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

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

July 2013

Technical Report No. 13-19

INTRODUCTION:

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

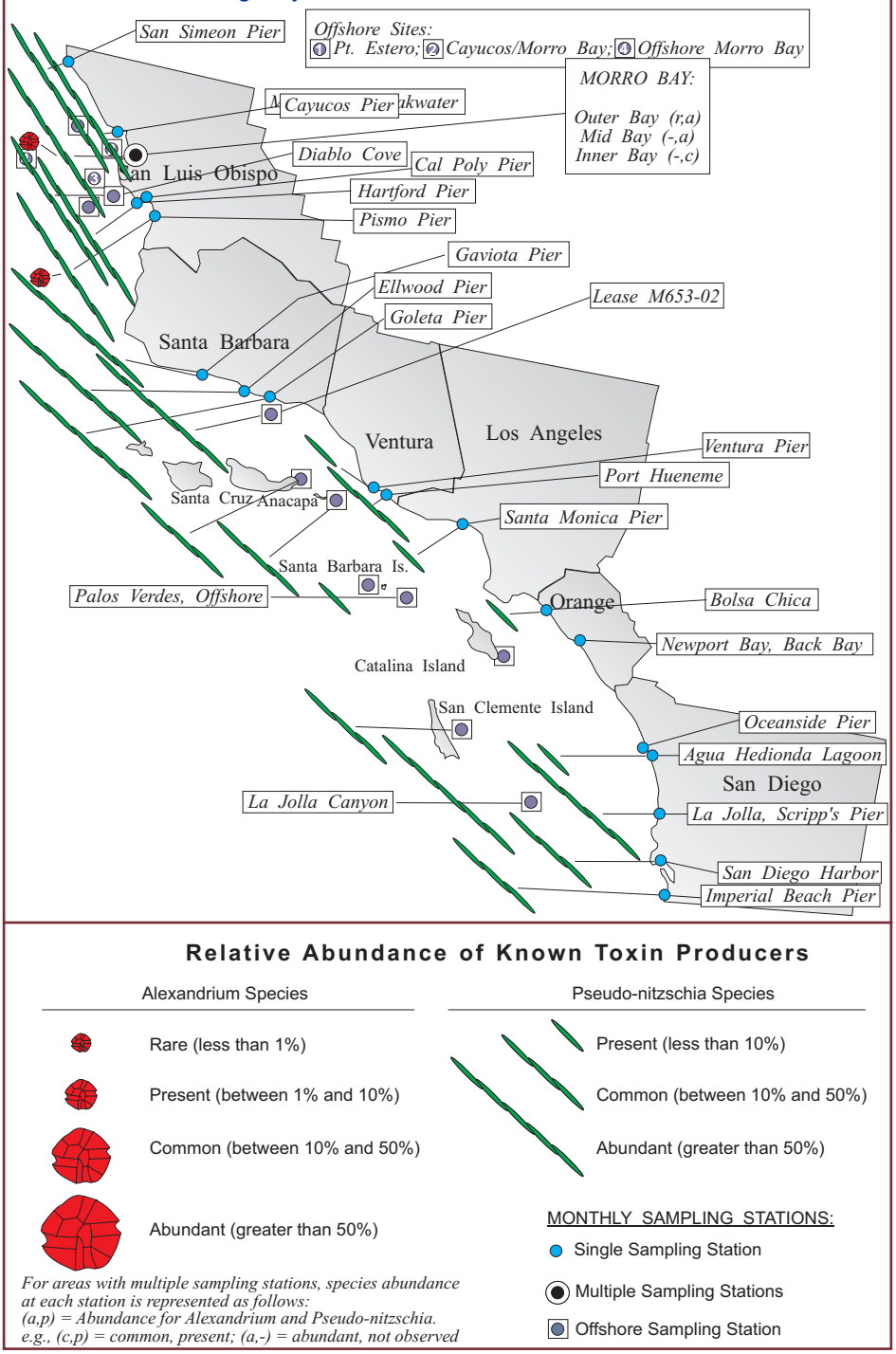
Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at two sampling locations in July (Figure 1). A small number of *Alexandrium* was observed in phytoplankton samples from Pismo Pier (July 29) and from the outer Morro Bay T-Pier (July 27). The latter observation was associated with a low concentration of PSP toxins in sentinel

(Continued on Page 2)

