

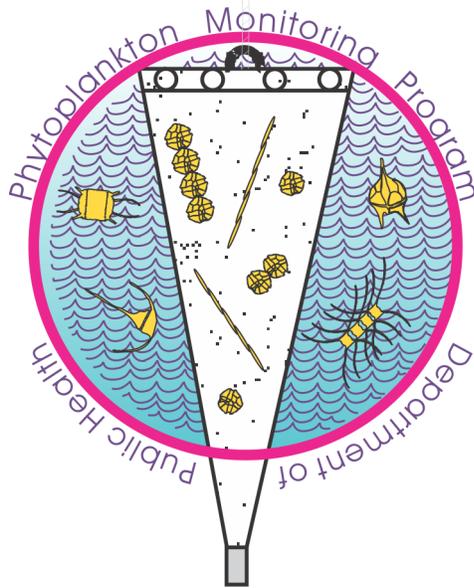


Marine Biotoxin Monitoring Report

December 2017

Technical Report No. 17-27

25 Years!



PHYTOPLANKTON MONITORING PROGRAM CELEBRATES ITS 25TH YEAR

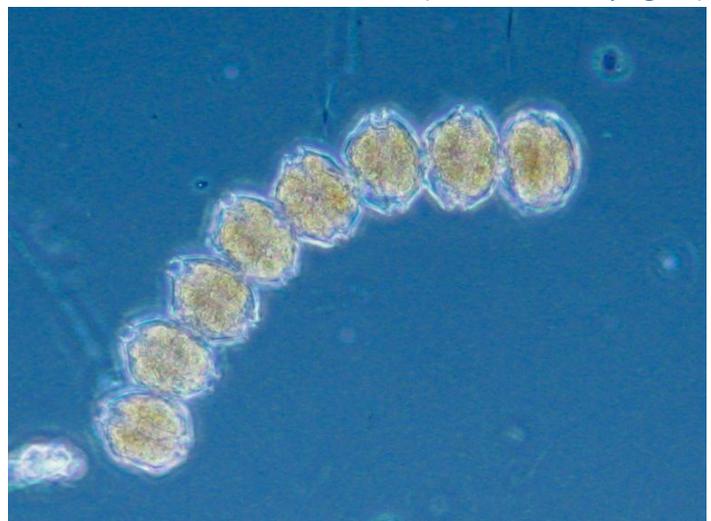
We wanted to take this opportunity to thank everyone that has helped to establish and maintain this unique statewide public health monitoring program over the past 25 years! We also wanted to take this moment to provide a brief history of the program for those that weren't with us 25 years ago. Although the Marine Biotoxin Monitoring Program staff had been engaged in sampling phytoplankton for *Alexandrium* at local sentinel stations since the late 1980's, the statewide program was established in 1992 in response to the first recorded domoic acid event in California. The death of hundreds of seabirds in Monterey Bay in the fall of 1991 was determined to be caused by the neurotoxin domoic acid, which had previously been known to exist only in eastern Canada, where a 1987 public health outbreak led to the syndrome name of Amnesic Shell-

fish Poisoning. The presence of this toxin was attributed to the diatom *Pseudo-nitzschia*, which had been grazed by the schooling anchovies that were being consumed by the seabirds in Monterey Bay.

