CALIFORNIA DEPT.OF PUBLIC HEALTH ENVIRONMENTAL MANAGEMENT BRANCH

Marine Biotoxin Monitoring Report

August 2017 Technical Report No. 17-22

INTRODUCTION:

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

Locally collected mussels can be placed in mesh bags and suspended in the water from boat docks and piers (preferably with limited public access). These 'sentinel mussels' can be easily retrieved regardless of tides, improving our ability to monitor these areas for marine toxins.

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;

Barnacle nauplii are often present in our phytoplankton samples.

(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 numerous locations along the northern California coast in August (Figure 1). This dinoflagellate was observed at sampling sites in each coastal County except Mendocino, representing an increase in distribution compared to observations in July. The relative abundance of *Alexandrium* was highest in a sample collected at Trinidad Pier in Humboldt County (August 8). *Alexandrium* was also common at the Santa Cruz Wharf (August 23), although cell numbers were lower than observed at Trinidad Pier.

PSP toxicity was detected in shellfish from sites in all coastal counties except San Francisco (Figure 2). Low levels of PSP toxins were detected in sentinel mussels from outer Humboldt Bay throughout the month, continuing a pattern that began in July. The

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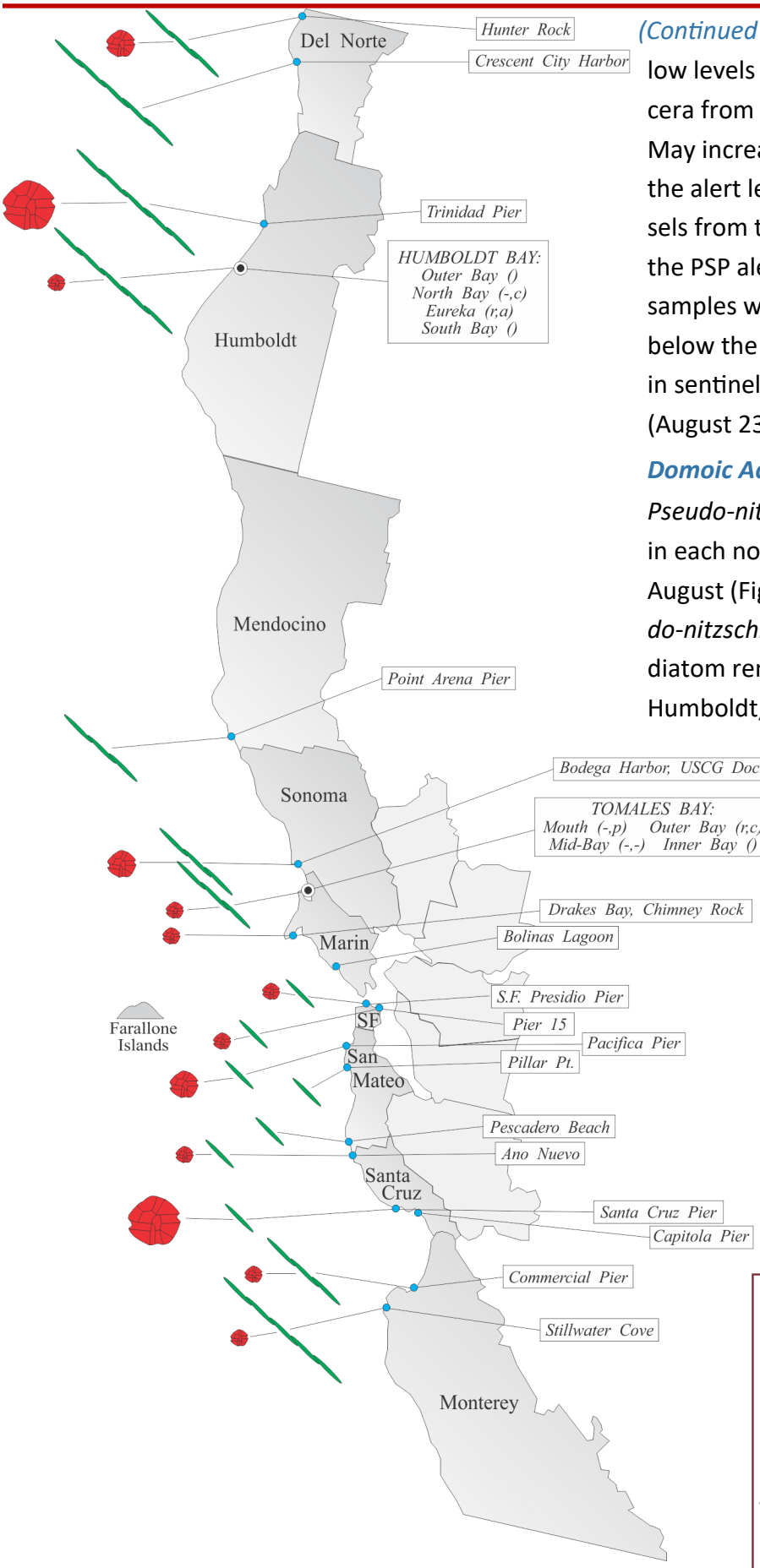

