

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

June 2011

Technical Report No. 11-18

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of June, 2011. 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 absent from most sampling locations in June (Figure 1). PSP toxins were not detected in shellfish samples collected throughout the month (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the
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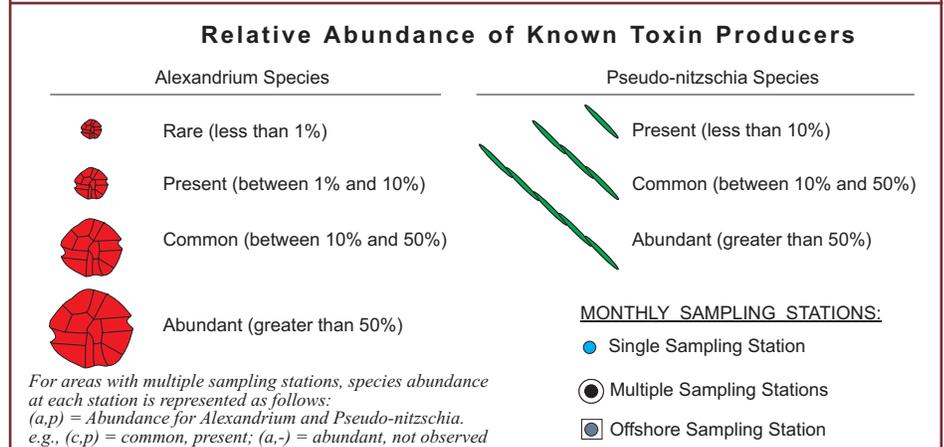
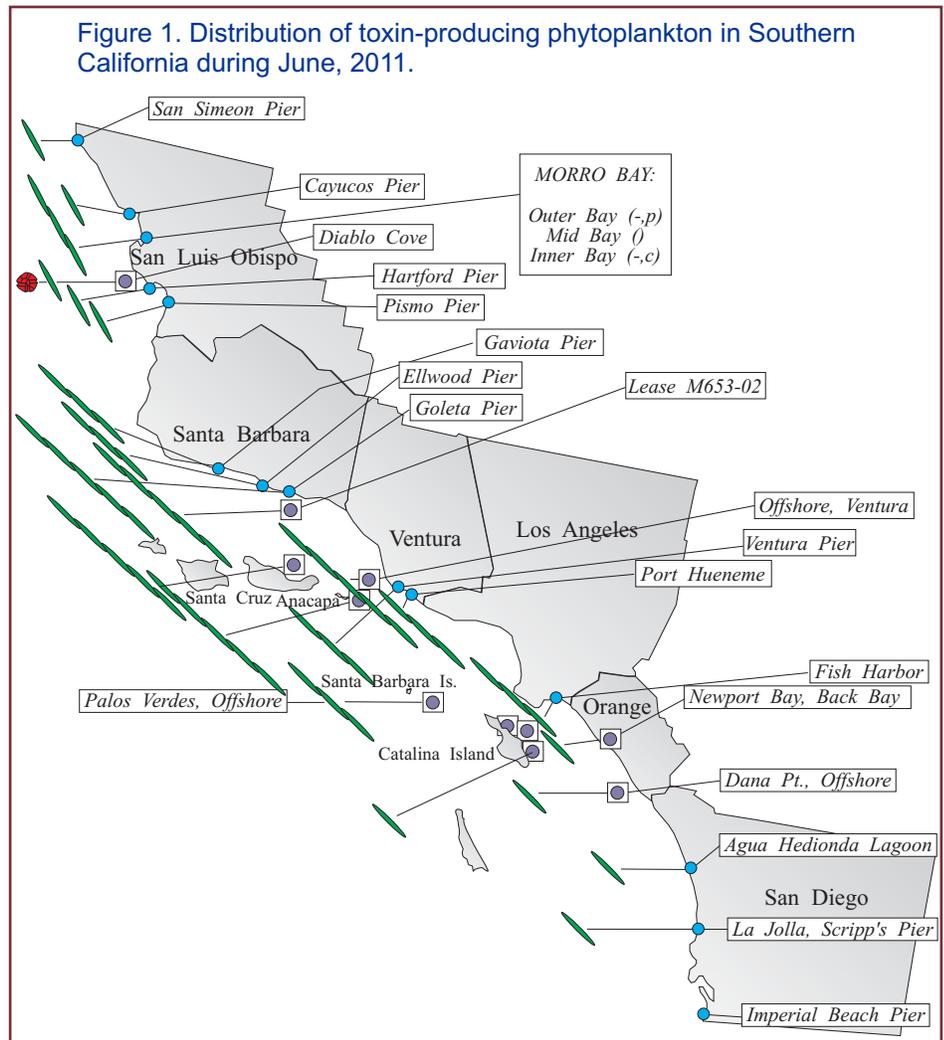
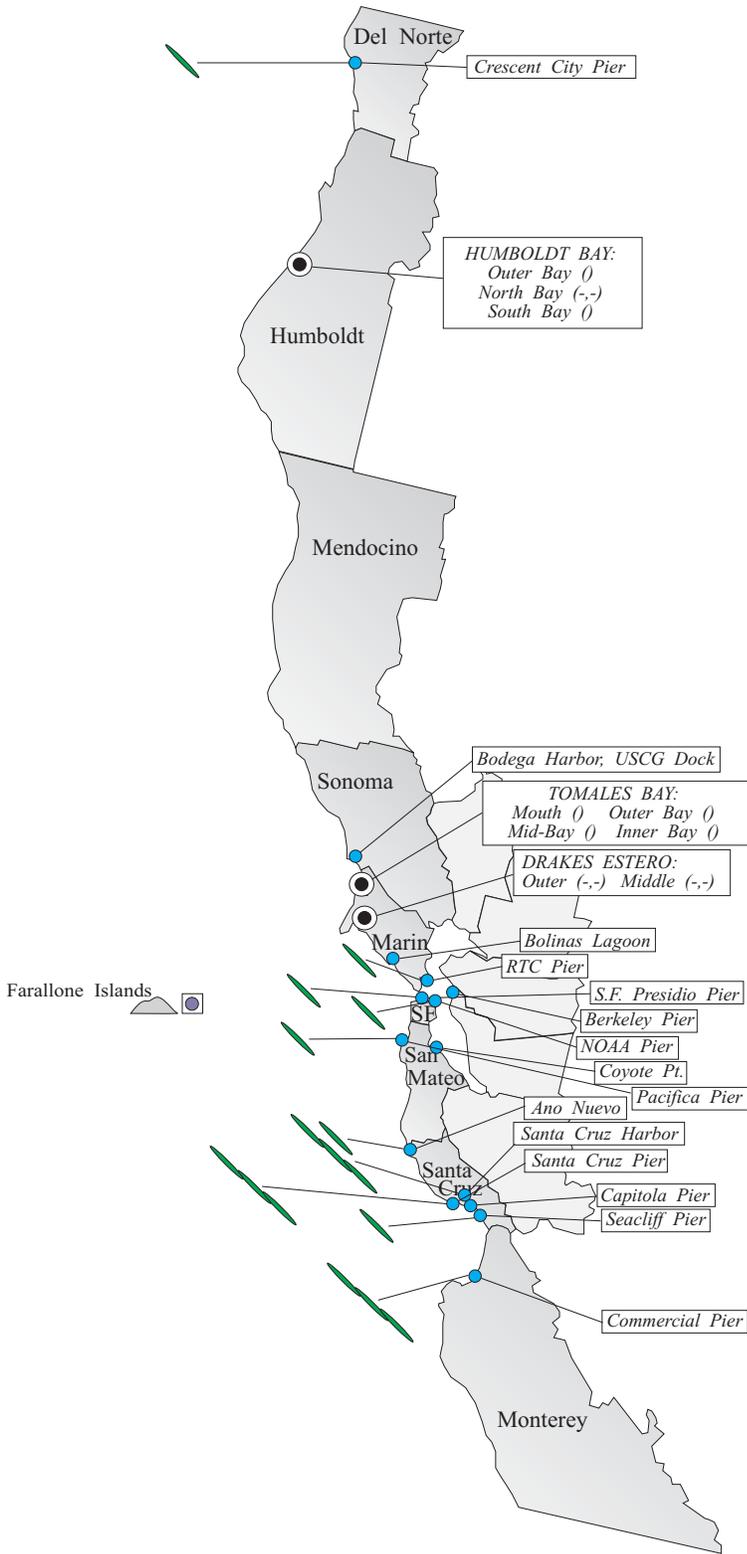


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during June, 2011.



