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

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

February 2013

Technical Report No. 13-10

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of February, 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 two sampling locations in February (Figure 1). PSP toxins were not detected in any shellfish samples collected throughout the month (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along most of the southern California coast (Figure 1). The

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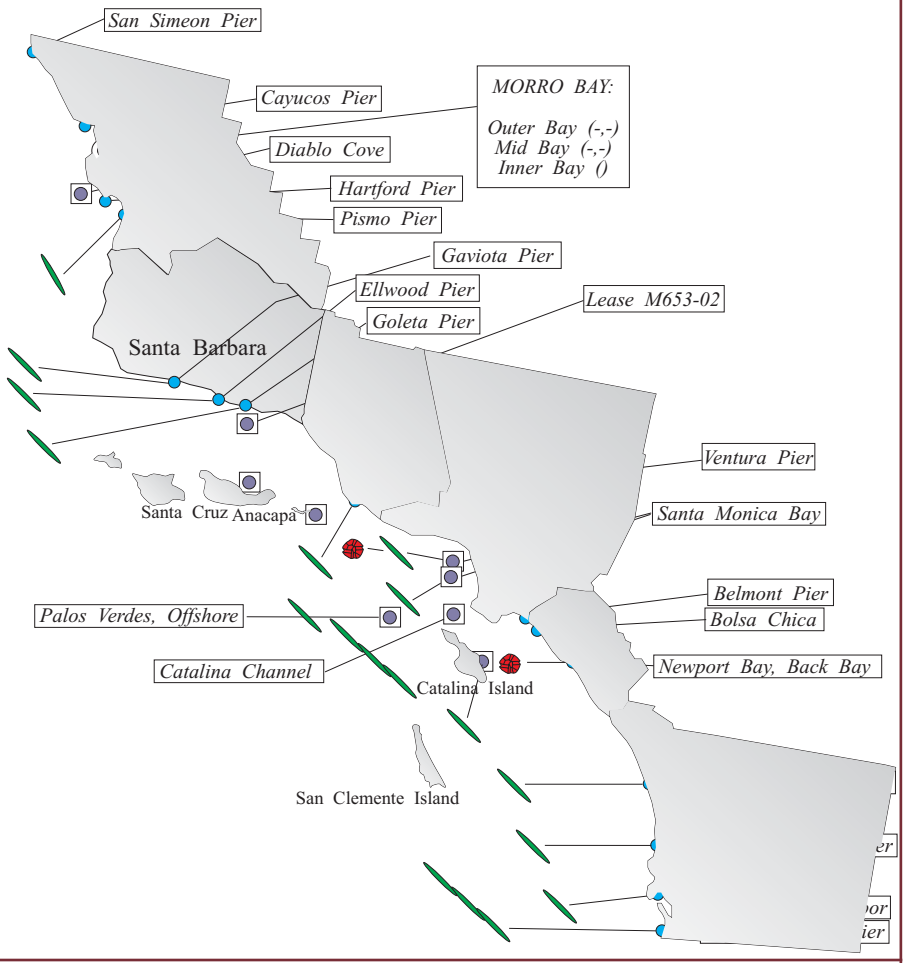
Figure 1. Distribution of toxin-producing phytoplankton in Southern California during February, 2013.



