

Monthly Marine Biotoxin Report August 2009

Technical Report No. 09-23

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of August, 2009. 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.

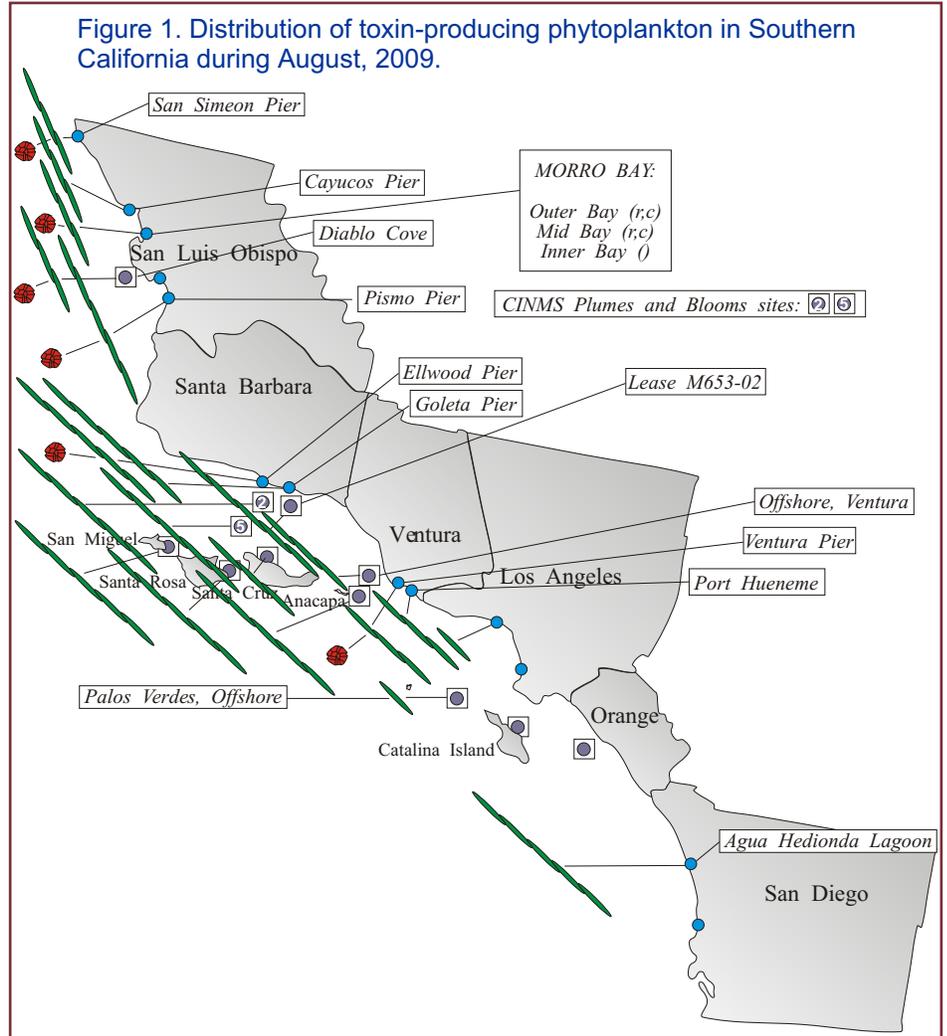
Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All 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 locations between San Luis Obispo and Ventura counties during August (Figure 1). The greatest frequency of occurrence of this dinoflagellate was at sites in San Luis Obispo

