CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
850 Marina Bay Parkway, Richmond, CA 94804

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

August 2012

Technical Report No. 12-21

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of August, 2012. 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 only observed at Pismo Pier at the beginning of the month (Figure 1). PSP toxins were not detected in any shellfish samples collected in August (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the

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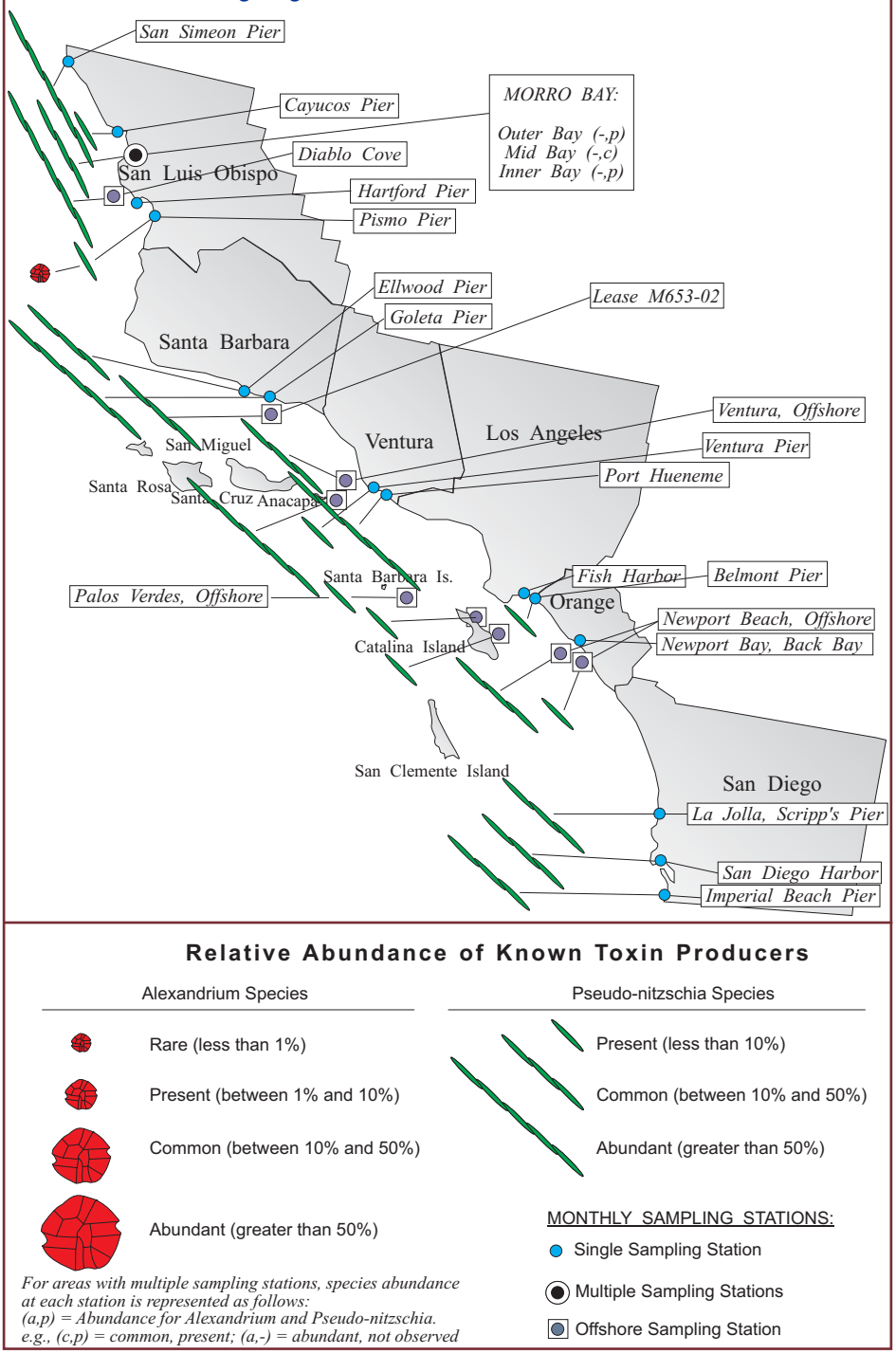
Figure 1. Distribution of toxin-producing phytoplankton in Southern California during August, 2012.



