

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

July 2010

Technical Report No. 10-13

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of July, 2010. 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.

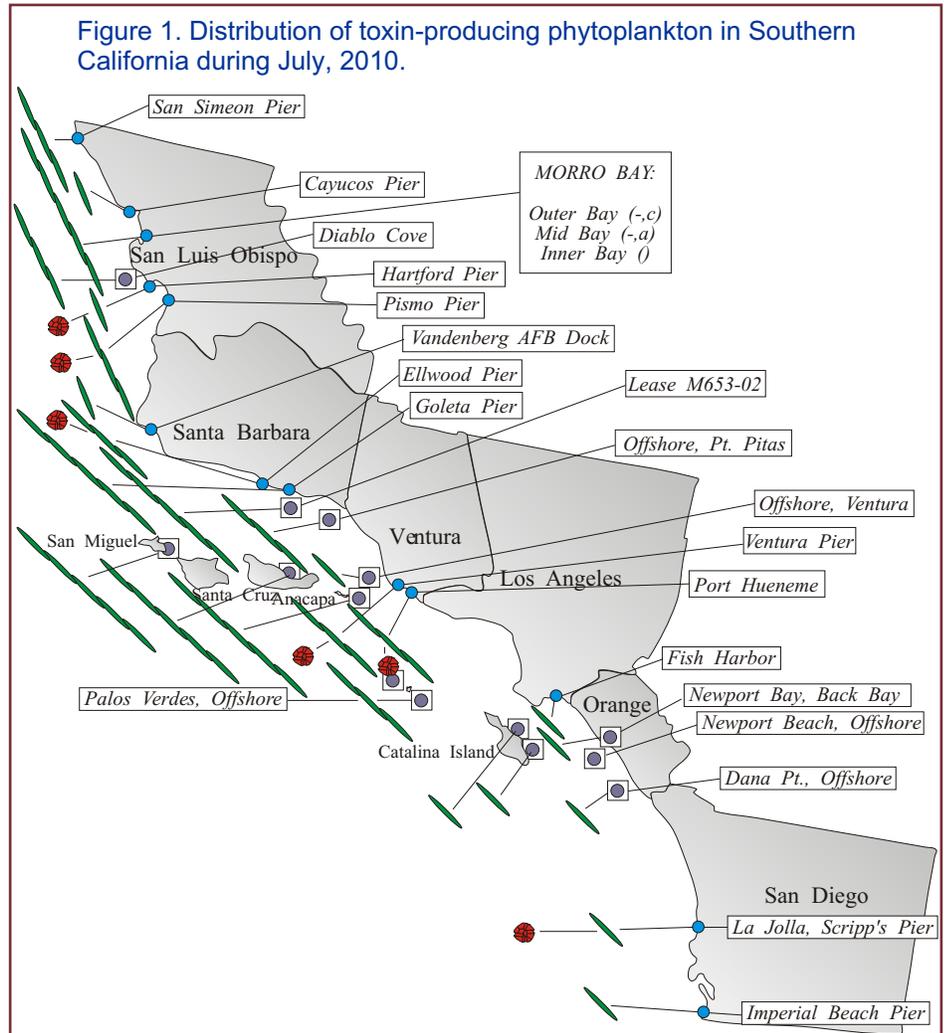
Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All 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 locations during July (Figure 1). Low numbers of this dinoflagellate were detected at sites along most southern California coastal counties. A low concentration of PSP toxins

