

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

May 2011

Technical Report No. 11-15

INTRODUCTION:

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

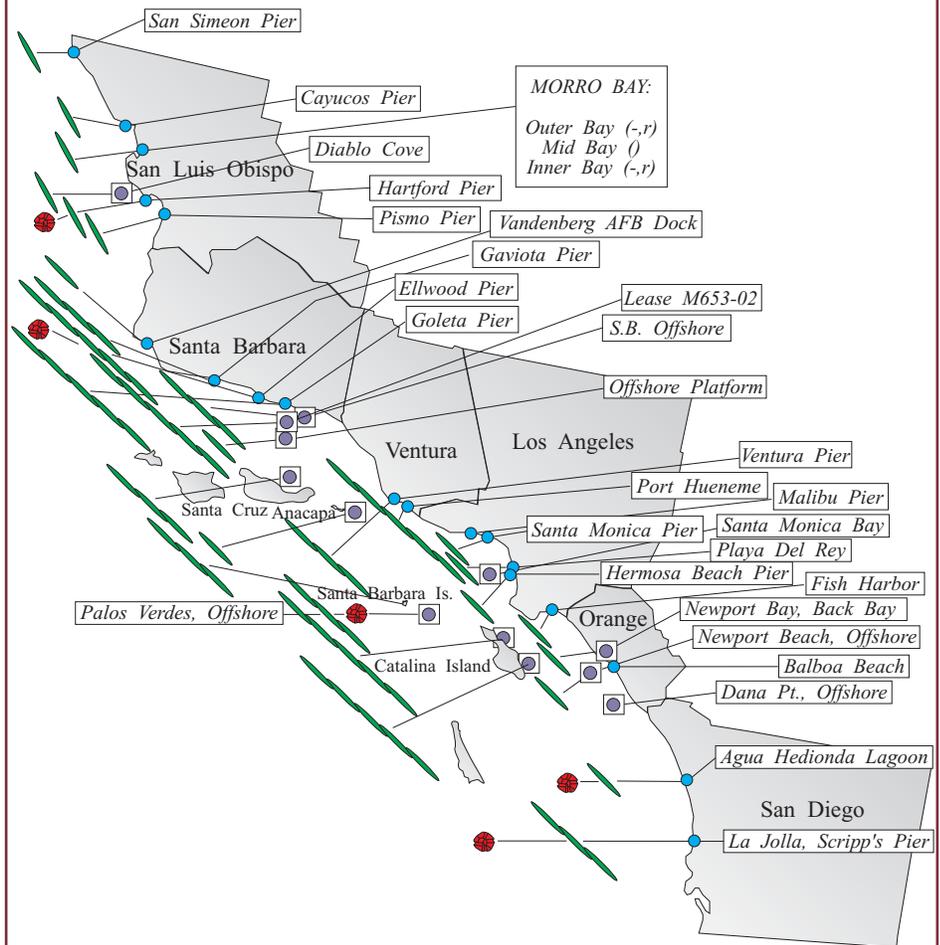
Paralytic Shellfish Poisoning

Low numbers of *Alexandrium* were detected at several of sites between San Luis Obispo and San Diego counties in May (Figure 1).

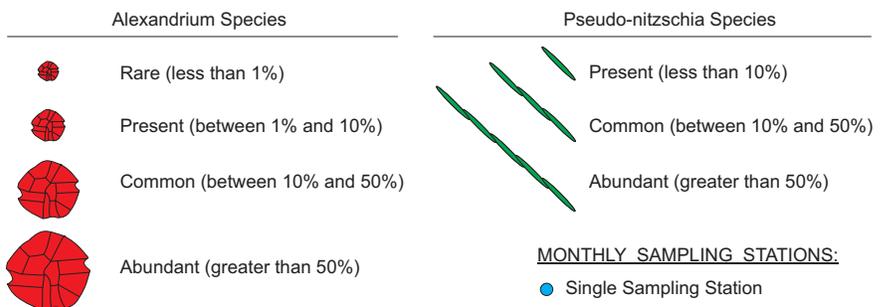
PSP toxins were not detected in shellfish samples collected in May (Figure 3).

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during May, 2011.