Relative Abundance of Known Toxin Producers

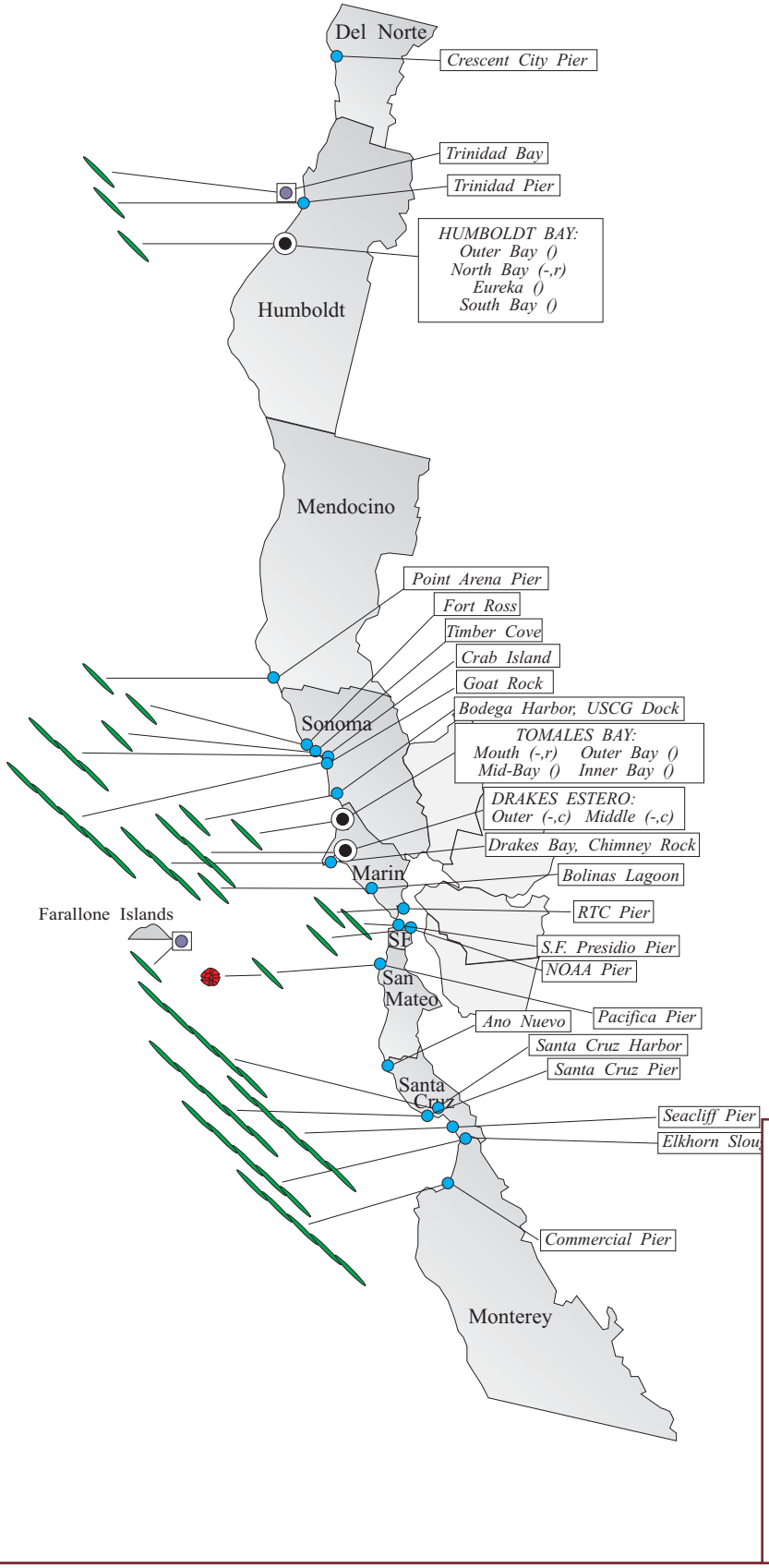
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

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

MONTHLY SAMPLING STATIONS:

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

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during August, 2012.