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



Relative Abundance of Known Toxin Producers

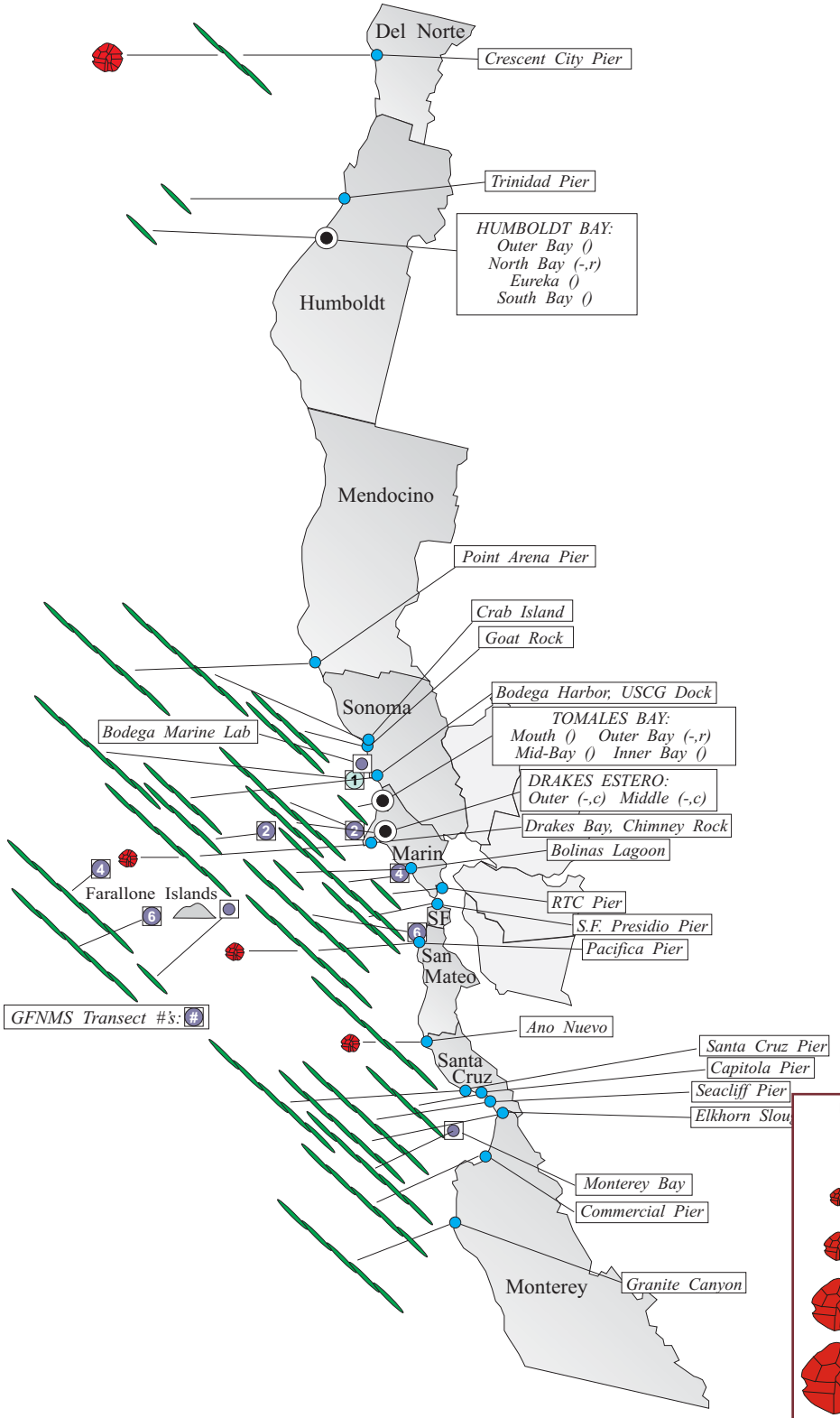
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

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 July, 2013.



(Continued from Page 1)

mussels (July 29) at this location (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the entire southern California coast (Figure 1). The relative abundance of this diatom remained abundant at sites in San Luis Obispo County and increased at sites in Santa Barbara, Ventura, and San Diego counties towards the end of the month. The highest relative abundances of *Pseudo-nitzschia* were observed at San Simeon Pier (July 4, 11, and 19), Pismo Pier (July 29), and inner Morro Bay (July 22).

Domoic acid was detected at two locations in July (Figure 3). A moderate concentration of toxin was detected in mussels from Goleta Pier (12 ppm, July 24) in Santa Barbara and a lower concentration in mussels from Scripps Pier (4.3 ppm, July 29).