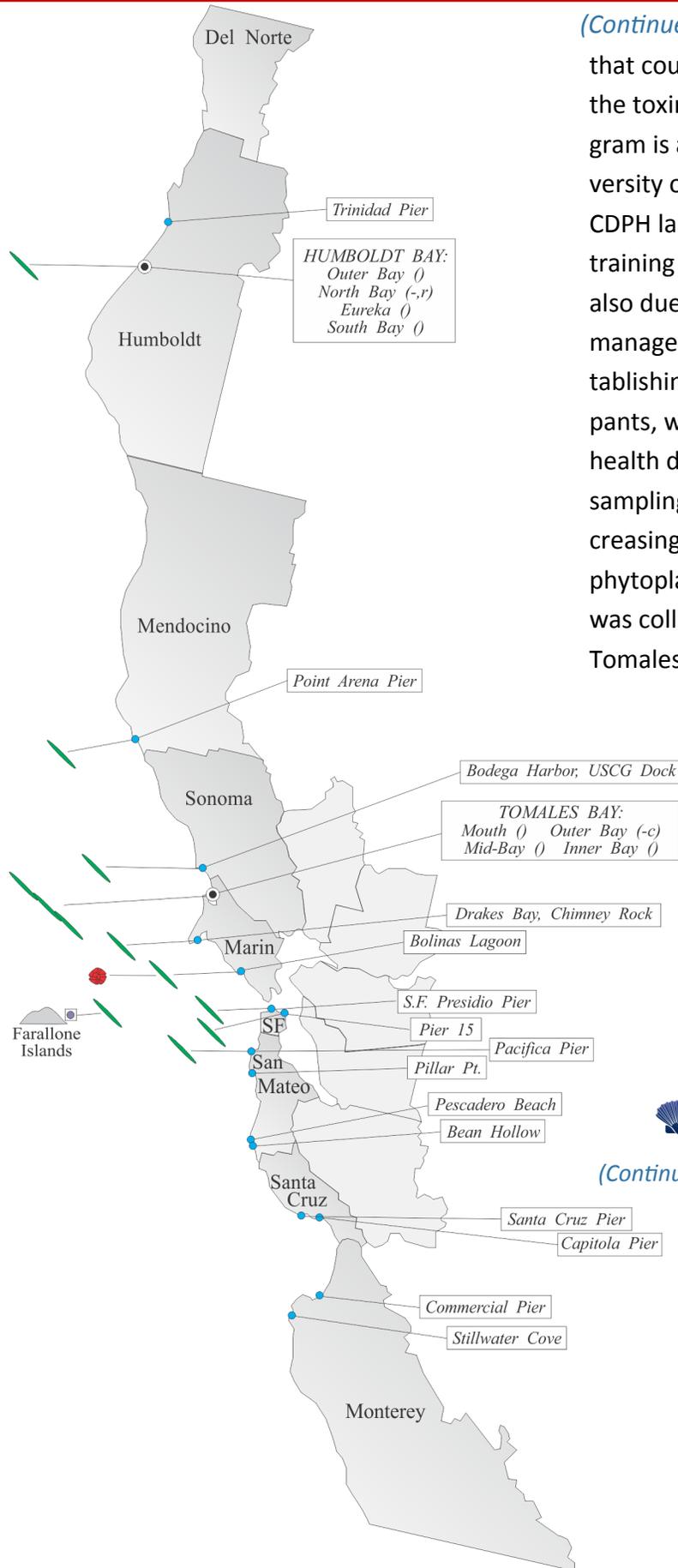
With no knowledge of the distribution or frequency of occurrence of the toxin-producing diatom *Pseudo-nitzschia*, it was clear that we needed to take a step back in the food chain and begin sampling for the phytoplankton species responsible for domoic acid and the paralytic shellfish poisoning toxins. Because of the role that anchovies played in the Monterey Bay mortality event, it was also clear that other commercial seafood species would need to be monitored to protect the public from domoic acid.

The phytoplankton program owes its origins to the technical support and encouragement provided by the U.S. Food and Drug Administration's (FDA) Office of Seafood. Dr. Sherwood Hall of FDA provided the initial equipment, guidance, and training on a simple, low cost approach to phytoplankton monitoring

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Alexandrium was rarely observed along the California coast in December.



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that could lend itself to the field identification of the toxin-producing species. The monitoring program is also indebted to Dr. Rita Horner of the University of Washington, who kindly traveled to the CDPH lab, then in Berkeley, to provide a multi-day training in phytoplankton identification. Thanks is also due to the CDPH shellfish program staff and management for taking on this challenge and establishing a grass-roots network of program participants, which began with help from local County health departments already engaged in shellfish sampling, commercial shellfish growers, and, increasingly, citizen volunteers. In fact, the very first phytoplankton sample of this fledgling program was collected on December 15, 1992, by the Tomales Bay BayKeeper program. The diversity of

participants has always been a strength of our program: we hope you take time to look at the tables of shellfish and phytoplankton samplers in each monthly report.

Once again, our sincere thanks and gratitude to all of our program participants over the years: we look forward to another 25 years of phytoplankton monitoring!



(Continue to page 4 for the December Monthly Report)

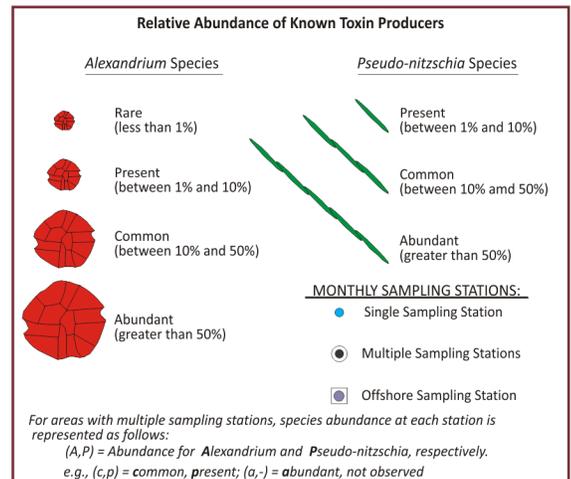


Figure 1. Toxic phytoplankton distribution in northern California.

