

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

April 2014

Technical Report No. 14-11

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of April, 2014. 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 in an April 18 sample from the Santa Barbara Channel (Figure 1). PSP toxins were not detected in any shellfish samples in April (Figure 3).

Domoic Acid

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

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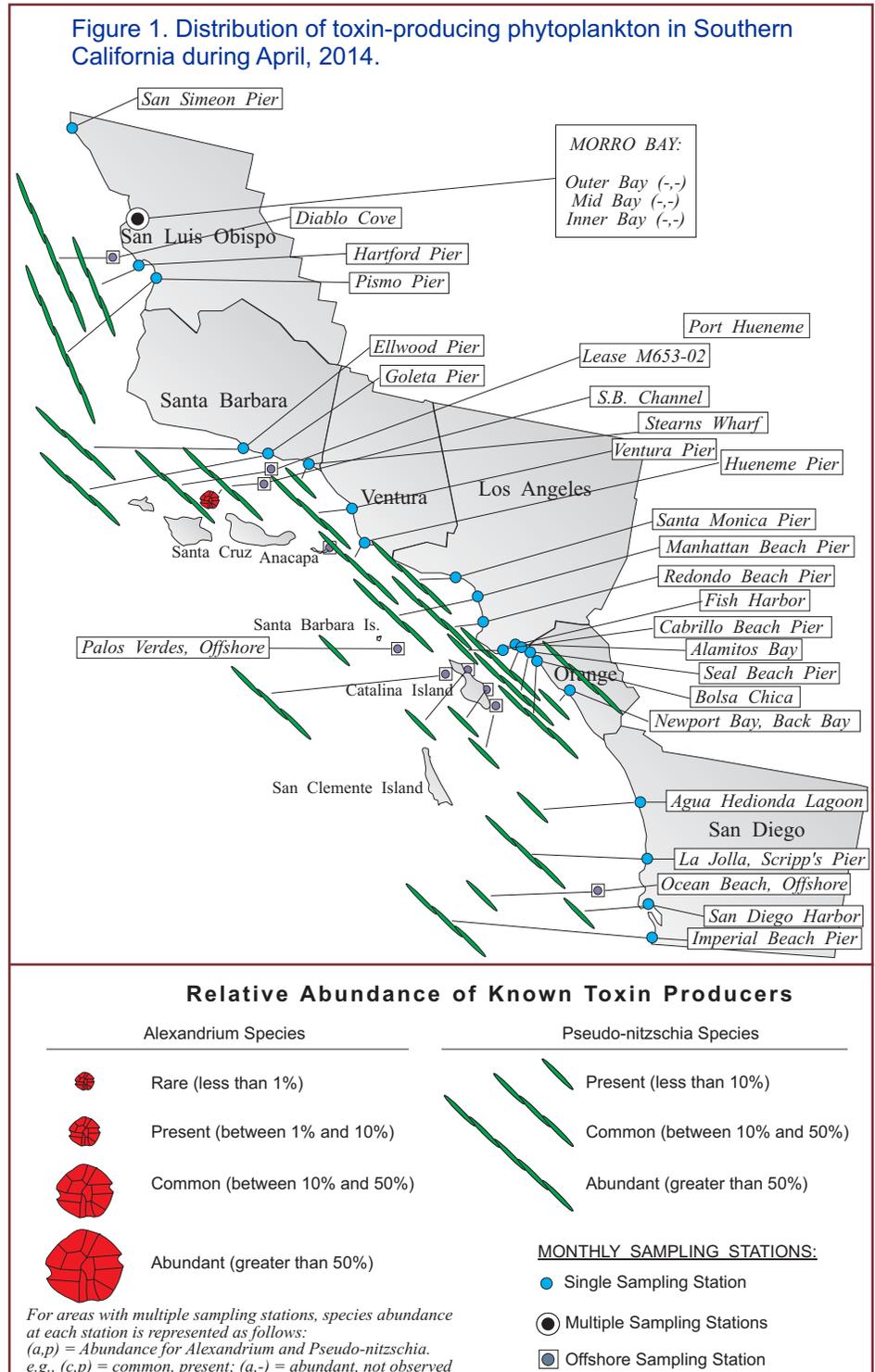
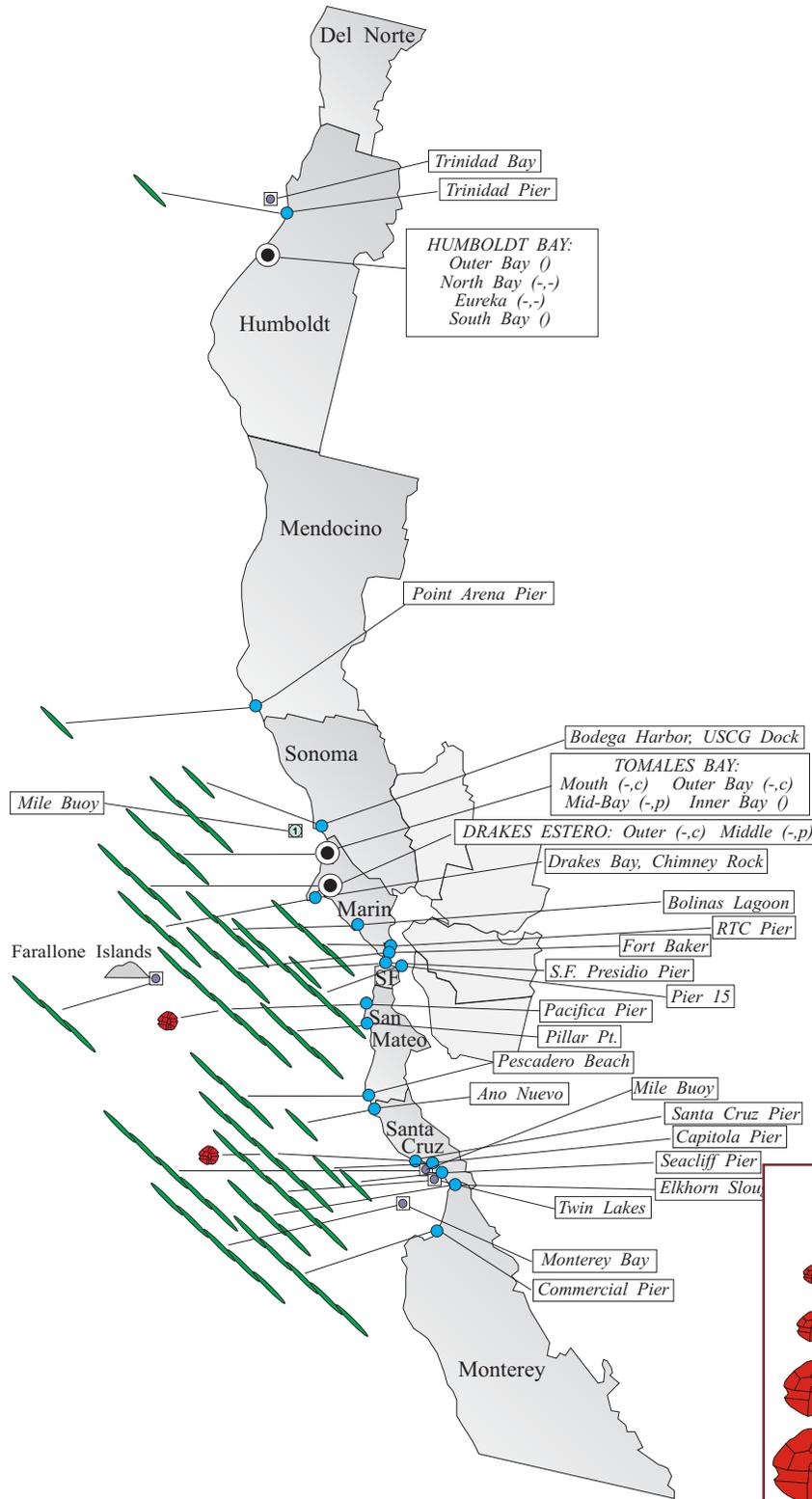