Relative Abundance of Known Toxin Producers

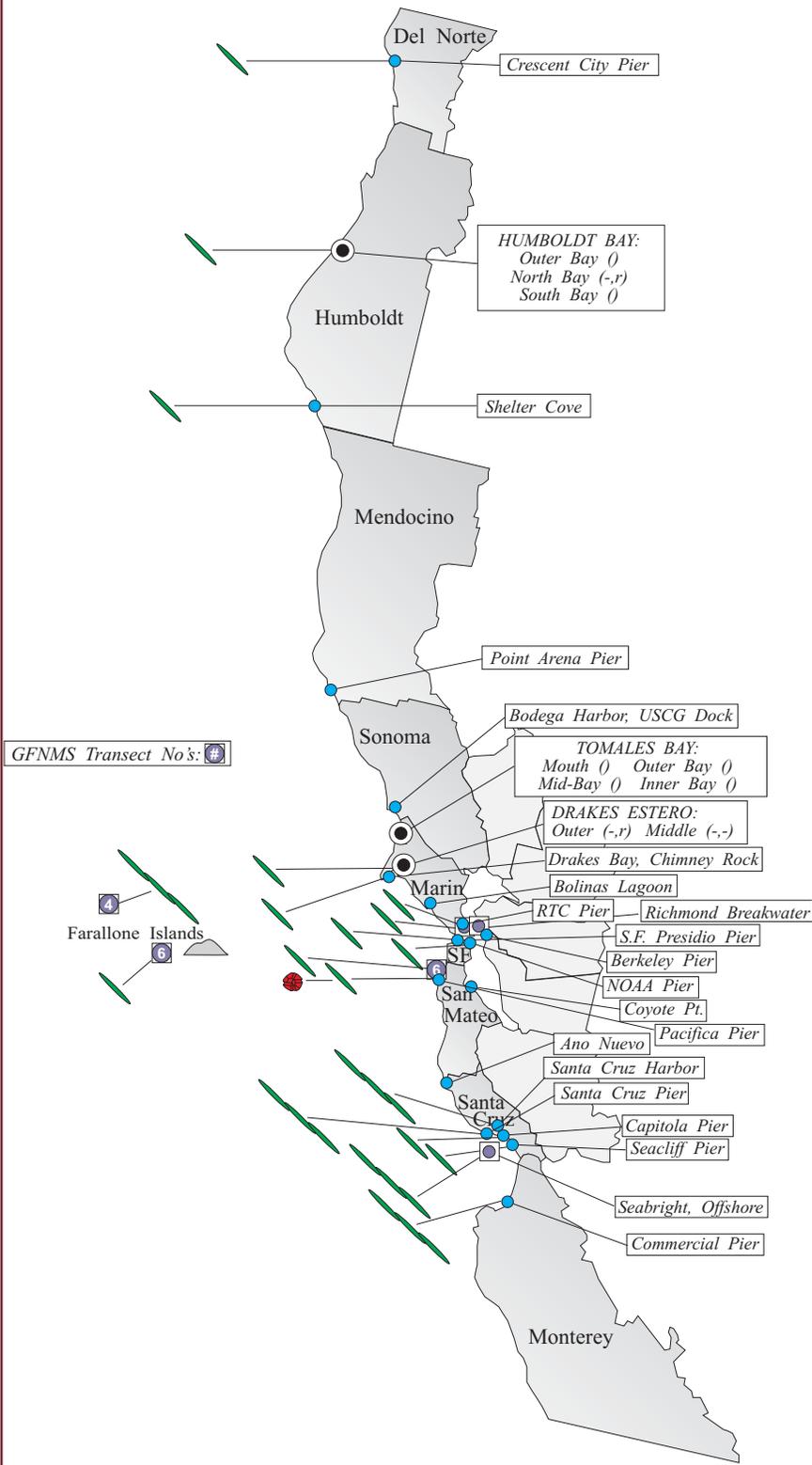


MONTHLY SAMPLING STATIONS:

- 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, 2011.



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Domoic Acid

Pseudo-nitzschia was observed along the entire southern California coast in May (Figure 1). The relative abundance of *Pseudo-nitzschia* decreased significantly at sites in San Luis Obispo and between Los Angeles and San Diego counties. This diatom also declined offshore near Santa Barbara and Anacapa islands and the nontoxic species of *Pseudo-nitzschia* was abundant near Catalina Island. The highest relative abundances of this diatom were observed at the Port Hueneme Pier, offshore of Palos Verdes, Goleta Pier, Ellwood Pier, and the aquaculture lease offshore of Santa Barbara.

Domoic acid was nondetectable during the first week of May following the earlier April decline. A low level of this toxin reoccurred in Santa Barbara on May 11 (Figure 3). During the last two weeks of the month moderate concentrations of domoic acid were detected in shellfish from several sites in Santa Barbara and Ventura counties.