Relative Abundance of Known Toxin Producers

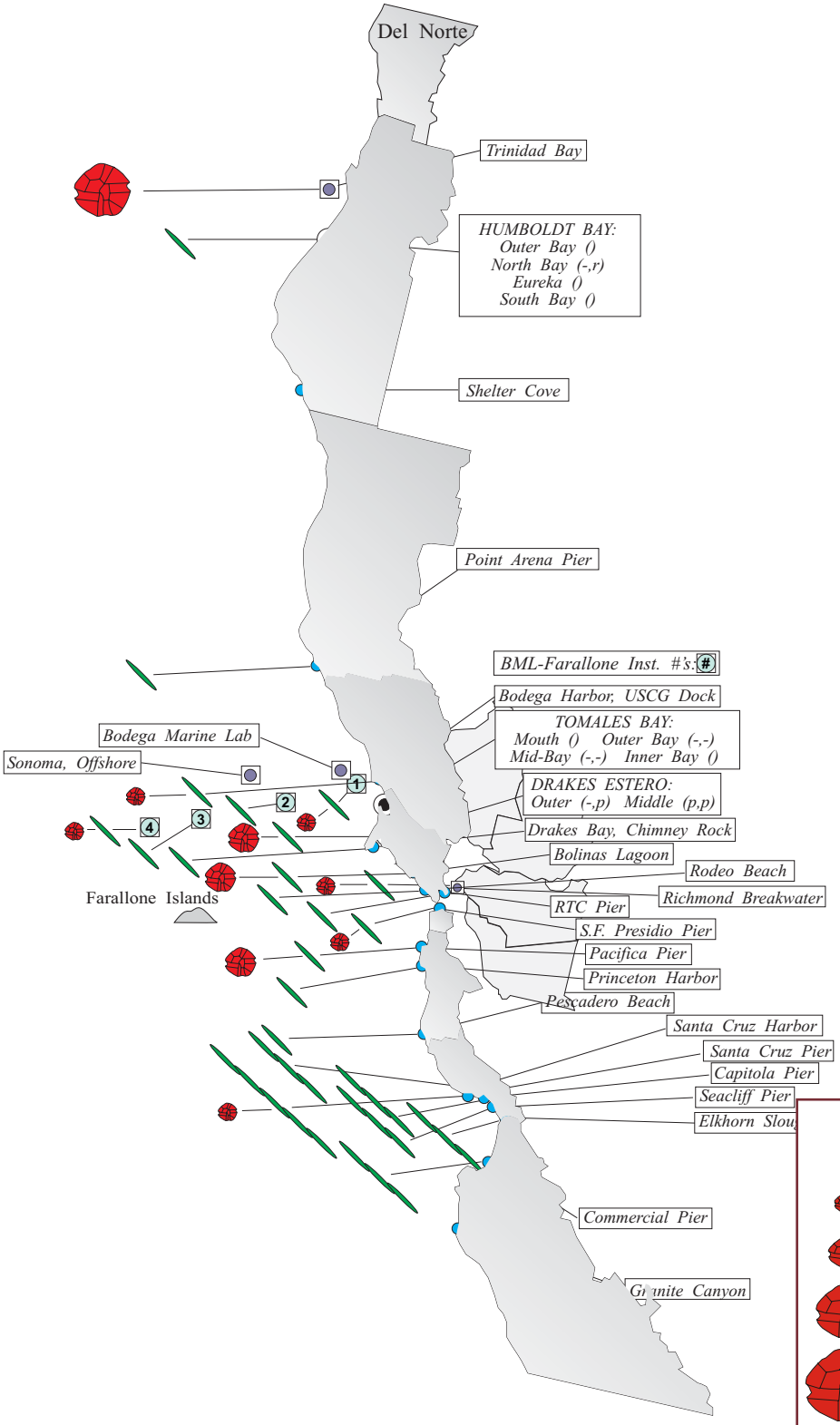
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

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 February, 2013.



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relative abundance of this diatom decreased at most sites, with the exception of Catalina Channel (Los Angeles County) and Imperial Beach Pier (San Diego County) where this diatom was common. Domoic acid was not detected in any bivalve shellfish samples analyzed during February. A wide range of toxin concentrations was detected in rock crab samples from the northern Channel Islands, ranging from below the detection limit to 360 ppm (Figure 3).

Non-toxic Species

Diatoms (*Chaetoceros*, *Lauderia)* were the most common genera observed.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed along most of the northern California coast in February (Figure 2). The percent composition of this dinoflagellate increased at several locations. The highest observed relative abundance was in a sample collected on February 16 by Humboldt State University offshore of Trinidad, in which *Alexandrium* accounted for approximately 25% of all species observed. There was also a noticeable increase in ths dinoflagellate inside Drakes Estero, Bolinas Lagoon, and at the Pacifica Pier.