Non-Toxic Species

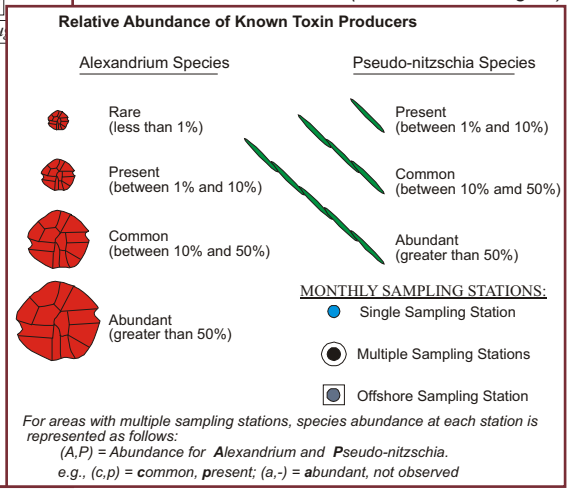
Aside from the prevalence of *Pseudo-nitzschia* along the southern California coast, several species of dinoflagellates were common. *Ceratium furca* was common at a number of locations between San Luis Obispo and San Diego. *Lingulodinium polyedrum* was common at Goleta Pier and offshore of Palos Verdes and was abundant at Santa Monica Pier and Imperial Beach Pier.

Northern California Summary:

Paralytic Shellfish Poisoning

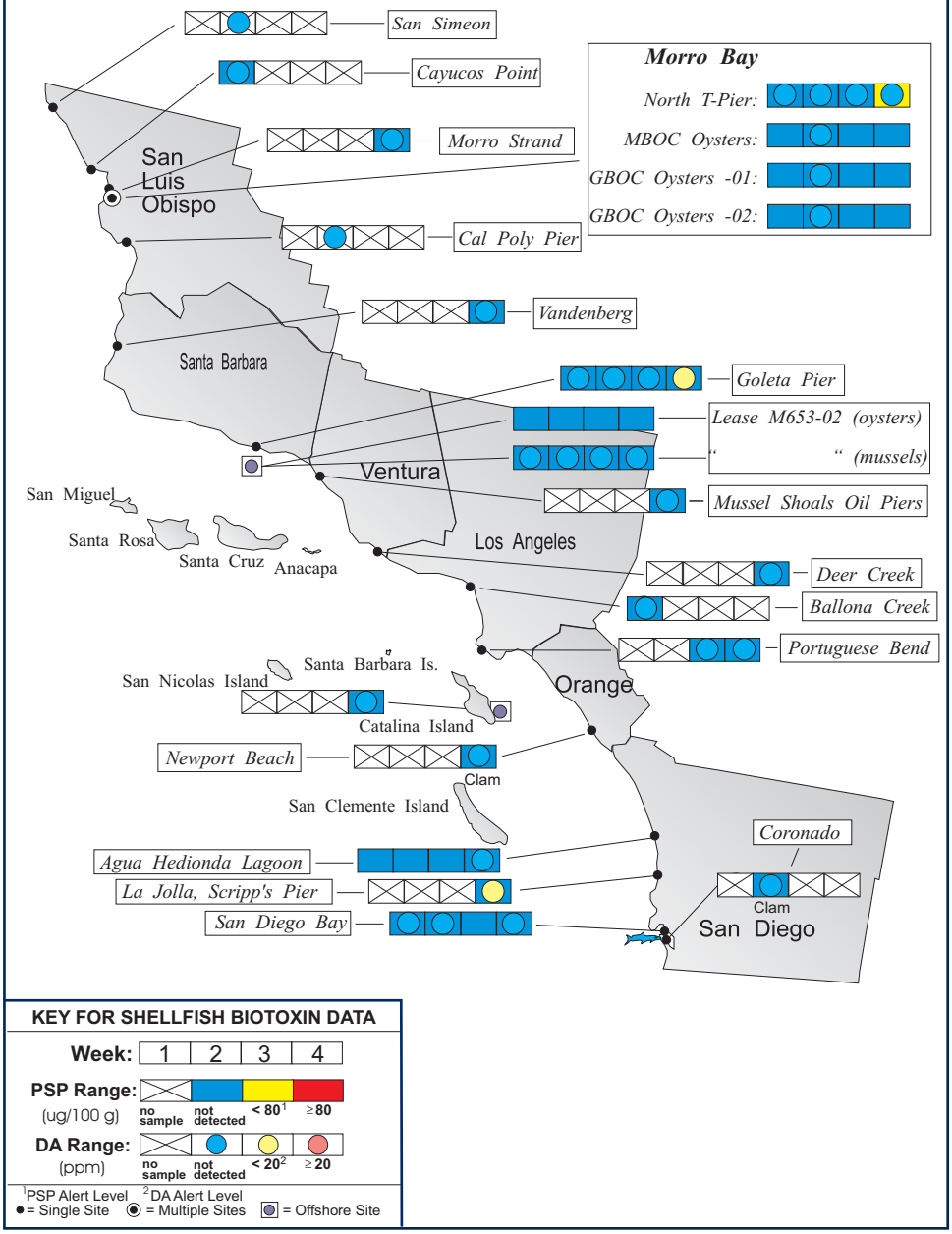
Alexandrium was detected at several

(Continued on Page 3)



(Continued from Page 2)

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



sampling locations in July (Figure 2). Low numbers of this dinoflagellate were observed at sites in Del Norte, Marin, and San Mateo counties.

Low levels of PSP toxins were detected in shellfish samples from several sites in Humboldt and Del Norte counties (Figure 4). By the last week of the month PSP toxins increased above the alert level in mussels from Patrick's Pt. (170 ug/100 g, July 29).

Domoic Acid

Pseudo-nitzschia was observed at most sampling locations in July (Figure 2). The relative abundance of this diatom remained high at sites between San Mateo and Monterey counties and increased significantly at sites between San Francisco and Mendocino counties, including offshore as far as the Farallone Islands. The highest relative abundance of *Pseudo-nitzschia* was observed at the Chimney Rock sentinel station (July 9), at Goat Rock along the Sonoma coast (July 11), and at Seacliff Pier in Santa Cruz (July 18).

As reported the past several months, domoic acid was not detected in shellfish samples from the regions experiencing very high densities of *Pseudo-nitzschia*.

Non-Toxic Species

Diatoms dominated the northern California coast in July. *Chaetoceros* and *Skeletonema* were common to abundant at sites between Humboldt and San Mateo

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)

counties. Bloom levels of the former were observed at Goat Rock (July 11) and the latter at Indian Island inside Humboldt Bay (July 9).

QUARANTINES: The annual mussel quarantine began early, on April 24, as a result of increasing levels of domoic acid and P*seudo-nitzschia* abundance over a wide region.

On March 15 CDPH terminated both the November 6 health advisory for all bivalve shellfish in Del Norte County and the October 31 extension of the annual mussel quarantine for Humboldt and Del Norte counties. Both of these control measures had been taken due to dangerous levels of the PSP toxins throughout this region.

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 clams (*Siliqua patula*) are an exception to

(Continued on Page 5)