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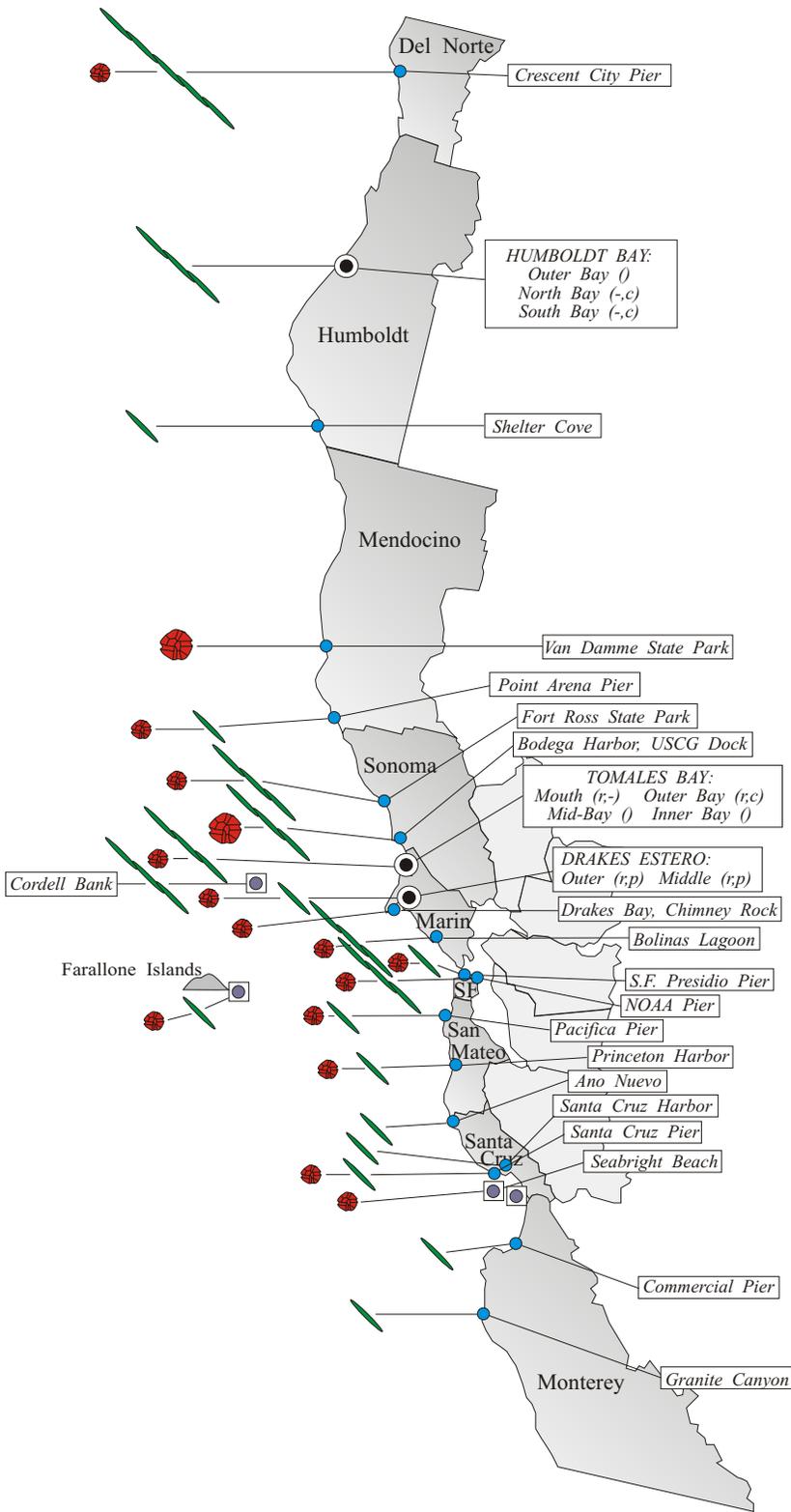


Relative Abundance of Known Toxin Producers

Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%) Present (between 1% and 10%) Common (between 10% and 50%) Abundant (greater than 50%)	Present (less than 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 2. Distribution of toxin-producing phytoplankton in Northern California during August, 2009.



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County, although cell numbers were quite low everywhere. PSP toxins were not detected in any shellfish samples collected in August.

Domoic Acid

Pseudo-nitzschia was detected along the entire southern California coast during August (Figure 1). There was an increase in the abundance of this diatom at a number of sites, particularly along the San Luis Obispo coast. As noted the past two months, there was a proportionally higher number of the nontoxic *Pseudo-nitzschia* species in the delicatissima complex. The toxic species in the seriata complex were common at a number of locations but remained less numerous than the nontoxic species. Also as previously noted, these distinctions should be considered tentative given the difficulty in identifying species of this diatom with light microscopy. Cell densities were relatively low at most sites, with the highest relative abundance observed in a sample collected near San Miguel Island. Domoic acid was not detected in any shellfish samples collected in August (Figure 3).