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during April, 2014.



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The percent composition of this diatom increased dramatically at most southern California sampling sites, however the cell mass was generally low. The highest relative abundances were observed at Seal Beach Pier (April 12) and Pismo Pier (April 23). Domoic acid was not detected in bivalve shellfish during April (Figure 3).

Non-Toxic Species

The diatom *Chaetoceros* was ubiquitous along the southern California coast. *Skeletonema* was common at San Luis Obispo sites and *Guinardia* was common at sites in Orange and San Diego counties.

Northern California Summary:

Paralytic Shellfish Poisoning

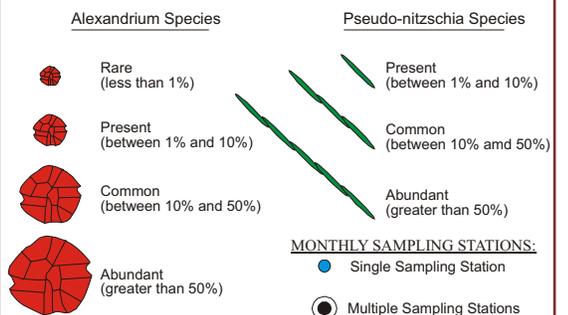
Alexandrium was rare and observed at only two sites in April (Figure 2). Low levels of the PSP toxins continued to be detected at sites in Del Norte and Humboldt counties, including at the outer Humboldt Bay sentinel mussel station the last three weeks of the month.

Domoic Acid

Pseudo-nitzschia was observed at most sampling sites in April, increasing in relative abundance at sites between Sonoma and Monterey counties (Figure 2). The highest relative abundances of *Pseudo-nitzschia* were observed offshore of Twin Lakes State Beach in Santa Cruz (April 4), at an offshore site in Monterey Bay (April 11), and at Pacifica Pier (April 22).

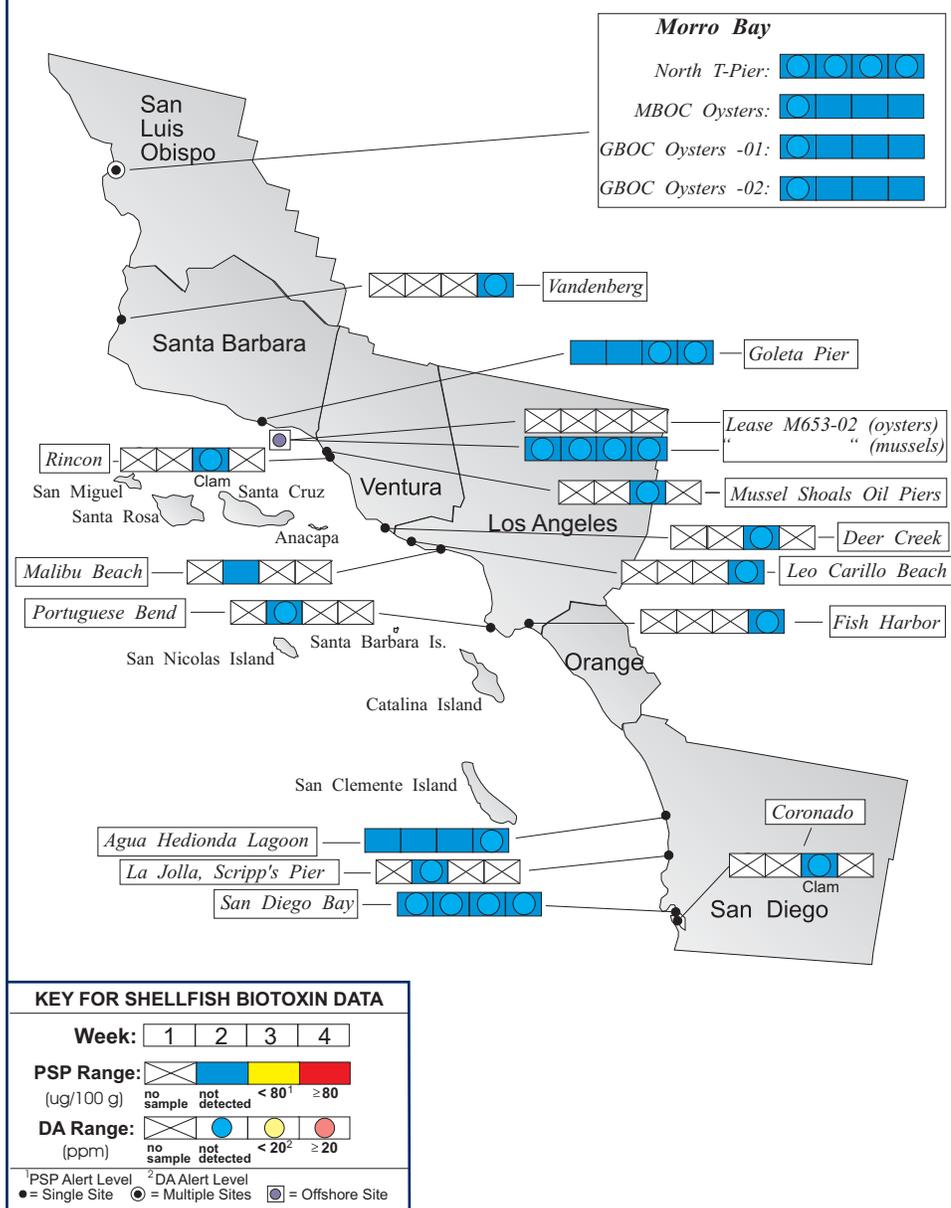
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Relative Abundance of Known Toxin Producers