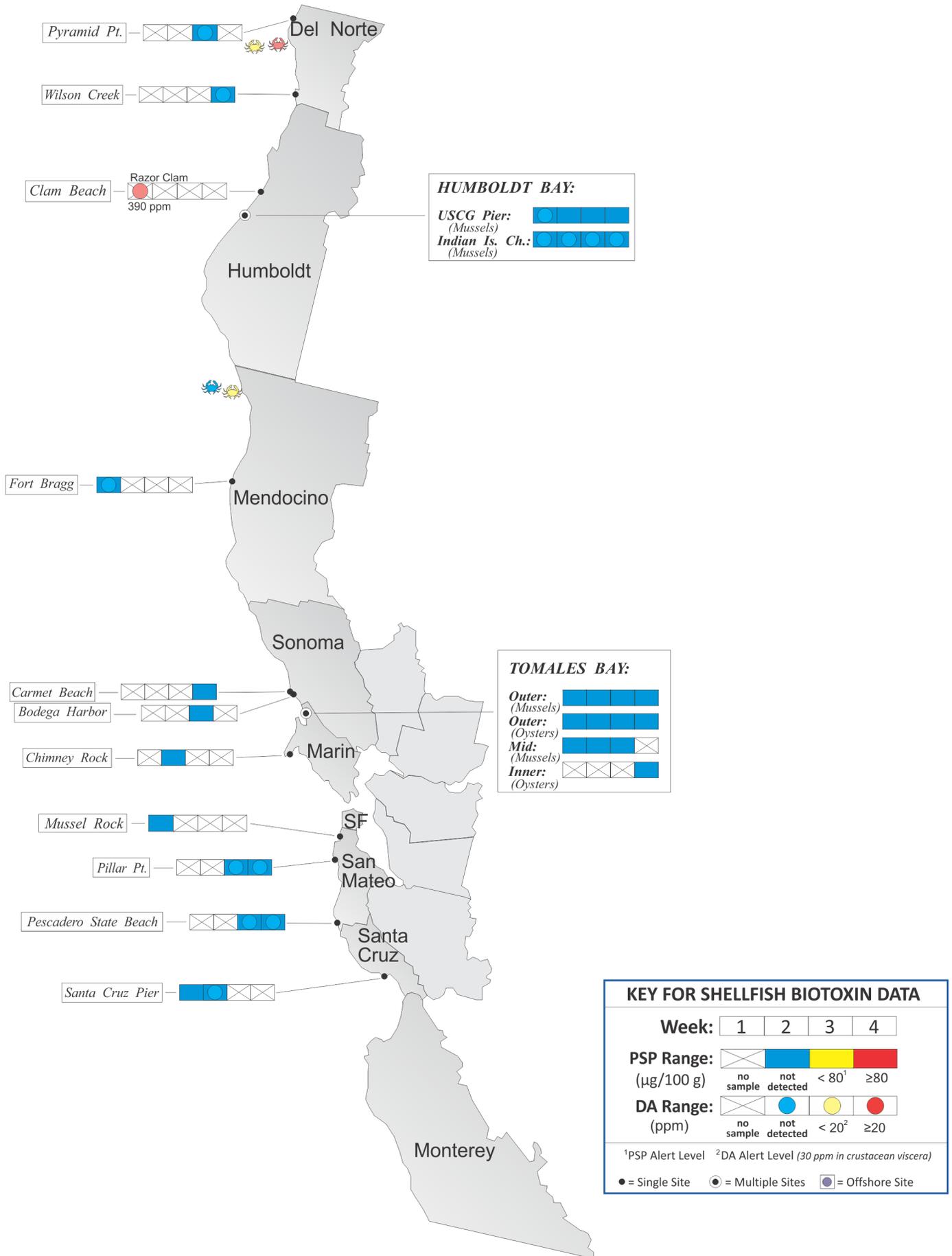


Figure 2. Distribution of shellfish biotoxins in northern California.

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Figure 3. Toxic phytoplankton distribution in southern California.

