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

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

May 2016

Technical Report No. 16-11

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of May, 2016. 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.

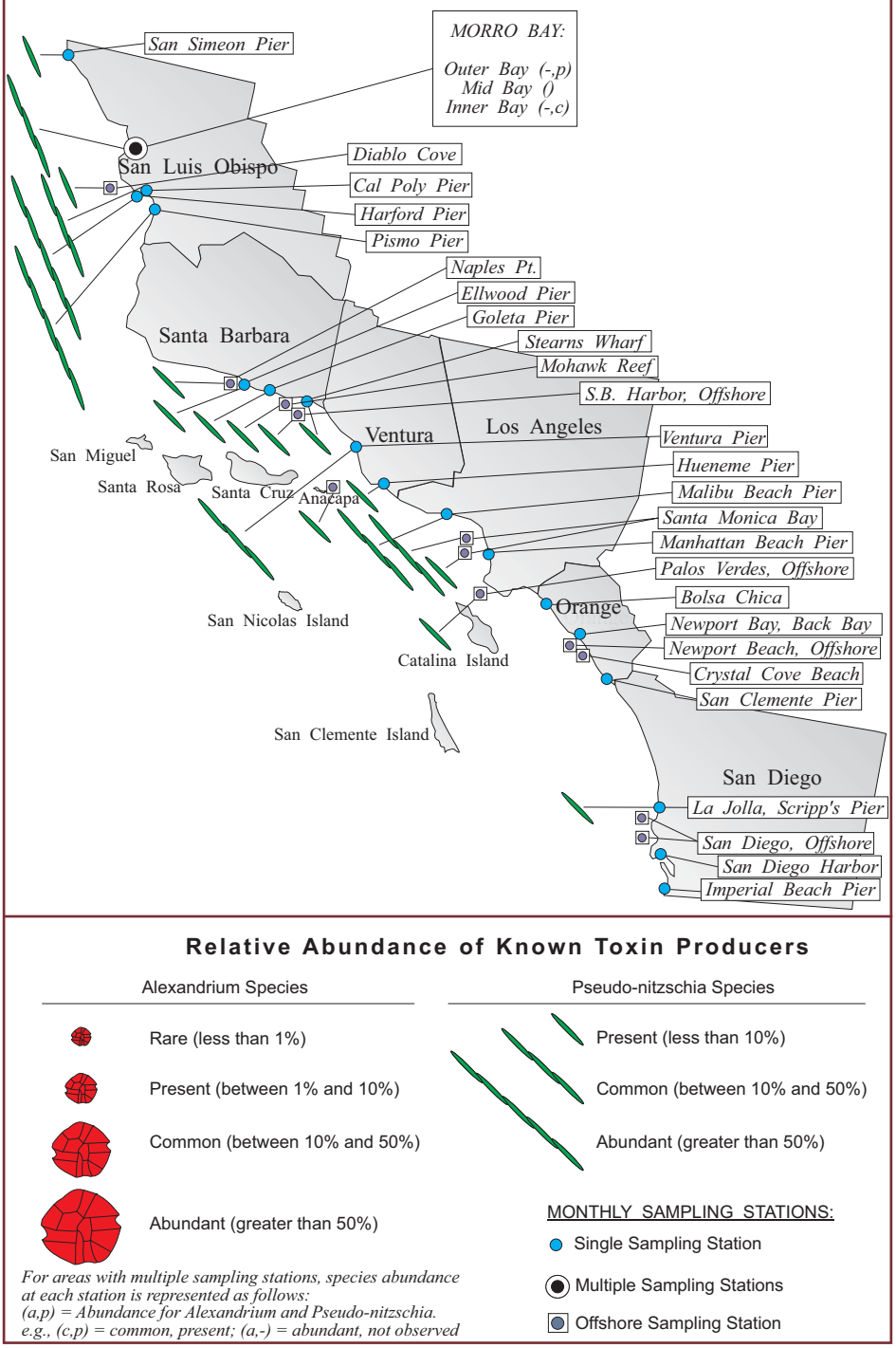
Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was not observed at any southern California sites (Figure 1). PSP toxins were not detected in any bivalve shellfish samples collected in May (Figure 3).