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 April, 2014.



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The elevated levels of domoic acid detected in sentinel mussels from Santa Cruz Pier during the last week of March continued through the first two weeks of April, then declined (Figure 4). The highest concentration detected was 140 ppm. Mussels from the Monterey commercial wharf declined from 170 ppm on March 27 to 94 ppm on April 10. The majority of anchovy and sardines samples collected by the CDPH Food and Drug Branch (FDB) exceeded the alert level for domoic acid. The highest concentration detected was 270 ppm. FDB samples of Dungeness crab contained low levels of domoic acid in the viscera. Mussels from just inside Elkhorn Slough near Moss Landing did not contain a detectable level of domoic acid. Low levels of this toxin were detected at 4 Mile Beach (Santa Cruz County) and farther up the coast at Pescadero Beach and Pillar Point in San Mateo County.

Non-Toxic Species

The diatoms *Skeletonema* and *Chaetoceros* were common at sites between Humboldt and San Mateo counties. *Bacteriastrum* was common at the Santa Cruz Pier the latter half of the month. Dinoflagellates were rare with the exception of *Prorocentrum* in mid-Tomales Bay, although the increase in cell numbers was brief.



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

QUARANTINES:

On April 4 the Department issued a Health Advisory warning consumers not to eat recreationally harvested bivalve shellfish (i.e., mussels, clams and scallops) from Santa Cruz and Monterey counties. This advisory was issued because of elevated levels of domoic acid in shellfish samples from this region.

On April 10 the Department issued an additional Health Advisory for Monterey and Santa Cruz counties that advised the public to avoid consuming the viscera of crab, as well as sardines and anchovies. As with the April 4 advisory, this action was taken due to the detection of high levels of domoic acid in several samples of finfish in the region.

Due to the duration of the domoic acid event in Santa Cruz and Monterey, an updated Health Advisory was issued on April 28 to ensure the public was aware of the continued risk associated with consuming bivalve shellfish or the viscera of crab and small finfish like anchovy and sardine.

