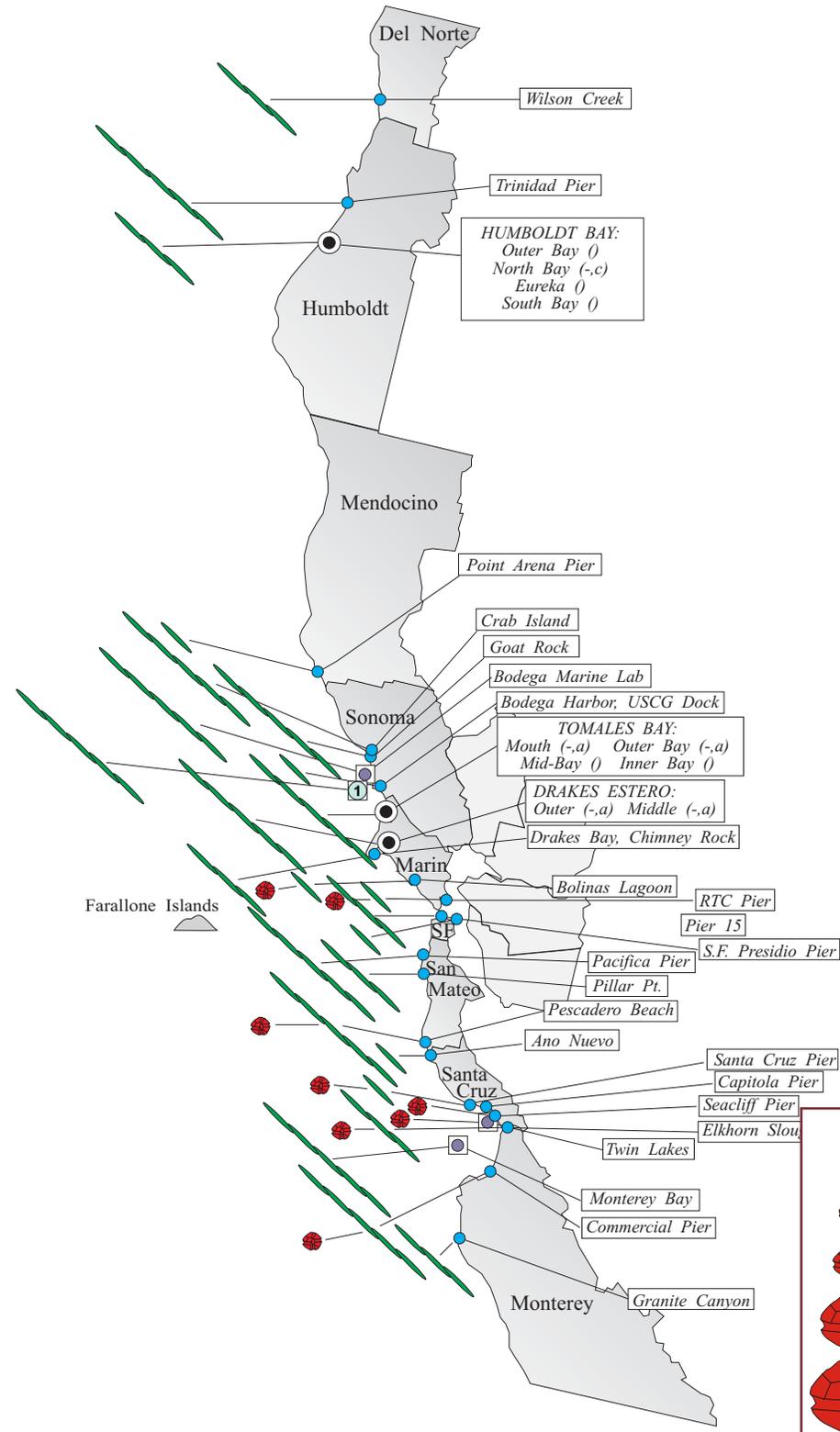


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during October, 2013.