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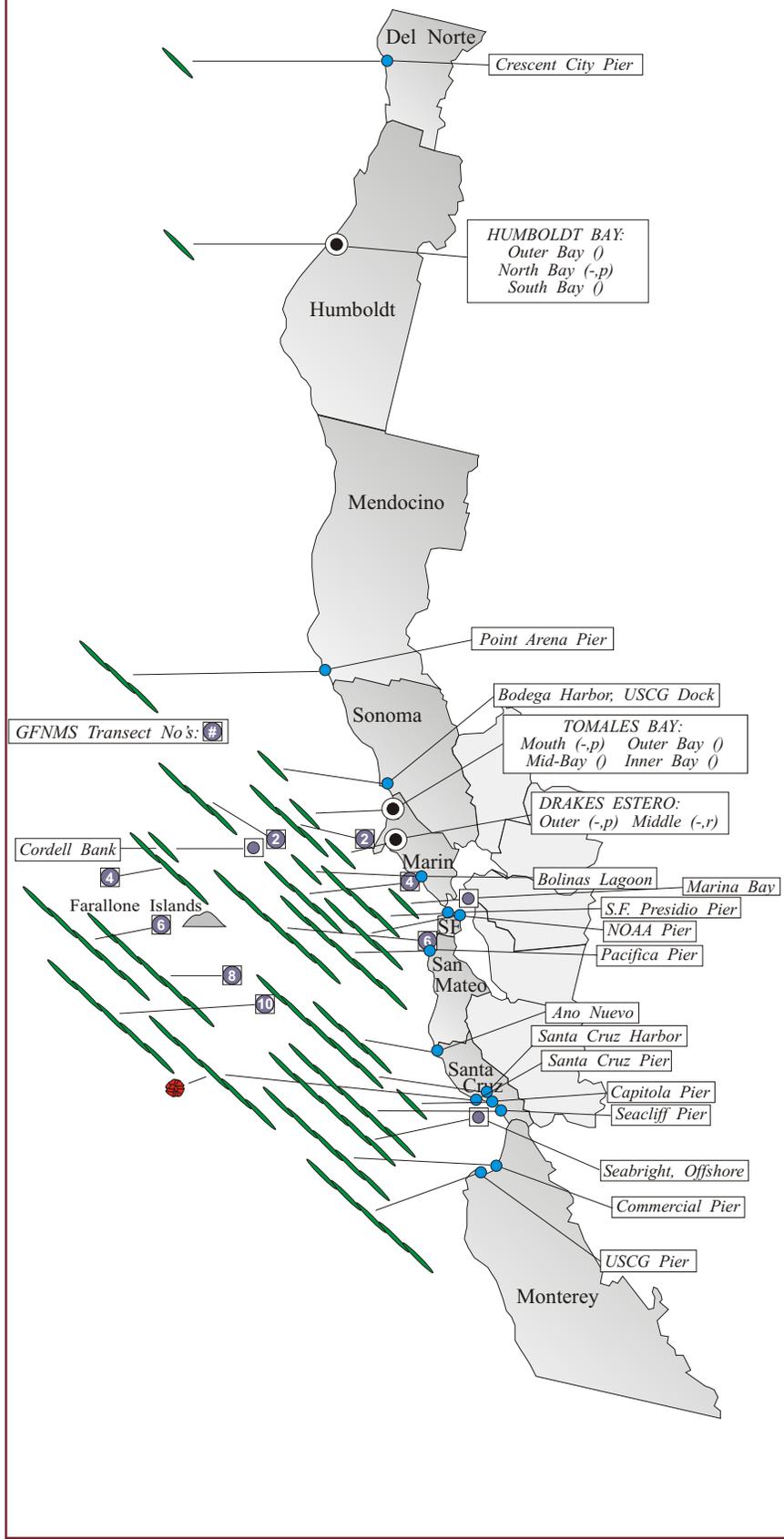
Relative Abundance of Known Toxin Producers			
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

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 July, 2010.



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was detected in a single shellfish sample from Goleta Pier (Santa Barbara) during the first week of the month (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the entire southern California coast during July (Figure 1). This diatom remained abundant along the coast of Santa Barbara and Ventura counties and continued to increase along the San Luis Obispo coast. *Pseudo-nitzschia* was also abundant in offshore samples from several of the Channel Islands. The highest relative abundance of *Pseudo-nitzschia* was observed in a sample collected near San Miguel Island on July 19 by the Guided Discovery ship Tole Mour.

