

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

November 2013

Technical Report No. 13-26

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of November, 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 several sampling locations between Santa Barbara and San Diego in November (Figure 1). PSP toxins were not detected in any shellfish samples during the month (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the

(Continued on Page 2)

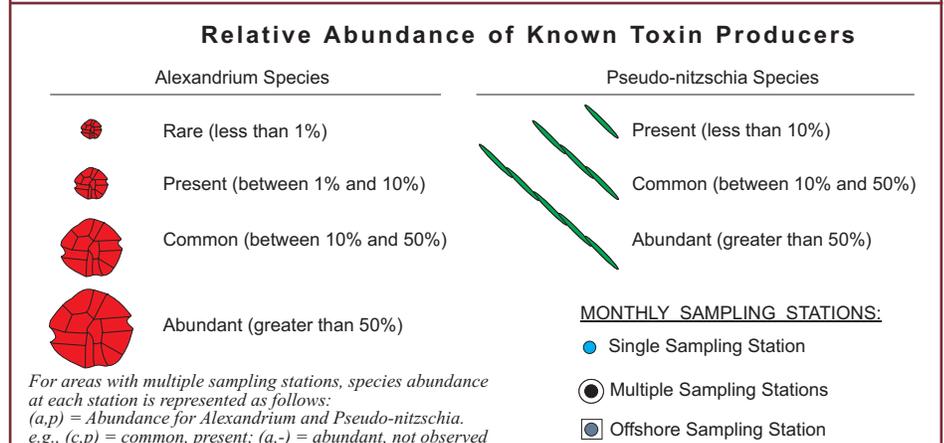
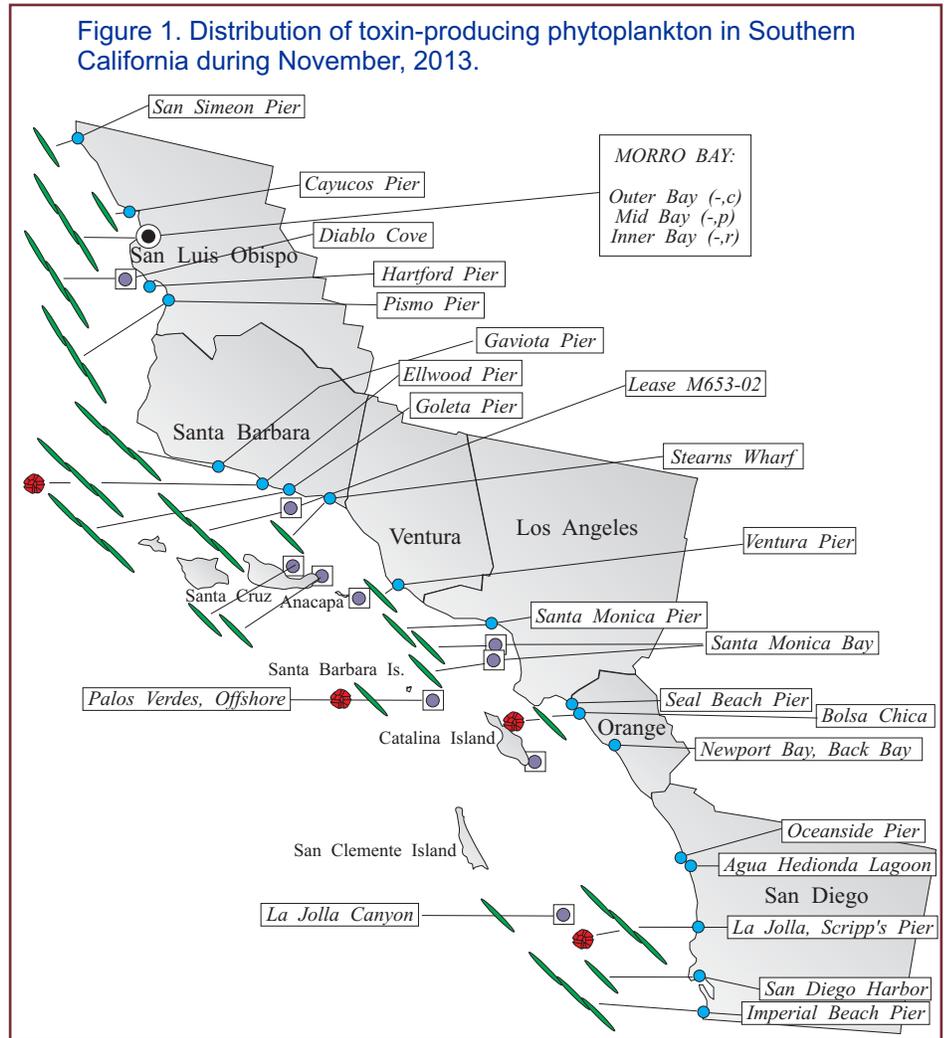
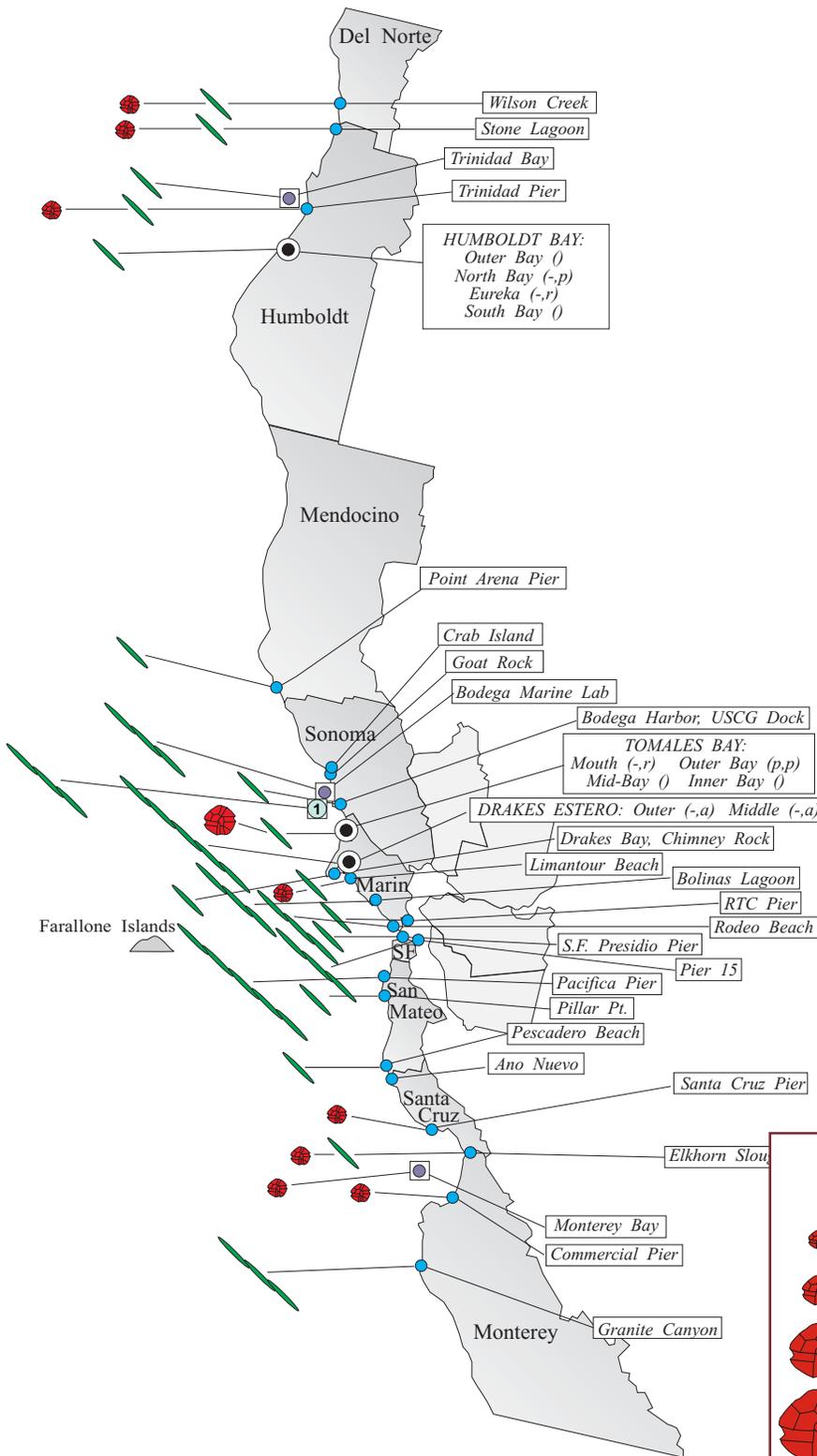