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 The relative abundance of this diatom declined compared to observations in September, but remained abundant at several sites in San Luis Obispo County. The highest relative abundances of *Pseudo-nitzschia* were at Pismo Pier (October 3), inside Morro Bay (October 7), and offshore of Diablo Cove (October 17).

Low levels of domoic acid were detected in bivalve shellfish from two locations in October (Figure 3). A sample of lobster viscera collected at the Ventura Harbor breakwater on October 6 contained 80 parts per million of domoic acid.

Non-Toxic Species

Diatoms remained dominant along the San Luis Obispo coast, with *Eucampia* common at all sites. The remainder of the southern California coast was characterized by a mix of diatoms (*Chaetoceros*, *Bacteriastrum*) and dinoflagellates (several *Ceratium* species and *Prorocentrum micans*, with *Lingulodinium polyedrum* common at several San Diego sites.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was detected at several locations between Marin and Monterey counties in October (Figure 2). The distribution of this dinoflagellate decreased compared to observations in September.

PSP toxins remained above the alert level in mussels from several sites in northern

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Relative Abundance of Known Toxin Producers

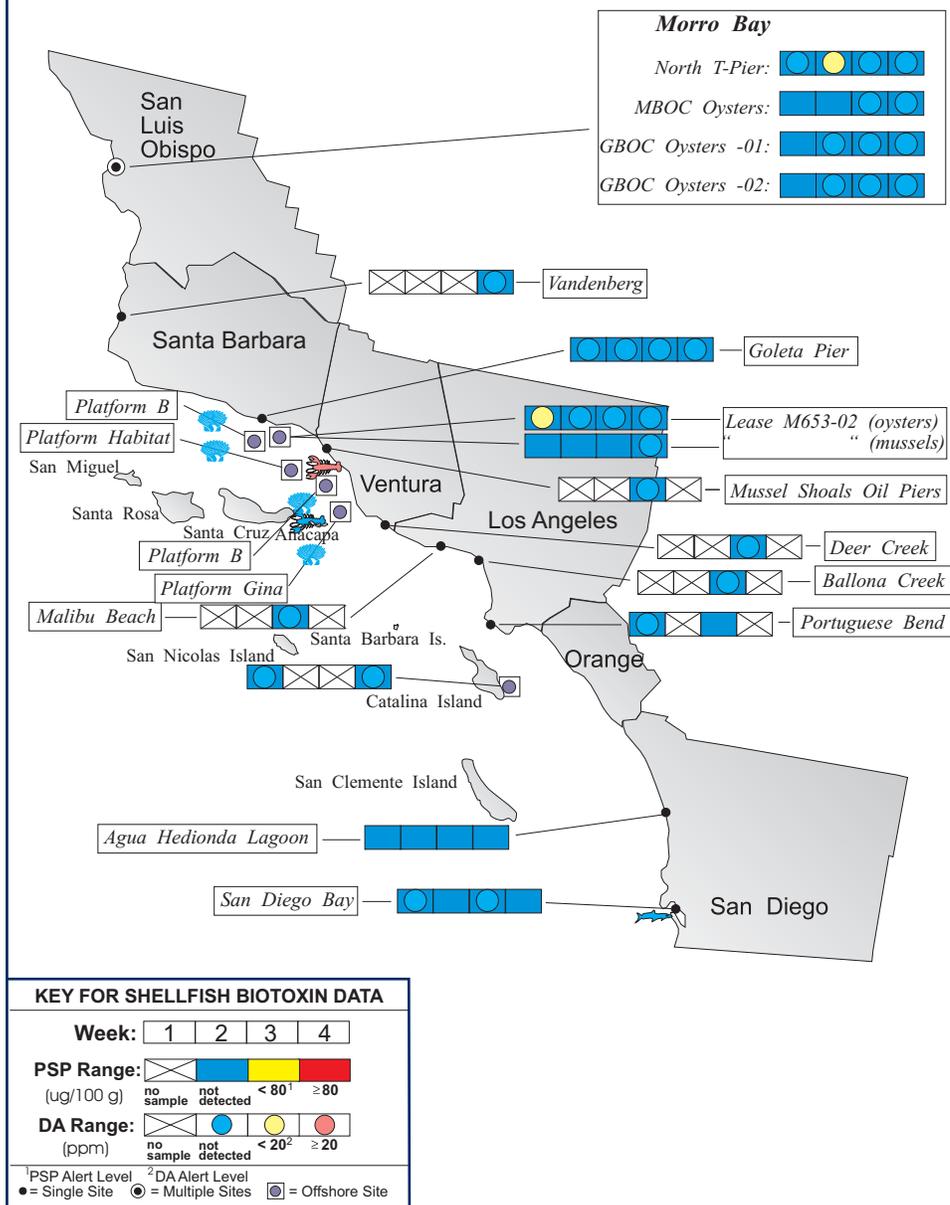
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