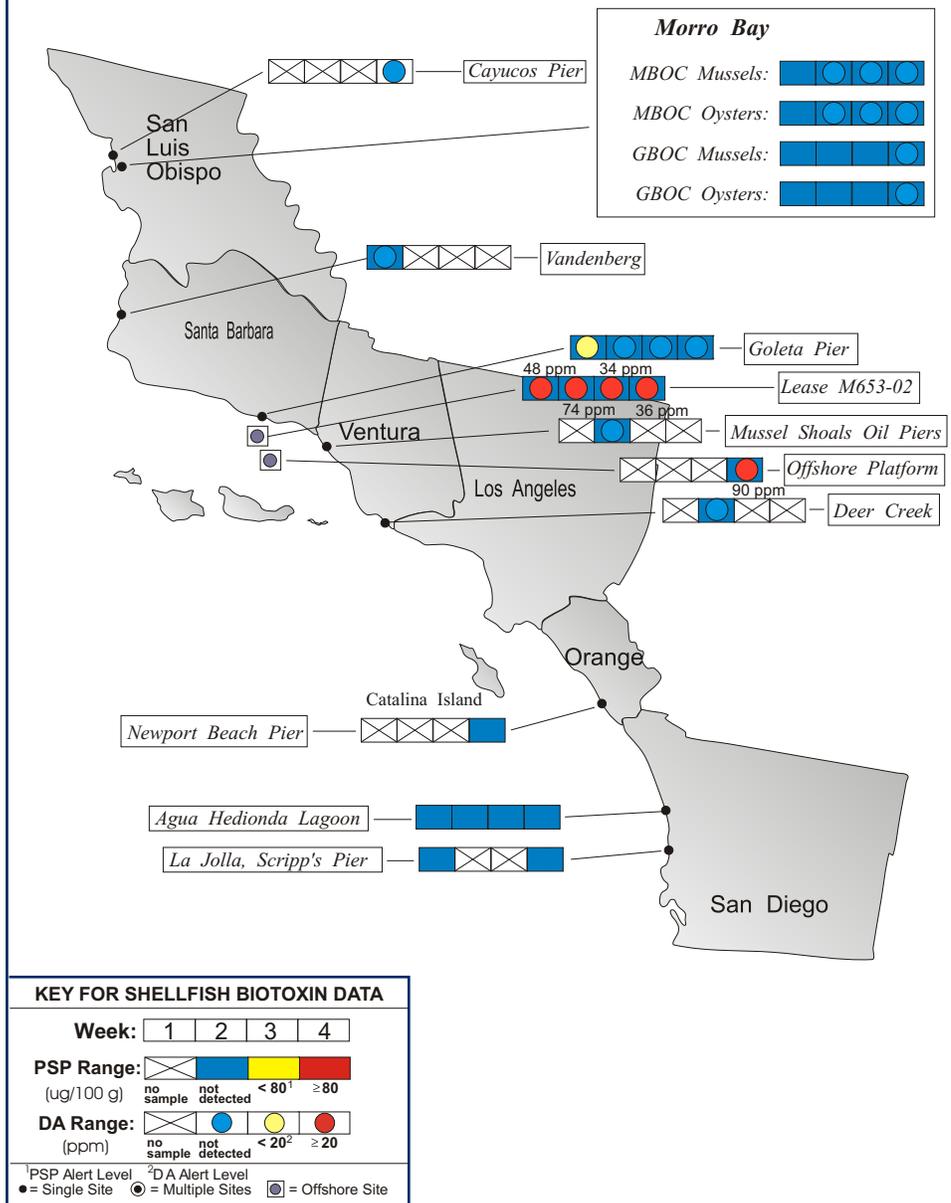
Domoic acid concentrations increased again offshore of Santa Barbara following a brief decline at the end of June. Toxin concentrations in shellfish exceeded the federal alert level for the entire month. A high concentration of this toxin was also detected in a mussel sample from an offshore platform during the last week of the month (Figure 3).

Non-toxic Species

Diatoms continued to dominate the phytoplankton assemblage along the San Luis Obispo coast, with *Skeletonema* and *Thalassiosira* the most abundant genera. Although diatoms were also abundant

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Figure 3. Distribution of shellfish biotoxins in Southern California during July, 2010.