The elevated concentrations of PSP toxins detected in northern California from October through January continued through February

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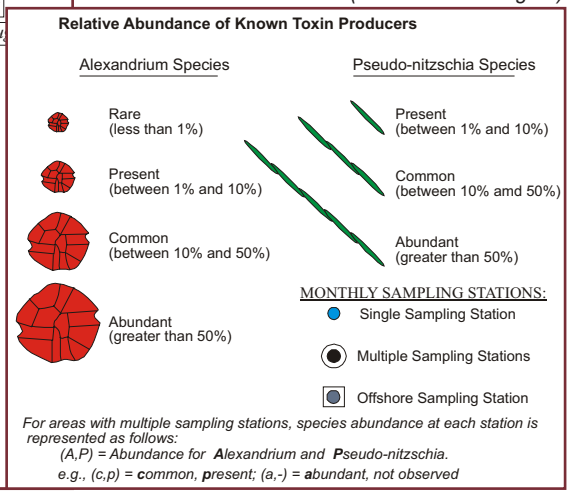
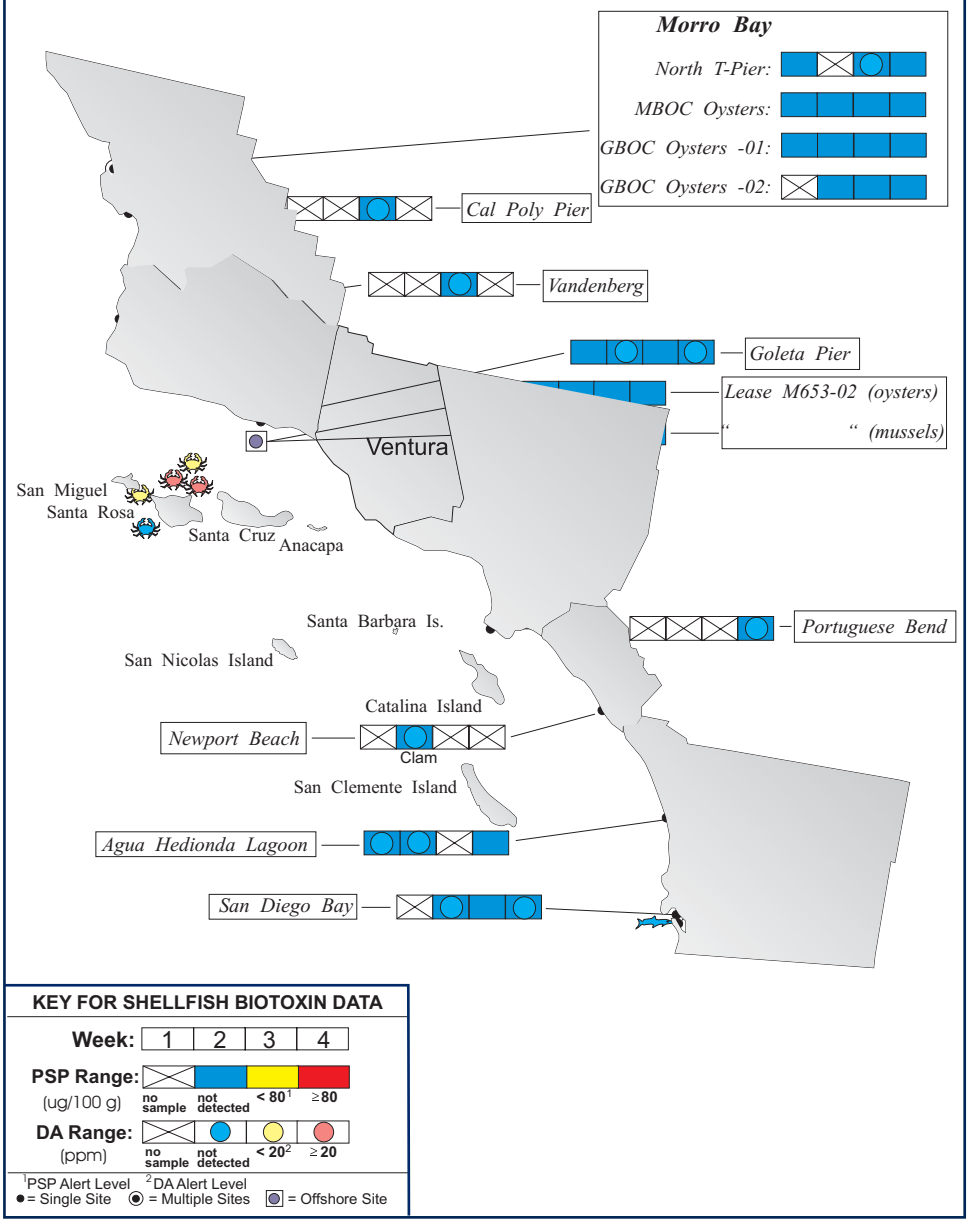


Figure 3. Distribution of shellfish biotoxins in Southern California during February, 2013.