(Continued on Page 2)

Figure 1. Distribution of toxin-producing phytoplankton in Southern California during May, 2016.



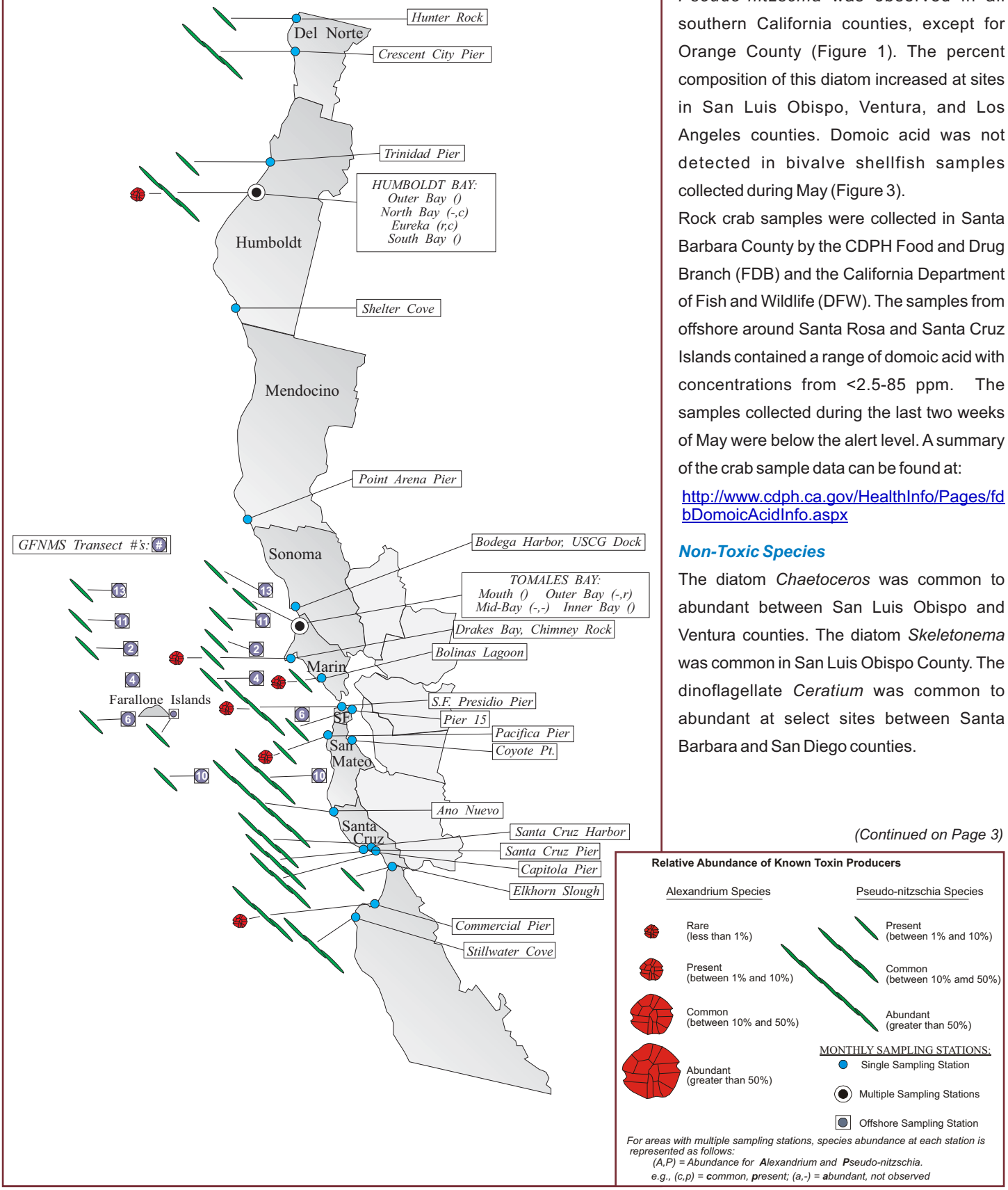
Relative Abundance of Known Toxin Producers

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%)	

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 2. Distribution of toxin-producing phytoplankton in Northern California during May, 2016.