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low levels of PSP toxins detected in rock scallop viscera from the Monterey Commercial Wharf since May increased significantly and were well above the alert level by August 30 (301 ug/100 g). Mussels from the same site and date were just below the PSP alert level (78 ug/100 g). All other shellfish samples with detectable toxin concentrations were below the alert level, the highest being 67 ug/100 g in sentinel mussels from the Santa Cruz Wharf (August 23).

Domoic Acid

Pseudo-nitzschia continued to be observed at sites in each northern California coastal county during August (Figure 1). The relative abundance of *Pseudo-nitzschia* decreased at most sites, although this diatom remained abundant at sites in Del Norte, Humboldt, and Monterey counties. The highest relative abundance of *Pseudo-nitzschia* was observed in a sample collected from Stillwater Cove in Monterey County (August 7).

Low concentrations of domoic acid were detected in shellfish samples from Humboldt County (Figure 2). Sentinel mussels from outer Humboldt Bay contained 3.9 ppm of toxin (August 21) and mussels from Trinidad Pier contained 9.2 ppm (August 23).

Rock crab samples caught along the Sonoma coast were submitted by the

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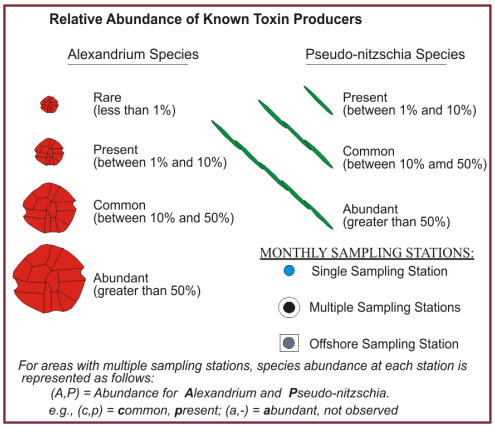

Figure 1. Toxic phytoplankton distribution in northern California.

