

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

March 2011

Technical Report No. 11-13

INTRODUCTION:

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

Low numbers of *Alexandrium* were detected at a number of sites between Santa Barbara and San Diego counties in March (Figure 1). This represents an increase in the distribution of this dinoflagellate compared to observations

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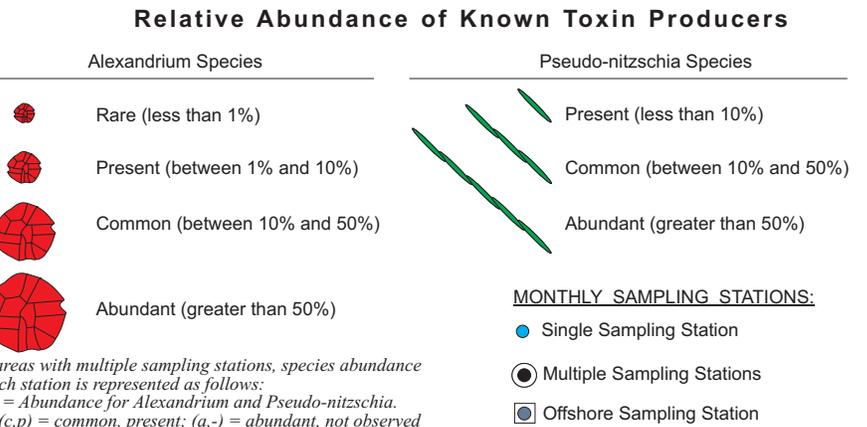
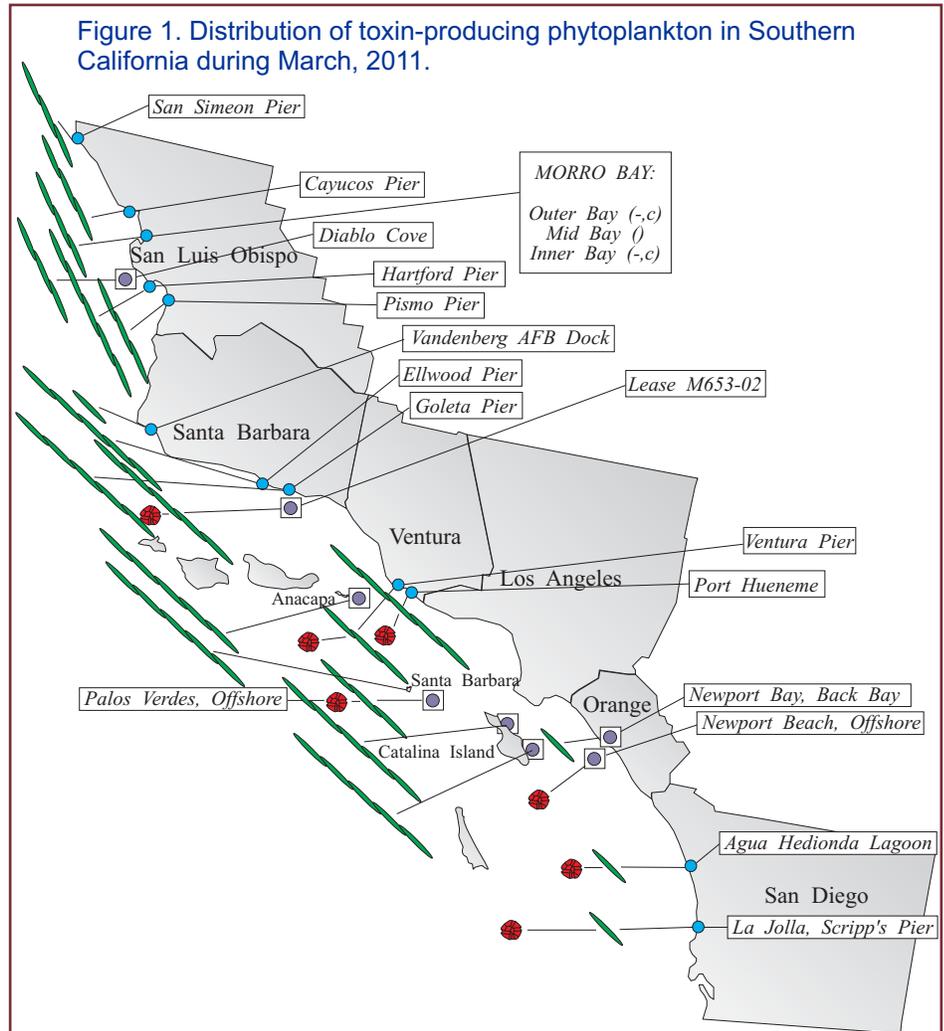
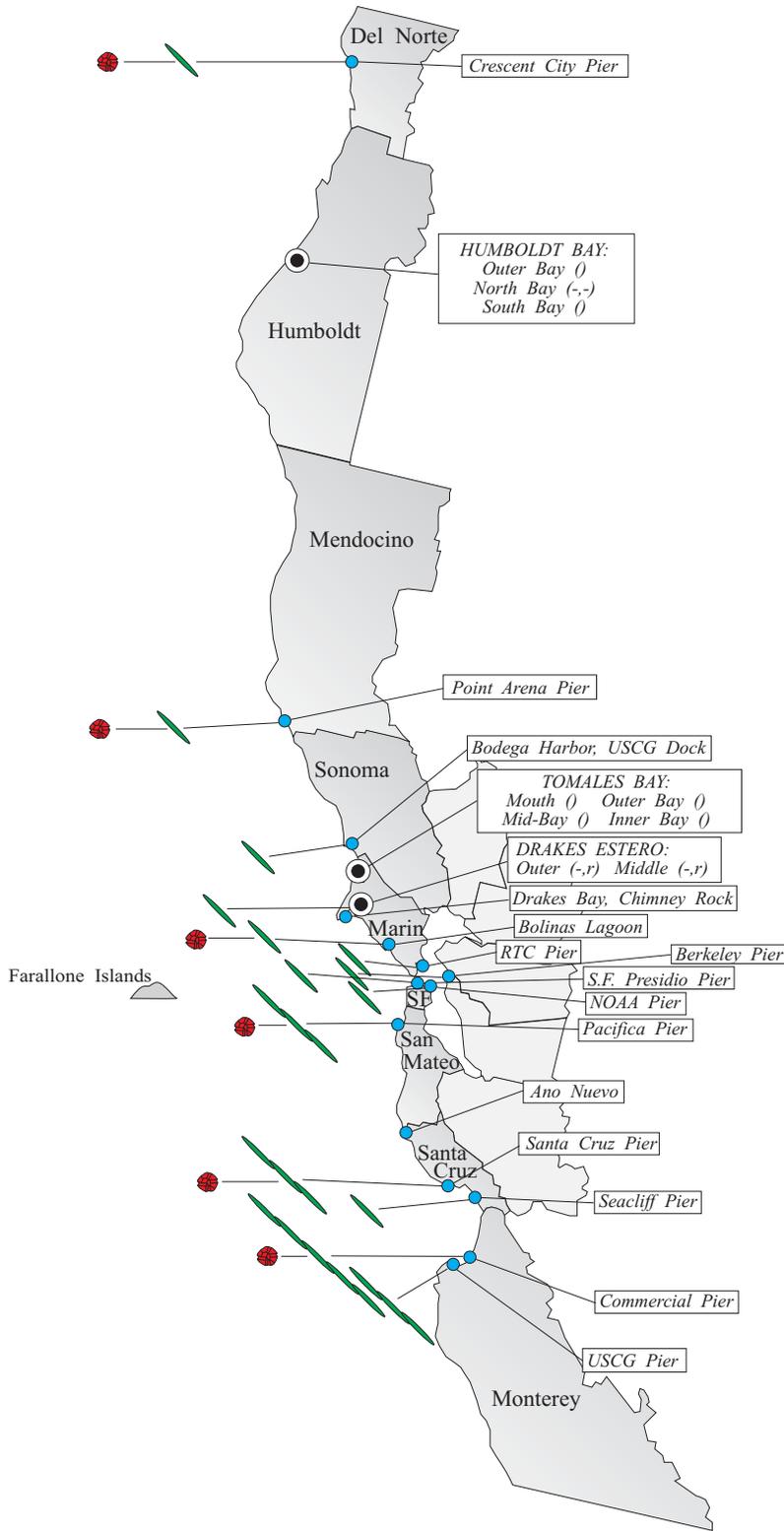