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entire southern California coast in June (Figure 1). The relative abundance of *Pseudo-nitzschia* was similar to observations in May. This diatom remained abundant at sites between Santa Barbara and Ventura counties, including offshore locations. The highest relative abundances of this diatom were observed offshore of Palos Verdes, at Santa Cruz Island, and at the Gaviota, Goleta, and Ellwood piers.

The low levels of domoic acid detected during May continued through the first week of June. By the second week of the month the toxin concentration in shellfish had exceeded the federal alert level at the aquaculture lease offshore of Santa Barbara (Figure 3). Domoic acid levels at this site continued to increase throughout the month, reaching 84 ppm by June 24. Low levels of domoic acid were detected in mussels farther inshore at Goleta Pier and at two sites in Ventura County. Spiny lobster from Santa Cruz Island continued to exhibit high concentrations of domoic acid in the viscera. Rock crab from Santa Rosa Island and lobster from farther south at Santa Barbara Island did not contain detectable levels of this toxin.

Non-toxic Species

Diatoms dominated the southern California coast between San Luis Obispo and Orange counties. *Chaetoceros* was common to

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Relative Abundance of Known Toxin Producers

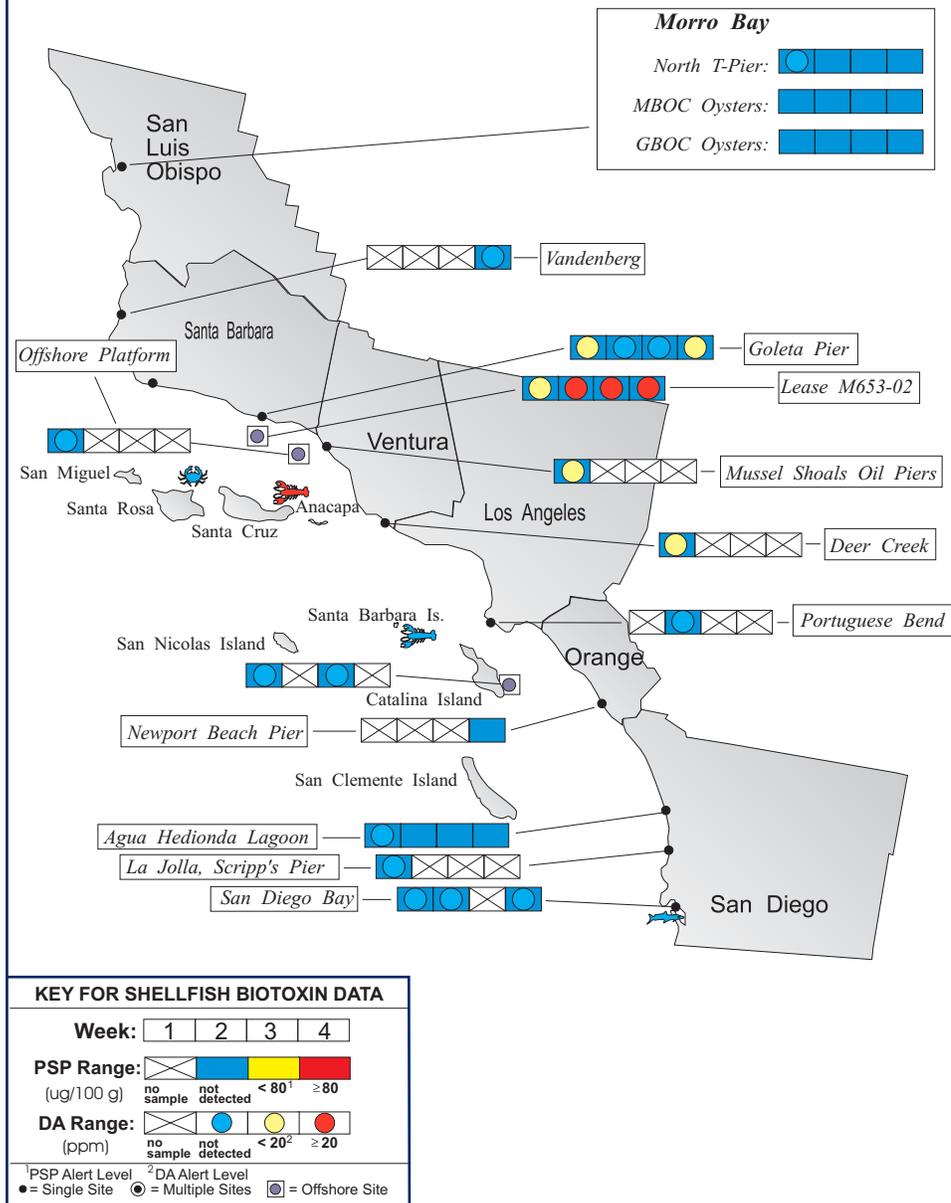
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