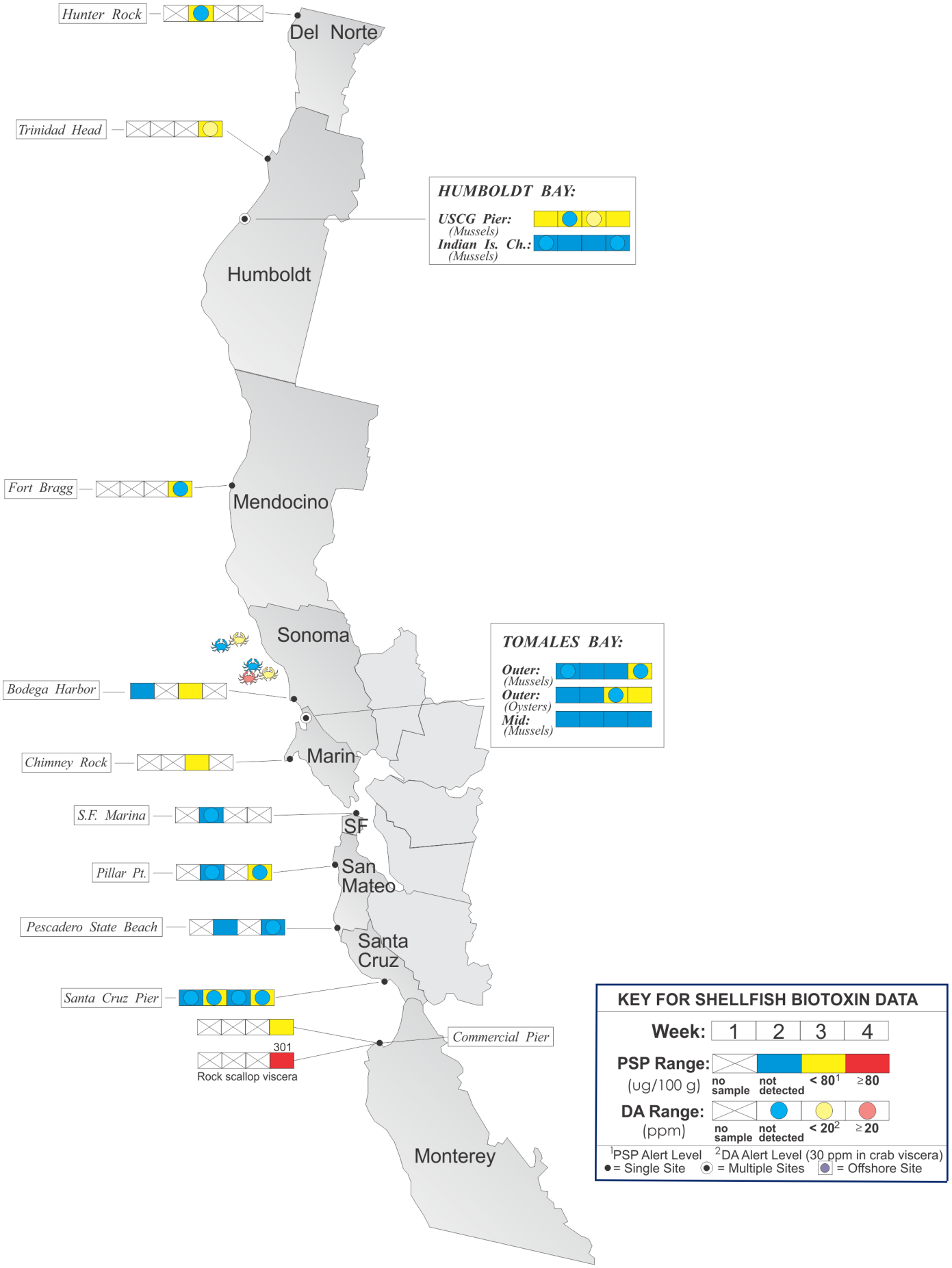

Figure 2. Distribution of shellfish biotoxins in northern California.