(Continued from Page 1)

Domoic Acid

Pseudo-nitzschia was observed in all southern California counties, except for Orange County (Figure 1). The percent composition of this diatom increased at sites in San Luis Obispo, Ventura, and Los Angeles counties. Domoic acid was not detected in bivalve shellfish samples collected during May (Figure 3).

Rock crab samples were collected in Santa Barbara County by the CDPH Food and Drug Branch (FDB) and the California Department of Fish and Wildlife (DFW). The samples from offshore around Santa Rosa and Santa Cruz Islands contained a range of domoic acid with concentrations from <2.5-85 ppm. The samples collected during the last two weeks of May were below the alert level. A summary of the crab sample data can be found at:

http://www.cdph.ca.gov/HealthInfo/Pages/fdbDomoicAcidInfo.aspx

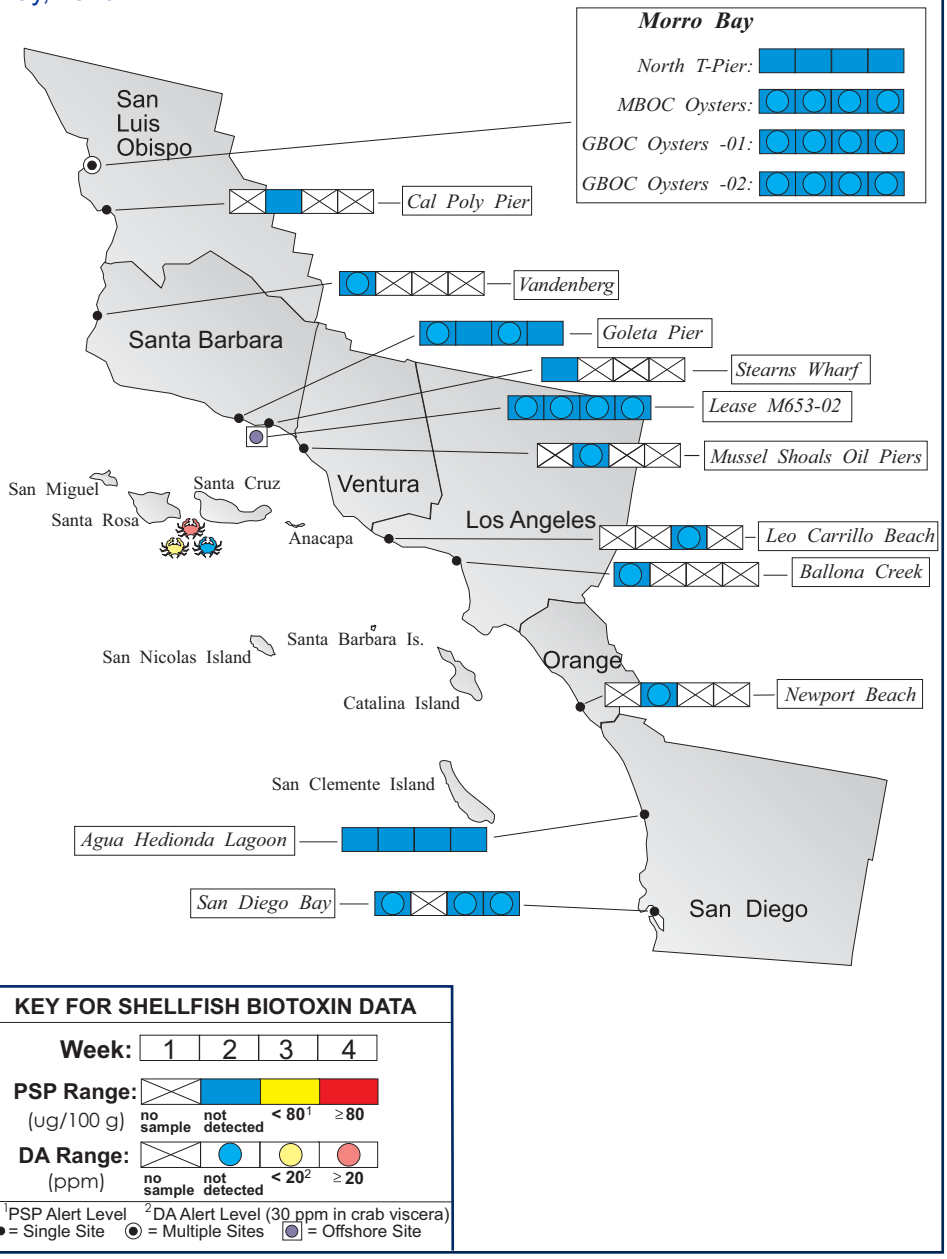
Non-Toxic Species

The diatom *Chaetoceros* was common to abundant between San Luis Obispo and Ventura counties. The diatom *Skeletonema* was common in San Luis Obispo County. The dinoflagellate *Ceratium* was common to abundant at select sites between Santa Barbara and San Diego counties.

(Continued on Page 3)

(Continued from Page 2)

Figure 3. Distribution of shellfish biotoxins in Southern California during May, 2016.



Northern California Summary:

Paralytic Shellfish Poisoning

Low numbers of *Alexandrium* were observed at seven sampling sites between Humboldt and Monterey counties (Figure 2). PSP toxins above the alert level were detected in the sentinel mussels at Chimney Rock in Marin County with the highest concentration detected of 592 ug/100 g on May 10. Low levels of PSP toxins were detected in mussel samples collected at Santa Cruz Pier (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed in all northern California counties, except Mendocino (Figure 2). The percent composition of this diatom