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 October, 2013.



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Humboldt County (Figure 4). Low levels of these toxins were detected in mussels from all other coastal counties except Sonoma (no samples were submitted from San Francisco County). The highest concentrations of these toxins were detected in mussel samples from Patrick's Point on October 4 (242 ug/100 g), offshore of Trinidad on October 6 (144 ug/100 g), and at Stone Lagoon on October 16 (216 ug/100 g).

Domoic Acid

Pseudo-nitzschia was observed at most sampling locations in October (Figure 2). The relative abundance of this diatom increased at sites in Humboldt and Del Norte counties and remained high at sites between Sonoma and Monterey counties. The highest relative abundances of *Pseudo-nitzschia* were observed at Goat Rock in Sonoma County (October 15), in outer Tomales Bay throughout the month, in outer Drakes Estero (October 8), and at Pacifica Pier and Pescadero Beach in San Mateo County (October 22 and 16, respectively).

As reported the past several months, domoic acid was not detected in any shellfish samples from the regions experiencing very high densities of *Pseudo-nitzschia*.

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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

Diatoms dominated the assemblage, with *Chaetoceros* the most common genera. *Ditylum* was common at sites in Marin and San Mateo counties. The dinoflagellate *Cochlodinium* was common to abundant during the latter half of the month at the entrance to Elkhorn Slough inside Monterey Bay.



QUARANTINES: 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. This alert was issued due to high levels of domoic acid in samples of crab viscera, also known as ‘crab butter’. 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.

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

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Figure 4. Distribution of shellfish biotoxins in Northern California during October, 2013.

