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

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

September 2012

Technical Report No. 12-22

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of September, 2012. 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 only observed at Ellwood Pier at the end of the month (Figure 1). PSP toxins were not detected in any shellfish samples collected in September (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the

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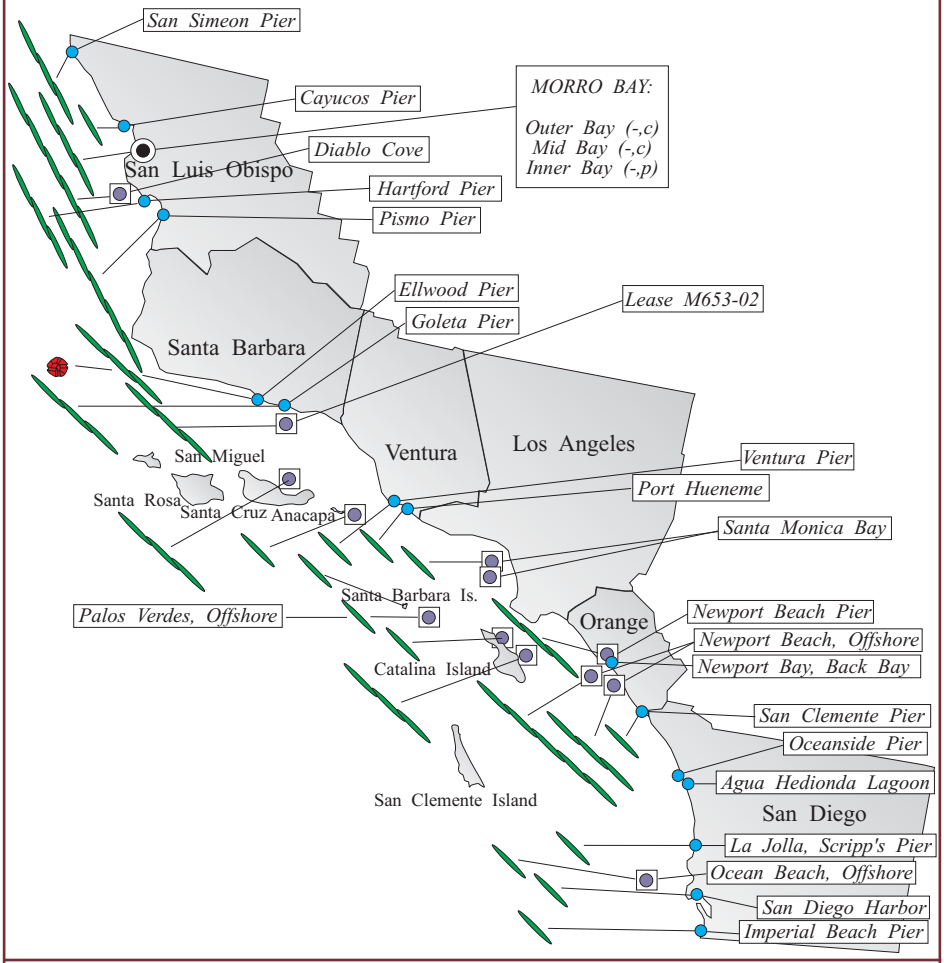
Figure 1. Distribution of toxin-producing phytoplankton in Southern California during September, 2012.