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

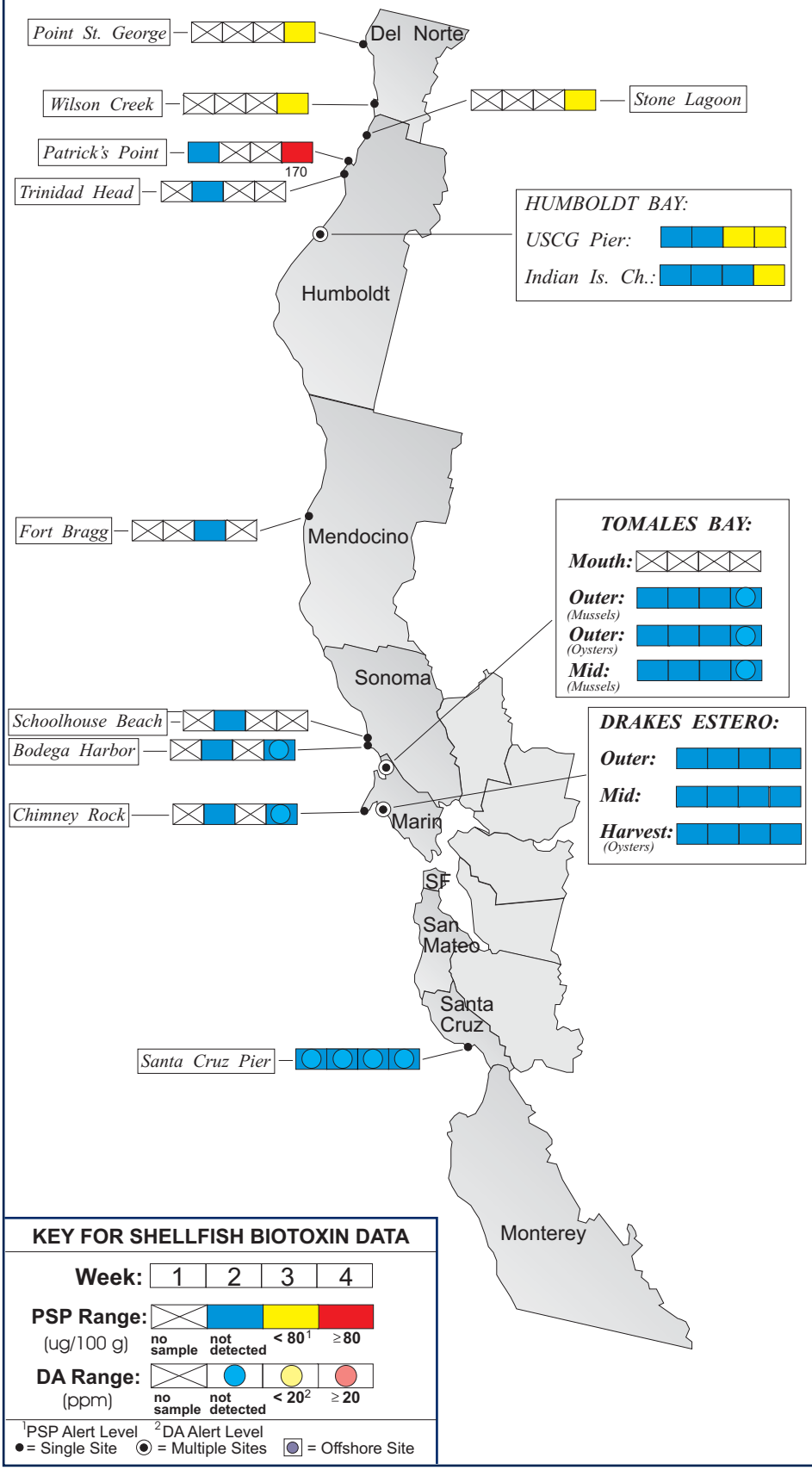


Table 1. Program participants submitting shellfish samples during July, 2013.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	2
	Del Norte County Environmental Health Department	1
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	1
	Humboldt State University Marine Lab	2
	Yurok Tribe Environmental Program	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	Point Reyes Oyster Company	5
	CDPH Marine Biotoxin Program	2
	Starbird Mariculture	1
San Francisco	None Submitted	
San Mateo	None Submitted	
Santa Cruz	U.C. Santa Cruz	5
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	12
	Morro Bay Oyster Company	5
	Coastal Discovery Center, San Simeon	1
	Cal Poly	1
	CDPH Volunteer (*Otto Schmidt*)	1
	CDPH Marine Biotoxin Program	1
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	5
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department, Burke	1
	Los Angeles County Health Department, Torrance	2
	CDPH Volunteer (*Cal Parsons*)	1
Orange	CDPH Volunteer (*Steve Crooke*)	1
San Diego	Carlsbad Aquafarms, Inc.	5
	CDPH Volunteer (*Steve Crooke*)	1
	Scripps Institute of Oceanography	1
	U.S. Navy Marine Mammal Program	5

Table 2. Program participants collecting phytoplankton samples during July, 2013.

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	5
	Humboldt State University Marine Lab	2
Mendocino	CDPH Volunteer (*Marie DeSantis*)	2
Sonoma	CDPH Marine Biotoxin Program	2
	Bodega Marine Lab & Farallone Institute	11

(Continued on Page 6)

(Continued from Page 4)

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.

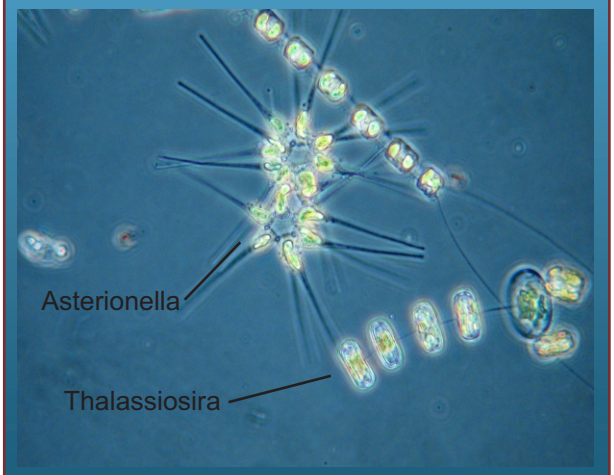
Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, 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.