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(Figure 4). Mussels at sites in southern Del Norte and northern Humboldt counties remained well above the alert level. There was a significant decline in toxicity at the Wilson Creek site but the concentration of PSP toxins in mussels from Patrick's Pt. remained elevated. The high levels of toxins detected inside Humboldt Bay in January decreased below the alert level by the beginning of February but remained detectable throughout the month. The elevated levels of PSP toxins detected inside Drakes Estero in January briefly declined during the first week of February, then increased significantly at both sentinel mussel stations. The toxin concentration reached 1076 ug/100g by February 18 in mussels from the channel buoy sentinel station. High concentrations of PSP toxins were also detected at several coastal sites in Marin and Sonoma counties by the end of the month. Low levels of toxicity were persistent in mussels from several sites in San Mateo and Santa Cruz counties throughout the month.

Domoic Acid

Pseudo-nitzschia was observed at most sampling sites in February (Figure 2). There was a significant increase in relative abundance of this diatom at sites inside Monterey. By February 27 *Pseudo-*

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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.

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(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553 4133

nitzschia was abundant in a sample collected by U.C. Santa Cruz at the Santa Cruz Pier. This sample also accounted for the highest cell mass of *Pseudo-nitzschia* observed throughout the month. Domoic acid was not detected in any shellfish samples in February.

Non-toxic Species

Diatoms continued to dominate the phytoplankton assemblage. *Skeletonema*, *Thalassiosira*, and *Chaetoceros* were common to abundant along the entire northern California coast. The dinoflagallate *Prorocentrum* was common inside Tomales Bay.

QUARANTINES: The November 6 health advisory for all bivalve shellfish in Del Norte County remained in effect. This action was taken because of the dangerous levels of PSP toxins detected and followed the extension of the annual mussel quarantine for Humboldt and Del Norte counties on October 31.