Relative Abundance of Known Toxin Producers

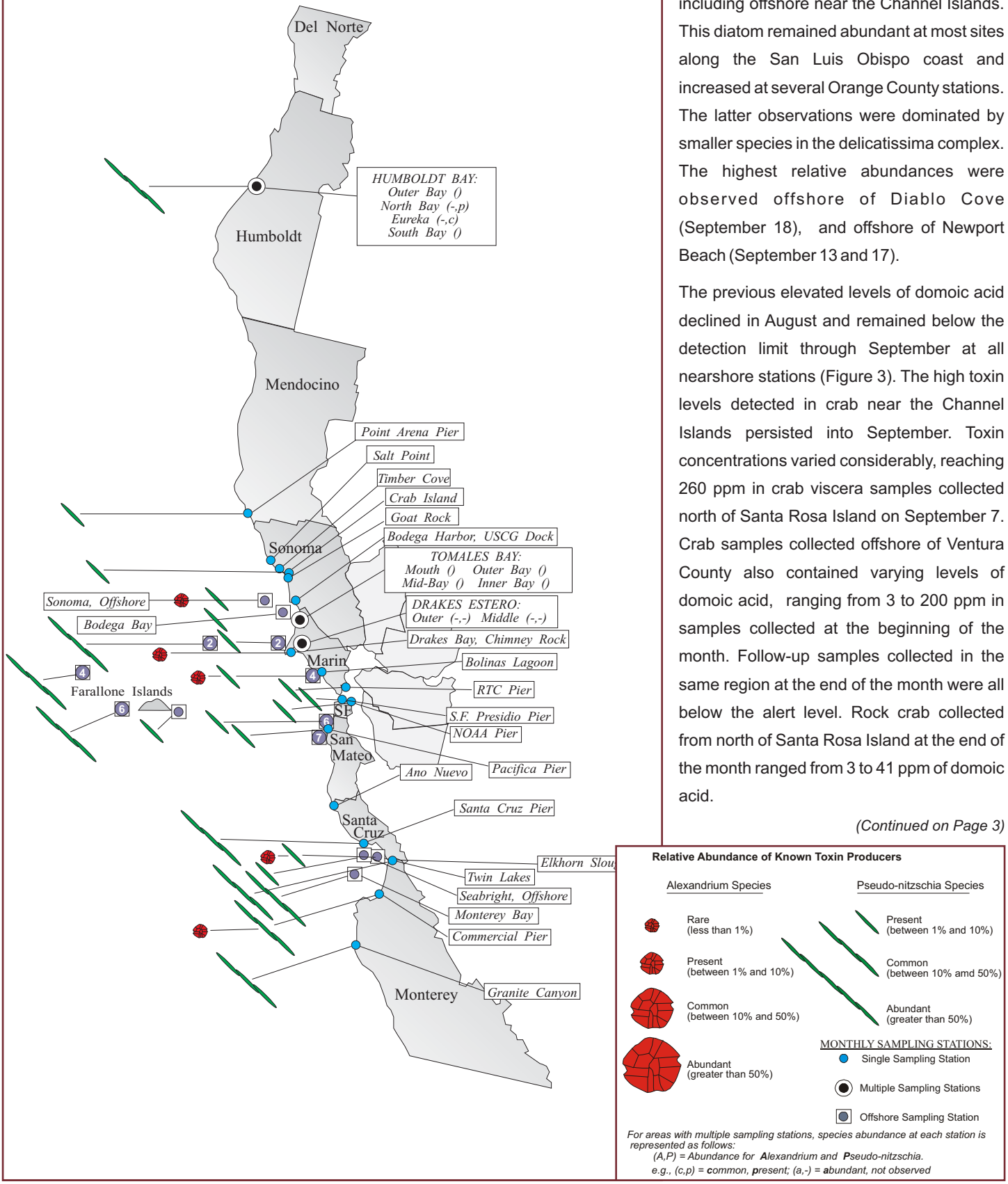
Alexandrium Species	Pseudo-nitzschia Species
Rare (less than 1%)	Present (less than 10%)
Present (between 1% and 10%)	Common (between 10% and 50%)
Common (between 10% and 50%)	Abundant (greater than 50%)
Abundant (greater than 50%)	

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, 2012.



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entire southern California coast (Figure 1). The high relative abundances observed in August declined along most of the coast, including offshore near the Channel Islands. This diatom remained abundant at most sites along the San Luis Obispo coast and increased at several Orange County stations. The latter observations were dominated by smaller species in the delicatissima complex. The highest relative abundances were observed offshore of Diablo Cove (September 18), and offshore of Newport Beach (September 13 and 17).