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 3. Distribution of shellfish biotoxins in Southern California during June, 2011.



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abundant throughout this region, with *Skeletonema* also common at San Luis Obispo sites. The dinoflagellates *Prorocentrum* and *Lingulodinium* were common along the San Diego coast.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was absent from all sampling locations but one during June (Figure 2). A very low number of this dinoflagellate was observed at Pacifica Pier on June 6. PSP toxins were not detected in any shellfish samples analyzed in June (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at several sites along the northern California coast, mostly between San Francisco and Monterey counties (Figure 2). This diatom remained common at sites in Santa Cruz and Monterey counties. Domoic acid was not detected in any samples analyzed in June.

Non-toxic Species

Diatoms remained dominant along the northern California coast. *Chaetoceros* was the most common genera observed, with *Skeletonema* also common in Bolinas Lagoon. The highest relative abundances

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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

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were observed at the Monterey Commercial Pier (June 21), Santa Cruz Harbor (June 5), and the Santa Cruz Pier (June 1).



QUARANTINES:

The October 16 health advisory remained in effect, warning consumers not to eat sport-harvested shellfish or the internal organs of crustaceans and small finfish from the Channel Islands. Elevated levels of domoic acid were first detected in the viscera of lobster in this region and subsequently in rock crab viscera.

The 2011 annual mussel quarantine is in effect. The annual quarantine began early (March 29) this year due to significant, increasing levels of the PSP toxins and domoic acid. 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. All certified shellfish growers are required to submit at least weekly samples of shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health. 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

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Figure 4. Distribution of shellfish biotoxins in Northern California during June, 2011.