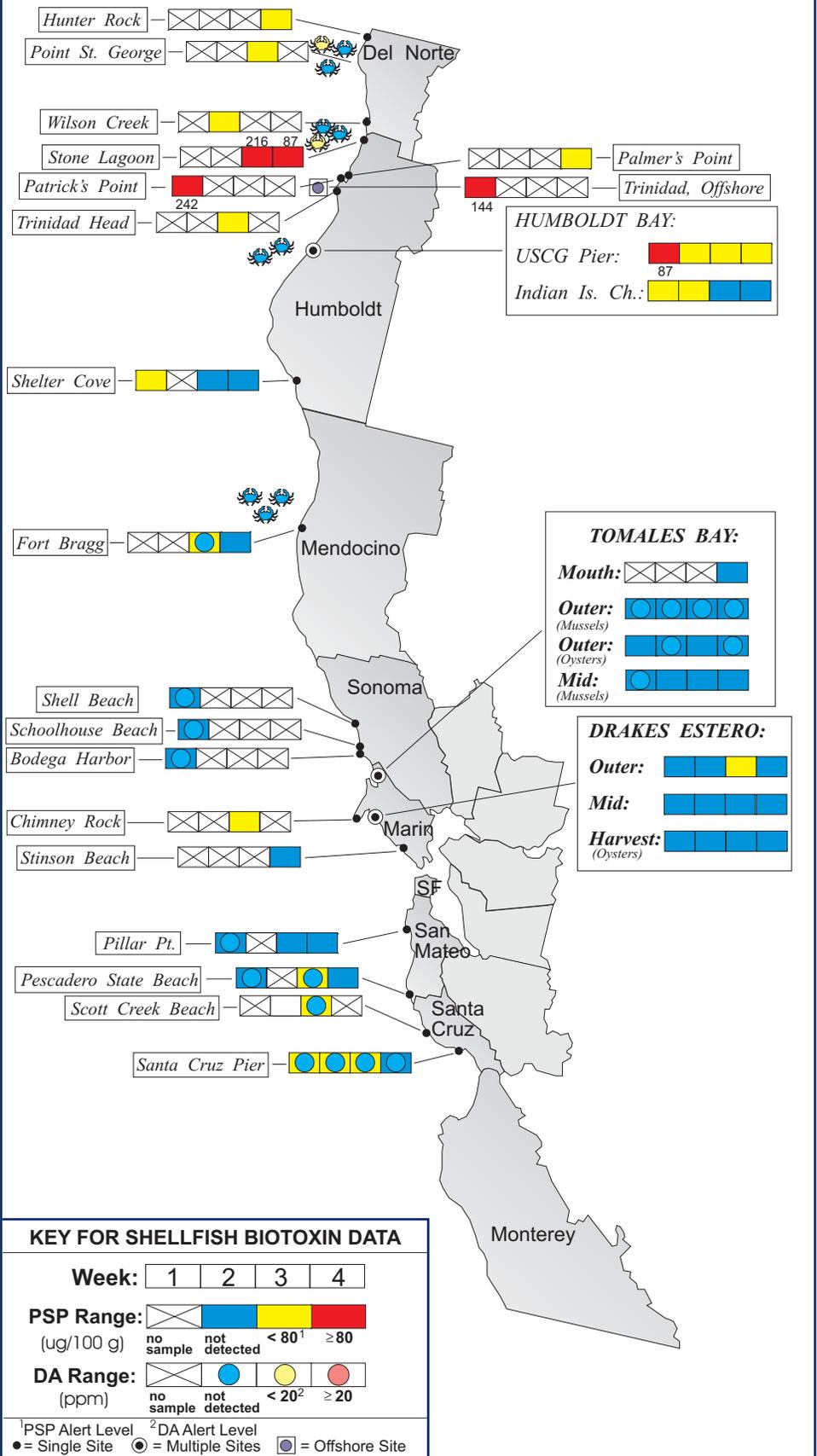


Table 1. Program participants collecting phytoplankton samples during October, 2013.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		Yurok Tribe Environmental Group	3
HUMBOLDT COUNTY		Coast Seafood Company	5
		Humboldt State University Marine Lab	6
MENDOCINO COUNTY		CDPH Volunteer (<i>Marie DeSantis</i>)	1
SONOMA COUNTY		Bodega Marine Lab & Farallone Institute	10
CDPH Marine Biotoxin Program	1	Sonoma Coast Watch	2
MARIN COUNTY		Drakes Bay Oyster Company	13
CDPH Marine Biotoxin Program	2	CDPH Volunteer (<i>Brent Anderson</i>)	5
SFSU, Romberg Tiburon Center	2	Hog Island Oyster Company	4
		Sonoma State University	4
SAN FRANCISCO COUNTY		CDPH Volunteer (<i>Eugenia McNaughton</i>)	3
		Exploratorium	1
SAN MATEO COUNTY		The Marine Mammal Center (<i>Stan Jensen</i>)	5
San Mateo County Environmental Health Dept.	8	U.C. Santa Cruz	2
SANTA CRUZ COUNTY		California Department of Parks and Recreation	1
Santa Cruz Co. Environmental Health Dept.	3	U.C. Santa Cruz	5
MONTEREY COUNTY		Friends of the Sea Otter (<i>Janis Chaffin</i>)	3
Marine Life Studies	1	Monterey Abalone Company	1
		Marine Pollution Studies Laboratory	2
SAN LUIS OBISPO COUNTY		Friends of the Sea Otter (<i>AI Guild</i>)	5
CDPH Volunteer (<i>Dan Hoskins</i>)	2	Grassy Bar Oyster Company	4
Morro Bay National Estuary Program	2	Coastal Discovery Center, San Simeon	1
Tenera Environmental	4	The Marine Mammal Center (<i>Webb, Lytsell</i>)	3
SANTA BARBARA COUNTY		CDPH Volunteer (<i>Sylvia Short</i>)	3
HABNet/CDPH Volunteers (<i>Grant, Liu</i>)	7	Island Packers/HABNet	1
Ty Warner Sea Life Center/HABNet	4	Santa Barbara Mariculture Company	4
Tole Mour	2	U.C. Santa Barbara	5
(<i>Manhattan Middle School, Redding School</i>)		National Park Service	1
VENTURA COUNTY		CDPH Volunteer (<i>Fred Burgess</i>)	3
National Park Service	1	Ventura Co. Environmental Health Dept.	3
LOS ANGELES COUNTY		CDPH Volunteers (<i>Kai Xu</i>)	3
Catalina Island Marine Institute	3	Long Beach Marine Institute	1
Los Angeles County Sanitation District	2	Voyager Excursions/HABNet	1
		Tole Mour (<i>Manhattan Middle School, Redding School</i>)	4
ORANGE COUNTY		Amigos de Bolsa Chica	4
California Department of Fish and Wildlife	4	CDPH Volunteer (<i>Jennifer McCarthy</i>)	2
SAN DIEGO COUNTY		Carlsbad Aquafarms, Inc.	1
CDPH Volunteer (<i>Cynthia Hall</i>)	2	Sea Camp/HABNet	2
Scripps Institute of Oceanography	4	Tijuana River National Estuary Research	5
U.S. Navy Marine Mammal Program	4		