The previous elevated levels of domoic acid declined in August and remained below the detection limit through September at all nearshore stations (Figure 3). The high toxin levels detected in crab near the Channel Islands persisted into September. Toxin concentrations varied considerably, reaching 260 ppm in crab viscera samples collected north of Santa Rosa Island on September 7. Crab samples collected offshore of Ventura County also contained varying levels of domoic acid, ranging from 3 to 200 ppm in samples collected at the beginning of the month. Follow-up samples collected in the same region at the end of the month were all below the alert level. Rock crab collected from north of Santa Rosa Island at the end of the month ranged from 3 to 41 ppm of domoic acid.

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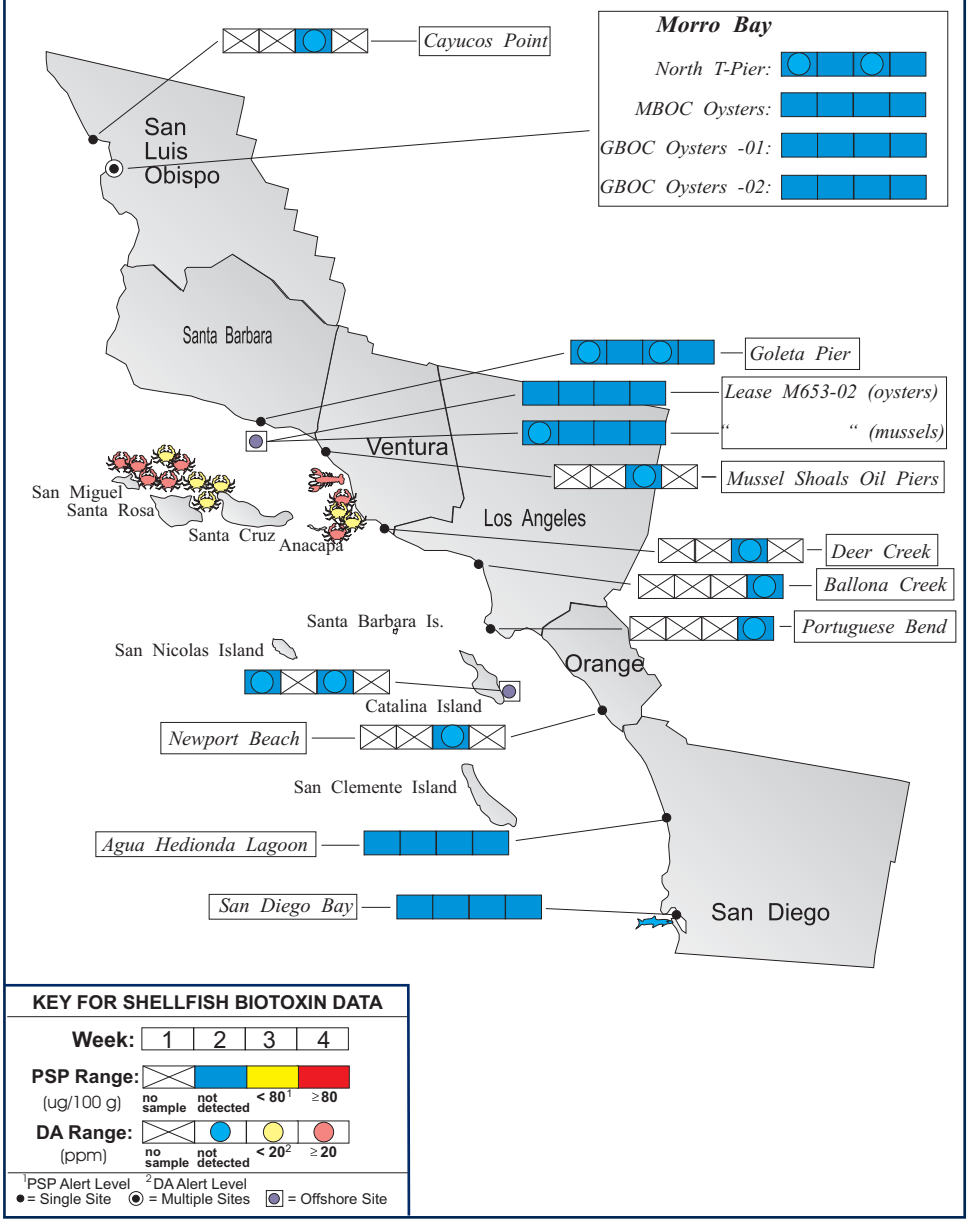
Figure 3. Distribution of shellfish biotoxins in Southern California during September, 2012.