increased at the majority of sites. Low levels of domoic acid were detected in mussels from Santa Cruz Pier at the end of the month. Elevated concentrations of domoic acid persisted in razor clam samples from Clam Beach in Humboldt County. Concentrations of domoic acid ranged from <2.5 -75 ppm in the meat samples, with levels of <2.5-80 ppm in the viscera (Figure 4). Low levels of domoic acid were detected in razor clam samples from Crescent Beach in Del Norte County. Subsequent testing of razor clams in this area revealed elevated levels of domoic acid, so the health advisory and fishery closure remains in effect. This data will be reported in the June monthly report.

(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)

FDB and DFW continued to collect crab samples along the northern California coast. Concentrations of domoic acid in Dungeness crab viscera ranged from <2.5-38 ppm in Humboldt County. Rock crab samples exhibited a range of domoic acid concentrations in the viscera from 10-87 ppm in Sonoma County, and from <2.5-50 ppm in San Mateo County.

Non-Toxic Species

The diatoms *Chaetoceros* and *Skeletonema* were common to abundant at sites in all northern California counties.

QUARANTINES:

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.

The December 9 Health Advisory warning consumers not to eat recreationally harvested razor clams from Humboldt and Del Norte counties remains in effect due to persistent elevated levels of domoic acid.

Information on the removal of Health Advisories for Dungeness crab in May and the current information for rock crab Health Advisories is located at:
http://www.cdph.ca.gov/HealthInfo/Pages/fdbDomoicAcidInfo.aspx

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 clams (*Siliqua patula*) are an exception to this

(Continued on Page 5)

Figure 4. Distribution of shellfish biotoxins in Northern California during May, 2016.