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during November, 2013.



(Continued from Page 1)
 entire southern California coast (Figure 1). The relative abundance of this diatom declined at sites along the San Luis Obispo coast and increased slightly at sites in Santa Barbara, Ventura, and San Diego compared to observations in October. The highest relative abundances of *Pseudo-nitzschia* were at Pismo Pier (November 12) and offshore of Diablo Cove (November 8). Domoic acid was not detected in bivalve shellfish in November (Figure 3). Lobster viscera samples from nearshore Santa Barbara contained varying levels of this toxin, from nondetectable to 99 ppm.

Non-Toxic Species

Diatoms dominated the entire southern California coast. *Chaetoceros* was ubiquitous and *Lauderia* was common between Santa Barbara and San Diego. The dinoflagellates *Prorocentrum micans* and *Lingulodinium polyedrum* were common at San Diego sites.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was detected at several locations between Del Norte and Monterey counties in November (Figure 2), an increase in distribution compared to October. This dinoflagellate was most numerous inside Tomales Bay.

PSP toxins remained above the alert level in mussels from northern Humboldt County (Figure 4). Low levels of these toxins were

(Continued on Page 3)

Relative Abundance of Known Toxin Producers

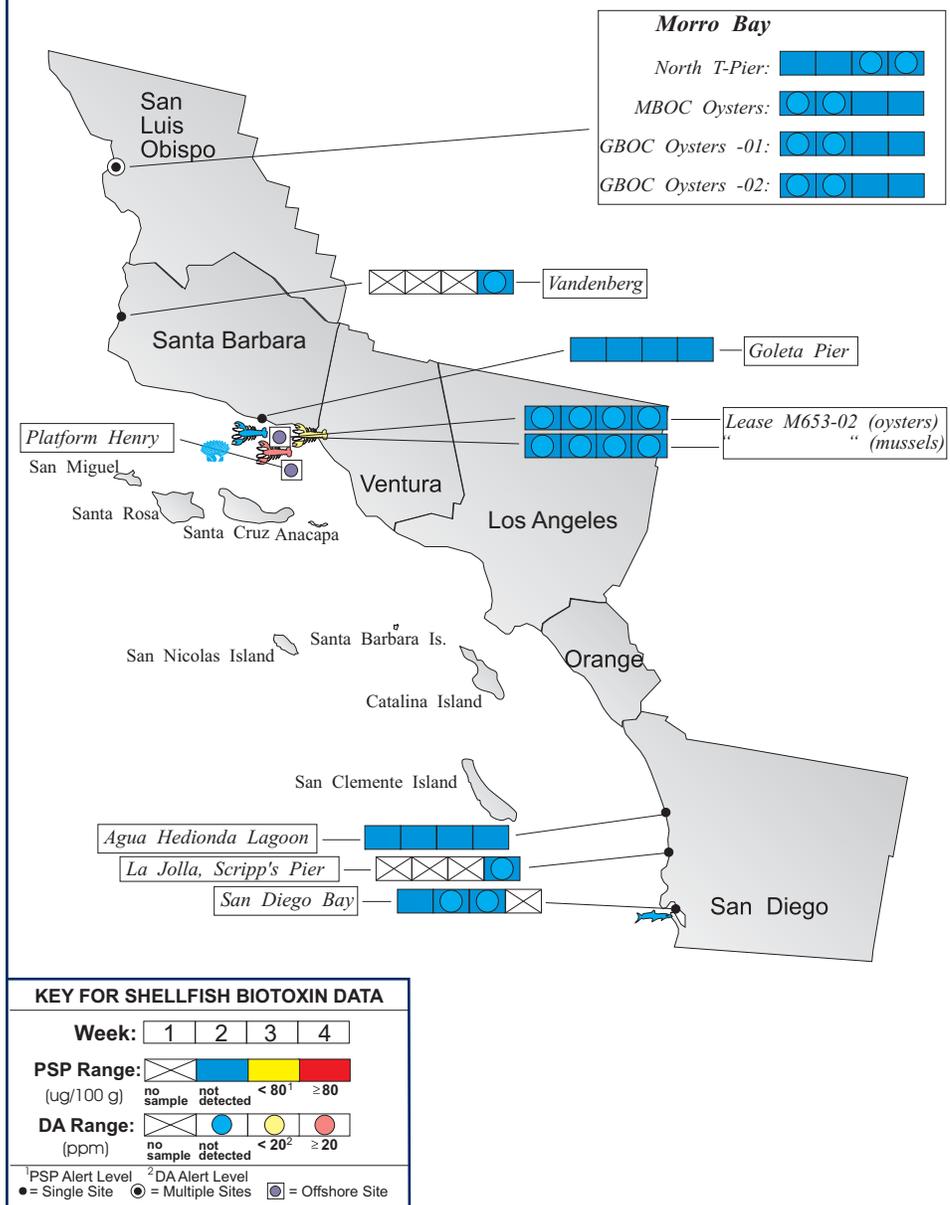
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

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 November, 2013.



(Continued from Page 2)

detected in mussels from all other coastal counties (no samples were submitted from Mendocino, San Francisco, or Monterey counties). Most significant was the occurrence of PSP toxins well inside Tomales Bay near Marconi Cove and the rapid increase of these toxins above the alert level in mussels from the Santa Cruz Pier by the end of the month (544 ug/100 g).

Domoic Acid

Pseudo-nitzschia was observed at most sampling locations in November (Figure 2). The relative abundance of this diatom decreased at sites in Humboldt and Del Norte counties and inside Monterey Bay, but remained high at sites between Marin and San Mateo counties. The highest relative abundances of *Pseudo-nitzschia* were observed in Drakes Estero (November 26), and at Pacifica Pier (November 5 and 19).

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*. The majority of crab viscera samples collected by the CDPH Food and Drug Branch did not contain detectable levels of domoic acid; a few viscera samples contained a low concentration of toxin and one sample was just above 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)

alert level (36 ppm).

Non-Toxic Species

The diatoms *Chaetoceros* was abundant at sites along the Humboldt coast. In contrast, several species of the dinoflagellate *Ceratium* were common to abundant at sites in Sonoma and Marin counties. *Cochlodinium* was common at all Monterey sites.