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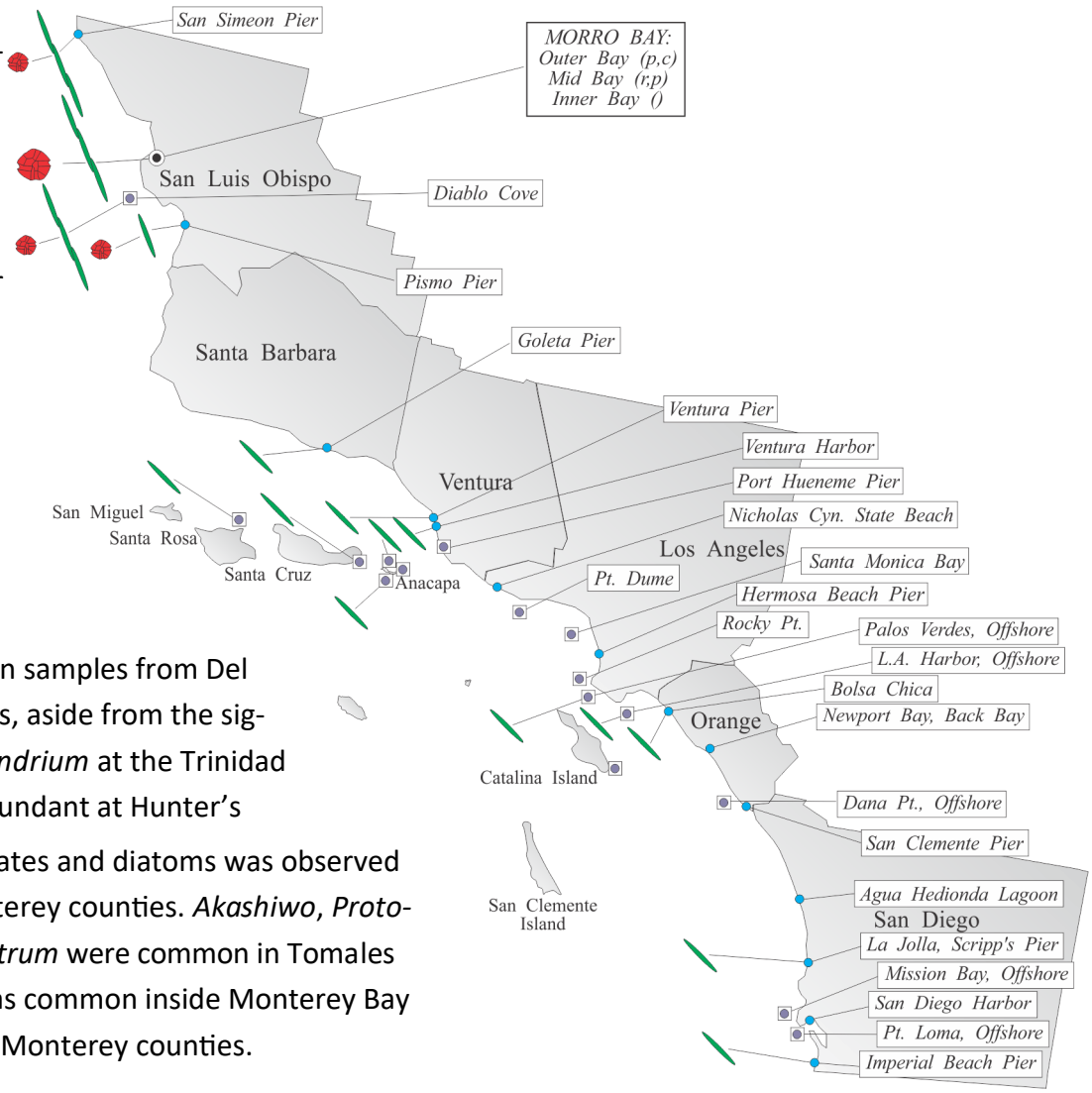
CDPH Food and Drug Branch. Samples from offshore of Salt Point contained low or undetectable levels of domoic acid and samples from offshore of the Russian River contained varying concentrations, from nondetectable to above the alert level. The highest concentration detected was 50 ppm.

Figure 3. Toxic phytoplankton distribution in southern California.



Non-Toxic Species

Diatoms were dominant in samples from Del Norte to Sonoma counties, aside from the significant increase of *Alexandrium* at the Trinidad Pier. *Rhizosolenia* was abundant at Hunter's Rock. A mix of dinoflagellates and diatoms was observed between Marin and Monterey counties. *Akashiwo*, *Protoperidinium*, and *Prorocentrum* were common in Tomales Bay and *Cochlodinium* was common inside Monterey Bay at sites in Santa Cruz and Monterey counties.

Southern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium continued to be observed at several sites along the San Luis Obispo County coastline, including

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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.