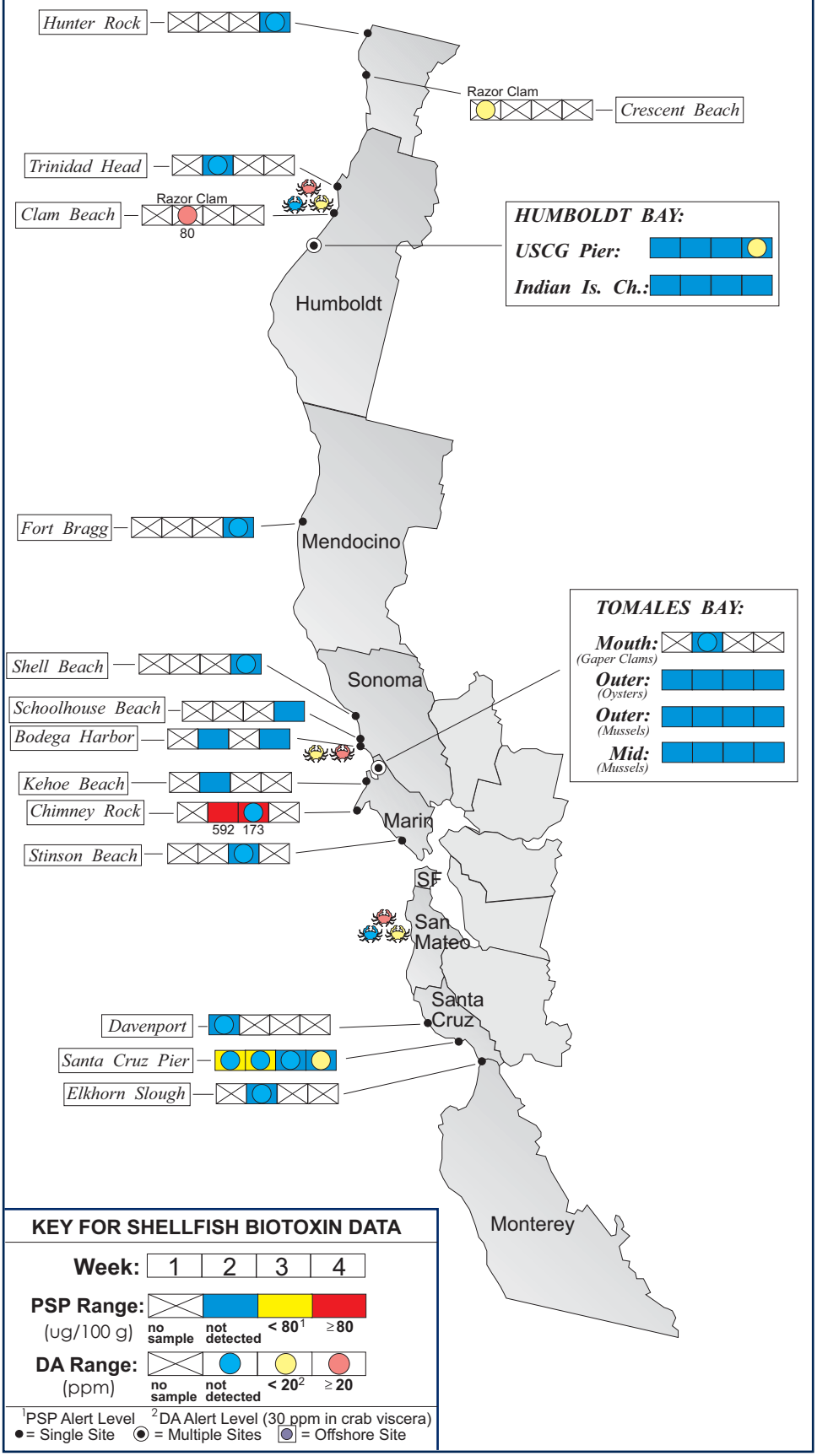


Table 1. Program participants collecting phytoplankton samples during May, 2016.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY			
CDPH Volunteer (*Jim Hooper)*	2	Tolowa Dee-ni' Nation	1
HUMBOLDT COUNTY			
Coast Seafood Company	5	Humboldt State University Marine Lab	2
Bureau of Land Management	1	CDPH Volunteer (*Giovannetti)*	2
MENDOCINO COUNTY		CDPH Volunteer (*Marie DeSantis*)	2
SONOMA COUNTY			
Gulf Farallones National Marine Sanctuary	4	CDPH Marine Biotoxin Program	2
MARIN COUNTY			
CDPH Volunteers (*Anderson, Clyde*)	7	Hog Island Oyster Company	5
Gulf Farallones National Marine Sanctuary	8	CDPH Marine Biotoxin Program	2
SAN FRANCISCO COUNTY		CDPH Volunteer (*Eugenia McNaughton*)	2
Monte Vista High School	1	Exploratorium	3
Gulf Farallones National Marine Sanctuary	2	San Francisco Bay Whale Watching Company	1
SAN MATEO COUNTY			
U.C. Santa Cruz - Ano Nuevo	2	The Marine Mammal Center (*Stan Jensen*)	5
Gulf Farallones National Marine Sanctuary	2	Friends of the Sea Otter (*Diane Larson*)	2
SANTA CRUZ COUNTY			
Santa Cruz County Envir. Health Department	3	The Otter Project (*Jeff Palsgaard)*	5
San Lorenzo Valley High School	1	U.C. Santa Cruz	4
MONTEREY COUNTY		CDPH Volunteer (*Taylor Bratton)*	1
The Otter Project (*Rose, Noke)*	5	Monterey Abalone Company	3
