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

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

September 2008

Technical Report No. 08-26

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of September, 2008. 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 several sampling stations during September (Figure 1). This dinoflagellate was observed in very low numbers at sites in San Luis Obispo, Ventura, and Orange counties. Although this

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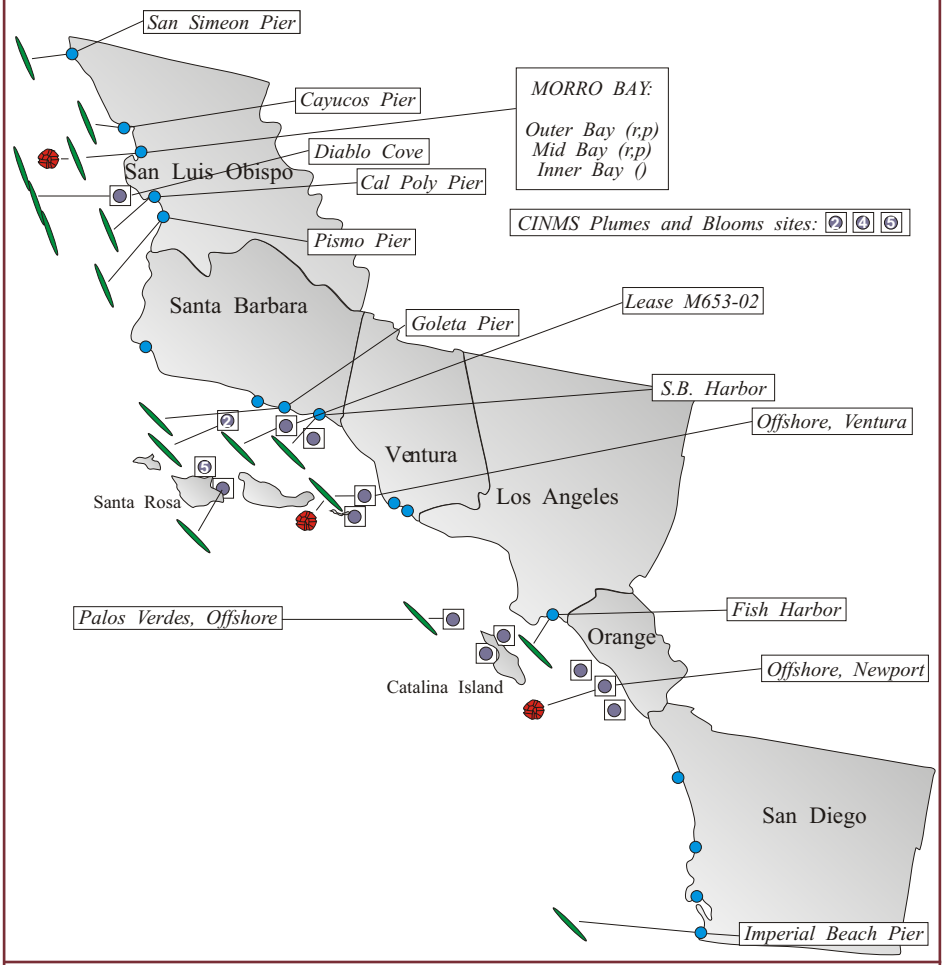
Figure 1. Distribution of toxin-producing phytoplankton in Southern California during September, 2008.