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between Santa Barbara and San Diego, there was a significant number of dinoflagellates in the assemblage. *Lingulodinium polyedrum* was common throughout most of this range, with *Ceratium* and *Prorocentrum* common at selected sites.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at only one sampling location during July (Figure 2). The relative absence of this dinoflagellate is highly unusual for this time of year. A low concentration of PSP toxins continued to be detected in mussels from Trinidad Head (Humboldt County) (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at most sampling locations along the northern California coast during July (Figure 2). There was a noticeable increase in the abundance of this diatom at sites between Monterey Bay and Mendocino County, including several offshore locations sampled by the Gulf of the Farallones National Marine Sanctuary. The highest relative abundances of *Pseudo-nitzschia* were observed at Pacifica Pier (July 26), Santa Cruz Pier (July 21), and the Monterey

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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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 USCG dock (July 24).

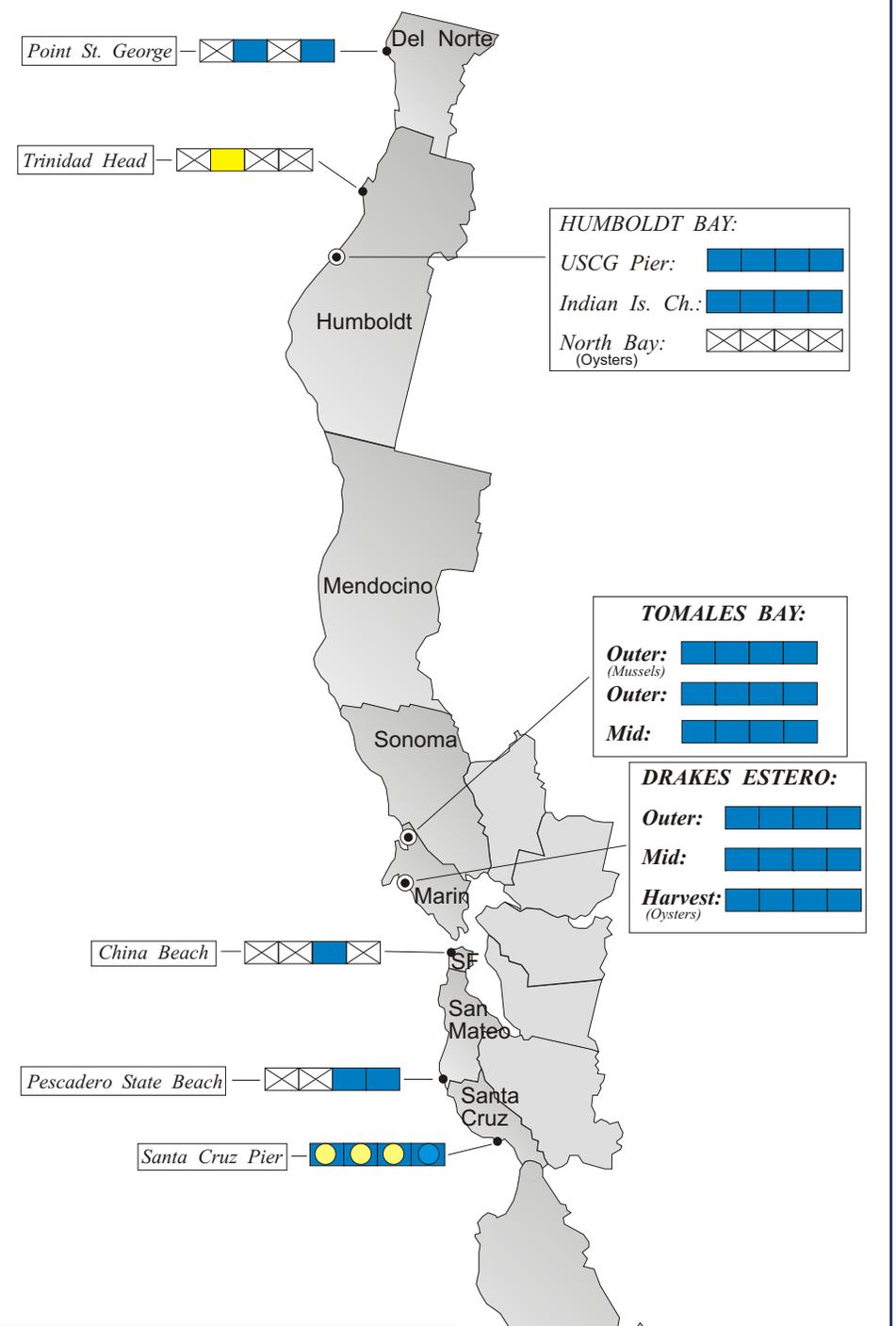
Despite the abundance of *Pseudo-nitzschia* there were only low concentrations of domoic acid detected in mussels from one location. Sentinel mussels from Santa Cruz Pier contained low levels of domoic acid for the first three weeks of the month (Figure 4).