INTRODUCTION:

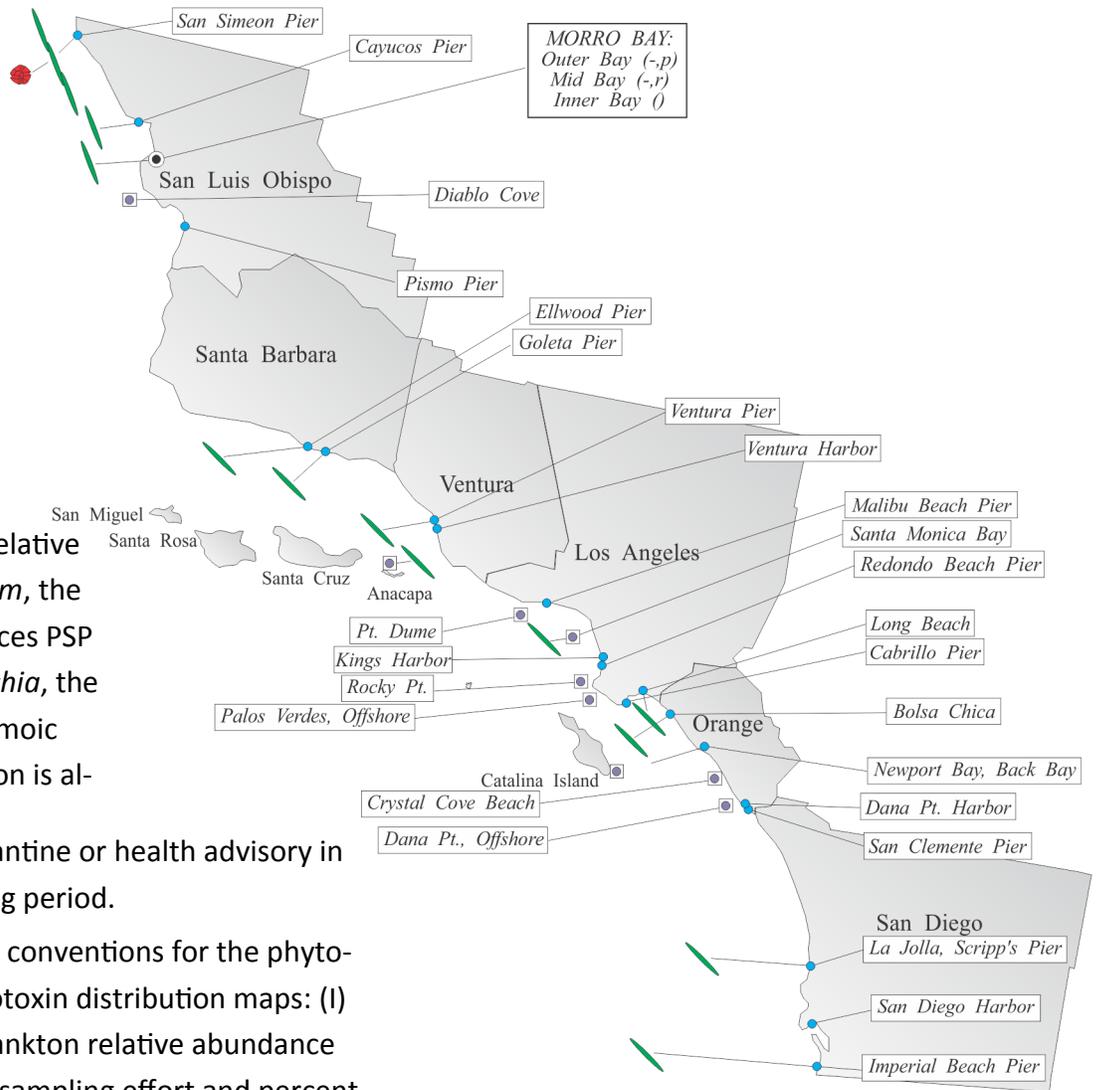
This report provides a summary of biotoxin activity for the month of December, 2017. Toxin concentration ranges are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided

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 al-

so 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 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

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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's health is threatened.