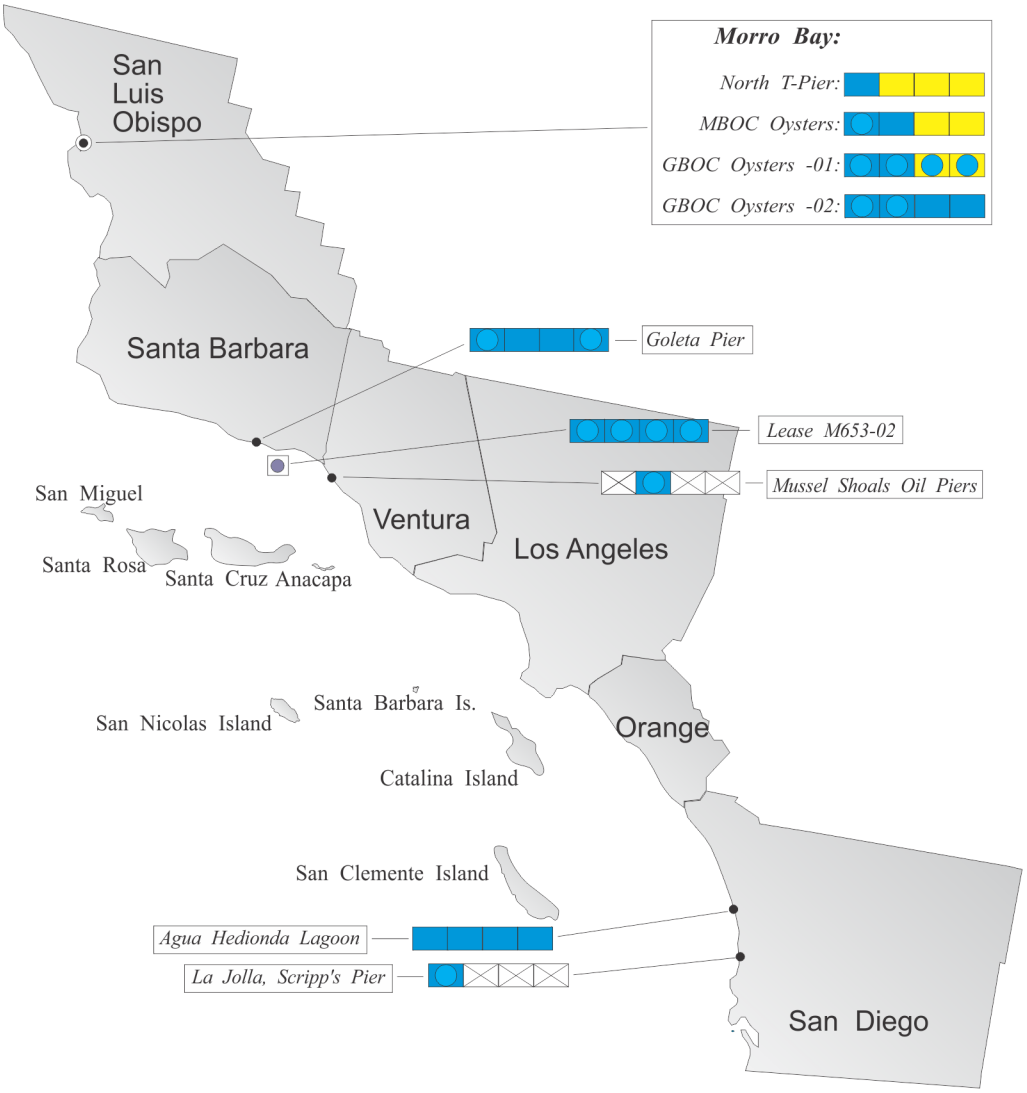
For Information on Volunteering:

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

For Recorded Biotoxin Information Call:

(800) 553 - 4133

Figure 4. Distribution of shellfish biotoxins in southern California.



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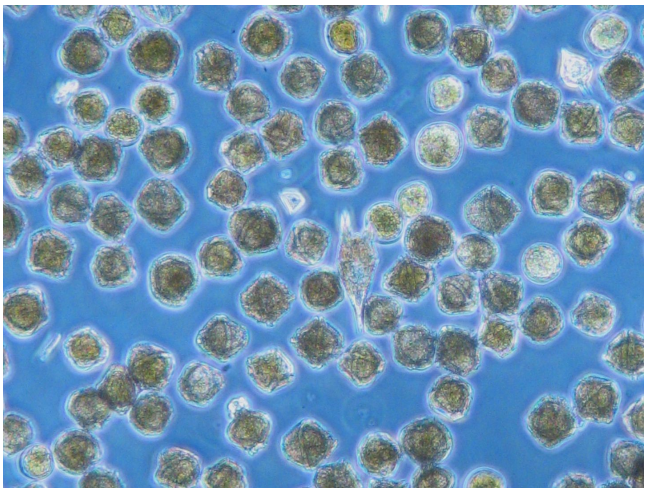
inside Morro Bay (Figure 3). The presence of this toxin-producing dinoflagellate has persisted in this region since June. Cell numbers were low at all sites.