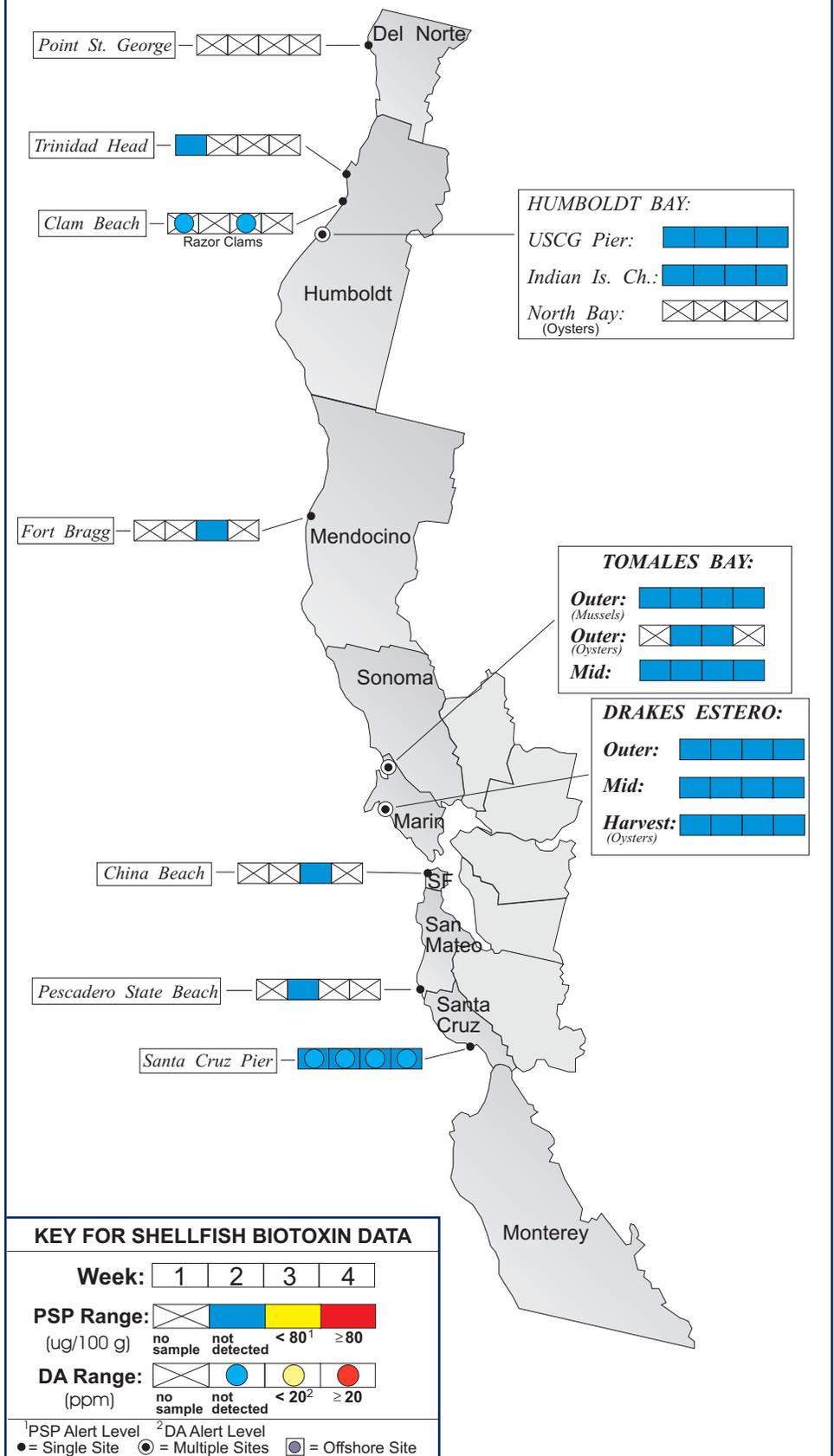


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during June, 2011.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
	Humboldt State University	2
	Mendocino County Environmental Health Department	1
Sonoma	None Submitted	
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	4
	Marin Oyster Company	2
	CDPH Marine Biotoxin Program	1
San Francisco	San Francisco Health Department	1
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.	6
	Morro Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	16
	U.C. Santa Barbara	5
	Vandenberg AFB	1
	California Department of Fish and Game	1
	CDPH Volunteer	1
Ventura	Ventura County Environmental Health Department	2
	U.C. Santa Barbara	1
Los Angeles	Los Angeles County Health Department	1
	CDPH Volunteer (<i>Cal Parsons</i>)	2
Orange	Orange County Health Care Agency	
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	2
	Scripps Institute of Oceanography	1

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 other 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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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.,

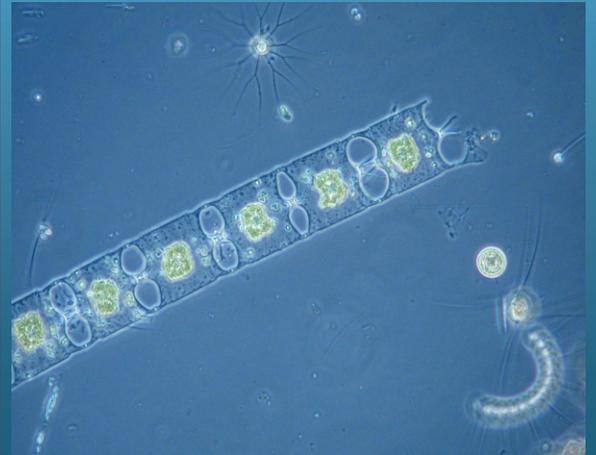
the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during June, 2011.