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entire southern California coast (Figure 1). The high relative abundances observed in July declined along most of the coast, although this diatom remained abundant at several sites between San Luis Obispo and Ventura and offshore at Anacapa Island. There was a mix of non-toxic and toxic species between Los Angeles and San Diego, with the former group increasingly common farther down the coast. The highest relative abundances were observed at Port Hueneme (August 6), offshore of Diablo Cove (August 10 and 23), and Goleta Pier (August 1).

The elevated levels of domoic acid detected in July in Morro Bay declined below the detection limit by the beginning of August (Figure 3). The high toxin levels in Santa Barbara decreased below the alert level by the beginning of the month and were nondetectable by the third week. As these areas returned to normal there was a sudden increase in domoic acid farther south in Ventura County. Samples of anchovies obtained by the CDPH Food and Drug Branch contained very high levels of domoic acid in the Port Hueneme region (86 to 155 ppm). Farther offshore, near the northern Channel Islands, a wide range of toxin concentrations was detected in rock crab (<2.5 to 49 ppm) and spiny lobster viscera (<2.5 to 140 ppm). The majority of these

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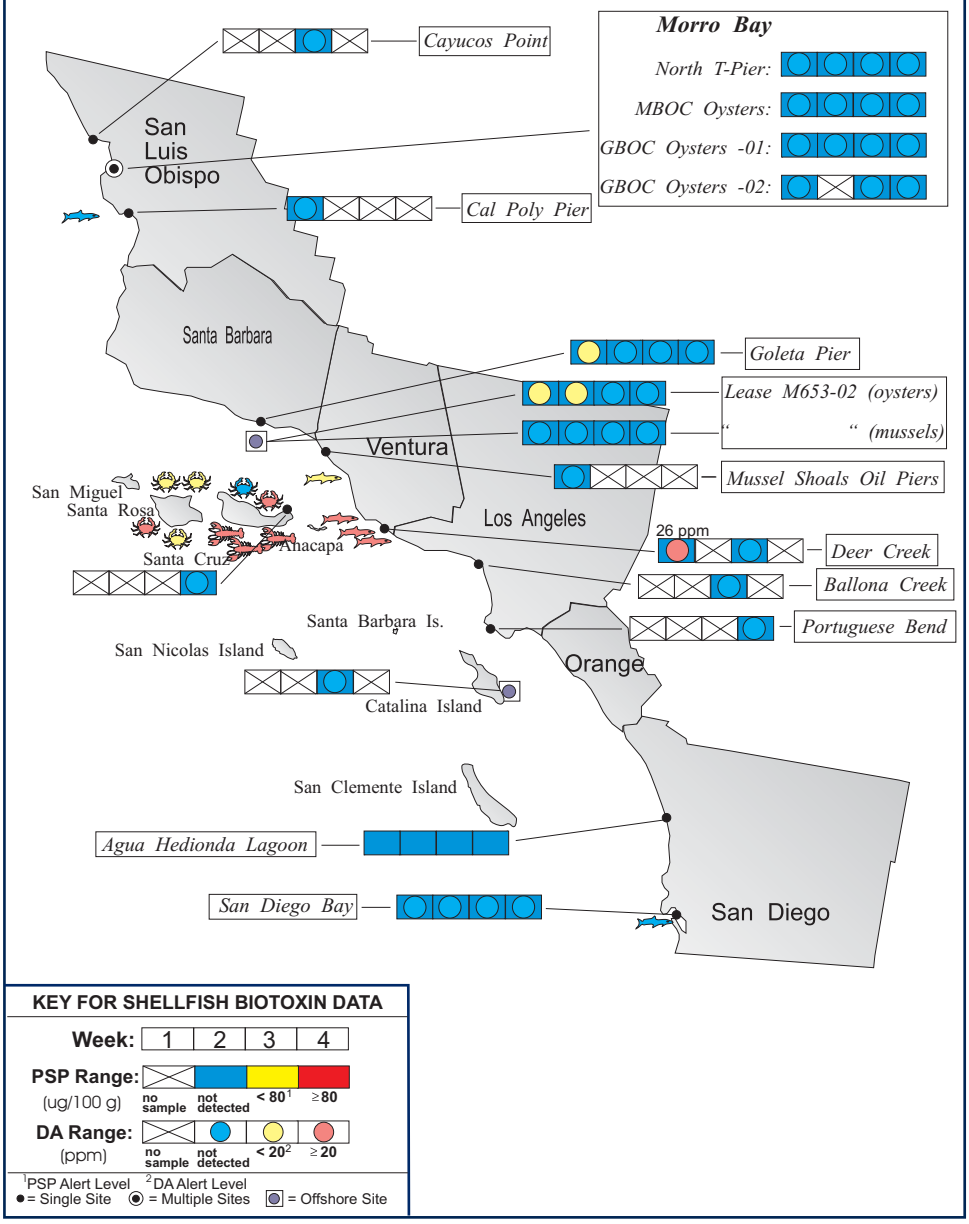
Figure 3. Distribution of shellfish biotoxins in Southern California during August, 2012.