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during March, 2011.



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in February.

There was a sudden increase in PSP toxins in mussels from Ballona Creek (Los Angeles County) by the third week of the month, reaching 220 ug/100g. Lower concentrations of these toxins were also detected in shellfish samples from a number of sites between Los Angeles and San Diego counties (Figure 3).

Domoic Acid

Pseudo-nitzschia continued to be common at many sites along most of the southern California coast (Figure 1). The relative abundance of *Pseudo-nitzschia* decreased slightly at sites in San Luis Obispo but remained abundant at Santa Barbara sites and increased significantly along the Ventura coast. This diatom was also abundant offshore near Santa Barbara and Catalina islands.

Domoic acid was detected at numerous sites between San Luis Obispo and Ventura counties (Figure 3). Toxin levels exceeded the alert level throughout this range. The Santa Barbara region experienced the highest toxin concentrations throughout the month, reaching 127 ppm on March 22 in oysters from an offshore aquaculture lease. The California Department of Fish and Game and the CDPH Food and Drug Branch coordinated to collect a number of rock crab. Samples of rock crab viscera from offshore

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Relative Abundance of Known Toxin Producers

Alexandrium Species

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

Pseudo-nitzschia Species

- Present (between 1% and 10%)
- Common (between 10% and 50%)
- Abundant (greater than 50%)

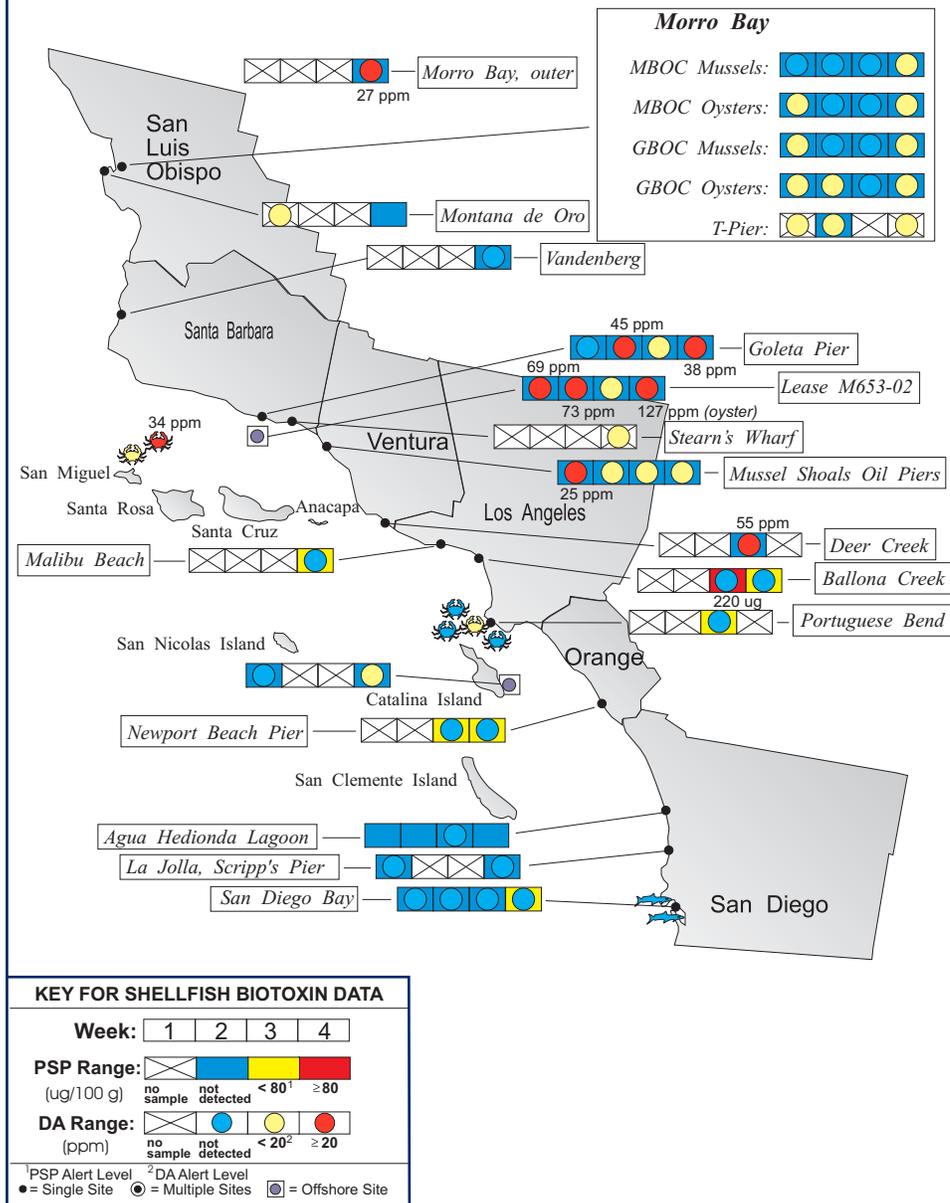
MONTHLY SAMPLING STATIONS:

