



Marine Biotoxin Monitoring Report

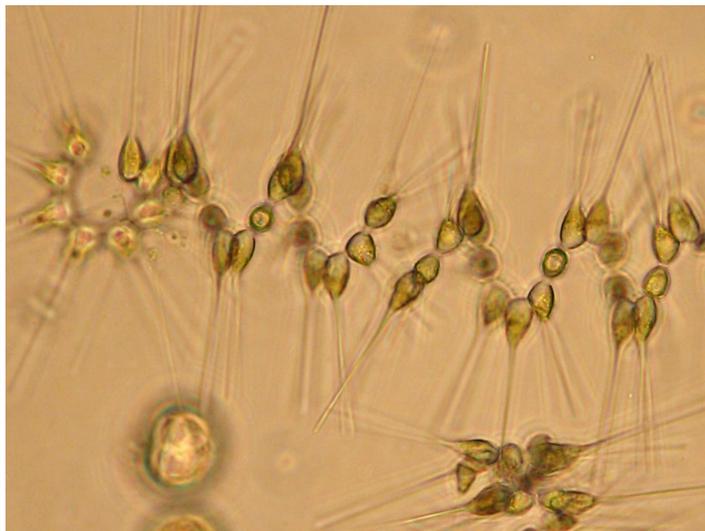
January 2017

Technical Report No. 17-12

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of January, 2017. Toxin concentration ranges 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 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



A chain of *Asterionella*, a diatom observed at several sites between Humboldt and Orange counties, was most common in the back bay of Newport Bay.

are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (e.g., 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.

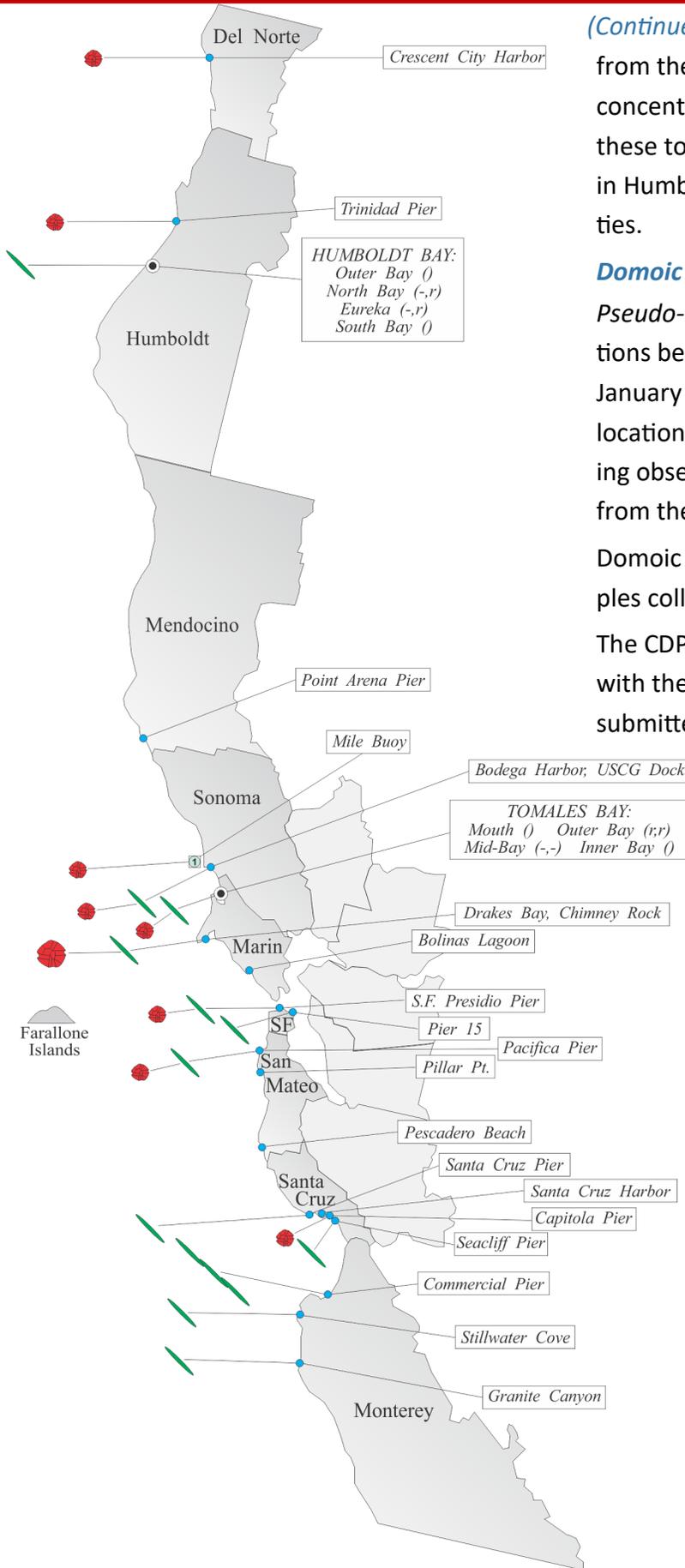
Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several northern California locations between Del Norte and Santa Cruz counties in January (Figure 1). Cell mass was low at these sites, with slightly higher relative abundances observed in samples from Drakes Bay (Marin County) and Pacifica Pier (San Mateo County).