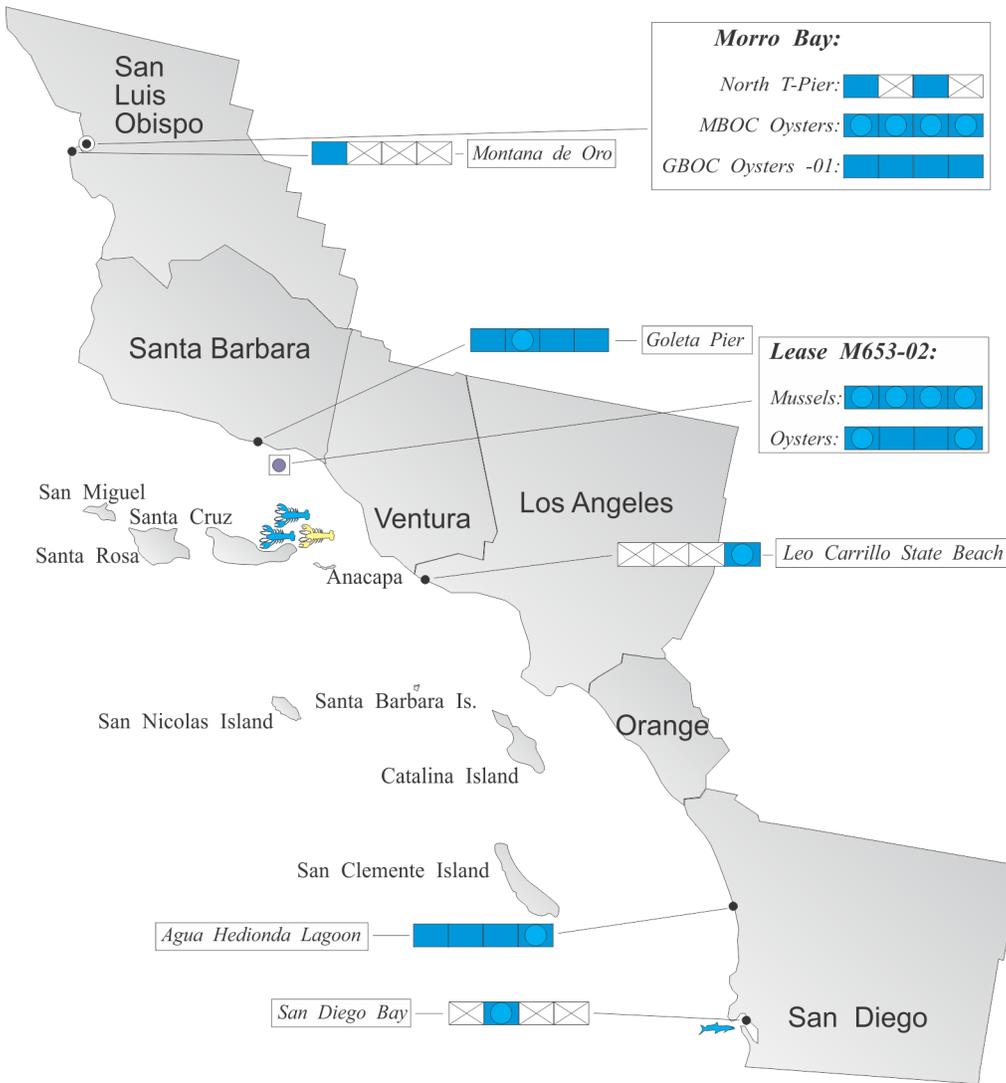
For Information on Volunteering:

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.



relative abundance were reduced from observations in November (Figure 1). This diatom was common in a December 26 sample collected in outer Tomales Bay. The cell mass at this site was slightly elevated and consistent in samples collected on December 10, 17, and 26. Low numbers of *Pseudo-nitzschia* were also observed in samples from Humboldt, Sonoma, Marin, San Francisco, and San Mateo counties.

Domoic acid was not detected in any mussel or oyster samples analyzed in December. Razor clams collected from Clam Beach (Humboldt County) by the California Department of Fish and Wildlife, however, continued to contain high concentrations of this toxin (Figure 2). All of the 13

razor clam meat samples were well above the alert level of 20 ppm, ranging from 78 to 390 ppm. The latter result is the highest concentration of domoic acid detected in California razor clams.

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Northern California Summary: Paralytic Shellfish Poisoning

Alexandrium was absent from all but one sampling site in December (Figure 1). A small number of cells was observed in a December 19 phytoplankton sample from Bolinas Lagoon in Marin County. PSP toxicity was not detected in any shellfish samples collected in December (Figure 2).

Domoic Acid

Pseudo-nitzschia was observed at several sampling sites in December, although the distribution and

concentration of domoic acid detected in California razor clams. The majority of clams (10) contained greater than 100 ppm of this toxin. The CDPH Food and Drug Branch (FDB), in coordination with the California Department of Fish and Wildlife (CDFW), submitted a number of Dungeness



The chain-forming diatom *Thalassiosira* was common inside Tomales Bay.