Non-toxic Species

Diatoms remained dominant along the southern California coast between San Luis Obispo and Ventura counties. *Chaetoceros* was abundant throughout this region. The

(Continued on Page 3)

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%)

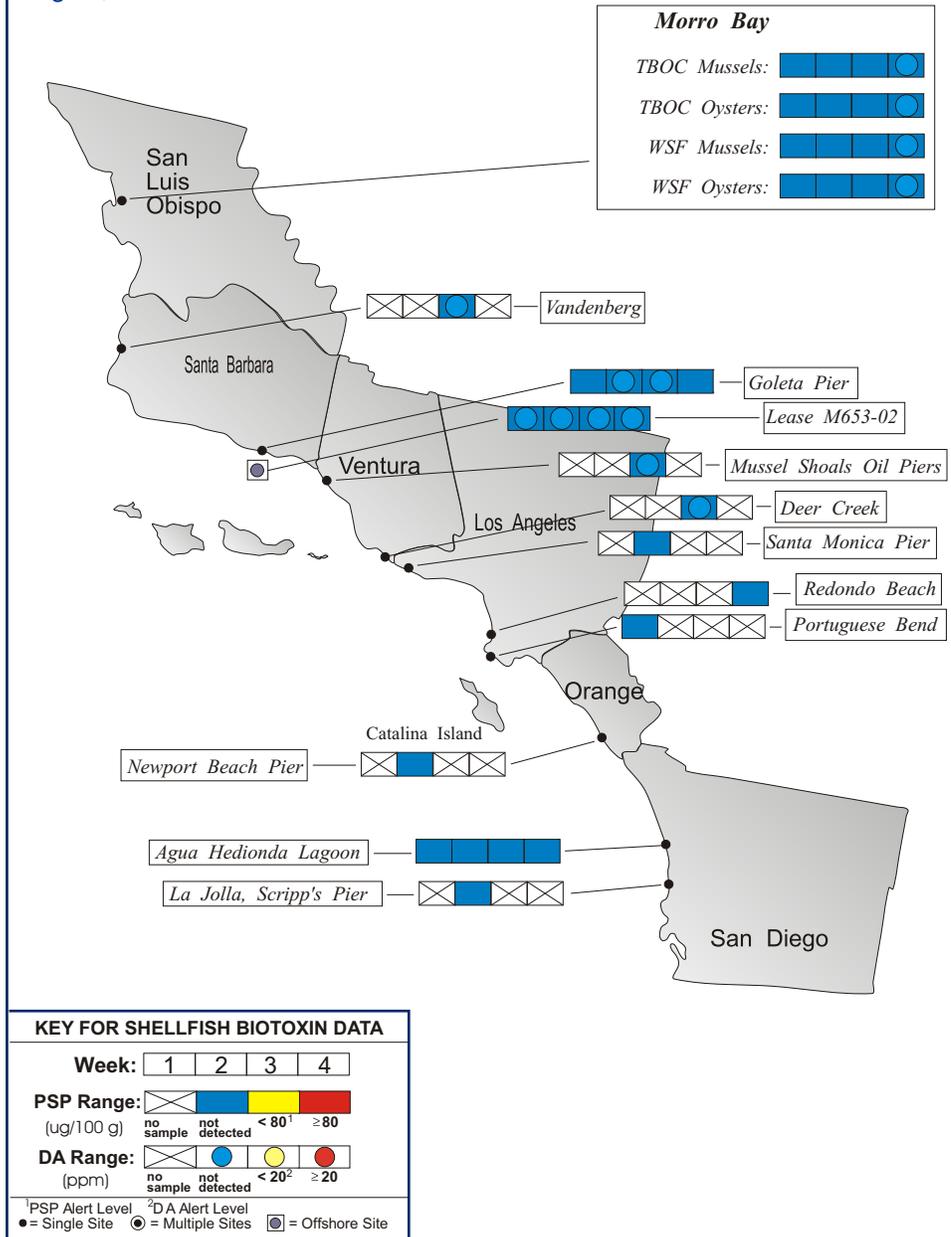
MONTHLY SAMPLING STATIONS:

- 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 August, 2009.



(Continued from Page 2)

dinoflagellate *Prorocentrum* was common at sites in Santa Barbara, Ventura and San Diego counties. *Ceratium spp.* and *Lingulodinium* were common at several sites along the Los Angeles coast.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at most locations between Del Norte and Santa Cruz counties in August (Figure 2). The highest relative abundance was observed in a sample from Van Damme State Park in Mendocino County (August 19).

The low levels of PSP toxins detected in shellfish samples during the latter half of July persisted into August. By the second week of the month a sample from Anchor Bay (Mendocino County) was found to contain PSP toxins above the alert level of 80 ug/100 g (147 ug/100 g, August 10). By the third week of August there were alert levels of the PSP toxins at sites in Sonoma and Marin counties, persisting through the end of the month. Toxin concentrations exceeded 600 ug/100 g in sentinel mussels from Bodega Harbor and Drakes Estero, reaching a maximum of 966 ug/100 g in the mid-Estero on August 20. PSP toxicity increased from below the alert level to well

(Continued on Page 4)

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)

above within one day (46 ug on August 18 and 432 ug on August 19, respectively). In a rare occurrence, these toxins were detected inside Tomales Bay throughout the month, exceeding the alert level by August 23. Elevated levels of the PSP toxins have not been detected inside Tomales Bay since 2002.