Non-toxic Species

Diatoms remained dominant along the northern California coast during July. *Skeletonema* and *Chaetoceros* were common at sites between Del Norte and San Mateo counties. The highest relative abundances of nontoxic species were observed in samples from the Crescent City Pier (*Skeletonema*) and the Pacifica Pier (*Chaetoceros*).



Figure 4. Distribution of shellfish biotoxins in Northern California during July, 2010.



QUARANTINES:

The annual mussel quarantine went into effect on May 1. 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

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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 July, 2010.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	None Submitted	1
Sonoma	None Submitted	1
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	5
	Marin Oyster Company	4
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	4
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	8
	Morro Bay Oyster Company	9
Santa Barbara	Santa Barbara Mariculture Company	18
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
	U.C. Santa Barbara	1
Los Angeles	None Submitted	
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	2

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.



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 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 remove and discard the dark parts (i.e., the digestive organs or viscera). Razor

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during July, 2010.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	4
Humboldt	Coast Seafood Company	4
Mendocino	CDPH Volunteer (<i>Marie De Santis</i>)	3
Sonoma	CDPH Marine Biotoxin Program	1
Marin	CDPH Volunteer (<i>Brent Anderson, Cal Strobel</i>)	5
	Cordell Bank National Marine Sanctuary	1
	Drakes Bay Oyster Company	13
San Francisco	Gulf of the Farallones National Marine Sanctuary	7
	San Francisco Health Department	4
	CDPH Volunteer (<i>Eugenia McNaughton</i>)	1
San Mateo	San Mateo County Environmental Health Dept.	2
	Gulf of the Farallones National Marine Sanctuary	4
	The Marine Mammal Center (<i>Stan Jensen</i>)	4
	U.C. Santa Cruz	2
Santa Cruz	California Department of Parks and Recreation	1
	The Marine Mammal Center (<i>Nancy Scarborough</i>)	1
	Santa Cruz County Environmental Health Dept.	3
	San Lorenzo Valley High School	2
Monterey	U.C. Santa Cruz	4
	CDPH Volunteer (<i>Jerry Norton</i>)	1
	Friends of the Sea Otter (<i>Aya Obara</i>)	3
	Friends of the Sea Otter (<i>Kelly Cherry</i>)	4
San Luis Obispo	Morro Bay National Estuary Program	2
	Monterey Bay National Marine Sanctuary	5
	Morro Bay Oyster Company	4
	Tenera Environmental	3
	The Marine Mammal Center (<i>Tim Lytsell, P.J. Webb</i>)	3
Santa Barbara	CDPH Volunteer (<i>Sylvia Short</i>)	4
	Channel Islands National Marine Sanctuary	1
	Santa Barbara Mariculture Company	9
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Guided Discoveries, Tole Mour	1
	CDPH Volunteer (<i>Fred Burgess</i>)	2
	Channel Islands National Marine Sanctuary	1
	Ventura County Environmental Health Department	1
Los Angeles	Guided Discoveries, Tole Mour	2
	National Park Service	2
	Los Angeles County Sanitation District	4
Orange	Guided Discoveries, Tole Mour	4
	Southern California Marine Institute	1
	California Department of Fish and Game	8
San Diego	Ocean Institute	1
	Orange County Health Care Agency	1
	Avian Research Associates	1
	Scripps Institute of Oceanography	4

PHYTOPLANKTON GALLERY



The diatom *Skeletonema* was common along the northern California coast in July.



The Santa Barbara coast contained a mix of *Pseudo-nitzschia* and the dinoflagellate *Lingulodinium*.



The hydrozoan *Obelia* is occasionally observed in our phytoplankton samples.