CALIFORNIA DEPT.OF PUBLIC HEALTH



Marine Biotoxin Monitoring Report

June 2020

Technical Report No. 20-20

INTRODUCTION:

This report contains results from the California Department of Public Health (CDPH) monitoring programs for shellfish toxins and associated toxinproducing phytoplankton. Toxin concentration ranges are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA), the latter associated with the syndrome called Amnesic Shellfish Poisoning. Estimates are provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo -nitzschia*, the diatom that produces domoic acid. This report also contains summary information for any quarantine or health advisory in effect during the reporting period. Finally, lists of participating



Mussels exposed at low tide along the Marin County coast.



Alexandrium numbers increased at several locations during June.

agencies and volunteers for each monitoring effort are provided.

Northern California Summary: Paralytic Shellfish Poisoning

Alexandrium increased in distribution and relative abundance during June (Figure 1). This dinoflagellate was observed in samples from sites along most coastal counties between Humboldt and Monterey. Alexandrium was common at the Pacifica Pier in San Mateo County (June 14, 15%) and the Monterey Commercial Wharf (June 24, 12%). Elevated numbers of Alexandrium were also observed in outer Tomales Bay in Marin County (June 29) and Bean Hollow State Park in San Mateo County (June 25).

(Continued on page 2)

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) Only known toxin-producing species (e.g., *seriata* complex for *Pseudo-nitzschia*) are represented on the maps; (iii) All toxin data are for mussel samples, unless otherwise noted; (iv) 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); (v) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.



Figure 1. Toxic phytoplankton distribution in northern California.

(Continued from page 1)

PSP toxicity was detected in mussel samples from numerous sites along the northern California coast, particularly between Marin and Monterey counties (Figure 2). Toxin concentrations exceeding the alert level were detected at the following locations: Mori Point (86 μ g/100 g) and Pillar Point (137 μ g/100 g) in San Mateo County; Davenport Landing (840 μ g/100 g) and the Santa Cruz Wharf (648 μ g/100 g) in Santa Cruz County; and the Monterey Commercial Wharf (498 μ g/100 g) and China Rock (116 μ g/100 g) in Monterey County.

Low concentrations of PSP toxins continued to be detected in mussel samples from the outer Humboldt Bay sentinel station on June 8, 15, 22, and 29 (38, 44, 42 and 40 μ g/100 g, respectively) and at several additional sites between Marin and Monterey counties.

Domoic Acid

Pseudo-nitzschia was observed at most sites between Humboldt and Monterey counties (Figure 1). The distribution and relative abundance of this diatom were similar to observations in May. *Pseudonitzschia* remained common in outer Tomales Bay during the first week of the month (45% and 20% on June 1 and 8, respectively). This diatom was also common in samples from the Pacifica Pier

(Continued on page 4)





Figure 2. Distribution of shellfish biotoxins in northern California.

(Continued from page 2)

(June 7, 15%) and Pillar Point (June 9, 12%) in San Mateo County; the cell mass was low at both sites.

Domoic acid was not detected in any mussel or oyster samples in June. Razor clam samples from Del Norte and Humboldt counties continued to con-San Miguel tain concentrations of domoic acid $a^{\rm tata}$ ${\rm Rosa}^{\rm tata}$ that exceeded the alert level (Figure 2). Volunteer Ken Graves, with permission from the California Department of Fish and Wildlife (CDFW), collected razor clams from Crescent Beach on June 5. All six clam samples contained domoic acid, with five samples exceeding the 20 ppm alert level (21, 23, 31, 45, and 56 ppm). An additional set of samples from Crescent Beach was collected on June 9 by the Tolowa Dee-ni' Nation. Of six clam samples, three contained domoic acid but none exceeded the alert level. A follow-up sampling event will be scheduled to verify that toxin concentrations have declined to a safe level.

CDFW collected six razor clam samples from Clam Beach in Humboldt County on June 8. All samples contained domoic acid, with three of the six clams exceeding the alert level (23, 24, and 87 ppm).

Non-Toxic Species

Diatoms dominated the phytoplankton assemblage between Humboldt and Mar-







Pseudo-nitzschia was common at sites between Sonoma and San Mateo counties.

Figure 4. Distribution of shellfish biotoxins in southern California.

(Continued from page 4)

in counties, as well as inside San Francisco Bay along the Richmond waterfront (Contra Costa County). *Chaetoceros* was common throughout this range, increasing to abundant in outer Tomales Bay with a high cell mass indicative of a bloom. *Skeletonema* and *Eucampia* were also common inside Humboldt Bay. The San Mateo coast was a transition zone, with dia-

toms common the first half of the month and dinoflagellates prevalent by the last week of June. *Protoperidinium* and *Akashiwo sanguineum* were common at the Pacifica Pier and Bean Hollow State Beach, respectively. A diversity of dinoflagellates were dominant in samples from Santa Cruz and Monterey counties, including *Ceratium furca*, *C. lineatum*, *Prorocentrum micans*, *P. gracilis*, and *A. sanguineum*.

Southern California Summary: Paralytic Shellfish Poisoning: Alexandrium was observed at sever-



al sites along the southern California coast (Figure 3). Low numbers of this dinoflagellate continued to be observed in samples collected offshore of Diablo Cove (June 3 and 18) and in mid Morro Bay (June 1

(Continued on page 6)

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 <u>redtide@cdph.ca.gov</u> or call 510-412-4635

(800) 553 - 4133

(Continued from page 5)

and 23) in San Luis Obispo County. *Alexandrium* was also observed in a June 24 sample from the Goleta Pier in Santa Barbara County. PSP toxins were not detected in any shellfish sampled in June (Figure 4).