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Non-toxic Species

The diatom *Chaetoceros* was common along most of the coast. The dinoflagellates *Prorocentrum* and *Ceratium* were common at sites in San Diego County.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several locations between Sonoma and Monterey counties (Figure 2). PSP toxins were not detected in any samples collected in September (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at most sites (Figure 2). This diatom decreased in relative abundance at all Monterey Bay sites compared to observations in August. Samples collected by the Applied California Current Ecosystems Studies (ACCESS) program contained higher levels of *Pseudo-nitzschia* in the stations farthest offshore.

Domoic acid was not detected in any samples collected in September (Figure 4).

Non-toxic Species

The diatom *Chaetoceros* continued to dominate the northern California coast. The dinoflagellate *Gonyaulax spinifera* became more widespread in distribution during September and was common at sites in

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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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Sonoma, Marin, and San Francisco counties. Several *Ceratium* species were common at the Santa Cruz Pier inside Monterey Bay.

QUARANTINES:

A health advisory was issued on September 14 for the northern Channel Islands as a result of high levels of domoic acid in samples of crab viscera, also known as 'crab butter'. This alert warned consumers to avoid eating bivalve shellfish or the internal organs of crab, lobster, and small finfish like sardines and anchovies from the affected region.

The health advisory issued on August 20 for Ventura County, identical in scope to the Channel Island advisory, remained in effect.

The annual mussel quarantine began 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. 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

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Figure 4. Distribution of shellfish biotoxins in Northern California during September, 2012.