Relative Abundance of Known Toxin Producers

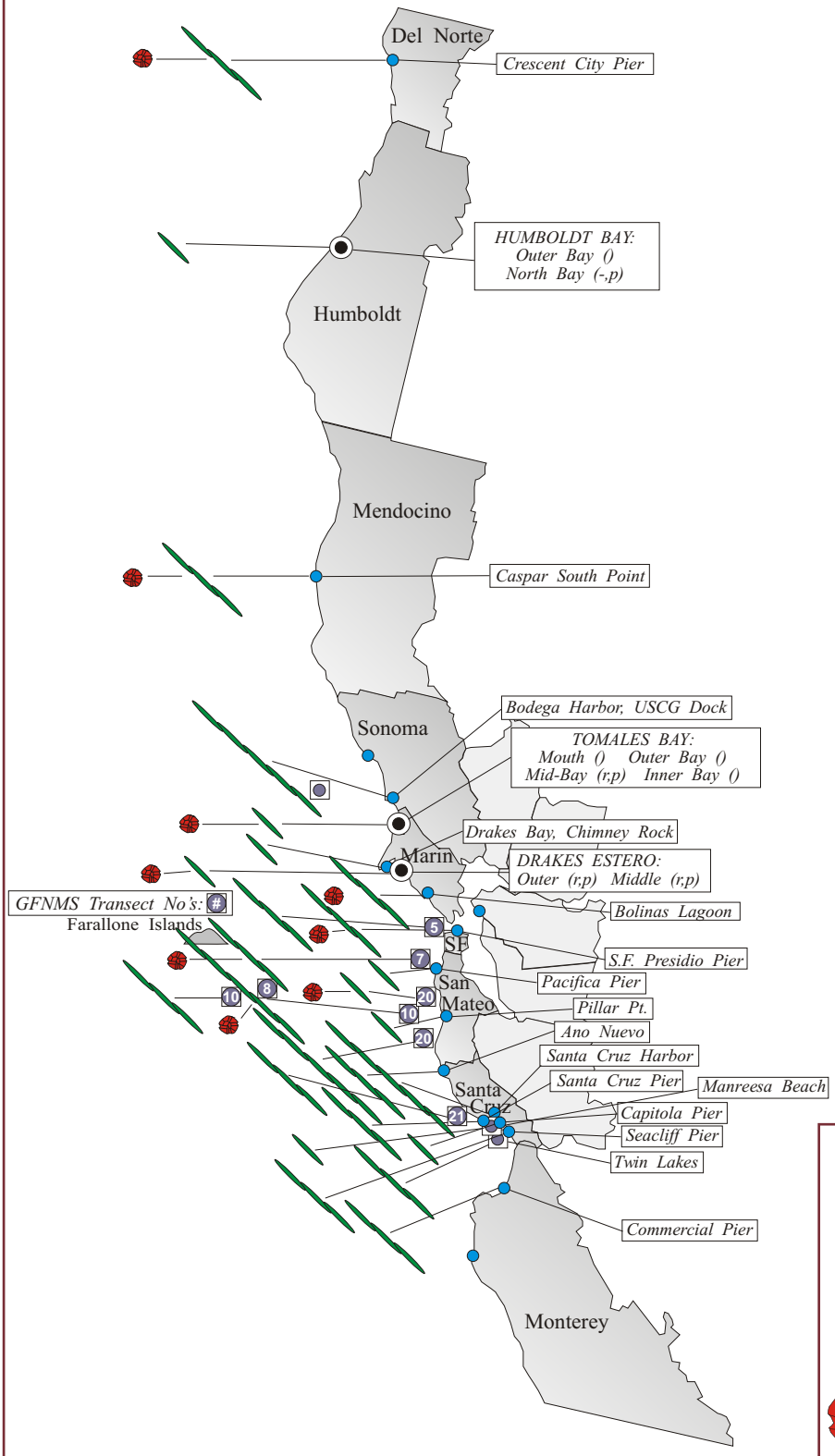
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

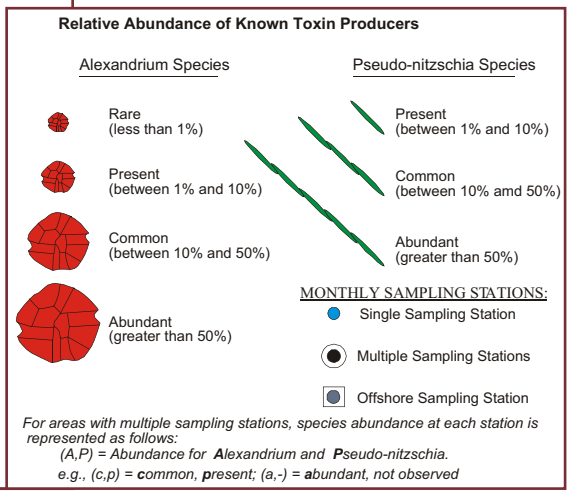
For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for Alexandrium and Pseudo-nitzschia.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during September, 2008.





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distribution was more widespread than observations in August, the relative abundance was very low at all sites. PSP toxins were not detected in any shellfish samples collected in September (Figure 3).