PSP toxicity was detected in shellfish samples from several sites between Humboldt and Monterey counties (Figure 2). High concentrations of the PSP toxins were detected in mussels from the outer Humboldt Bay sentinel station (135 $\mu\text{g}/100\text{ g}$ on January 31), Fort Bragg (208 $\mu\text{g}/100\text{ g}$ on January 25), and at the Monterey Commercial Wharf (152 $\mu\text{g}/100\text{ g}$ on January 11). PSP toxicity was also well above the alert level in rock scallop viscera from the Monterey Commercial Wharf, reaching a maximum of 507 $\mu\text{g}/100\text{ g}$ on January 25 and decreasing to 186 $\mu\text{g}/100\text{ g}$ on January 31. The scallop adductor muscle

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from the January 25 sample also contained a low concentration of the PSP toxins. Lower levels of these toxins were also detected at additional sites in Humboldt, Sonoma, Marin, and Santa Cruz counties.

Domoic Acid

Pseudo-nitzschia was observed at numerous locations between Humboldt and Monterey counties in January (Figure 1). The cell mass was low at these locations, with the highest relative abundance being observed in a sample collected on January 5 from the Seacliff Pier (Santa Cruz County).

Domoic acid was not detected in any mussel samples collected in January (Figure 2).

The CDPH Food and Drug Branch, in coordination with the California Department of Fish and Wildlife, submitted crab viscera samples from multiple locations between northern Mendocino

County and San Mateo County. Dungeness crab viscera from the Mendocino samples contained low levels of domoic acid (Figure 2). Rock crab viscera from the remaining sites contained low or nondetectable levels of toxin, with the exception of one crab sample from Marin that contained 39 ppm of domoic acid.

Non-Toxic Species

A mix of diatoms and dinoflagellates was observed at various locations along

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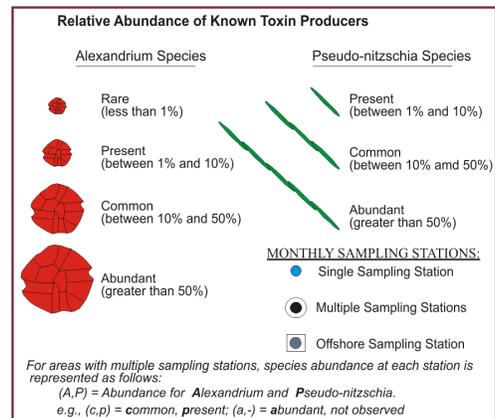


Figure 1. Toxic phytoplankton distribution in northern California.