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crab viscera samples for domoic acid analysis. Concentrations of domoic acid above the alert level were detected in crab samples from offshore of Del Norte, with a maximum concentration of 56 ppm. Toxin levels were low or nondetectable in crab from northern Mendocino County.

Non-Toxic Species

The diatom *Chaetoceros* was common in outer Tomales Bay (Marin County) and at the Pacifica Pier (San Mateo County). *Thalassiosira* was also common inside Tomales Bay. The dinoflagellate *Ceratium furca* was abundant inside Bolinas Lagoon (Marin County) and common offshore, east of the Farallon Islands. *Akashiwo sanguineum*, an unarmored dinoflagellate, was also common east of the Farallones and at the Capitola Pier (Santa Cruz County).

Southern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium was only observed at one location in December (Figure 3). This dinoflagellate was present in very low numbers in samples collected at the San Simeon Pier (San Luis Obispo County) on December 1 and 21. This continues an apparent northward progression in the occurrence of *Alexandrium*, having been observed in November in a sample from Cayucos Pier and in October in mid-Morro Bay. The presence of this

Table 1. Program participants collecting phytoplankton samples.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		None Submitted	
HUMBOLDT COUNTY			
Coast Seafood Company	3	Humboldt State University Marine Lab	2
MENDOCINO COUNTY		CDPH Volunteer (<i>Marie DeSantis</i>)	1
SONOMA COUNTY		CDPH Marine Biotoxin Program	1
MARIN COUNTY		CDPH Volunteers (<i>Brent Anderson, George Clyde</i>)	4
CDPH Marine Biotoxin Program	1	Hog Island Oyster Company	5
SAN FRANCISCO COUNTY		Gulf of the Farallones National Marine Sanctuary	1
CDPH Volunteer (<i>Eugenia McNaughton</i>)	3	Exploratorium	3
SAN MATEO COUNTY		CDPH Volunteer (<i>Ignacio Martin-Bragado</i>)	1
The Marine Mammal Center	4	San Mateo County Environmental Health Dept.	2
SANTA CRUZ COUNTY		CDPH Volunteer (<i>Jeff Palsgaard</i>)	3
Santa Cruz County Environmental Health Dept.	2	U.C. Santa Cruz	2
MONTEREY COUNTY		CDPH Volunteer (<i>Jonathan Lim</i>)	1
Monterey Abalone Company	1	The Otter Project	4
SAN LUIS OBISPO COUNTY			
CDPH Volunteer (<i>Dan Hoskins</i>)	1	Friends of the Sea Otter	1
Grassy Bay Oyster Company	1	Monterey Bay National Estuary Program	2
Monterey Bay National Marine Sanctuary	4	Tenera Environmental	1
SANTA BARBARA COUNTY			
HABNet	2	U.C. Santa Barbara	5
VENTURA COUNTY		Channel Island High School	1
CDPH Volunteer (<i>Fred Burgess</i>)	1	National Park Service	1
LOS ANGELES COUNTY		CDPH Volunteers	5
City of L.A. Environmental Monitoring Division	1	(<i>Cal Parsons, Gina Lumbruno, Jenny Peters</i>)	
Los Angeles County Health Department	1	Los Angeles Water Keeper	4
ORANGE COUNTY		Amigos de Bolsa Chica	5
Back Bay Science Center	3	CDPH Volunteer (<i>Truong Nguyen</i>)	1
Crystal Cove Alliance	2	Ocean Institute	2
SAN DIEGO COUNTY		Scripps Institute of Oceanography	2
Tijuana River National Estuary Research	2	U.S. Navy Marine Mammal Program	3

toxin-producing dinoflagellate has persisted in San Luis Obispo County since June.

PSP toxins were not detected in any samples analyzed in December (Figure 4).

Domoic Acid

Pseudo-nitzschia was observed at one or more sampling sites in each southern California County during December (Figure 3). While the distribution was similar to observations in October, there was a significant decrease in the relative abundance of this diatom along the entire southern California coast. Very low numbers of *Pseudo-nitzschia* were observed at all locations; although common in a De-

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December 7 sample from San Simeon Pier, the cell mass and species diversity were quite low. Domoic acid was not detected in any bivalve shellfish samples analyzed in December (Figure 4). FDB and CDFW collected samples of spiny lobster in the vicinity of Santa Cruz Island. The majority of lobster viscera samples were below the detection limit, with one sample containing a low concentration of domoic acid (11 ppm).