Domoic Acid

Pseudo-nitzschia was detected at numerous sites between San Luis Obispo and San Diego counties (Figure 1). The distribution of this diatom was similar to observations in August but the relative abundance decreased significantly in most areas. Both the "seriata" and "delicatissima" complexes of *Pseudo-nitzschia* were observed, the former representing the known toxic species and the latter including those species not currently known to produce toxin. Domoic acid was not detected in any shellfish samples collected along the southern California coast in September; a sample of lobster viscera collected from the Ventura Harbor breakwater on September 27 contained a low concentration (3 ppm) of this toxin (Figure 3).

Non-toxic Species

As observed in August, the southern California coast was dominated by dinoflagellates. *Prorocentrum* was the most abundant genera observed, with *Cochlodinium* and *Ceratium* also common at

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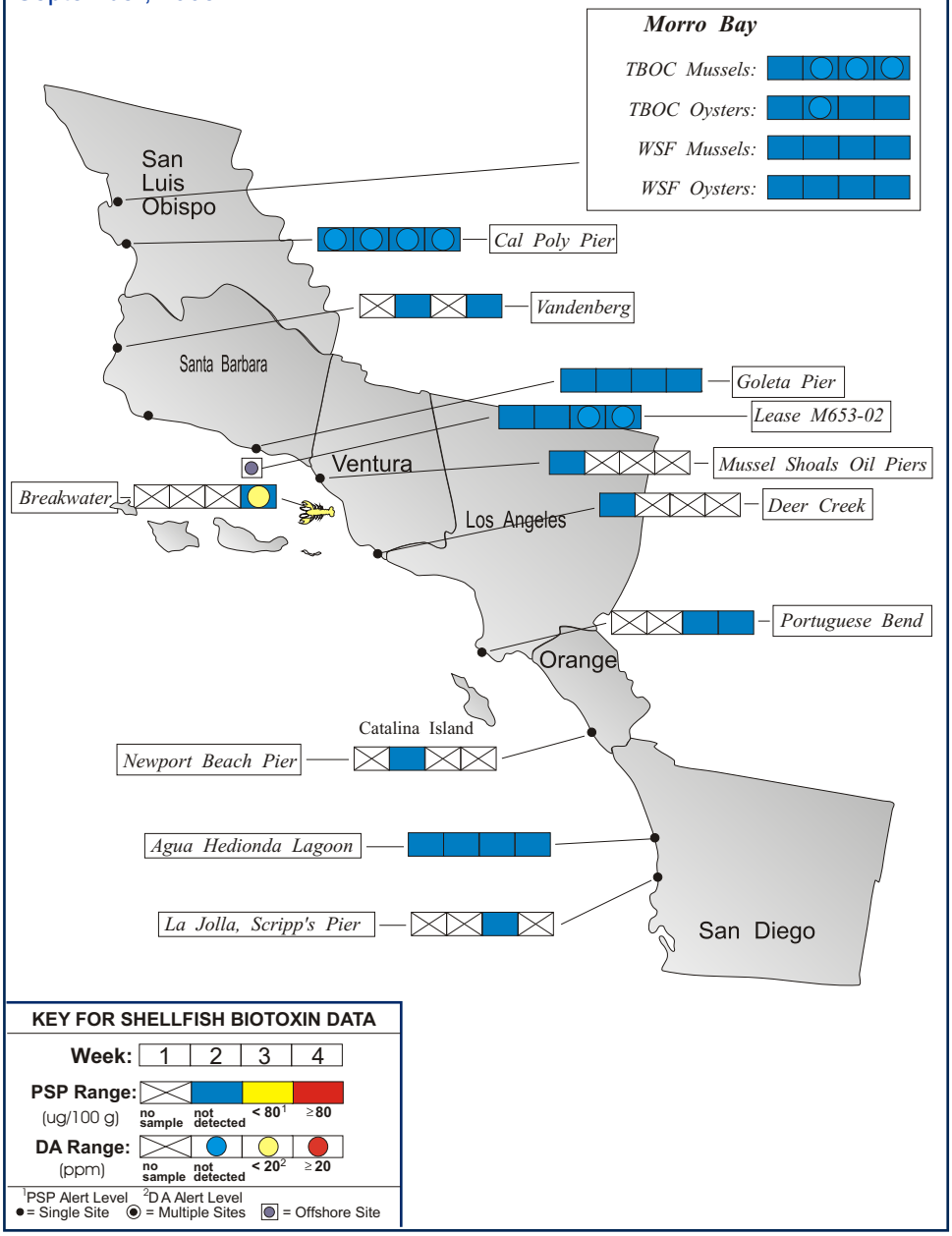
Figure 3. Distribution of shellfish biotoxins in Southern California during September, 2008.