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

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

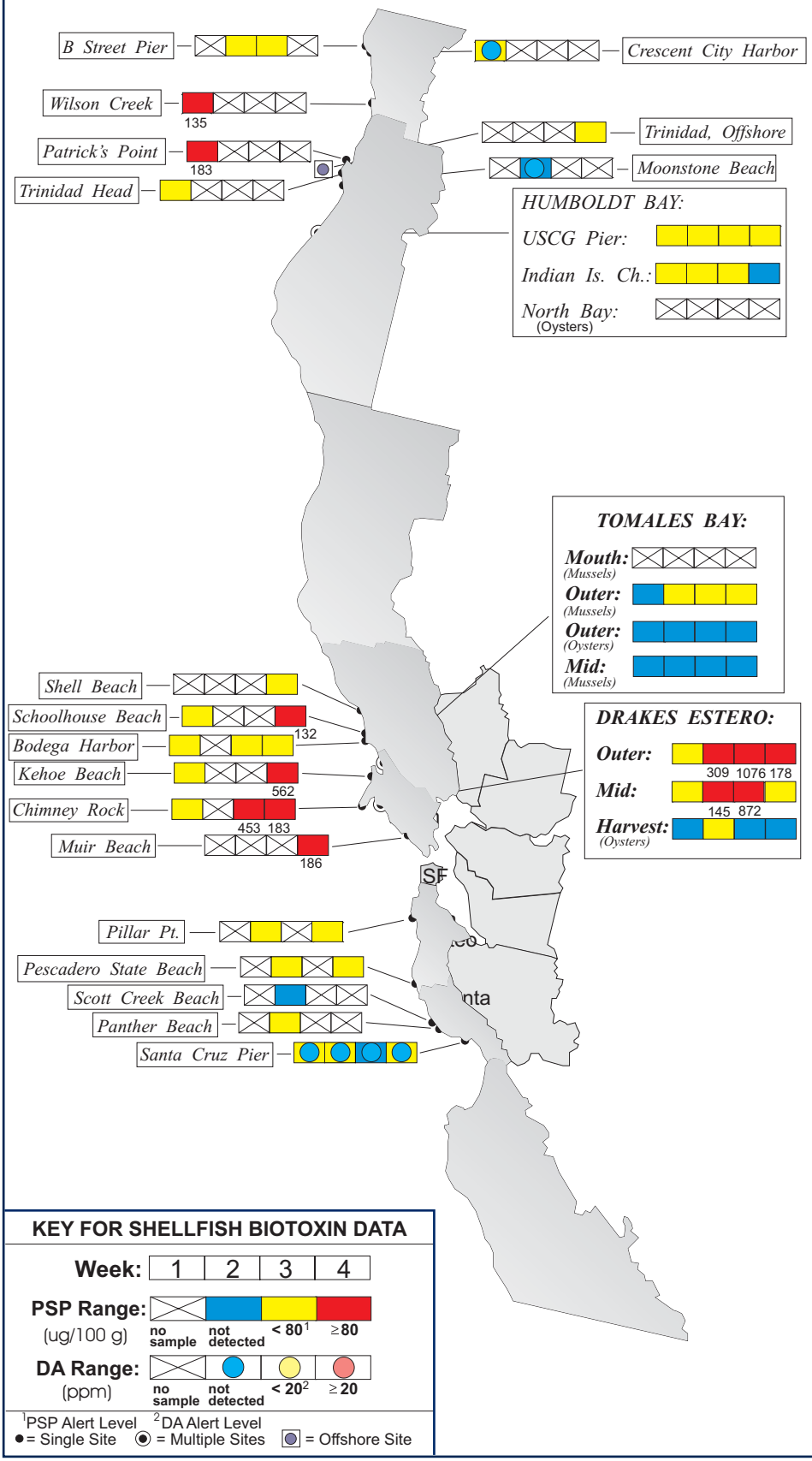

Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during February, 2013.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	1
	CDPH Volunteer (*Harriet Jenesky*)	4
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
	Humboldt State University Marine Lab	1
	CDPH Volunteers (*Georgianna Woods, Brett Stacy*)	2
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	5
	CDPH Volunteer (*James Sanders*)	1
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	46
	Hog Island Oyster Company	4
	Point Reyes Oyster Company	4
	CDPH Marine Biotoxin Program	5
	CDPH Volunteer (*Rand Dobleman*)	1
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer (*Devon Padilla*)	2
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	9
	Morro Bay Oyster Company	5
	Avila Beach Sea Life Center	1
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	5
	HABNet	10
	Vandenberg AFB	1
Ventura	None Submitted	
Los Angeles	Los Angeles County Health Department	1
Orange	CDPH Volunteer (*Steve Crooke*)	1
San Diego	Carlsbad Aquafarms, Inc.	3
	CDPH Volunteer (*Steve Crooke*)	1
	U.S. Navy Marine Mammal Program	5

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during February, 2013.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
	Humboldt State University Marine Lab	1
	Bureau of Land Management	1
Mendocino	CDPH Volunteer (*Marie DeSantis*)	3