Domoic Acid

Low numbers of *Pseudo-nitzschia* were observed at numerous sites between San Luis Obispo and San Diego counties (Figure 3).

Domoic acid was not detected in any mussel or oyster samples in June (Figure 4).

Non-Toxic Species

The dinoflagellate *Lingulodinium polyedrum*, which dominated most of the southern California coast in May, declined significantly in June. Nonetheless, this dinoflagellate remained abundant offshore of Palos Verdes (June 3 and 24) in Los Angeles County and at the Pacifica Beach Pier in San Diego County (June 21). Cell numbers were greatly reduced from previous samples.

A variety of diatom species reappeared at various locations along the southern California coast. *Chaetoceros* was common to abundant at sites between San Luis Obispo and Los Angeles counties; *Bacteriastrum* was also common throughout this range. *Eucampia* was common in San Diego Table 1. Program participants collecting phytoplankton samples.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		None Submitted	
HUMBOLDT COUNTY			
Humboldt State University Marine Lab	2	Pacific Shellfish	5
MENDOCINO COUNTY		CDPH Volunteer (Kristin Gordon)	4
SONOMA COUNTY		CDPH Marine Biotoxin Program	2
MARIN COUNTY		CDPH Volunteer (Brent Anderson)	1
CDPH Marine Biotoxin Program	1	Hog Island Oyster Company	6
CONTRA COSTA COUNTY		CDPH Marine Biotoxin Program	5
SAN FRANCISCO COUNTY		None Submitted	
SAN MATEO COUNTY		CDPH Volunteer (Nacho Martin)	1
CDPH Marine Biotoxin Program	2	San Mateo County Environmental Health Dept.	4
The Marine Mammal Center	4	U.C. Santa Cruz	2
SANTA CRUZ COUNTY		CDPH Volunteer (Nacho Martin)	3
Monterey Bay National Marine Sanctuary	2	U.C. Santa Cruz	4
MONTEREY COUNTY		CDPH Volunteer (Nacho Martin)	1
Monterey Abalone Company	3	Pacific Grove Museum of Natural History	5
SAN LUIS OBISPO COUNTY		CDPH Volunteers (Skip Rotstein, Dan Hoskins)	2
Grassy Bar Oyster Company	4	Tenera Environmental	3
SANTA BARBARA COUNTY		CDPH Volunteer (John Kuizenga)	1
Santa Barbara Channelkeeper	4	U.C. Santa Barbara	6
VENTURA COUNTY		None Submitted	
LOS ANGELES COUNTY		CDPH Volunteers (Cal Parsons)	1
Los Angeles County Sanitation District	1	Los Angeles Water Keeper	4
ORANGE COUNTY			
Back Bay Science Center	3	CDPH Volunteer (Truong Nguyen)	1
SAN DIEGO COUNTY			
CDPH Volunteers (Randy Dick, Melissa Roa)	2	Carlsbad Aquafarms, Inc.	2
Scripps Institute of Oceanography	5	U.S. Navy Marine Mammal Program	3

County in a sample from the Scripps Pier in La Jolla.

QUARANTINES:

The annual mussel quarantine began on May 1. This quarantine applies to the sport-harvesting of mussels along the entire California coast, including all bays and estuaries.

The CDFW closure of the razor clam fishery remains in effect due to the continued presence of dangerous levels of domoic acid in razor clams from beaches in Humboldt and Del Norte counties.

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

(Continued from page 6)

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 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 finTable 2. Program participants collecting shellfish samples.

COUNTY	AGENCY	#
Del Norte	CDPH Volunteer (Ken Graves)	6
	Tolowa Dee-ni' Nation	9
Humboldt	California Department of Fish and Wildlife	6
	Humboldt County Environmental Health Department	1
	Pacific Shellfish	10
Mendocino	CDPH Volunteer (Kristin Gordon)	1
	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
Marin	CDPH Marine Biotoxin Program	2
	Cove Mussel Company	2
	Hog Island Oyster Company	13
San Francisco	None Submitted	
San Mateo	CDPH Volunteer (Nacho Martin)	1
	CDPH Marine Biotoxin Program	3
	San Mateo County Environmental Health Department	2
Santa Cruz	CDPH Volunteer (Stuart Jackson)	2
	CDPH Marine Biotoxin Program	1
	U.C. Santa Cruz	2
Monterey	CDPH Volunteers (Serena Lomonico, Mark Donaldson)	2
	Monterey Abalone Company	2
San Luis Obispo	CDPH Volunteer (Stuart Helmintoller)	1
	California Polytechnic State University	1
	Grassy Bar Oyster Company	5
Santa Barbara	CDPH Volunteer (<i>Burki)</i>	1
	Santa Barbara Mariculture Company	9
	U.C. Santa Barbara	5
Ventura	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Health Department	3
	Southern California Marine Institute	1
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarm, Inc.	4
	U.S. Navy Marine Mammal Program	1

fish like sardines and anchovies.

Sportharvesters should only collect shellfish from areas that are not affected by a current health advisory or quarantine. 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



The relatively rare diatom Planktoniella.



The chain-forming diatom Odontella.



Chaetoceros was once again common along much of the California coast.