Non-Toxic Species

Dinoflagellates were dominant along most of the southern California coast in December, with the diatoms prevalent at some sites in Los Angeles and Orange counties. The dinoflagellate *Gonyalulax spinifera* was abundant in a December 6 sample from Goleta Pier (Santa Barbara County) and common in samples from San Simeon Pier, Ventura Harbor, Santa Monica Bay, and offshore of the Palos Verdes Peninsula. Another dinoflagellate, *Lingulodinium polyedrum*, was abundant at Goleta Pier (December 20) and common in samples from Ellwood Pier, and Catalina Island. The diatom *Hemialus* remained abundant offshore of Palos Verdes and was also abundant offshore of Pt. Dume. *Skeletonema* and *Chaetoceros* were common in a sample from Long Beach.

QUARANTINES:

The annual mussel quarantine was lifted on October 31 for all coastal counties except Sonoma.

The CDFW closure of the razor clam fishery remains in effect due to the continued presence of dangerous levels of domoic acid in ra-

Table 2. Program participants collecting shellfish samples.

COUNTY	AGENCY	#
Del Norte	Tolowa Dee-ni' Nation	1
	Yurok Tribe Environmental Group	1
Humboldt	Coast Seafood Company	8
	California Department of Fish and Wildlife	13
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Volunteer (<i>John Morozumi</i>)	1
	CDPH Marine Biotoxin Program	1
Marin	CDPH Marine Biotoxin Program	1
	Cove Mussel Company	3
	Hog Island Oyster Company	4
	Marin Oyster Company	4
	Tomales Bay Oyster Company	1
San Francisco	None Submitted	
San Mateo	CDPH Volunteer (<i>Gary Della Maggiora</i>)	1
	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	2
Monterey	None Submitted	
San Luis Obispo	CDPH Volunteer (<i>Stuart Helms</i>)	1
	Grassy Bar Oyster Company	4
	Morro Bay Oyster Company	6
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
Ventura	None Submitted	
Los Angeles	CDPH Volunteer (<i>Steven Field</i>)	1
	Los Angeles County Health Department	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarm, Inc.	4
	U.S. Navy Marine Mammal Program	2

zor clams from beaches in Humboldt and Del Norte counties.

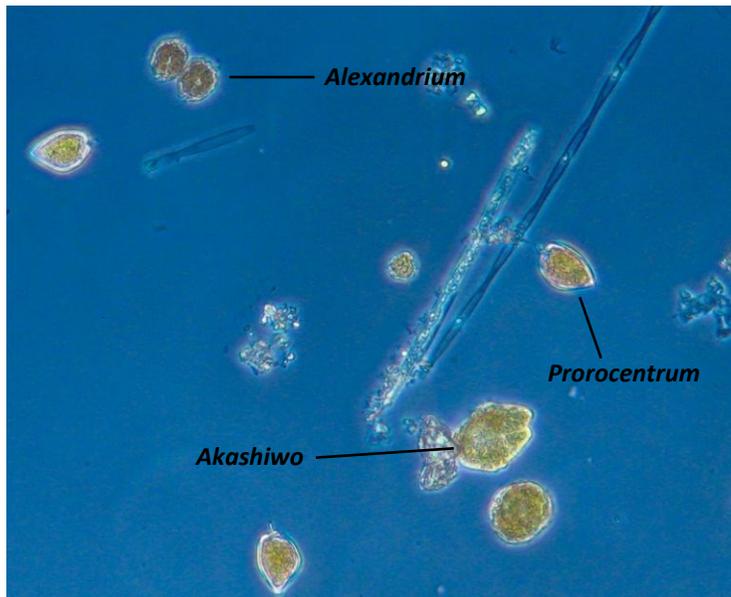
On October 19 CDPH lifted the health advisory for scallops and clams in Los Angeles County. Recent testing confirmed that concentrations of domoic acid have remained at safe or undetectable levels.

Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

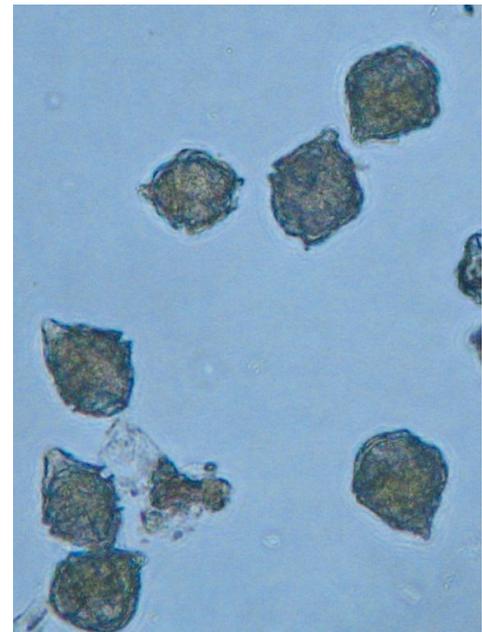


If you are having difficulty accessing this document, please contact CDPH at 1-800-553-4133 to request this information in an alternate format.

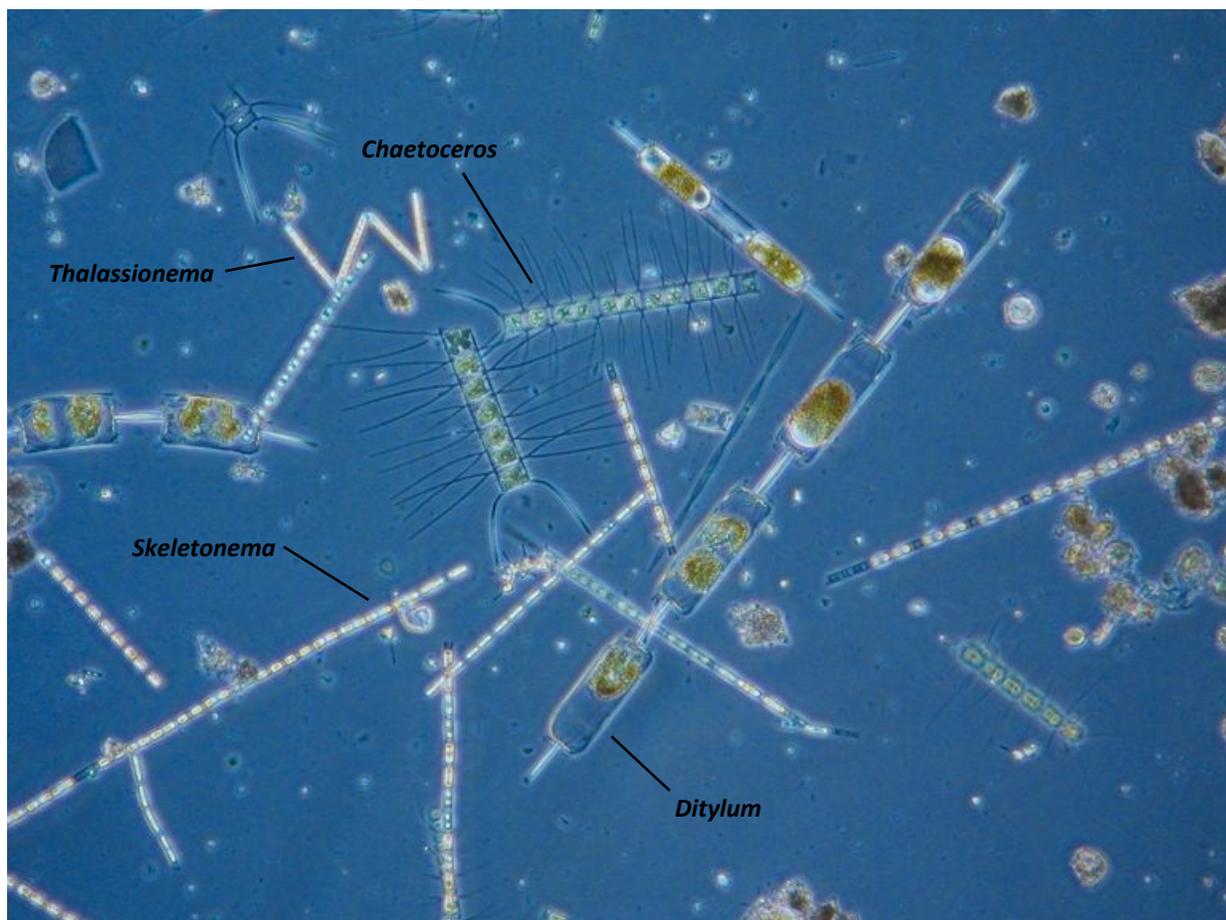
Phytoplankton Gallery



Several dinoflagellate species were observed in December.



The dinoflagellate *Gonyaulax spinifera* was common in several locations.



A variety of diatoms, most in low numbers, was observed along the California coast.