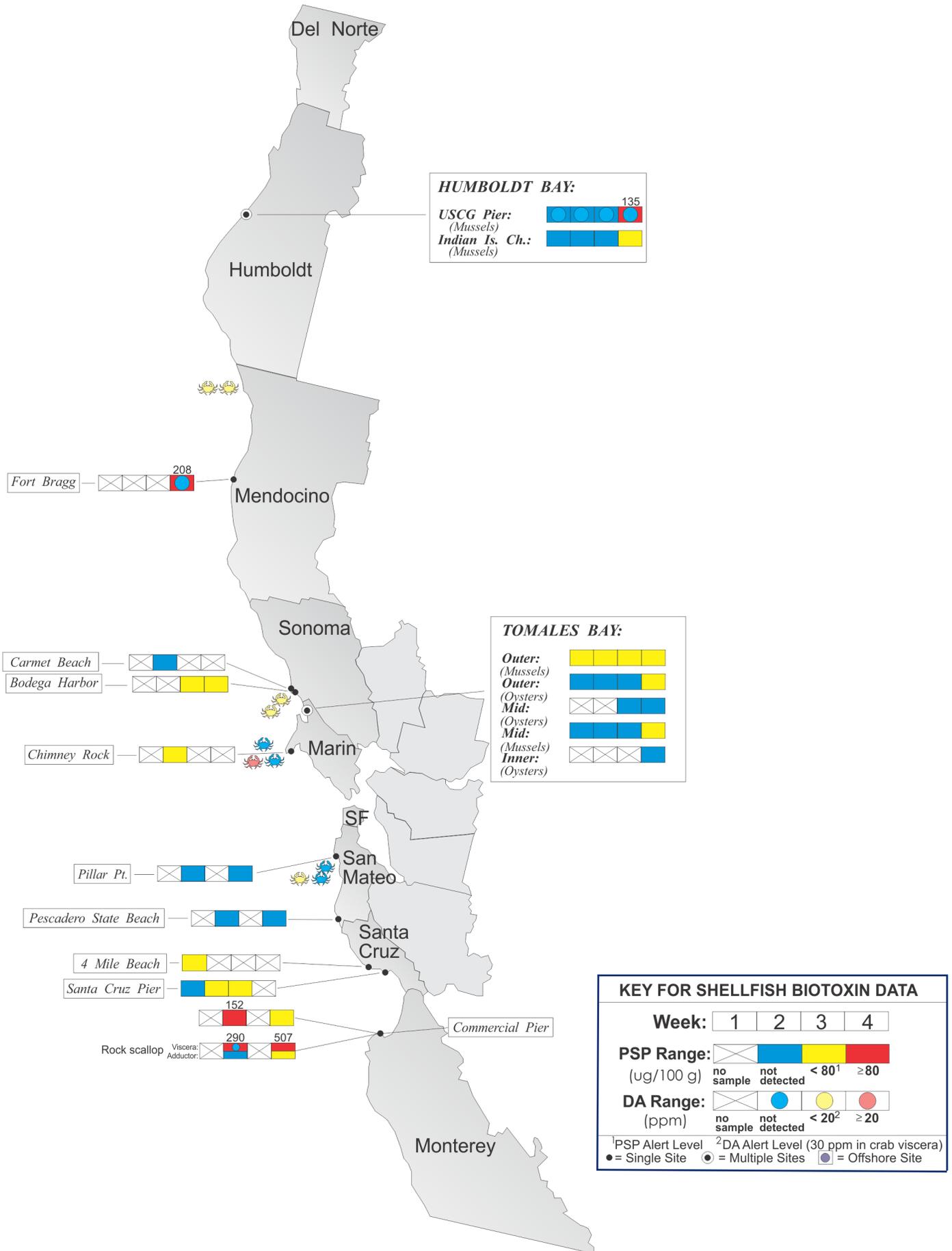


Figure 2. Distribution of shellfish biotoxins in northern California.

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the northern California coast. *Chaetoceros* was common in Crescent City harbor, Pier 15 inside San Francisco Bay, and at the Pacifica Pier. The diatom *Asterionella* was abundant at the Trinidad Pier. The dinoflagellate *Akashiwo sanguineum* was common offshore of the Bodega Marine Laboratory and *Prorocentrum micans* was abundant in the mid-bay region of Tomales Bay.