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crustacean samples had elevated levels of domoic acid.

Non-toxic Species

Diatoms (*Chaetoceros*) were dominant along the coast, with the increasing presence of some dinoflagellates (*Prorocentrum*, *Ceratium*) farther south.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at Pacifica Pier on August 22 (Figure 2). PSP toxins were not detected in any samples collected in August (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at most sites along the northern California coast (Figure 2). This diatom increased in relative abundance in northern Sonoma County and most significantly at sites throughout Monterey Bay. The highest relative abundances were observed at Moss Landing (August 4), Goat Rock and Crab Island (August 28), and the Santa Cruz Pier (August 1 and 15).

Low levels of domoic acid were detected in sentinel mussels at Santa Cruz Pier by the first week of August (Figure 4). The toxin level steadily increased, reaching 38 ppm

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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by August 15 before declining rapidly by August 22 (3.6 ppm).

Non-toxic Species

The diatom *Chaetoceros* continued to dominate the northern California coast. The dinoflagellate *Gonyaulax* was common in a sample from Timber Cove (August 16). *G. spinifera* was associated with a red tide along the Sonoma coast in August and September of 2011.

QUARANTINES:

A health advisory was issued on August 20 for Ventura County due to elevated levels of domoic acid. Consumers were advised to avoid eating bivalve shellfish or the internal organs of crab, lobster, and small finfish like sardines and anchovies.

The annual mussel quarantine began on May 1. This quarantine prohibits the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively throughout the year. In addition, routine coastal phytoplankton and biotoxin monitoring is maintained throughout the quarantine period. Special quarantines or health advisories may be issued for additional seafood species as warranted by increasing toxin levels.

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

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Figure 4. Distribution of shellfish biotoxins in Northern California during August, 2012.