SAN LUIS OBISPO COUNTY		CDPH Marine Biotoxin Program	1
Morro Bay National Estuary Program	1	Morro Bay Oyster Company	4
Coastal Discovery Center, San Simeon	5	Tenera Environmental	3
Friends of the Sea Otter *(Cherry, Peterson)*	4	CDPH Volunteer (*Alison Plemons)*	3
SANTA BARBARA COUNTY			
Santa Barbara Channel Keeper	6	CDPH Volunteer (*Sylvia Short*)	2
HABNet Volunteers	3	U.C. Santa Barbara	4
VENTURA COUNTY		CDPH Volunteer (*Fred Burgess*)	4
Ventura County Environmental Health Dept	1	National Park Service	1
LOS ANGELES COUNTY			
Los Angeles County Sanitation District	4	Los Angeles County Health Department	2
City of Los Angeles Envir. Monitoring Division	3	CDPH Volunteer (*Kyrollos Yanny*)	1
ORANGE COUNTY		Orange County Health Care Agency	2
California Department of Fish and Wildlife	4	Amigos de Bolsa Chica	4
Crystal Cove Alliance	3	CDPH Volunteer (*Truong Nguyen*)	2
SAN DIEGO COUNTY			
Scripps Institute of Oceanography	4	Tijuana River National Estuary Research	4
Sea Camp/HABNet	5	U.S. Navy Marine Mammal Program	2

(Continued from Page 4)

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.

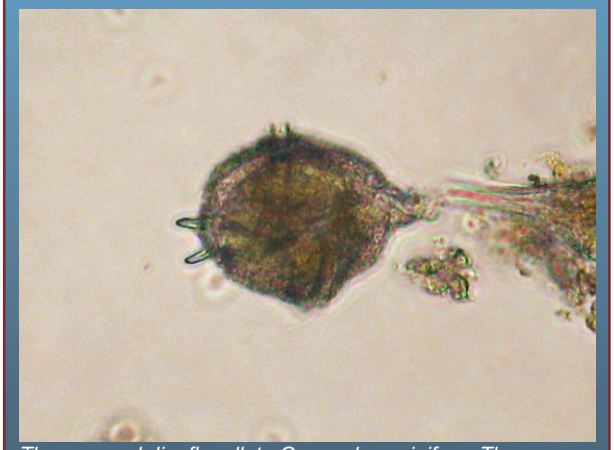
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in seafood species such as crab, lobster, and small finfish like sardines and anchovies.