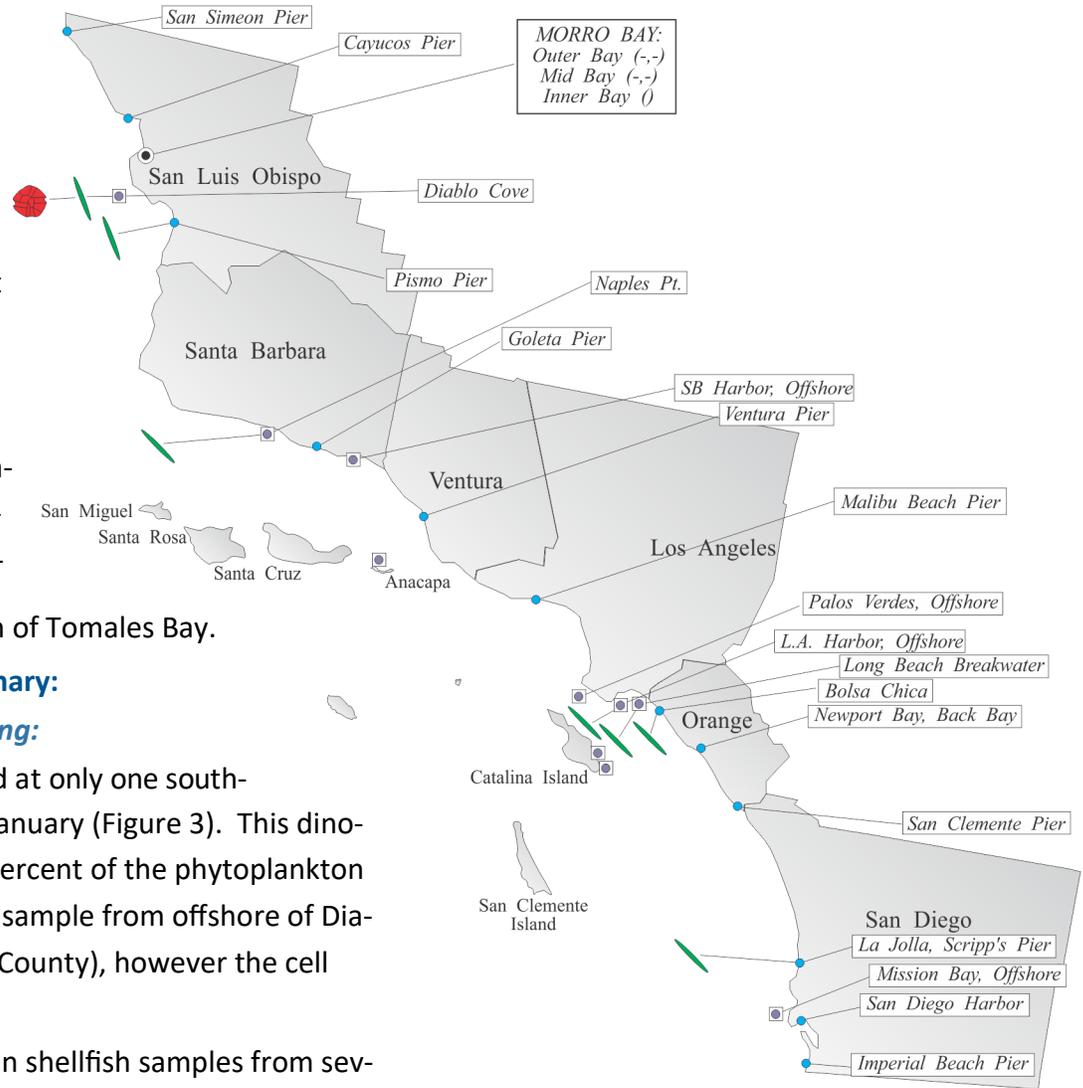
Southern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium was observed at only one southern California site during January (Figure 3). This dinoflagellate comprised five percent of the phytoplankton assemblage in a January 6 sample from offshore of Diablo Cove (San Luis Obispo County), however the cell mass was low.

PSP toxins were detected in shellfish samples from several sites in January (Figure 4). Low concentrations of these toxins persisted at sampling sites in San Luis Obispo County following the elevated levels detected in December in outer Morro Bay and Morro Strand.