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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 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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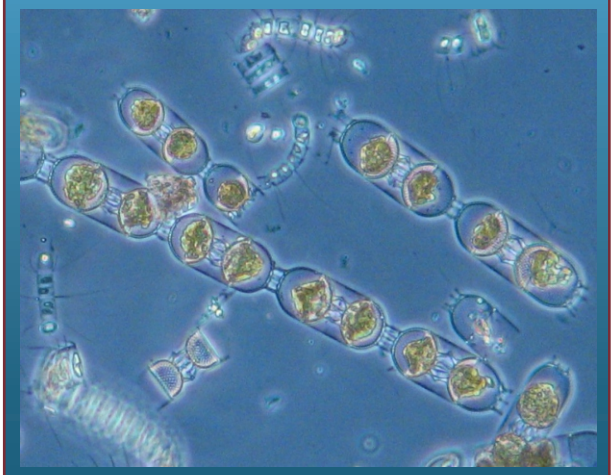
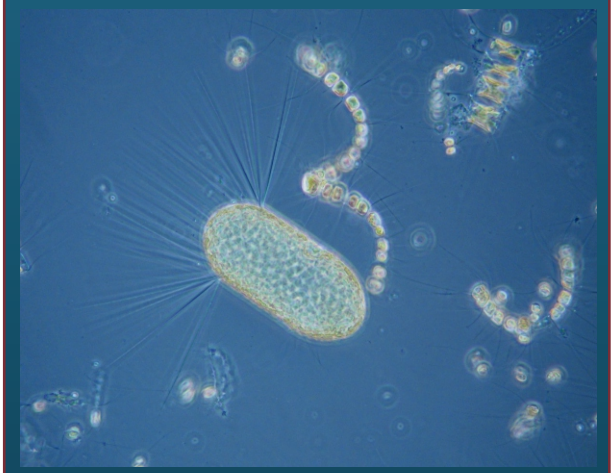
Sonoma	CDPH Marine Biotoxin Program	3
	Bodega Marine Lab & Farallone Institute	9
Marin	Drakes Bay Oyster Company	19
	CDPH Volunteer (*Brent Anderson*)	4
	SFSU, Romberg Tiburon Center	2
	CDPH Marine Biotoxin Program	3
	Hog Island Oyster Company	2
	Golden Gate National Recreation Area	1
Contra Costa	CDPH Marine Biotoxin Program	1
Alameda	None Submitted	
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	2
San Mateo	The Marine Mammal Center (*Stan Jensen*)	4
	San Mateo County Environmental Health Department	6
Santa Cruz	Santa Cruz County Environmental Health Department	3
	U.C. Santa Cruz	4
Monterey	Friends of the Sea Otter (*Janis Chaffin*)	2
	Monterey Abalone Company	3
	Marine Pollution Studies Laboratory	2
San Luis Obispo	Friends of the Sea Otter (*Kelly Cherry*)	4
	Grassy Bar Oyster Company	3
	Morro Bay National Estuary Program	2
	Monterey Bay National Marine Sanctuary	2
	Tenera Environmental	2
	The Marine Mammal Center (*P.J. Webb, Tim Lytsell*)	1
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	2
	HABNet/CDPH Volunteer (*Boyd Grant*)	3
	HABNet/Island Packers	1
	National Park Service	1
	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	3
Ventura	CDPH Volunteer (*Fred Burgess*)	1
	National Park Service	1
Los Angeles	Catalina Island Marine Institute	3
	City of Los Angeles Environmental Monitoring Division	3
	CDPH Volunteer (*Cal Parsons*)	1
	Los Angeles County Sanitation District	3
	Long Beach Marine Institute	1
	HABNet/Voyager Excursions	3
Orange	California Department of Fish and Game	4
San Diego	Carlsbad Aquafarms, Inc.	2
	Scripps Institute of Oceanography	4
	Tijuana River National Estuary Research Reserve	4
	U.S. Navy Marine Mammal Program	4

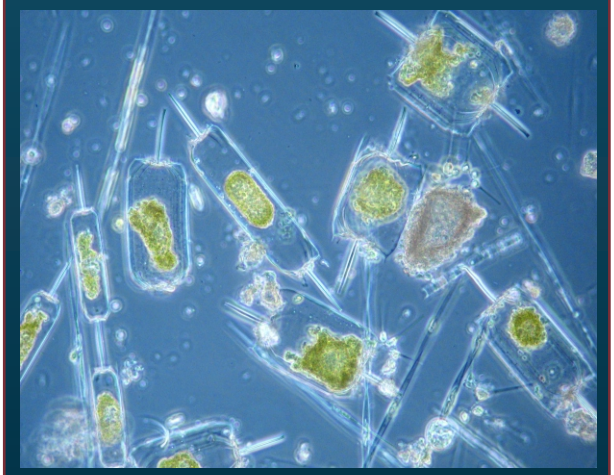
PHYTOPLANKTON GALLERY



Chains of Stephanopyxis, one of many diatoms observed along the coast in February.



The diatom Corethron was a rare but welcome site amidst the abundant chains of Chaetoceros and Skeletonema.



The single-celled diatom Ditylum can be quite variable in cell dimensions.