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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 affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are 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 October, 2013.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	1
	Smith River Rancheria	1
	Del Norte County Health Department	1
	CDPH Food and Drug Branch	6
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	1
	Yurok Tribe Environmental Program	2
	CDPH Volunteer (<i>Steve Fox</i>)	3
	Humboldt State University Marine Lab	2
	CDPH Food and Drug Branch	3
Mendocino	Mendocino County Environmental Health Department	2
	CDPH Food and Drug Branch	7
Sonoma	CDPH Marine Biotoxin Program	2
	CDPH Volunteer (<i>James Sanders</i>)	1
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	Point Reyes Oyster Company	4
	CDPH Marine Biotoxin Program	2
	CDPH Volunteer (<i>Jamie Sutton</i>)	1
Starbird Mariculture		1
		1
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	6
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer (<i>Devon Pattillo</i>)	1
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	8
	CDPH Volunteer (<i>Bill Weinerth</i>)	1
	U.C. Santa Barbara	7
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
	CDPH Volunteers (<i>Bill Weinerth</i>)	2
	U.C. Santa Barbara	1
Los Angeles	Los Angeles County Health Department, Burke	1
	Los Angeles County Health Department, Torrance	2
	CDPH Volunteers (<i>Cal Parsons, Vladimir Igoshin</i>)	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	5
	U.S. Navy Marine Mammal Program	5

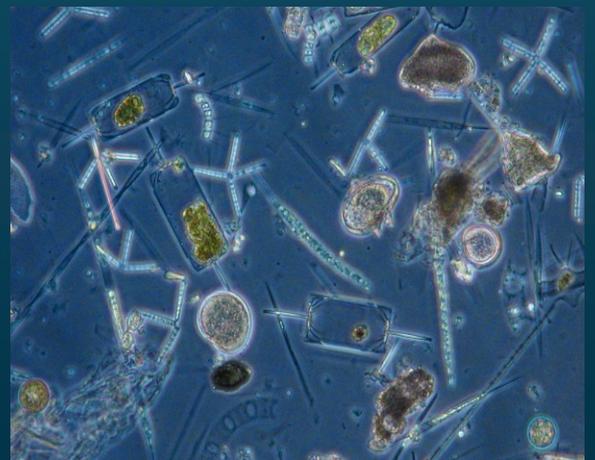
PHYTOPLANKTON GALLERY



An unusual species, *Neoceratium arietinum* (synonym *Ceratium arietinum*, *Ceratium tripos* var. *bucephalum* Cleve, 1897) was observed along the Santa Barbara coast.



The diatom *Ditylum* was common at sites in Marin and San Mateo counties.



There was a diverse mix of diatoms and dinoflagellates along the California coast in October.