Figure 3. Toxic phytoplankton distribution in southern California.



(Continued on page 5)

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's health is threatened.

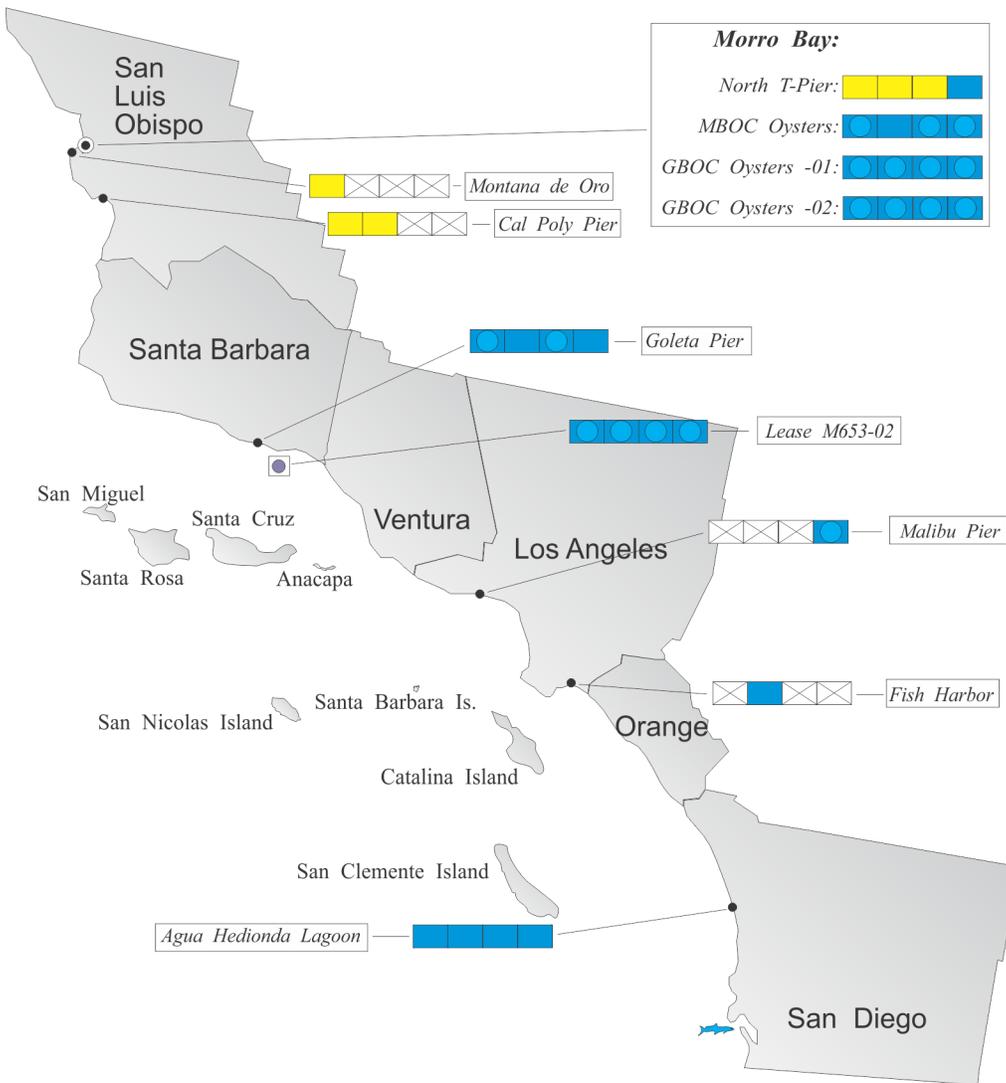
For Information on Volunteering:

For Recorded Biotoxin Information Call:

Email redtide@cdph.ca.gov or call 510-412-4635

(800) 553 - 4133

Figure 4. Distribution of shellfish biotoxins in southern California.



any shellfish samples analyzed in January (Figure 4).