- 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 March, 2011.



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near Santa Cruz Island contain moderate levels of domoic acid. Crab samples collected offshore of Palos Verdes were mostly nondetectable for this toxin.

Non-toxic Species

As in past months *Pseudo-nitzschia* dominated the phytoplankton assemblage, with few occurrences of other species in significant numbers. The diatom *Chaetoceros* was common in some samples collected throughout the southern California coast.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at sites in most northern California counties in March (Figure 2). The cell numbers were very low but the distribution in March represents an increase compared to observations in February. PSP toxins were not detected in any shellfish samples analyzed in March (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at sites along most northern California coastal counties (Figure 2). There was a significant increase in this diatom in Monterey Bay. The highest relative abundance was observed at the Santa Cruz Pier (March 16).

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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.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553 - 4133

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Low concentrations of domoic acid were detected in sentinel mussels from the Santa Cruz Pier during the last two weeks of the month. The highest concentration detected was 15 ppm (March 16).

Non-toxic Species

Diatoms were most numerous at a number of sites along the coast, particularly of sites along the coast, particularly *Chaetoceros*. The dinoflagellate *Ceratium tripos* was common inside Bolinas Lagoon, while *C. divaricatum* was common in Monterey Bay.



QUARANTINES:

The October 16 health advisory remained in effect through March, 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 2010 annual mussel quarantine ended at midnight on October 31, with the exception of the health advisory issued for the Channel Islands. When in effect, 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