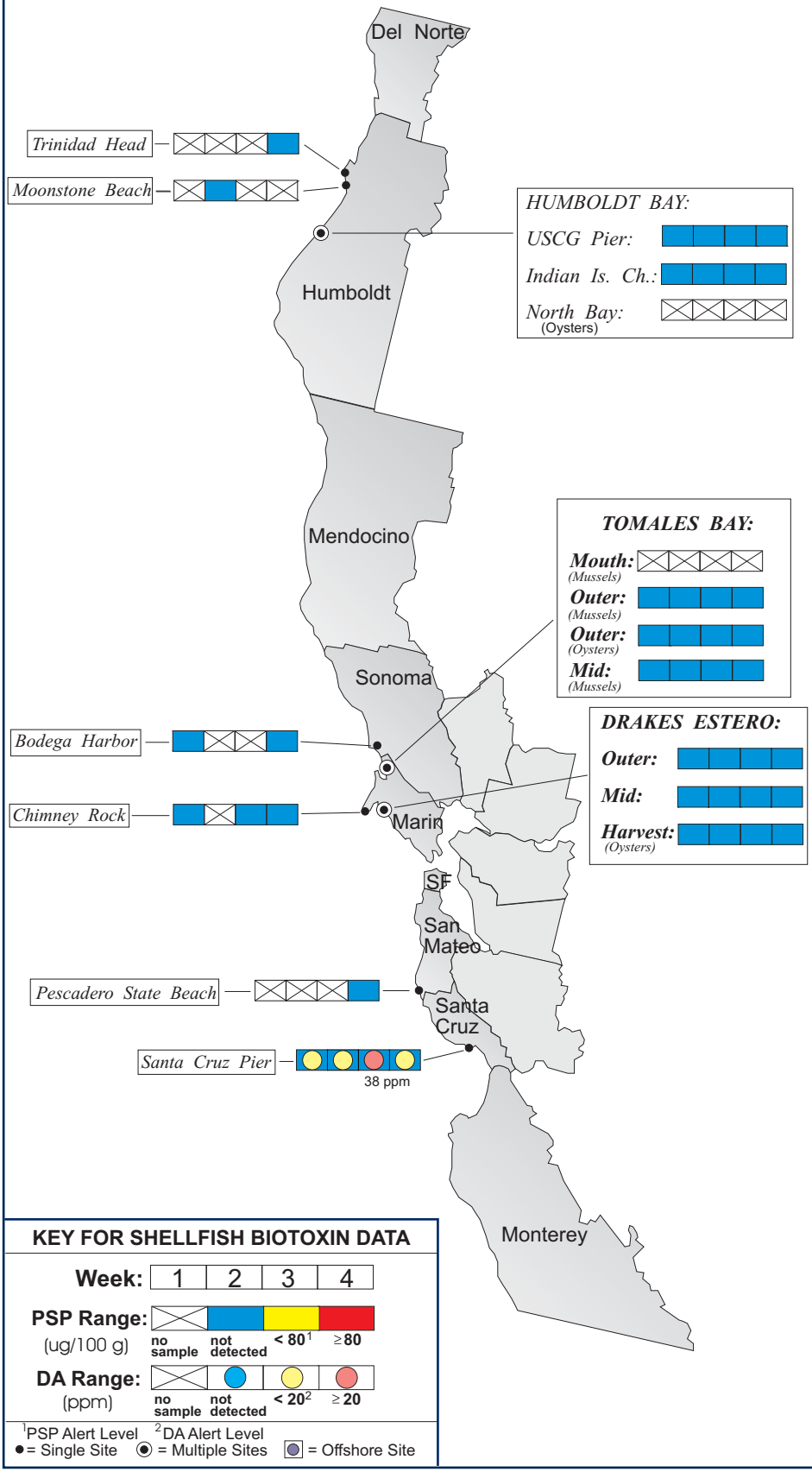

Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during August, 2012.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
	CDPH Volunteer (Georgianna Wood)	1
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	2
Marin	Cove Mussel Company	5
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	5
	Marin Oyster Company	4
	CDPH Marine Biotoxin Program	3
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	1
Santa Cruz	U.C. Santa Cruz	5
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	6
	CDPH Volunteer (Otto Schmidt)	1
	Avila Beach Sea Life Center	1
	CDPH Food and Drug Branch	1
Santa Barbara	Santa Barbara Mariculture Company	12
	U.C. Santa Barbara	5
	California Department of Fish and Game	8
	Wild Planet Foods	5
Ventura	Ventura County Environmental Health Department	3
	CDPH Food and Drug Branch	6
Los Angeles	CDPH Volunteer (Cal Parsons)	1
	Los Angeles County Health Department	2
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	5