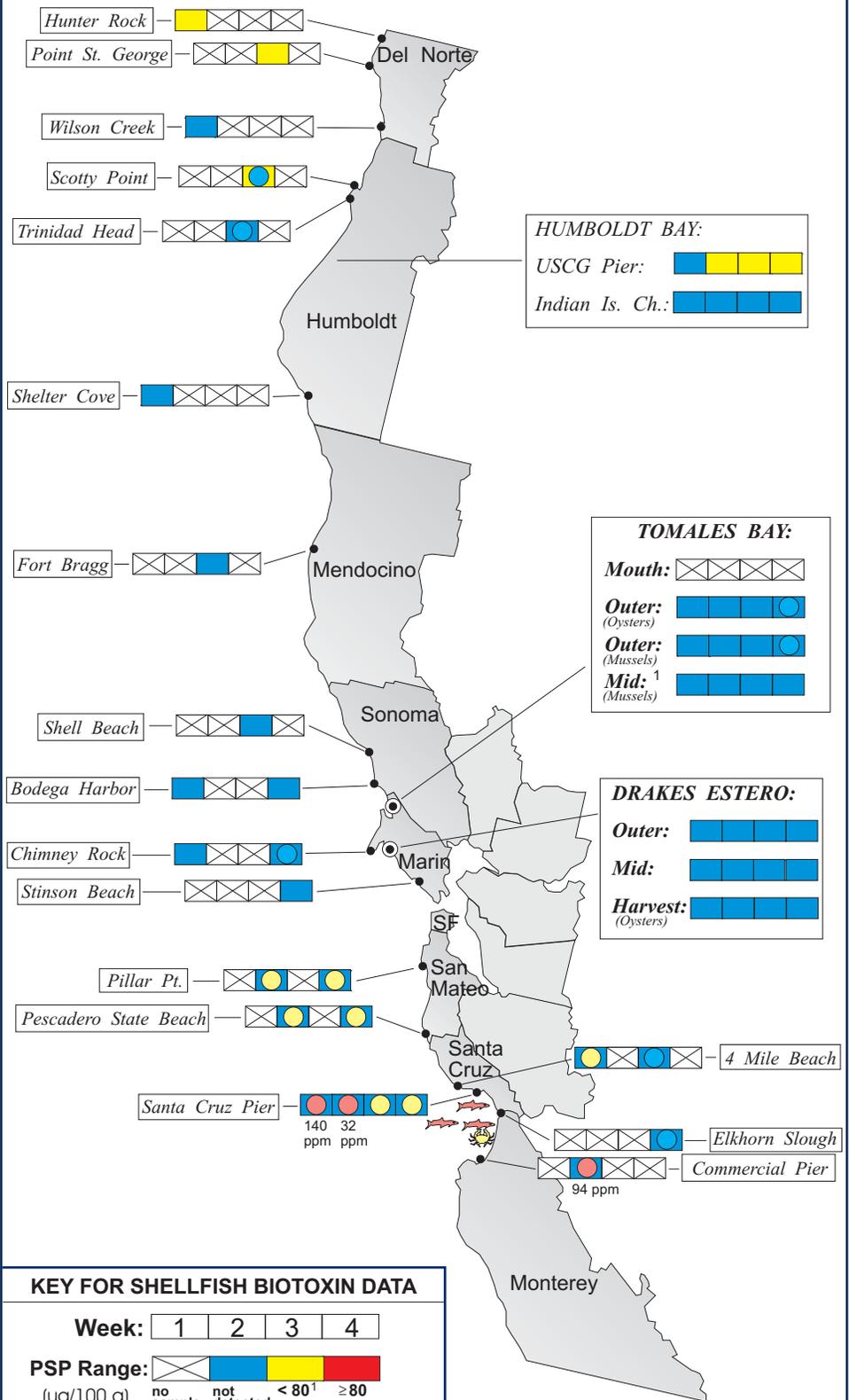
The annual mussel quarantine was on schedule to begin on May 1. This annual quarantine applies to sporharvested mussels along the entire California coastline, including all bays and estuaries.

The September 14 health advisory for the northern Channel Islands remained in effect. 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 due to persistent elevated levels of domoic acid in crab viscera samples.

Consumers of Washington clams, also known as butter clams (*Saxidomus*

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Figure 4. Distribution of shellfish biotoxins in Northern California during April, 2014.