Non-toxic Species

Diatoms dominated the southern California coast, with *Skeletonema*, and *Chaetoceros* common to abundant along the San Luis Obispo coast. *Guinardia*, *Rhizosolenia*, and *Lauderia* were prevalent between Santa Barbara and San Diego.

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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

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QUARANTINES:

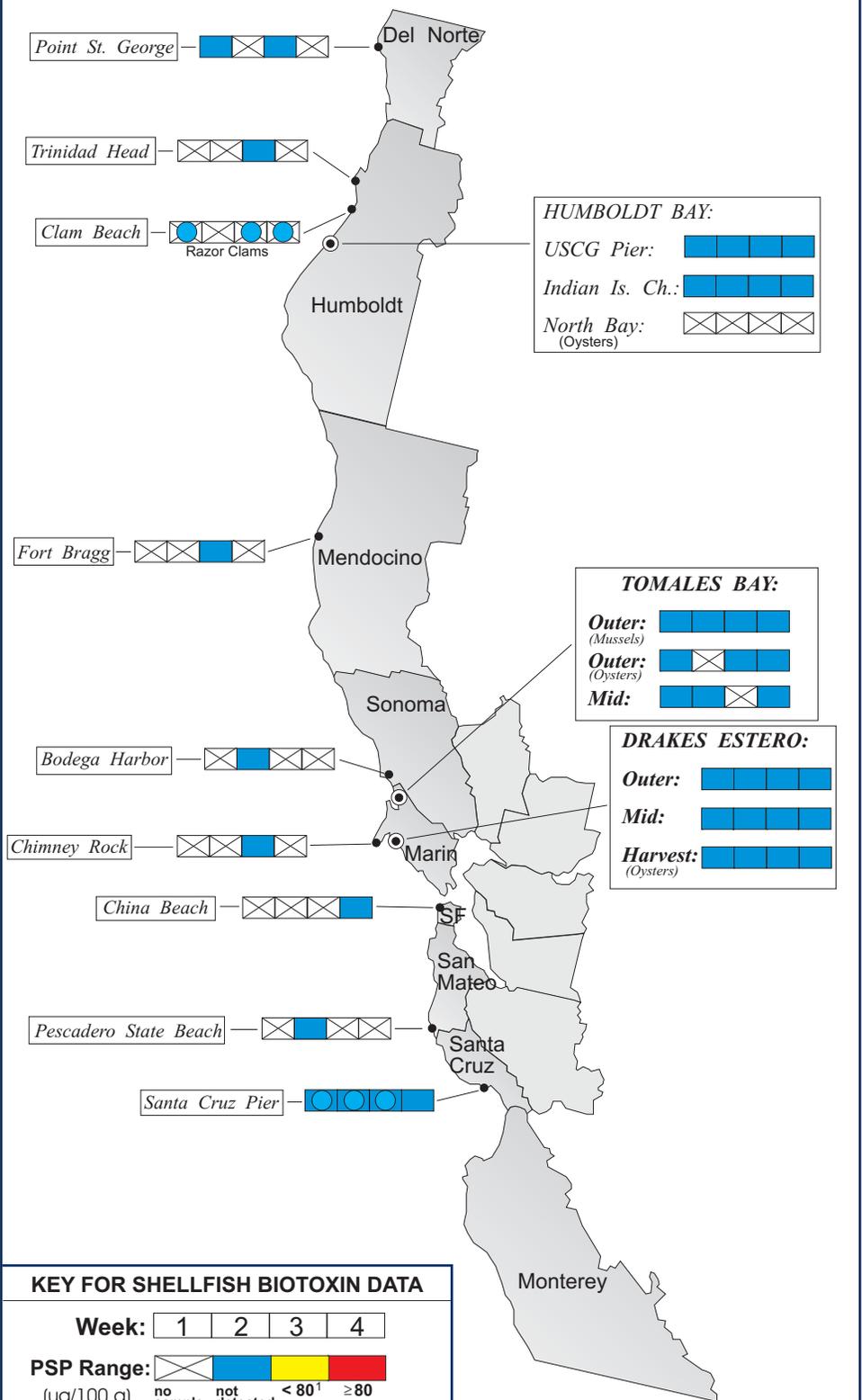
The October 16 health advisory remained in effect, warning consumers not to eat sport-harvested shellfish or the internal organs of crustaceans and small finfish from the Channel Islands. Elevated levels of domoic acid were first detected in the viscera of lobster in this region and subsequently in rock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

