CALIFORNIA DEPT.OF PUBLIC HEALTH



Marine Biotoxin Monitoring Report

March 2020

Technical Report No. 20-15

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 guarantine or health advisory in effect during the reporting period. Finally, lists of participating agencies and volunteers for each monitoring effort are provided.

Northern California Summary: Paralytic Shellfish Poisoning

Alexandrium was observed at scattered locations between Sonoma and Santa Cruz counties in March (Figure 1). Low numbers of this dinoflagellate were observed in samples from the Bodega Harbor sentinel station in Sonoma County (March 5), the Pacifica Pier in San Mateo County (March 8), and the Santa Cruz Wharf (March 11). The highest percent compo-



Alexandrium occurs as chains of varying numbers of cells and, more commonly, as single cells.

sition of *Alexandrium* (2%) was observed at the latter site. This distribution was similar to observations in February (Marin through Monterey), however the frequency of observations was lower.

Although the cell mass of *Alexandrium* was low in the Santa Cruz Wharf sample, low levels of the PSP toxins were detected in mussels from several Santa Cruz sampling sites (Figure 2): Four Mile Beach (38 μ g/100 g; March 9); Davenport Landing (69 μ g/100 g; March 18); and Swift Street Beach (57 μ g/100 g; March 19). A mussel sample from the Monterey Commercial Wharf also contained a low concentration of the PSP toxins (40 μ g/100 g; March 10).

(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)

Domoic Acid

Pseudo-nitzschia was observed at numerous sites between Humboldt and Monterey counties in March (Figure 1). This represents an increase in distribution compared to observations in February. Cell numbers were low at all sites except the Pacifica Pier, where Pseudo-nitzschia was common on March 15 (10 %) with slightly elevated cell mass. Domoic acid was not detected in any mussel or oyster samples in March, however razor clam samples from Del Norte and Humboldt counties continued to contain alert levels of this toxin (Figure 2). Nine razor clam samples were collected on March 8 from Crescent Beach (Del Norte County), eight of which exceed the alert level (35-180 ppm). The California Department of Fish and Wildlife (CDFW) collected 2 razor clam samples from Clam Beach in

> Humboldt County on March 8, with one exceeding the alert level (68 ppm). CDFW also submitted samples of Washington clams (also known as butter clams, Saxidomus nuttalli) and gaper clams (Tresus nuttalli) from central Humboldt Bay, none of which contained a detectable level of domoic acid.

Non-Toxic Species

Phytoplankton abundance increased along the northern California coast in



(Continued on page 4)





Figure 2. Distribution of shellfish biotoxins in northern California.

(Continued from page 2)

March, with diatoms dominating the assemblage at most locations. Skeletonema was common between Del Norte and San Mateo counties, and Chaetoceros was also common along most of this range. The latter diatom was abundant inside Humboldt Bay (March 9) and San Francisco Bay (March 9 and 23) at the Richmond Marina Bay

Harbor. Stephanopyxis and Pleurosigma were common in samples from the Noyo River Harbor in Mendocino County and Thalassiosira was common at the Presidio Pier in San Francisco County. The dinoflagellate Akashiwo sanguineum was common in a March 11 sample from the Santa Cruz Wharf.

Southern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium was observed at scattered sites between San Luis Obispo and San Diego counties in March (Figure 3). This distribution was similar to



observed less frequently in March. The highest percent composition of this dinoflagellate (1%) was observed in a March 27 sample from inside San Diego Bay, however the cell mass was very low. Alexandrium was also observed in northern San Diego County inside Agua Hedionda Lagoon (March 11 and 25), offshore of Palos Verdes in Los Angeles County (March 4), and at the San Simeon Pier in northern San Luis Obispo County (March 13 and 18). PSP toxins were not detected in any shellfish sampled in March (Figure 4).





Figure 3. Toxic phytoplankton distribution in southern California.



Figure 4. Distribution of shellfish biotoxins in southern California.

(Continued from page 4)

Domoic Acid

Pseudo-nitzschia was observed at one or more sites in each coastal county except Ventura in March (Figure 3). There was a significant decrease in the percent composition of this diatom compared to observations in February, particularly at sites in San Luis Obispo, southern Los Angeles, and northern Orange counties. The cell mass remained low at all sites. Domoic acid was not detected in any mussel or oyster samples during March (Figure 4).