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

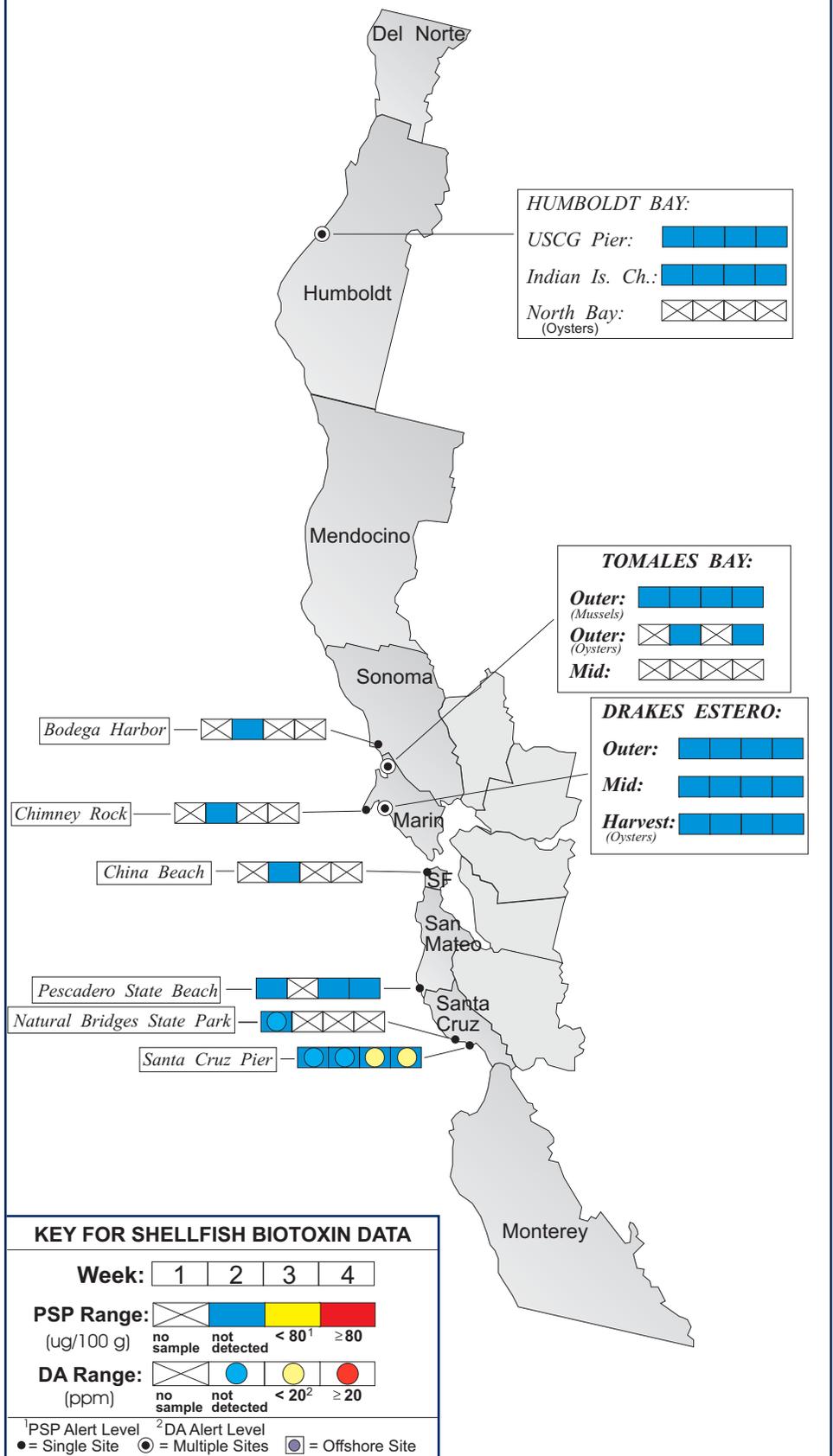


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during March, 2011.

COUNTY	AGENCY	#
Del Norte	None submitted (tsunami)	
Humboldt	Coast Seafood Company	8
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	1
Marin	Cove Mussel Company	0
	Drakes Bay Oyster Company	20
	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	3
Santa Cruz	U.C. Santa Cruz	5
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	12
	Morro Bay Oyster Company	12
	Cal Poly	4
	CDPH Marine Biotoxin Program	1
Santa Barbara	Santa Barbara Mariculture Company	9
	U.C. Santa Barbara	6
Ventura	Ventura County Environmental Health Department	2
	Coastal Marine Biolabs	4
Los Angeles	Los Angeles County Health Department	4
	Department of Fish and Game; Food and Drug Branch	3
Orange	Orange County Health Care Agency	2
San Diego	Carlsbad Aquafarms, Inc.	6
	Scripps Institute of Oceanography	2
	U.S. Navy Marine Mammal Program	5

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 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.