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during August, 2012.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
	Humboldt State University Marine Lab	2
	CDPH Volunteer (*Dustin Fredricey*)	1
Mendocino	CDPH Volunteer (*Marie de Santis*)	3
Sonoma	CDPH Marine Biotoxin Program	2
	Sonoma Coast Watch	4
	California Department of Fish and Game	3

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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 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.

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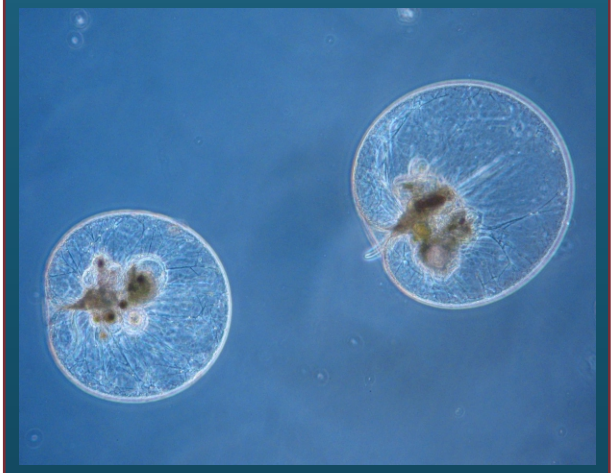
COUNTY	AGENCY	#
Marin	Drakes Bay Oyster Company	12
	CDPH Volunteer (*Brent Anderson*)	3
	SFSU, Romberg Tiburon Center	3
	CDPH Marine Biotoxin Program	4
Contra Costa	None Submitted	
Alameda	None Submitted	
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	1
	Exploratorium	2
	San Francisco Bay Whale Watching Company	1
San Mateo	The Marine Mammal Center (*Stan Jensen*)	4
	San Mateo County Environmental Health Department	1
	U.C. Santa Cruz	1
Santa Cruz	San Lorenzo Valley High School	2
	California Department of Parks and Recreation	1
	U.C. Santa Cruz	5
Monterey	Friends of the Sea Otter (*Janis Chaffin*)	3
	Monterey Abalone Company	1
	CDPH Volunteer (*Jerry Norton*)	1
San Luis Obispo	Friends of the Sea Otter (*Kelly Cherry*)	5
	Grassy Bar Oyster Company	4
	Morro Bay National Estuary Program	1
	Monterey Bay National Marine Sanctuary	4
	Tenera Environmental	5
	The Marine Mammal Center (*P.J. Webb, Tim Lytsell*)	5
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	2
	Santa Barbara Mariculture Company	6
	U.C. Santa Barbara	5
Ventura	CDPH Volunteer (*Fred Burgess*)	4
	Channel Island National Marine Sanctuary	1
	National Park Service	2
	Ventura County Environmental Health Department	2
	Tole Mour	1
Los Angeles	Los Angeles County Sanitation District	4
	CDPH Volunteer (*Cal Parsons*)	1
	Los Angeles County Health Department	3
	Tole Mour	4
	Southern California Marine Institute	1
	Long Beach Marine Institute	1
Orange	Orange County Sanitation District	6
	California Department of Fish and Game	4
San Diego	Scripps Institute of Oceanography	4
	Tijuana River National Estuary Research Reserve	5
	U.S. Navy Marine Mammal Program	4

PHYTOPLANKTON GALLERY

The diatom Tropidoneis occurs occasionally in our phytoplankton samples .



The dinoflagellate Noctiluca is one of several bioluminescent species present along the California coast.

The fast-swimming larvae of polychaete worms are sometimes observed in our samples.