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some locations.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several northern California sampling sites in September (Figure 2). This dinoflagellate was mostly observed at sites between Sonoma and San Mateo counties, as well as farther north in Del Norte County. This distribution is slightly reduced from observations during the previous month.

The elevated levels of PSP toxins in Drakes Estero that began in August continued through the first half of September. PSP toxicity reached 105 ug/100g in the outer Estero by September 9 and 99 ug in the mid-Estero by September 16th. Low levels of these toxins were also detected in Tomales Bay (Marin County), Bodega Harbor (Sonoma County), and in outer Humboldt Bay and along the Humboldt coast at Trinidad (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed along most of the northern California coast during September (Figure 2). The distribution and relative abundance was similar to observations in August, although the overall

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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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numbers of this diatom decreased significantly throughout the month. A mix of the seriata and delicatissima complexes of this diatom were observed, with the latter predominating at most sites. The predominance of the non-toxic complex may account for the overall lack of toxin in shellfish samples despite relatively high abundances of *Pseudo-nitzschia*. Mussels from Bodega Harbor contained a low level (5 ppm) of domoic acid on September 2, which declined below the detection limit by the next week.

Non-toxic Species

The phytoplankton assemblage along the northern California coast continued to be dominated by diatoms for most of the month. The most common genera observed were *Thalassiosira, Ditylum,* and *Skeletonema*. The dinoflagellates *Prorocentrum* and *Ceratium* were common towards the end of the month at various sites between Marin and Santa Cruz counties.

QUARANTINES:

The annual mussel quarantine went into effect on May 1. The annual quarantine applies specifically to sport-harvested mussels and is in effect for the entire California coastline, including all bays and estuaries. Routine phytoplankton and biotoxin monitoring is maintained throughout the year, not just within the quarantine period. This allows the detection of unexpected increases in biotoxin activity outside of the routine quarantine period. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively. All

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Figure 4. Distribution of shellfish biotoxins in Northern California during September, 2008.