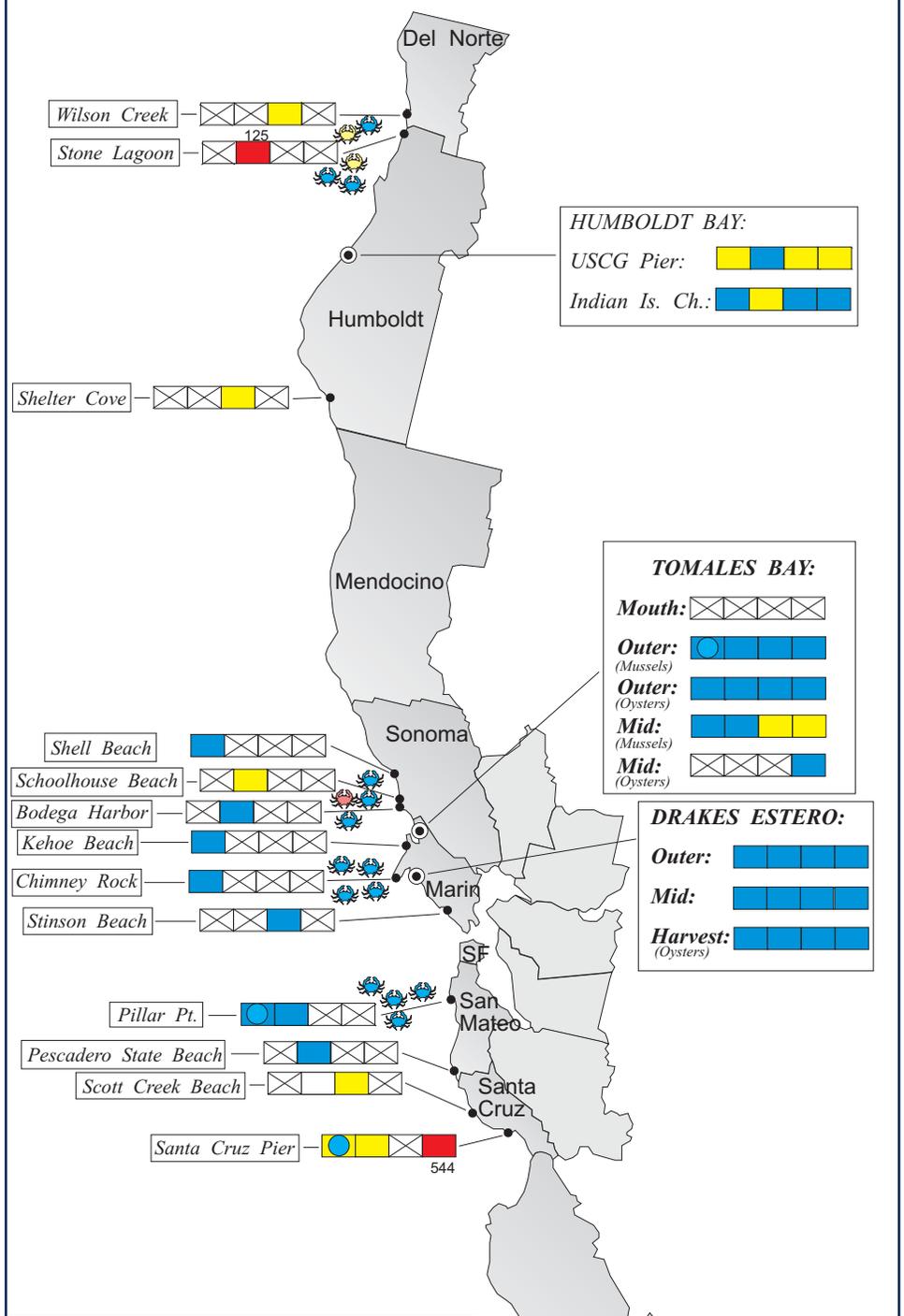
QUARANTINES: The annual mussel quarantine ended at midnight on October 31 for all coastal counties except for northern Humboldt County. The quarantine on sport-harvested mussels was extended from the northern jetty at the entrance to Humboldt Bay to the Humboldt-Del Norte county line as a result of persistent 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

(Continued on Page 5)