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 April, 2014.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		None Submitted	
HUMBOLDT COUNTY		Coast Seafood Company	4
		Humboldt State University Marine Lab	5
MENDOCINO COUNTY		CDPH Volunteer (<i>Marie DeSantis</i>)	1
SONOMA COUNTY		Bodega Marine Lab & Farallone Institute	1
		CDPH Marine Biotoxin Program	1
MARIN COUNTY		Drakes Bay Oyster Company	11
CDPH Marine Biotoxin Program	1	CDPH Volunteer (<i>Anderson, Clyde</i>)	4
SFSU, Romberg Tiburon Center	3	Hog Island Oyster Company	4
Sonoma State University	3	NatureBridge	3
SAN FRANCISCO COUNTY		CDPH Volunteer (<i>Eugenia McNaughton</i>)	1
San Francisco Bay Whale Watching Company	1	Exploratorium	2
SAN MATEO COUNTY		The Marine Mammal Center (<i>Stan Jensen</i>)	4
San Mateo County Environmental Health Dept.	6	U.C. Santa Cruz	1
		U.C. Santa Cruz - Ano Nuevo	1
SANTA CRUZ COUNTY		U.C. Santa Cruz	3
California Department of Parks and Recreation	2	Santa Cruz Co. Environmental Health Dept.	3
MONTEREY COUNTY		Friends of the Sea Otter (<i>Janis Chaffin</i>)	5
Marine Life Studies	1	Monterey Abalone Company	2
SAN LUIS OBISPO COUNTY		Friends of the Sea Otter (<i>Kelly Cherry</i>)	4
Morro Bay National Estuary Program	1	Grassy Bar Oyster Company	3
Coastal Discovery Center, San Simeon	2	Tenera Environmental	4
The Marine Mammal Center (<i>Webb</i>)	4	CDPH Volunteer (<i>AI Guild</i>)	4
SANTA BARBARA COUNTY		CDPH Volunteer (<i>Sylvia Short</i>)	3
HABNet/CDPH Volunteers (<i>Boyd Grant</i>)	4	Island Packers/HABNet	1
National Park Service	1	Santa Barbara Mariculture Company	3
Santa Barbara Channel Keeper	1	U.C. Santa Barbara	4
Ty Warner Sea Life Center/HABNet	1		
VENTURA COUNTY		CDPH Volunteer (<i>Fred Burgess</i>)	2
National Park Service	1	Ventura County Environmental Health Dept.	1
LOS ANGELES COUNTY		CDPH Volunteers (<i>Kai Xu, Cal Parsons</i>)	3
Catalina Island Marine Institute	9	Long Beach Marine Institute	1
Tole Mour	3	Los Angeles County Health Department	3
Los Angeles County Sanitation District	2	Southern California Marine Institute	1
ORANGE COUNTY		Amigos de Bolsa Chica	4
California Department of Fish and Wildlife	2	CDPH Volunteer (<i>Jennifer McCarthy</i>)	1
SAN DIEGO COUNTY		Carlsbad Aquafarms, Inc.	1
Scripps Institute of Oceanography	4	Sea Camp/HABNet	2
U.S. Navy Marine Mammal Program	4	Tijuana River National Estuary Research	4

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nutalli), 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 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

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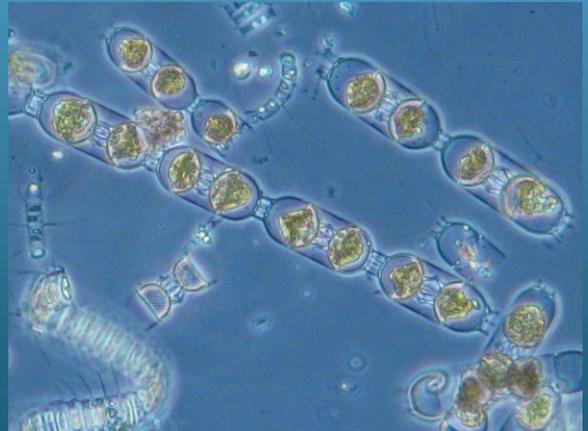
Table 2. CDPH program participants submitting shellfish samples during April, 2014.

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	2
	Smith River Rancheria	1
	Yurok Tribe Environmental Group	1
Humboldt	Coast Seafood Company	10
	Humboldt State University Marine Lab	2
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	2
	CDPH Volunteers (<i>James Sanders, John Morozumi</i>)	2
Marin	Cove Mussel Company	4
	CDPH Volunteer (<i>Jamie Sutton</i>)	1
	Drakes Bay Oyster Company	20
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	4
	Tomales Bay Oyster Company	4
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteers (<i>Michael Wolcott, Devon Pattillo</i>)	2
Monterey	Monterey Abalone Company	1
	CDPH Volunteer (<i>Josh Smith</i>)	1
	CDPH Food and Drug Branch	18
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	6
Santa Barbara	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	5
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
	CDPH Volunteer (<i>Steve Crooke</i>)	1
Los Angeles	CDPH Volunteers (<i>Vladimir Igoshin, Steve Field</i>)	1
	Los Angeles County Health Department Commerce	1
	Southern California Marine Institute	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	5
	CDPH Volunteer (<i>Steve Crooke</i>)	1
	Scripps Institute of Oceanography	1
	U.S. Navy Marine Mammal Program	4

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.



PHYTOPLANKTON GALLERY



The chained diatom *Stephanopyxis*.



The somewhat rare centric diatom *Planktoniella sol.*



The chained diatoms *Melosira* and *Odontella*. The former is typically seen in very calm water areas like Bolinas Lagoon.