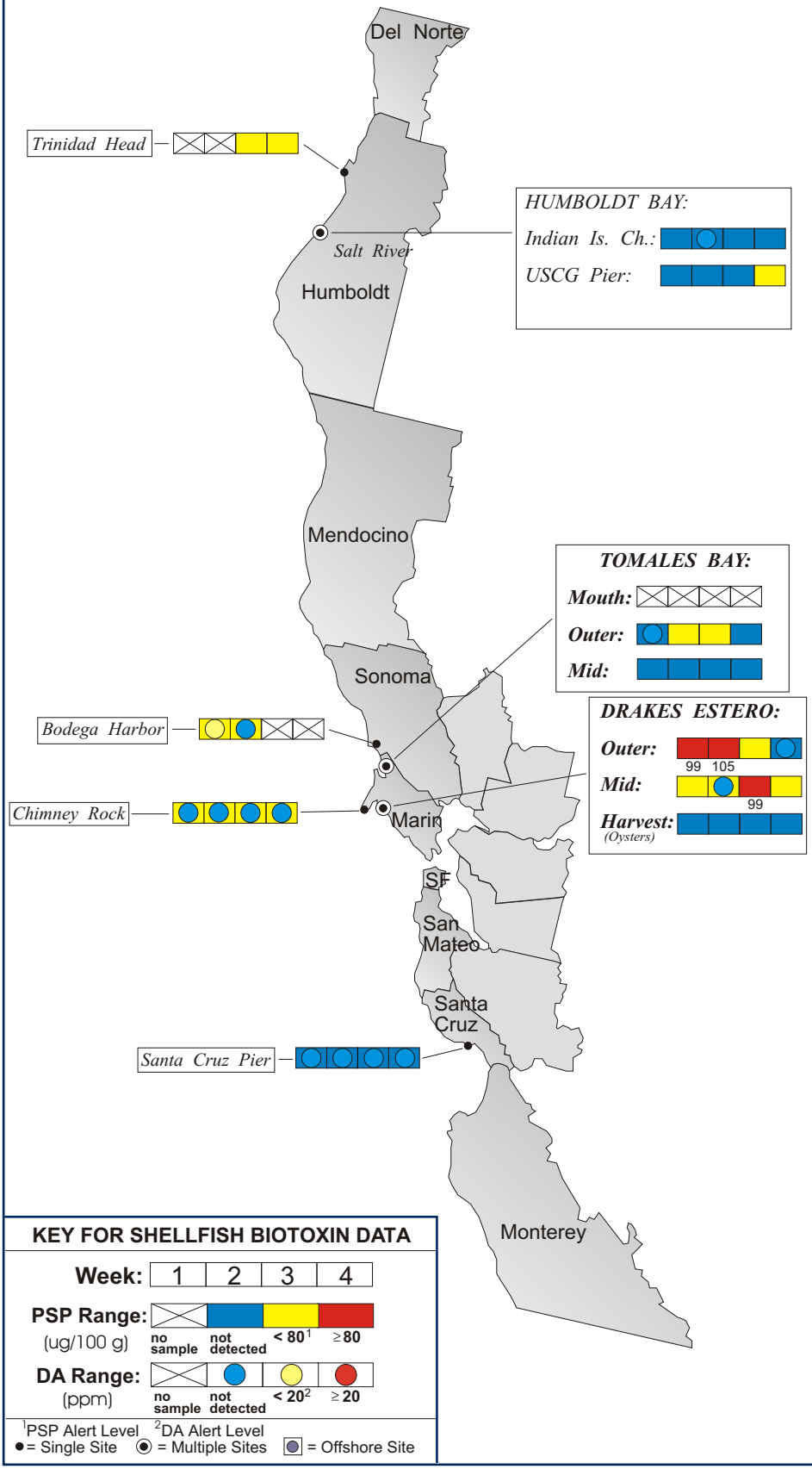


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during September, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	7
	Humboldt County Environmental Health Department	2
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Monitoring Program	2
Marin	Cove Mussel Company	5
	Drakes Bay Oyster Company	36
	Hog Island Oyster Company	4
	Marin Oyster Company	5
	CDPH Marine Biotoxin Monitoring Program	10
San Francisco	None Submitted	
San Mateo	None Submitted	
Santa Cruz	U.C. Santa Cruz	4
Monterey	None Submitted	
San Luis Obispo	Cal Poly	5
	Tomales Bay Oyster Company	8
	Williams Shellfish Farms	10
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
Ventura	Ventura County Environmental Health Department	2
	CDPH Volunteer (*Bill Weinerth*)	1
Los Angeles	Los Angeles County Health Department	2
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	5
	Scripps Institute of Oceanography	1

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.

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 this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies.

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.

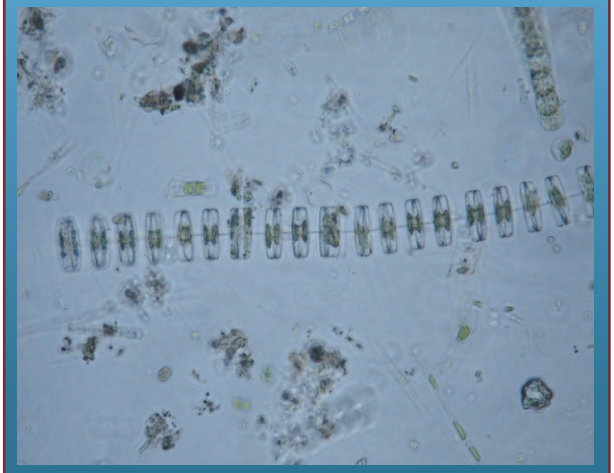
Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, 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. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