PSP toxins were detected at several sites in Morro Bay (Figure 4). Toxicity was first detected in mussels from the outer bay in the second week of August and persisted throughout the month. By the third week of the month there were low levels of toxicity in oysters from two aquaculture leases farther inside the bay.



The dinoflagellate *Lingulodinium* was common to abundant between San Luis Obispo and San Diego counties.

Domoic Acid

Pseudo-nitzschia was observed at sampling sites in each southern California County in August (Figure 3). The relative abundance of this diatom decreased compared to observations in July, most noticeably at sites along the San Luis Obispo and Santa Barbara coastline, as well as at the offshore northern Channel Island chain. Cell mass was low at all locations, with the highest relative abundance observed in an August 3 sample collected offshore of Diablo Cove.

Domoic acid was absent from all shellfish samples collected in August (Figure 4).

Non-Toxic Species

A mix of diatoms and dinoflagellates was observed along the southern California coast. There was a greater diversity and relative abundance observed among the dinoflagellates. Several *Ceratium* species were common to abundant along much of the coast, including *Ceratium furca*, C. *divaricatum*, and *C. fusus*. *Lingulodinium polyedrum* was abundant at Goleta Pier, Ventura Harbor, Ventura Pier, Hermosa Beach Pier, offshore of Pt. Dume, inside Santa Monica Bay, and offshore of the Palos Verdes peninsula.

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QUARANTINES:

The annual mussel quarantine began as scheduled on May 1 and will continue through at least October 31.

Due to the persistent presence of dangerous levels of domoic acid in razor clams from beaches in Humboldt and Del Norte counties, the California Department of Fish and Wildlife's (CDFW) closure of the razor clam fishery remains in effect.

On June 6 CDPH announced a Health Advisory warning consumers not to eat recreationally harvested bivalve shellfish, including mussels, clams, and rock scallops, from Los Angeles County.

A Health Advisory issued on May 5 warned consumers not to eat recreationally harvested bivalve shellfish, including mussels, clams, and rock scallops, from Santa Barbara County. The health advisory included rock crab caught in state waters around Santa Rosa Island and the northern Channel Islands.

An April 28 Health Advisory warned consumers to avoid eating recreationally harvested bivalve shellfish from Ventura County due to dangerous levels of domoic acid.

A Health Advisory was issued on April 13 warning consumers not to eat recreationally harvested bivalve shellfish from Santa Barbara County, including the northern Channel Islands. Dangerous levels of domoic acid were detected in this region.