The 2011 annual mussel quarantine began early on March 29 rather than the usual May 1 date. The early start of the quarantine was 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 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

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



KEY FOR SHELLFISH BIOTOXIN DATA

Week: 1 2 3 4

PSP Range: [White][Blue][Yellow][Red]
 (ug/100 g) no sample not detected < 80¹ ≥ 80

DA Range: [White][Blue][Yellow][Red]
 (ppm) no sample not detected < 20² ≥ 20

¹PSP Alert Level ²DA Alert Level
 ● = Single Site ● = Multiple Sites ◐ = Offshore Site

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

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	9
	Humboldt County Environmental Health Department	1
	Humboldt State University	3
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	1
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	Marin Oyster Company	3
	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	4
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	9
	Morro Bay Oyster Company	5
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	4
Los Angeles	Los Angeles County Health Department	2
	CDPH Volunteer (<i>Cal Parsons</i>)	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	5
	U.S. Navy Marine Mammal Program	5

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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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.

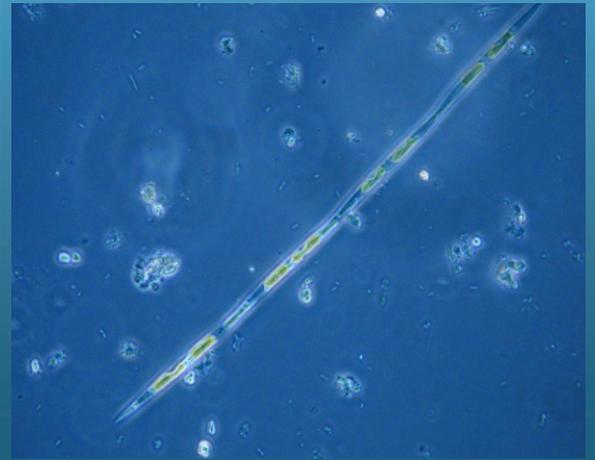
PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech

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

COUNTY	AGENCY	#
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	5
	Bureau of Land Management	1
Mendocino	CDPH Volunteer (<i>Marie De Santis</i>)	1
Sonoma	CDPH Marine Biotoxin Program	1
Marin	Drakes Bay Oyster Company	12
	CDPH Volunteer (<i>Brent Anderson</i>)	5
	CDPH Marine Biotoxin Program	1
	SFSU, Romberg Tiburon Center	4
Contra Costa	CDPH Marine Biotoxin Program	1
Alameda	None Submitted	
San Francisco	CDPH Volunteer (<i>Eugenia McNaughton</i>)	4
	Exploratorium	3
	San Francisco Bay Whale Watching Company	1
San Mateo	San Mateo County Environmental Health Department	1
	Friends of the Sea Otter (<i>Diane Larsen</i>)	1
	The Marine Mammal Center (<i>Stan Jensen</i>)	5
	U.C. Santa Cruz	2
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	3
	The Marine Mammal Center (<i>Nancy Scarborough</i>)	1
	San Lorenzo Valley High School	1
	California Department of Parks and Recreation	2
Monterey	Monterey Abalone Company	5
	CDPH Volunteer (<i>Jerry Norton</i>)	1
San Luis Obispo	Friends of the Sea Otter (<i>Kelly Cherry</i>)	5
	Morro Bay National Estuary Program	1
	Monterey Bay National Marine Sanctuary	1
	Tenera Environmental	2
	The Marine Mammal Center (<i>P.J. Webb, Tim Lytsell</i>)	6
	Morro Bay Oyster Company	1
	Grassy Bar Oyster Company	1
	CDPH Marine Biotoxin Program	1

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PHYTOPLANKTON GALLERY



Low numbers of Pseudo-nitzschia were observed inside San Diego Bay.



Skeletonema and a variety of other diatoms (and a few dinoflagellates) were common in May.



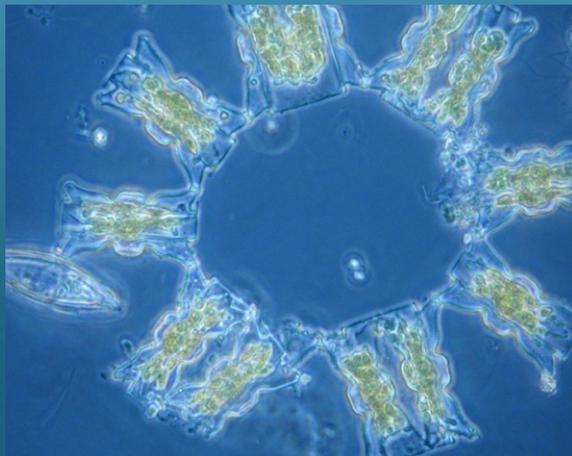
A side view of a centric diatom (most of the chloroplasts are absent).