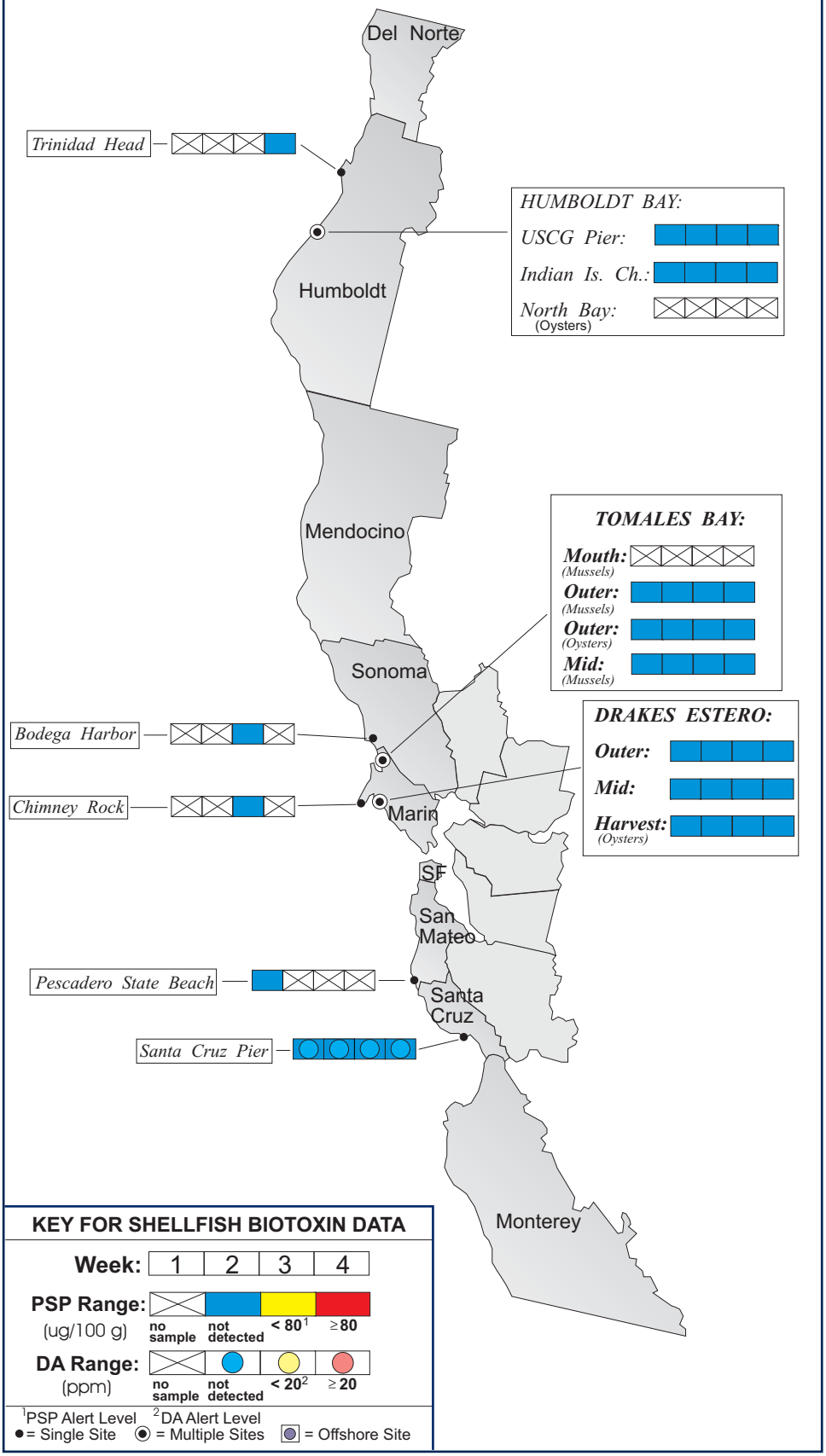

Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during September, 2012.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	1
Marin	Cove Mussel Company	4
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	4
	Marin Oyster Company	4
	CDPH Marine Biotoxin Program	1
San Francisco	None Submitted	
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.	10
	Morro Bay Oyster Company	6
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
	Sea Grant, U.C. Santa Barbara	9
	Wild Planet Foods	3
Ventura	Ventura County Environmental Health Department	3
	CDPH Volunteers (*Bill Weinerth, Rick Watanabe*)	19
Los Angeles	CDPH Volunteer (*Cal Parsons*)	2
	Los Angeles County Health Department	1
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	5

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during September, 2012.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
	Humboldt State University Marine Lab	1
Mendocino	CDPH Volunteer (*Marie de Santis*)	3
Sonoma	CDPH Marine Biotoxin Program	1
	Sonoma Coast Watch	3
	Bodega Marine Lab	3
	California Department of Fish and Game	5
Marin	Drakes Bay Oyster Company	10
	CDPH Volunteer (*Brent Anderson*)	4
	SFSU, Romberg Tiburon Center	3
	CDPH Marine Biotoxin Program	2