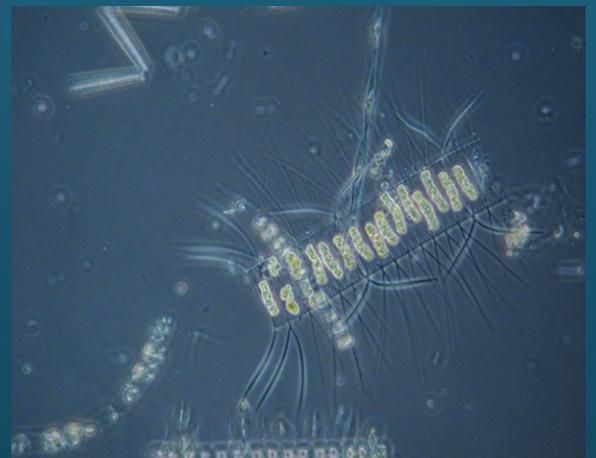
COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	5
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	1
Marin	Drakes Bay Oyster Company	10
	CDPH Volunteer (<i>Brent Anderson</i>)	4
	CDPH Marine Biotoxin Program	1
	SFSU, Romberg Tiburon Center	5
Contra Costa	CDPH Marine Biotoxin Program	1
Alameda	CDPH Volunteer (<i>Ariel Durant</i>)	4
	Exploratorium	3
San Francisco	CDPH Volunteer (<i>Eugenia McNaughton</i>)	3
	San Francisco Bay Whale Watching Company	2
San Mateo	Friends of the Sea Otter (<i>Diane Larsen</i>)	1
	The Marine Mammal Center (<i>Stan Jensen</i>)	4
	U.C. Santa Cruz	3
Santa Cruz	U.C. Santa Cruz	5
	Santa Cruz County Environmental Health Department	3
	San Lorenzo Valley High School	2
	California Department of Parks and Recreation	2
Monterey	Monterey Abalone Company	2
	CDPH Volunteer (<i>Jerry Norton</i>)	1
San Luis Obispo	Friends of the Sea Otter (<i>Kelly Cherry</i>)	4
	Morro Bay National Estuary Program	1
	Monterey Bay National Marine Sanctuary	2
	Tenera Environmental	3
	The Marine Mammal Center (<i>P.J. Webb, Tim Lytsell</i>)	4
Santa Barbara	Grassy Bar Oyster Company	4
	CDPH Volunteer (<i>Sylvia Short</i>)	5
	Santa Barbara Mariculture Company	6
	Sea Grant Extension Volunteer (<i>Jonathan Gonzales</i>)	4
	U.C. Santa Barbara	5
	National Park Service	1
Ventura	CDPH Volunteer (<i>Fred Burgess</i>)	3
	Ventura County Environmental Health Department	1
	National Park Service	3
	Channel Island National Marine Sactuary	1

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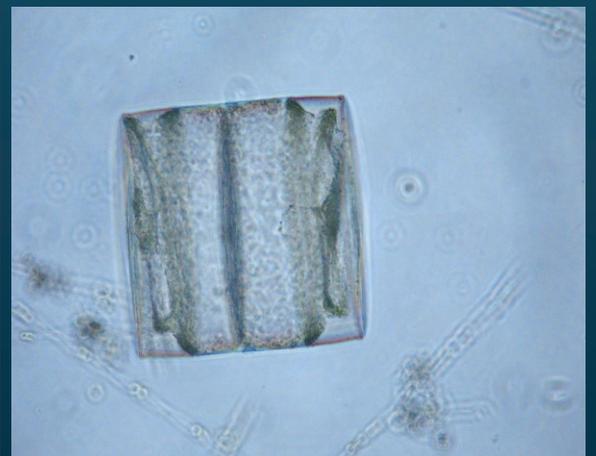
PHYTOPLANKTON GALLERY



The diatom *Odontella* was present in low numbers at some sites.