A Look Back: This time last year (May 2010)

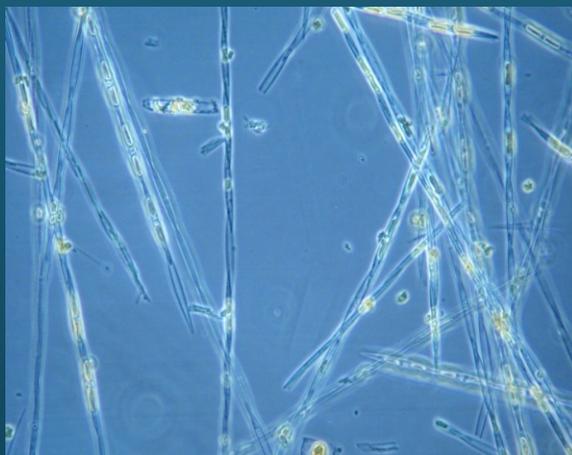
<p>Northern California Summary: <i>Paralytic Shellfish Poisoning</i></p> <p>In May 2010 <i>Alexandrium</i> was observed at a number of sampling locations. Low concentrations of PSP toxins were detected in sentinel mussels from Humboldt Bay and farther up the coast at Trinidad Head.</p> <p>Domoic Acid</p> <p><i>Pseudo-nitzschia</i> was observed at most sampling locations in May 2010. Low levels of domoic acid were detected in sentinel mussels from the Santa Cruz Pier during the last two weeks of May.</p>	<p>Southern California Summary: <i>Paralytic Shellfish Poisoning</i></p> <p>Low numbers of <i>Alexandrium</i> were detected at sites in San Luis Obispo, Santa Barbara, and San Diego counties in May 2010. PSP toxins were not detected in any shellfish samples collected during the month.</p> <p>Domoic Acid</p> <p><i>Pseudo-nitzschia</i> was detected along the entire coast during May 2010. Domoic acid was detected in shellfish samples from offshore of Santa Barbara, reaching 40 ppm on May 25.</p>
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PHYTOPLANKTON GALLERY

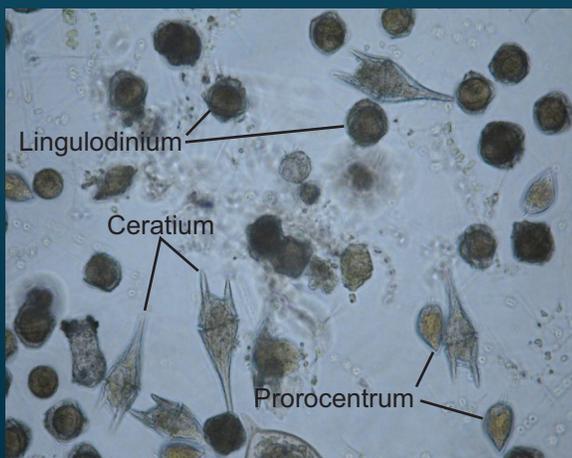
May 2010 Observations:



An unusual circular chain of the diatom *Odontella*.



Pseudo-nitzschia was common to abundant at a number of sites in May.



Despite the predominance of diatoms in May, there were areas where dinoflagellates were common.

Table 2 continued (from Page 6).

Santa Barbara	CDPH Volunteer (<i>Sylvia Short</i>)	5
	Santa Barbara Mariculture Company	5
	Tole Mour (<i>Ken Caryl Middle School</i>)	1
	CDPH Marine Biotxin Program	2
	U.C. Santa Barbara	5
	Vandenberg AFB	2
	National Park Service	1
Ventura	CDPH Volunteer (<i>Fred Burgess</i>)	5
	Ventura County Environmental Health Department	2
	National Park Service	1
Los Angeles	Los Angeles County Sanitation District	4
	Los Angeles County Health Department	1
	Cit of Los Angeles Environmental Monitoring Division	3
	CDPH Volunteer (<i>Cal Parsons</i>)	1
	Southern California Marine Institute	1
	Catalina Island Marine Institute	1
	Tole Mour (<i>Ken Caryl Middle School</i>)	9
Orange	California Department of Fish and Game	3
	Orange County Health Care Agency	1
	Ocean Institute	1
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	5