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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 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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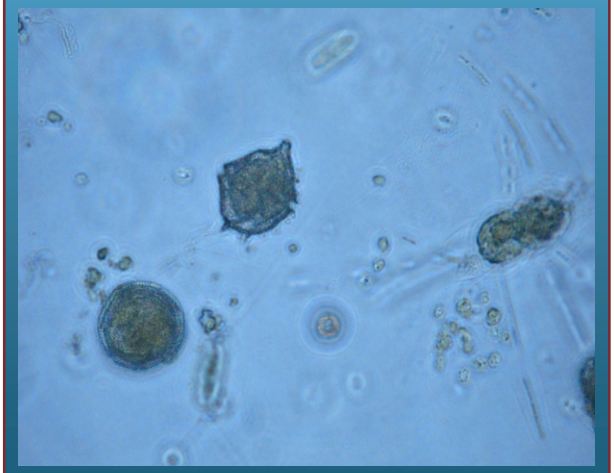
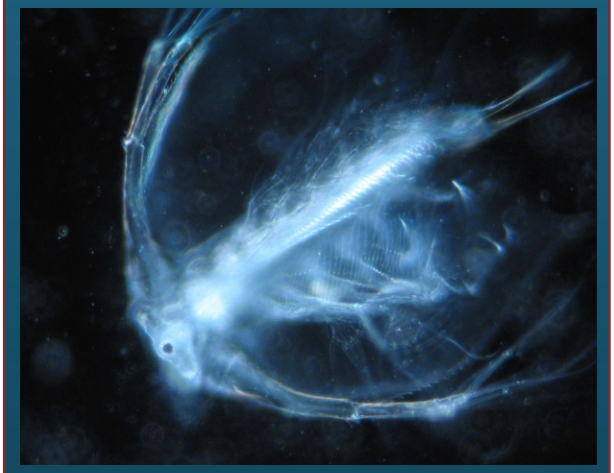
Marin (cont.)	Gulf of the Farallones National Marine Sanctuary	7
	Golden Gate Recreational Area	1
Contra Costa	None Submitted	
Alameda	None Submitted	
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	3
	Exploratorium	2
	San Francisco Bay Whale Watching Company	1
	Gulf of the Farallones National Marine Sanctuary	3
San Mateo	The Marine Mammal Center (*Stan Jensen*)	4
	San Mateo County Environmental Health Department	1
	U.C. Santa Cruz	1
	Gulf of the Farallones National Marine Sanctuary	1
Santa Cruz	California Department of Parks and Recreation	2
	U.C. Santa Cruz	4
Monterey	Friends of the Sea Otter (*Janis Chaffin*)	3
	Monterey Abalone Company	3
	Marine Pollution Studies Laboratory	2
	Marine Life Studies	1
San Luis Obispo	Friends of the Sea Otter (*Kelly Cherry*)	2
	Grassy Bar Oyster Company	3
	Morro Bay National Estuary Program	2
	Monterey Bay National Marine Sanctuary	2
	Tenera Environmental	3
	The Marine Mammal Center (*P.J. Webb*)	3
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	4
	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	4
	National Park Service	1
	Tole Mour	2
Ventura	CDPH Volunteer (*Fred Burgess*)	3
	National Park Service	2
	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Sanitation District	3
	CDPH Volunteer (*Cal Parsons*)	2
	Tole Mour	6
	City of Los Angeles Environmental Monitoring Division	3
Orange	Orange County Sanitation District	4
	California Department of Fish and Game	4
	Orange County Health Care Agency	2
San Diego	Scripps Institute of Oceanography	4
	Carlsbad Aquafarms, Inc.	2
	CDPH Volunteer (*Cynthia Hall*)	1
	San Diego Whale Watch	1
	Tijuana River National Estuary Research Reserve	3
	U.S. Navy Marine Mammal Program	4

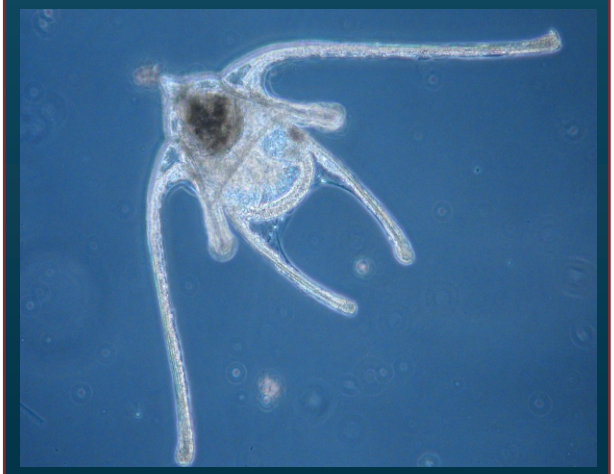
PHYTOPLANKTON GALLERY



One of several 'red tide' dinoflagellates, Gonyaulax spinifera continued to increase in September.



A spooky looking Cladoceran with the carapace opened up.



Another zooplankton, this a is a larval stage of the brittlestar Ophiothrix.