Table 1. Program participants collecting phytoplankton samples.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY			
Tolowa Dee-ni' Nation	1	CDPH Volunteer (*Jim Hooper)*	1
HUMBOLDT COUNTY		CHPH Volunteer (*Olivia Giovannetti, Sage Roy)*	2
Coast Seafood Company	4	Humboldt State University Marine Lab	2
MENDOCINO COUNTY		CDPH Volunteer (*Marie DeSantis)*	2
SONOMA COUNTY		CDPH Marine Biotoxin Program	2
MARIN COUNTY		CDPH Volunteers	4
CDPH Marine Biotoxin Program	2	(*Brent Anderson,George Clyde)*	
Hog Island Oyster Company	3		
SAN FRANCISCO COUNTY			
CDPH Volunteer (*Eugenia McNaughton)*	2	Exploratorium	3
SAN MATEO COUNTY		San Mateo County Environmental Health Dept.	6
The Marine Mammal Center	4	U.C. Santa Cruz	2
SANTA CRUZ COUNTY			
CDPH Volunteer (*Jeff Palsgaard)*	5	U.C. Santa Cruz	4
MONTEREY COUNTY			
Monterey Abalone Company	3	The Otter Project	4
SAN LUIS OBISPO COUNTY		Friends of the Sea Otter	3
Grassy Bay Oyster Company	2	Monterey Bay National Estuary Program	2
Monterey Bay National Marine Sanctuary	5	Tenera Environmental	4
SANTA BARBARA COUNTY			
National Park Service/HABNet	2	U.C. Santa Barbara	5
VENTURA COUNTY		CDPH Volunteer (*Fred Burgess)*	4
Channel Island High School	1	National Park Service	4
LOS ANGELES COUNTY		CDPH Volunteer (*Cal Parsons)*	1
City of L.A. Environmental Monitoring Division	4	Los Angeles County Health Department	1
Los Angeles County Sanitation District	2	Los Angeles Water Keeper	7
ORANGE COUNTY			
Amigos de Bolsa Chica	3	Back Bay Science Center	2
CDPH Volunteer (Truong Nguyen)	2	Ocean Institute	1
SAN DIEGO COUNTY			
Carlsbad Aquafarm, Inc.	2	Sea Camp/HABNet	1
Scripps Institute of Oceanography	3	Tijuana River National Estuary Research	5
U.S. Navy Marine Mammal Program	3	Wildcoast	2

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

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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 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.

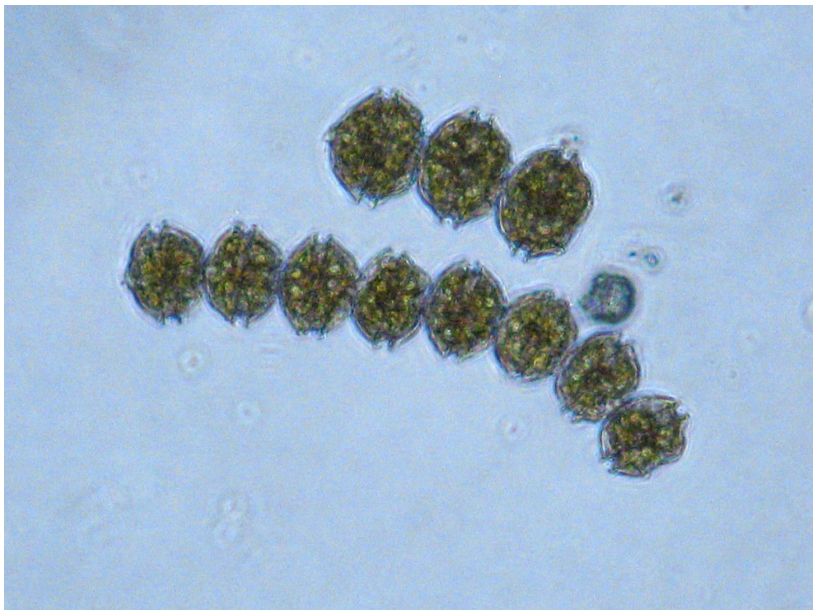
Table 2. Program participants collecting shellfish samples.

COUNTY	AGENCY	#
Del Norte	Tolowa Dee-ni' Nation	1
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	2
Marin	Cove Mussel Company	4
	Hog Island Oyster Company	7
	Marin Oyster Company	6
	Pt. Reyes Oyster Company	3
	CDPH Marine Biotoxin Program	1
San Francisco	San Francisco Estuary Institute	1
San Mateo	San Mateo County Environmental Health Department	4
Santa Cruz	U.C. Santa Cruz	5
Monterey	Monterey Abalone Company	2
San Luis Obispo	Grassy Bar Oyster Company	13
	Morro Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara	5
Ventura	Ventura County Environmental Health Department	1
Los Angeles	None Submitted	
Orange	None Submitted	
San Diego	Carlsbad Aquafarm, Inc.	5
	Scripps Institute of Oceanography	1

Photos Wanted!