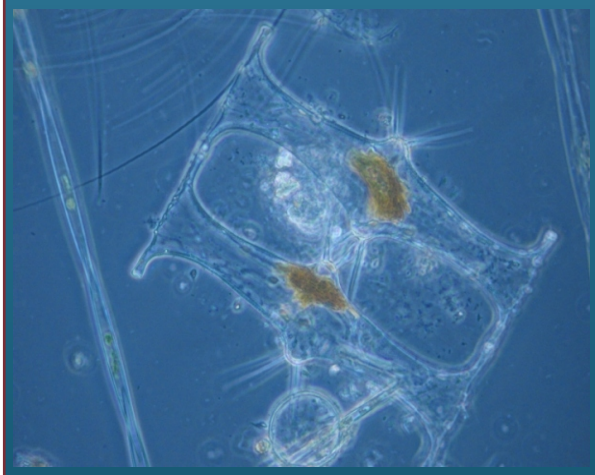
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during September, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	5
	California Department of Fish and Game	3
Mendocino	California Department of Fish and Game	1
Sonoma	California Department of Fish and Game	1
	CDPH Volunteer (*Cathleen Cannon*)	1
	CDPH Marine Biotoxin Program	2
	Cordell Banks National Marine Sanctuary	1
Marin	CDPH Volunteers (*Brent Anderson, Richard Plant)*	6
	Drakes Bay Oyster Company	18
	CDPH Marine Biotoxin Program	5
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	2
	Gulf of the Farallones National Marine Sanctuary	2
	San Francisco Health Department	2
San Mateo	CDPH Volunteer (*Kathleen Abadie*)	1
	San Mateo County Environmental Health Dept.	1
	The Marine Mammal Center (*Stan Jensen*)	3
	Gulf of the Farallones National Marine Sanctuary	6
	U.C. Santa Cruz	2
Santa Cruz	Gulf of the Farallones National Marine Sanctuary	1
	California Department of Parks and Recreation	1
	San Lorenzo Valley High School	2
	Santa Cruz County Environmental Health Dept.	3
	U.C. Santa Cruz	4
	The Marine Mammal Center (*Nancy Scarborough*)	1
Monterey	Marine Pollution Studies Laboratory	1
	Monterey Abalone Company	3
San Luis Obispo	CDPH Volunteer (*Renee and Auburn Atkins*)	3
	Cal Poly	13
	Monterey Bay National Marine Sanctuary	1
	Morro Bay National Estuary Program	1
	Tenera Environmental	3
	The Marine Mammal Center (*Tim Lytsell*)	7
	Tomales Bay Oyster Company	4
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	2
	National Park Service	1
	Santa Barbara City College	1
	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	4
	Channel Islands National Marine Sanctuary	3
	Vandenberg AFB	2
Ventura	CDPH Volunteer (Fred Burgess)	1
	Channel Islands National Marine Sanctuary	2
	National Park Service	2
	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Sanitation District	2
	Southern California Marine Institute	1
	Guided Discoveries, Tole Mour	3
	Catalina Island Marine Institute	2
Orange	Orange County Health Care Agency	1
San Diego	Avian Research Associates	3
	Scripps Institute of Oceanography	5

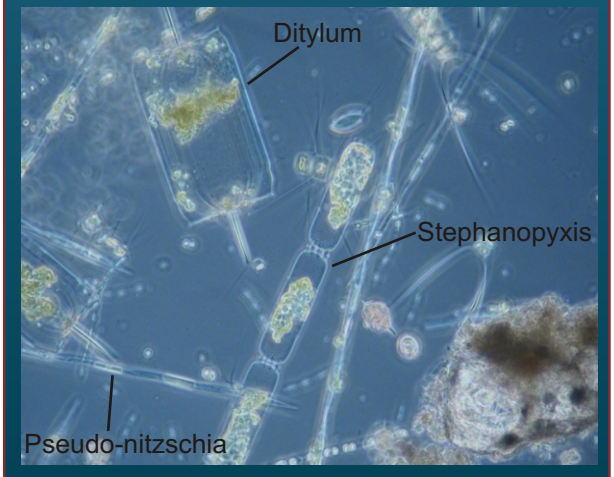
PHYTOPLANKTON GALLERY



The chain-forming, centric diatom Thalassiosira is a common member of the north coast phytoplankton assemblage.



Odontella was observed at a number of locations in northern California.



This assemblage of diatoms is typical of our observations in central and northern California over the past several months.