The chained diatom *Chaetoceros* remained common to abundant along much of the coast.



A large species of the centric diatom *Coscinodiscus* (viewed from the side of the cell).

A Look Back: PSP and Domoic Acid, June 2007

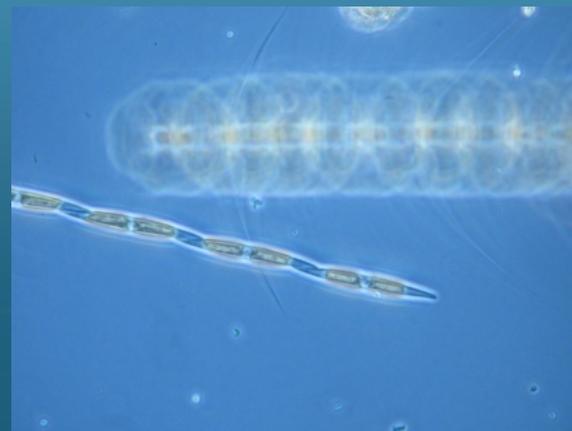
<p>Northern California Summary: <i>Paralytic Shellfish Poisoning</i></p> <p><i>Alexandrium</i> was observed at sites between Marin and Monterey counties in June 2007. <i>Alexandrium</i> continued to be observed in significant numbers as far offshore as the Farallone Islands. <i>Alexandrium</i> was observed in a sample collected just inside Tomales Bay (June 30, 2007).</p> <p>PSP toxins were detected in sentinel mussels from the Santa Cruz Pier during the second week of June through the end of the month. By the third week of June these toxins were detected in shellfish samples from San Francisco and Marin counties, with elevated levels in Drakes Bay (166 ug/100 g) and Drakes Estero (91 ug). PSP toxin concentrations reached 619 ug in Drakes Estero on June 21, 2007.</p> <p>Non-toxic Species</p> <p>Diatoms continued to dominate the phytoplankton assemblage. <i>Chaetoceros</i> was by far the most common diatom. <i>Skeletonema</i> and <i>Thalassiosira</i> continued to be common at many locations.</p>	<p>Southern California Summary: <i>Paralytic Shellfish Poisoning</i></p> <p><i>Alexandrium</i> was observed at a several sampling stations between San Luis Obispo and Santa Barbara counties, as well as in southern San Diego County, during June 2007.</p> <p>A low concentration of the PSP toxins was detected in sentinel mussels from Avila (San Luis Obispo County).</p> <p>Domoic Acid</p> <p><i>Pseudo-nitzschia</i> numbers declined in most areas of the Southern California coast. Domoic acid was not detected in any shellfish samples, although a low concentration of this toxin was detected in a sample of lobster viscera from Anacapa Island on June 28.</p> <p>Non-toxic Species</p> <p>Common diatoms included <i>Chaetoceros</i>, <i>Thalassiosira</i>, and <i>Skeletonema</i>. Common dinoflagellates included several species of the genus <i>Ceratium</i> and <i>Prorocentrum</i>.</p>
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Table 2 continued (from Page 6).

COUNTY	AGENCY	#
Los Angeles	Los Angeles County Sanitation District	4
	CDPH Volunteer (<i>Cal Parsons</i>)	2
	Southern California Marine Institute	1
	Tole Mour	4
Orange	California Department of Fish and Game	3
	Ocean Institute	1
San Diego	Carlsbad Aquafarms, Inc.	3
	Scripps Institute of Oceanography	4
	Tijuana River National Estuary Research Reserve	1

PHYTOPLANKTON GALLERY

June 2007 Observations:



Pseudo-nitzschia declined in numbers but remained common at many sampling locations.



The dinoflagellate *Dinophysis* was observed in low numbers at several locations.



The diatom *Odontella* (formerly *Biddulphia*) was present in a sample from Crescent City.