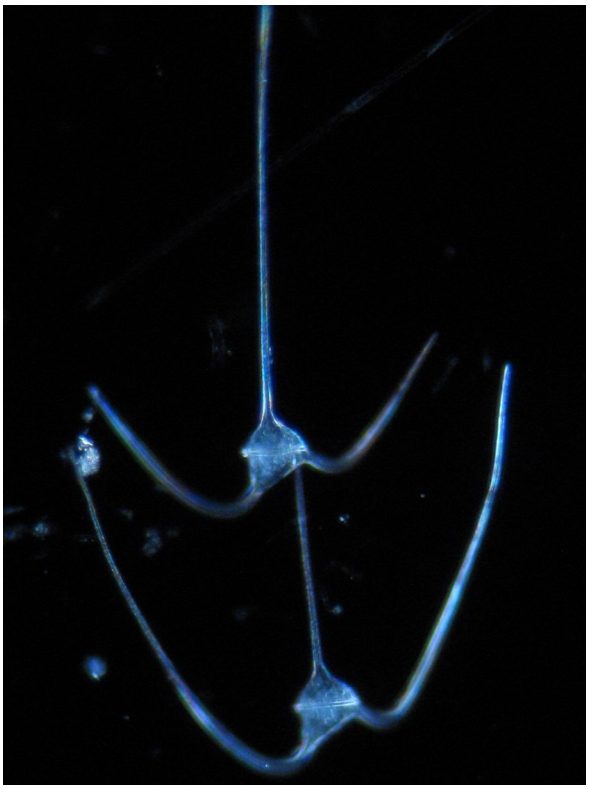
You may have noticed that in recent months our report format has changed slightly. We would like to highlight the various sampling sites along our beautiful coast but have run out of pictures! If you would be willing to share a photograph of your sampling site, or of the phytoplankton you are observing, please email it to redtide@cdph.ca.gov with a note that it is okay to use it in a monthly report. If one or more people are in the photo we would also need their permission to use the picture, so frame your photos wisely!

Phytoplankton Gallery

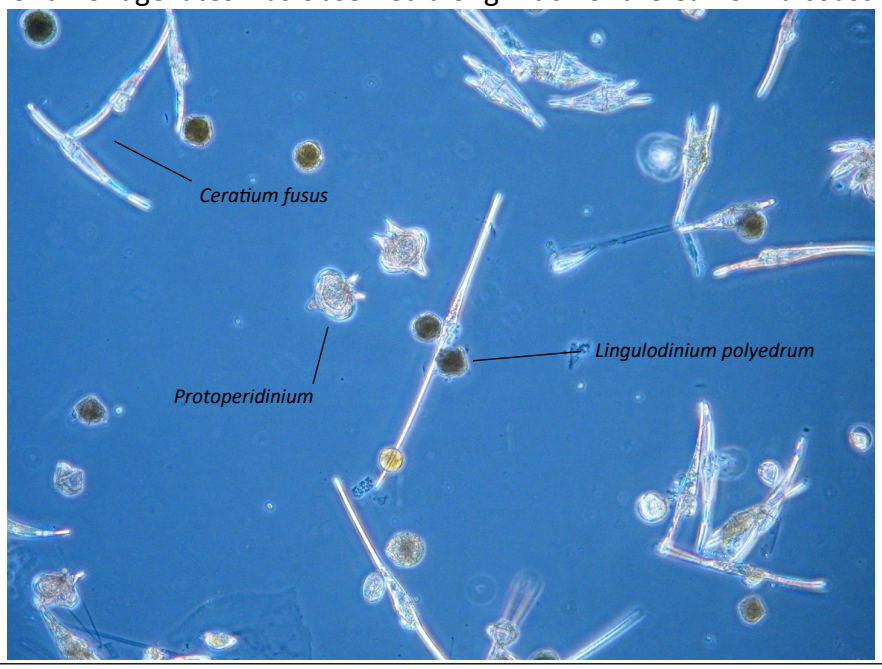


Chains of the dinoflagellate *Alexandrium*.

Darkfield microphotograph of the dinoflagellate *Ceratium macroceros*, observed in a sample from Catalina Island.



A mix of dinoflagellates was observed along much of the California coast in August.



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