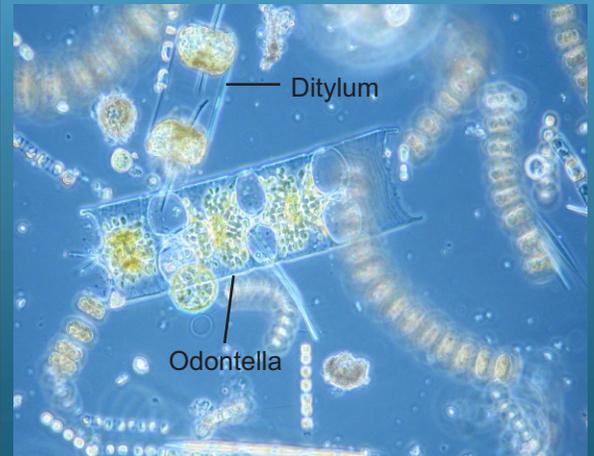
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 closures are implemented as needed to protect the public's health. In addition, routine coastal phytoplankton and biotoxin monitoring is maintained throughout the quarantine period. Special quarantines or health advisories may be issued for additional 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 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

Table 2. Phytoplankton samplers for March 2011.

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	5
Mendocino	CDPH Volunteer (<i>Marie De Santis</i>)	2
Sonoma	CDPH Volunteer (<i>Cathleen Cannon</i>)	1
	CDPH Marine Biotoxin Program	1
Marin	Drakes Bay Oyster Company	13
	CDPH Volunteer (<i>Brent Anderson</i>)	5
	CDPH Marine Biotoxin Program	1
	SFSU, Romberg Tiburon Center	4
Contra Costa	CDPH Volunteer (<i>Ariel Durant</i>)	1
Alameda	CDPH Volunteer (<i>Ariel Durant</i>)	3
San Francisco	CDPH Volunteer (<i>Eugenia McNaughton</i>)	3
	Exploratorium	4
	San Francisco Health Department	3
San Mateo	San Mateo County Environmental Health Department	3
	The Marine Mammal Center (<i>Stan Jensen</i>)	5
	CDPH Volunteer (<i>Diane Larsen</i>)	1
Santa Cruz	U.C. Santa Cruz	5
	Santa Cruz County Environmental Health Department	3
	San Lorenzo Valley High School	1
Monterey	Monterey Abalone Company	5
	CDPH Volunteer (<i>Jerry Norton</i>)	1
	Friends of the Sea Otter (<i>Jason Lupisan</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>Tim Lytsel, P.J. Webb</i>)	5
	CDPH Marine Biotoxin Program	1
Santa Barbara	CDPH Volunteer (<i>Sylvia Short</i>)	4
	Santa Barbara Mariculture Company	3
	Tole Mour (<i>Colorado Springs School, Fountain Valley School, Lyons High/Middle School</i>)	3
Ventura	CDPH Volunteer (<i>Fred Burgess</i>)	5
	Coastal Marine Biolabs	4
	National Park Service	2
	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Sanitation District	4
	CDPH Volunteer (<i>Cal Parsons</i>)	1
	Tole Mour (<i>Colorado Springs School, Fountain Valley School, Lyons High/Middle School, Redding Middle Sch.</i>)	9
Orange	California Department of Fish and Game	8
	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	4

PHYTOPLANKTON GALLERY



The diatom *Odontella* is rarely seen in high numbers in our samples.



Zooplankton like these copepods were prevalent in some areas as spring blooms provided plenty of food.



This beautiful species of *Ceratium* was observed offshore near Catalina Island. Note the chains of *Pseudo-nitzschia* in the background.