Domoic Acid

Pseudo-nitzschia was observed at several sites in August (Figure 2). Both the seriata and delicatissima complexes were represented, with the latter most numerous in samples from Crescent City, Humboldt Bay, and Cordell Bank. Domoic acid was not detected in any shellfish samples collected in August.

Non-toxic Species

Diatoms continued to dominate much of the northern California coast, although dinoflagellates became common at a number of locations between Marin and San Mateo counties. Red tides and bioluminescence, relatively rare in northern California, were reported from a number of locations. *Ceratium spp.* and *Gonyaulax spinifera* were the most common dinoflagellates in these areas.

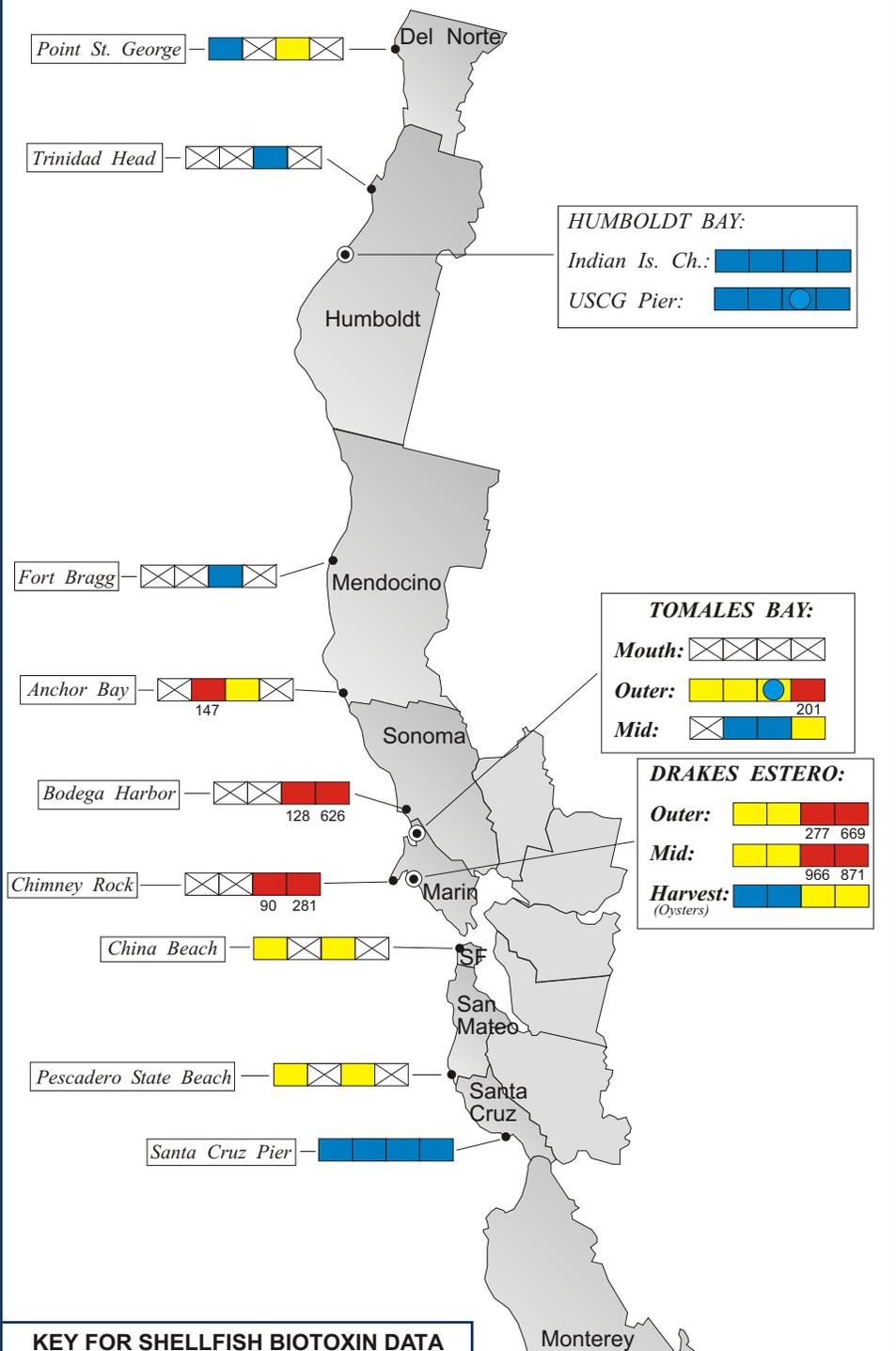


QUARANTINES:

The annual mussel quarantine went in effect on May 1. This quarantine applies specifically to the sport-harvesting of mussels along 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

(Continued on Page 5)

Figure 4. Distribution of shellfish biotoxins in Northern California during August, 2009.



KEY FOR SHELLFISH BIOTOXIN DATA

Week: 1 2 3 4

PSP Range: (ug/100 g) no sample not detected < 80¹ ≥ 80

DA Range: (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 August, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	CDPH Volunteer (<i>Marie De Santis</i>)	2
	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Monitoring Program	2
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	31
	Hog Island Oyster Company	10
	Marin Oyster Company	12
	CDPH Marine Biotoxin Monitoring Program	2
	Tomales Bay Oyster Company	1
	Pt. Reyes Oyster Company	4
San Francisco	San Francisco County Health Department	2
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	4
Monterey	None Submitted	
San Luis Obispo	Tomales Bay Oyster Company	10
	Williams Shellfish Farms	8
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department	3
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	5
	Scripps Institute of Oceanography	1

does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively. 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.

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.

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. 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 August, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	4
	Bureau of Land Management	2
	Fortuna High School	1
Mendocino	CDPH Volunteer (<i>Marie De Santis</i>)	3
	California Department of Fish and Game	1
Sonoma	CDPH Volunteer (<i>Cathleen Cannon</i>)	1
	California Department of Fish and Game	1
	CDPH Marine Biotoxin Program	2
Marin	CDPH Volunteers (<i>Brent Anderson, Cal Strobel</i>)	7
	(<i>Marjorie Siegel, Cathleen Cannon</i>)	
	Cordell Banks National Marine Sanctuary	1
	Drakes Bay Oyster Company	13
	CDPH Marine Biotoxin Program	1
San Francisco	Tomales Bay Oyster Company	1
	Hog Island Oyster Company	2
	CDPH Volunteer (<i>E. McNaughton</i>)	3
	San Francisco Health Department	3
San Mateo	San Francisco Whale Tours	1
	CDPH Volunteer (<i>Kathleen Abadie</i>)	2
	San Mateo County Environmental Health Dept.	2
Santa Cruz	The Marine Mammal Center (<i>Stan Jensen</i>)	3
	U.C. Santa Cruz	1
	U.C. Santa Cruz	4
	San Lorenzo Valley High School	2
Monterey	California Department of Parks and Recreation	2
	Monterey Abalone Company	1
	CDPH Volunteer (<i>Jerry Norton</i>)	1
San Luis Obispo	Marine Pollution Studies Laboratory	1
	CDPH Volunteer (<i>Renee and Auburn Atkins</i>)	2
	Monterey Bay National Marine Sanctuary	4
	Morro Bay National Estuary Program	3
	Tenera Environmental	4
Santa Barbara	The Marine Mammal Center	12
	(<i>Tim Lytsell, P.J. Webb, Debbie Davis</i>)	
	Tomales Bay Oyster Company	4
	CDPH Volunteer (<i>Sylvia Short</i>)	4
	Channel Islands National Marine Sanctuary	3
Ventura	U.C. Santa Barbara	4
	National Park Service	1
	Santa Barbara Mariculture Company	4
Los Angeles	Guided Discoveries, Tole Mour	2
	CDPH Volunteer (<i>Fred Burgess</i>)	2
	Channel Islands National Marine Sanctuary	2
Orange	Ventura County Environmental Health Department	3
	Los Angeles County Health Department	2
	Los Angeles County Sanitation District	4
San Diego	Guided Discoveries, Tole Mour	1
	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	5
	Scripps Institute of Oceanography	5

PHYTOPLANKTON GALLERY



Diatoms dominated the northern coast and included less common forms like the detailed *Isthmia* pictured here.



Pseudo-nitzschia spp. were common to abundant along the San Luis Obispo coast and near the Channel Islands.



Many southern California sites finally saw a change from diatoms to a dinoflagellate-dominated community that is more typical of the summer months.