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

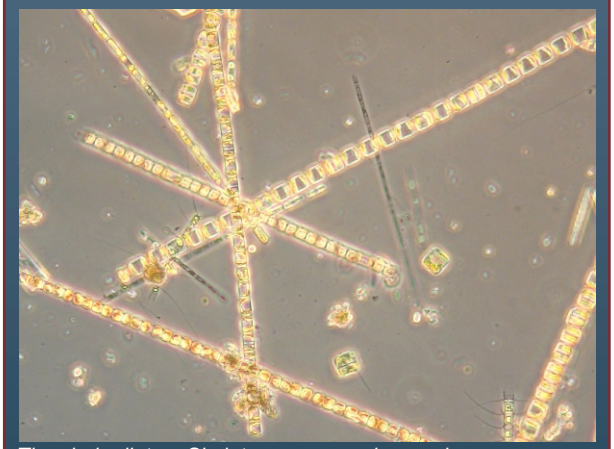
Table 2. CDPH program participants submitting shellfish samples during May, 2016.

COUNTY	AGENCY	#
Del Norte	Tolowa Dee-ni' Nation	1
	CDPH Volunteer (*Ken Graves*)	6
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	1
	California Department of Fish and Wildlife	7
	CDPH Food and Drug Branch	18
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	2
	CDPH Volunteers (*Morozumi*, *Sanders*)	2
	CDPH Food and Drug Branch/ Dept. Fish and Wildlife	6
Marin	Cove Mussel Company	5
	Hog Island Oyster Company	5
	Starbird Mariculture	6
	CDPH Volunteer (*Jamie Sutton*)	1
	CDPH Marine Biotoxin Program	3
	California Department of Fish and Wildlife	6
San Francisco	None Submitted	
San Mateo	CDPH Food and Drug Branch	24
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer (*Joel Herzel*)	1
Monterey	CDPH Volunteer (*Katherine Neylan*)	1
San Luis Obispo	Grassy Bar Oyster Company	12
	Morro Bay Oyster Company	10
	CDPH Marine Biotoxin Program	1
Santa Barbara	Santa Barbara Mariculture Company	6
	U.C. Santa Barbara	4
	Ty Warner Sea Life Center/HABNet	1
	Vandenberg AFB	1
	CDPH Food and Drug Branch	17
Ventura	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Health Department Sims	2
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	5
	U.S. Navy Marine Mammal Program	3

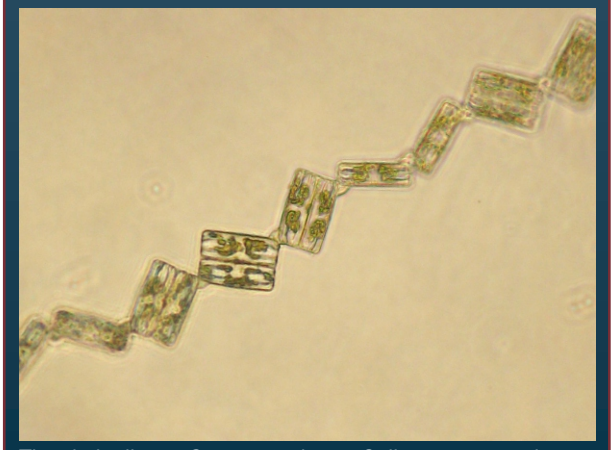
PHYTOPLANKTON GALLERY



The armored dinoflagellate Gonyaulax spinifera. The characteristic features of antapical spines and epical horn are readily visible.



The chain diatom Skeletonema was observed as common or abundant at sites from Del Norte to San Luis Obispo counties in May.



The chain diatom Grammatophora. Cells are rectangular with rounded corners attached in a zig-zag pattern.