Non-Toxic Species

The dinoflagellate *Ceratium furca* was common to abundant at several sites between San Luis Obispo and Los Angeles counties. The highest relative abundance was observed offshore of Palos Verdes. Another *Ceratium* species, *C. macroceros*, was common at the Long Beach Breakwater. Several diatom genera were also prominent, including *Asterionella* (abundant at the San Simeon Pier), *Lauderia* (common offshore of Santa Barbara at Naples Pt.), *Licmophora* (common offshore of Anacapa Island—see photo below), and *Eucampia* (common at the Long Beach breakwater).

QUARANTINES:

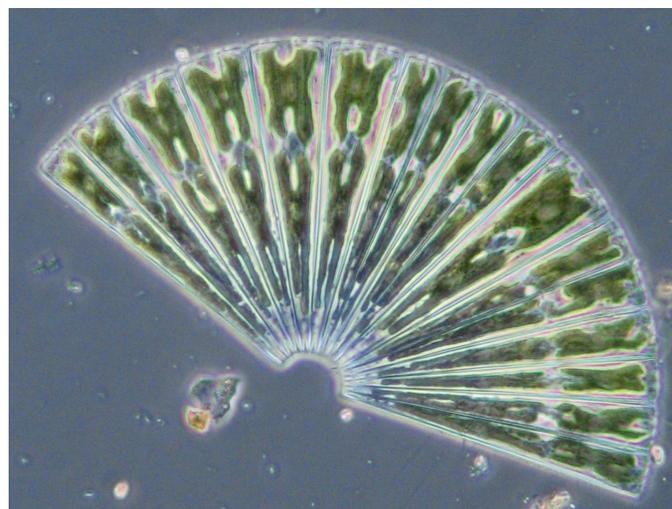
The annual mussel quarantine is scheduled to go into effect on May

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Domoic Acid

Pseudo-nitzschia was observed at several sampling sites in southern California during January (Figure 3). The cell mass was low at all locations and the relative abundance was greatly reduced from observations in December. The highest relative abundance of this diatom was observed in a January 3 sample from Pismo

Pier. Domoic acid was not detected in



The diatom *Licmophora*, consisting of fan-shaped cells, normally grow on stalks attached to various objects. They can be dislodged, becoming part of the phytoplankton community observed in our samples.

1. The California Department of Fish and Wildlife’s closure of the razor clam fishery remains in effect for Humboldt and Del Norte counties. On January 11 CDPH lifted the last remaining health advisory for Dungeness crab caught along the California coast. This health

(Continued on page 6)

(Continued from page 5)

advisory had applied to Dungeness crab caught in state waters in areas north of Latitude 39° 33.3' N (near Ten Mile River in mid-Mendocino County) and south of Latitude 40° 01' N (near Shelter Cove in southern Humboldt County).

On January 25 CDPH lifted the health advisory for rock crab caught in state waters in all areas south of Latitude 37° 30' N, near Pillar Point. The advisory remains in effect for rock crab caught in state waters north of Latitude 37° 30' N (near Pillar Point).

As a precaution, in those areas where crab are safe to consume, the public is advised not eat the viscera (internal organs, also known as “butter” or “guts”). The viscera usually contain much higher levels of domoic acid than crab body meat. When whole crabs are cooked in liquid, domoic acid may leach from the viscera into the cooking liquid. Water or broth used to cook whole crabs should be discarded and not used to prepare other dishes such as sauces, broths, soups or stews (for example, cioppino or gumbo), stocks, roux, dressings or dips.

The best ways to reduce risk are to remove the crab viscera and rinse out the body cavity prior to cooking, or boil or steam whole crabs, instead of frying or broiling, and discard the viscera and cooking liquids.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned

Table 1. Program participants collecting phytoplankton samples.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		CDPH Volunteer (<i>Jim Hooper</i>)	2
HUMBOLDT COUNTY		Humboldt State University Marine Lab	1
Coast Seafood Company	5	CHPH Volunteer (<i>Olivia Giovannetti</i>)	2
MENDOCINO COUNTY		CDPH Volunteer (<i>Marie DeSantis</i>)	1
SONOMA COUNTY			
Bodega Marine Laboratory	1	CDPH Marine Biotoxin Program	2
MARIN COUNTY		CDPH Volunteers	5
CDPH Marine Biotoxin Program	1	(<i>Brent Anderson, George Clyde</i>)	
Hog Island Oyster Company	5		
SAN FRANCISCO COUNTY			
CDPH Volunteer (<i>Eugenia McNaughton</i>)	3	Exploratorium	4
SAN MATEO COUNTY			
San Mateo County Environmental Health Dept.	6	The Marine Mammal Center	4
SANTA CRUZ COUNTY		CDPH Volunteer (<i>Jeff Palsgaard</i>)	4
Monterey Bay National Marine Sanctuary	1	Santa Cruz County Environmental Health Dept.	2
San Lorenzo Valley High School	2	U.C. Santa Cruz	4
MONTEREY COUNTY		Monterey Abalone Company	2
Marine Pollution Studies Laboratory	1	The Otter Project	3
SAN LUIS OBISPO COUNTY			
CDPH Volunteer (<i>Dan Hoskins</i>)	1	Friends of the Sea Otter	5
Grassy Bay Oyster Company	2	Monterey Bay National Estuary Program	1
Monterey Bay National Marine Sanctuary	2	Tenera Environmental	2
SANTA BARBARA COUNTY			
Santa Barbara Channel Keeper	4	U.C. Santa Barbara	4
VENTURA COUNTY			
CDPH Volunteer (<i>Fred Burgess</i>)	4	National Park Service	2
LOS ANGELES COUNTY			
CDPH Volunteer (<i>Cal Parsons</i>)	1	Catalina Island Marine Institute	1
City of L.A. Environmental Monitoring Division	2	Los Angeles County Health Department	1
Los Angeles County Sanitation District	2	Long Beach Marine Institute	2
ORANGE COUNTY		Amigos de Bolsa Chica	4
Back Bay Science Center	4	CDPH Volunteer (<i>Truong Nguyen</i>)	2
SAN DIEGO COUNTY			
Scripps Institute of Oceanography	5	Sea Camp/HABNet	1
Tijuana River National Estuary Research	3	U.S. Navy Marine Mammal Program	2

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

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to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins can produce a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms can be 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 seafood species such as crab, lobster, and small finfish like sardines and anchovies.

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. Program participants collecting shellfish samples.

COUNTY	AGENCY	#
Del Norte	Tolowa Dee-ni' Nation	2
	Yurok Tribe Environmental Group	1
Humboldt	Coast Seafood Company	15
	CDPH Volunteer (<i>Georgianna Woods</i>)	1
	California Department of Fish and Wildlife	6
	Humboldt County Environmental Health Department	2
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	2
	CDPH Volunteer (<i>John Morozumi</i>)	2
Marin	Cove Mussel Company	4
	Hog Island Oyster Company	6
	Marin Oyster Company	5
	Pt. Reyes Oyster Company	2
	Tomales Bay Oyster Company, LLC	1
	CDPH Volunteer (<i>Carl Vogler, Jamie Sutton</i>)	2
San Francisco	None Submitted	
	CDPH Marine Biotoxin Program	2
San Mateo	San Mateo County Environmental Health Department	3
	CDPH Volunteer (<i>Gary Dellamaggiore</i>)	1
Santa Cruz	U.C. Santa Cruz	4
Monterey	Monterey Abalone Company	2
	CDPH Volunteer (<i>Serena Lomonico</i>)	1
San Luis Obispo	Grassy Bar Oyster Company	8
	Morro Bay Oyster Company	6
	CDPH Volunteer (<i>Stuart Heimintoller</i>)	1
	California Polytechnic State University	1
Santa Barbara	CDPH Marine Biotoxin Program	1
	Santa Barbara Mariculture Company	4
Ventura	U.C. Santa Barbara	3
	Ventura County Environmental Health Department	1
Los Angeles	Southern California Marine Institute	1
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarm, Inc.	4
	U.S. Navy Marine Mammal Program	2



Phytoplankton Gallery

Several examples of the diatom *Odontella*, often observed in low numbers in our samples.