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



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

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

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		Yurok Tribe Environmental Group	1
HUMBOLDT COUNTY		Coast Seafood Company	4
		Humboldt State University Marine Lab	5
		Yurok Tribe Environmental Group	2
MENDOCINO COUNTY		CDPH Volunteer (<i>Marie DeSantis</i>)	3
SONOMA COUNTY		Bodega Marine Lab & Farallone Institute	6
CDPH Marine Biotoxin Program	1	Sonoma Coast Watch	2
MARIN COUNTY		Drakes Bay Oyster Company	11
CDPH Marine Biotoxin Program	1	CDPH Volunteer (<i>Brent Anderson</i>)	4
SFSU, Romberg Tiburon Center	1	Hog Island Oyster Company	5
Golden Gate National Recreation Area	1	Sonoma State University	5
SAN FRANCISCO COUNTY		CDPH Volunteer (<i>Eugenia McNaughton</i>)	2
		Exploratorium	3
SAN MATEO COUNTY		The Marine Mammal Center (<i>Stan Jensen</i>)	4
San Mateo County Environmental Health Dept.	3	U.C. Santa Cruz	2
SANTA CRUZ COUNTY		U.C. Santa Cruz	31
MONTEREY COUNTY		Friends of the Sea Otter (<i>Janis Chaffin</i>)	5
Marine Life Studies	2	Monterey Abalone Company	1
		Marine Pollution Studies Laboratory	3
SAN LUIS OBISPO COUNTY		Friends of the Sea Otter (<i>Kelly Cherry</i>)	4
Morro Bay National Estuary Program	1	Grassy Bar Oyster Company	4
Coastal Discovery Center, San Simeon	2	Tenera Environmental	5
The Marine Mammal Center (<i>Webb</i>)	2		
SANTA BARBARA COUNTY		CDPH Volunteer (<i>Sylvia Short</i>)	4
HABNet/CDPH Volunteers (<i>Boyd Grant</i>)	4	Island Packers/HABNet	3
Ty Warner Sea Life Center/HABNet	1	Santa Barbara Mariculture Company	4
National Park Service	2	U.C. Santa Barbara	4
VENTURA COUNTY		CDPH Volunteer (<i>Fred Burgess</i>)	3
National Park Service	1		
LOS ANGELES COUNTY		CDPH Volunteers (<i>Kai Xu, Cal Parsons</i>)	3
City of L.A. Environmental Monitoring Division	3	Los Angeles County Sanitation District	2
ORANGE COUNTY		Amigos de Bolsa Chica	5
California Department of Fish and Wildlife	2	CDPH Volunteer (<i>Jennifer McCarthy</i>)	1
SAN DIEGO COUNTY		Carlsbad Aquafarms, Inc.	2
CDPH Volunteer (<i>Cynthia Hall</i>)	1	Sea Camp/HABNet	2
Scripps Institute of Oceanography	4	Tijuana River National Estuary Research	4
U.S. Navy Marine Mammal Program	3		

(Continued from Page 4)

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 November, 2013.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	1
Humboldt	Coast Seafood Company	8
	Yurok Tribe Environmental Program	1
	CDPH Volunteer (<i>Steve Fox</i>)	1
	CDPH Food and Drug Branch	5
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	2
	CDPH Volunteer (<i>James Sanders</i>)	1
	CDPH Food and Drug Branch	6
Marin	Cove Mussel Company	6
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	8
	Point Reyes Oyster Company	5
	CDPH Marine Biotoxin Program	2
	CDPH Volunteer (<i>Jamie Sutton</i>)	1
	CDPH Food and Drug Branch	6
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	2
	CDPH Volunteer (<i>Bryan Hains</i>)	1
	CDPH Food and Drug Branch	6
Santa Cruz	U.C. Santa Cruz	3
	CDPH Volunteer (<i>Devon Pattillo</i>)	1
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	6
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	5
Ventura	None Submitted	
Los Angeles	None Submitted	
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	1
	U.S. Navy Marine Mammal Program	4

PHYTOPLANKTON GALLERY



The dinoflagellate *Alexandrium*, which produces the PSP toxins, was present at a number of locations.



Odontella is a chain-forming diatom that is often present in low numbers.



Chaetoceros was the most common nontoxic diatom occurring along the southern California coast.