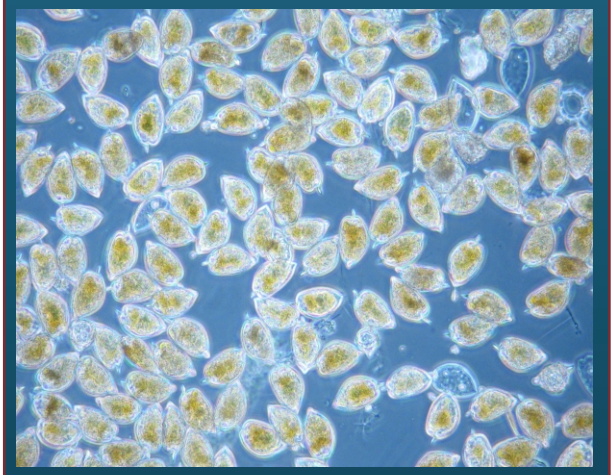
(Continued from Page 5)

	Sonoma CoastWatch	2
Marin	Drakes Bay Oyster Company	12
	CDPH Volunteer (*Brent Anderson*)	5
	Gulf of the Farallones National Marine Sanctuary	7
	SFSU, Romberg Tiburon Center	2
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	1
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	2
	Gulf of the Farallones National Marine Sanctuary	2
San Mateo	The Marine Mammal Center (*Stan Jensen*)	5
	U.C. Santa Cruz	3
Santa Cruz	U.C. Santa Cruz	5
	Santa Cruz County Environmental Health Department	3
Monterey	Friends of the Sea Otter (*Janis Chaffin*)	3
	Monterey Abalone Company	3
	Marine Pollution Studies Laboratory	4
	Marine Life Studies	3
San Luis Obispo	Friends of the Sea Otter (*Kelly Cherry, Al Guild*)	3
	CDPH Volunteer (*Dan Hoskins*)	1
	Grassy Bar Oyster Company	5
	Morro Bay National Estuary Program	3
	Coastal Discovery Center, San Simeon	4
	Tenera Environmental	4
	The Marine Mammal Center (P.J. Webb, *Tim Lytsell*)	2
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	5
	HABNet/CDPH Volunteer (*Boyd Grant)*	5
	National Park Service	1
	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	5
Ventura	CDPH Volunteer (*Fred Burgess*)	3
	National Park Service	3
	Tole Mour	1
	Ventura County Environmental Health Department	1
Los Angeles	CDPH Volunteer (*Cal Parsons, Kai Xu*)	4
	Los Angeles County Sanitation District	2
	Voyager Excursions/HABNET	1
	Tole Mour	1
Orange	California Department of Fish and Wildlife	4
	Amigos de Bolsa Chica	4
San Diego	Carlsbad Aquafarms, Inc.	3
	CDPH Volunteer (*Cynthia Hall*)	1
	Sea Camp/HABNET	1
	Scripps Institute of Oceanography	5
	Tijuana River National Estuary Research Reserve	5
	U.S. Navy Marine Mammal Program	5

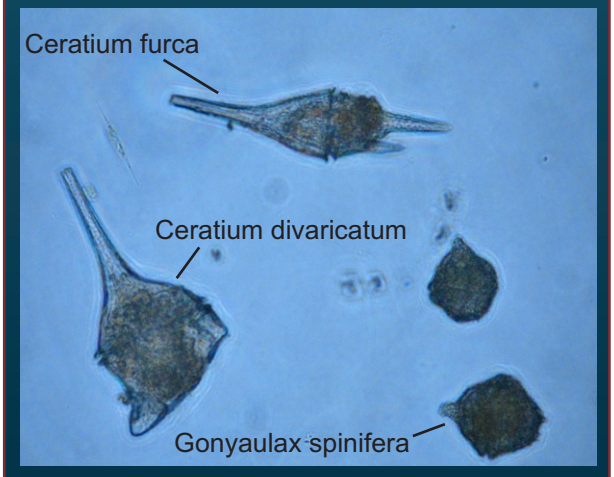
PHYTOPLANKTON GALLERY



Clusters of the diatom Asterionella are often observed in low numbers.



The dinoflagellate Prorocentrum was common at some southern California locations.



Two common species of the dinoflagellate Ceratium.