Non-Toxic Species

The phytoplankton assemblage contained a mix of diatoms and dinoflagellates in March, with a significant increase in cell mass compared to observations in February. The diatom *Chaetoceros* was common to abundant in samples from each southern California coastal county except Ventura. The highest cell mass of this diatom was observed in samples



from the San Simeon Pier (March 1 and 6). *Bacteriastrum* was common offshore of Rocky Point on the Palos Verdes Peninsula (30%; March 7), in Bolsa Chica Lagoon (20%; March 13), in the

(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: Email redtide@cdph.ca.gov or call 510-412-4635 For Recorded Biotoxin Information Call:

12-4635 (800) 553 - 4133

Page 6

(Continued from page 5)

Back Bay of Newport Bay (43%; March 5), and offshore of Crystal Cove State Beach. *Skeletonema* was abundant in outer Agua Hedionda Lagoon (55 and 80% on March 18 and 25, respectively), with high cell mass indicative of a bloom.

The dinoflagellate *Ceratium furca* was common to abundant at sites along the San Luis Obispo coast, with the highest cell mass in samples from offshore of Diablo Cove. *Lingulodinium polyedrum* was common at sites along all southern California coastal counties. The highest cell mass was observed in a sample offshore of Diablo Cove (March 25) and, to a lesser extent, in samples from the Scripps Pier in San Diego County (March 23 and 30).

QUARANTINES:

On December 20 CDPH lifted the domoic acid health advisory for sport-harvested mussels, scallops, and clams in Mendocino County. On November 19 CDPH lifted the domoic acid health advisory in Humboldt County for all bivalve shellfish <u>except</u> razor clams.

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,

Table 1. Program	participants	collecting	phytoplanktor	ו samples
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AGENCY	#	AGENCY	#
DEL NORTE COUNTY			
Tolowa Dee-ni' Nation		Yurok Tribe Environmental Program	1
HUMBOLDT COUNTY			
Pacific Shellfish	5	Humboldt State University Marine Lab	1
MENDOCINO COUNTY		CDPH Volunteer (Kristin Gordon)	1
SONOMA COUNTY	CDPH Marine Biotoxin Program	2	
MARIN COUNTY			
CDPH Volunteers (Brent Ar	Volunteers (Brent Anderson, Ignacio Martin-Bragado)		
CDPH Marine Biotoxin Program 4		Hog Island Oyster Company	4
CONTRA COSTA COUNTY	CDPH Marine Biotoxin Program	3	
SAN FRANCISCO COUNTY			
CDPH Volunteer (Eugenia McNaughton)	1	Exploratorium	1
SAN MATEO COUNTY		CDPH Marine Biotoxin Program	1
The Marine Mammal Center		San Mateo County Environmental Health Dept	2
SANTA CRUZ COUNTY		U.C. Santa Cruz	2
MONTEREY COUNTY			
Monterey Abalone Company	2	Pacific Grove Museum of Natural History	4
SAN LUIS OBISPO COUNTY			
CDPH Volunteer (Skip Rotstein)	3	Grassy Bar Oyster Company	5
Monterey Bay National Marine Sanctuary		Tenera Environmental	4
SANTA BARBARA COUNTY			
Santa Barbara Channelkeeper	2	U.C. Santa Barbara	4
VENTURA COUNTY			
CDPH Volunteer (Fred Burgess)		Ventura County Environmental Health Dept.	1
LOS ANGELES COUNTY			
CDPH Volunteer (Gina Lumbruno)	1	Los Angeles County Health Department	1
Los Angeles County Sanitation District		Los Angeles Water Keeper	1
ORANGE COUNTY			
Amigos de Bolsa Chica	4	Back Bay Science Center	3
Crystal Cove Alliance		CDPH Volunteer (Truong Nguyen)	1
SAN DIEGO COUNTY		Carlsbad Aquafarms, Inc.	4
Scripps Institute of Oceanography	5	SEACAMP/HABNet	1
Tijuana River National Estuary Research	2	U.S. Navy Marine Mammal Program	4

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 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.

(Continued from page 6)

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.

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.

Table 2. Program participants collecting shellfish samples.

COUNTY	AGENCY	#
Del Norte	CDPH Volunteer (<i>Ken Graves</i>)	9
	Tolowa Dee-ni' Nation	1
	Yurok Tribe Environmental Program	1
Humboldt	Pacific Shellfish	10
	Humboldt County Environmental Health Department	1
	California Department of Fish and Wildlife	5
Mendocino	CDPH Volunteer (Kristin Gordon)	2
	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
Marin	CDPH Marine Biotoxin Program	2
	Cove Mussel Company	3
	Hog Island Oyster Company	10
	Tomales Bay Oyster Company	2
San Francisco	None Submitted	
San Mateo	CDPH Marine Biotoxin Program	1
	San Mateo County Environmental Health Department	1
Santa Cruz	CDPH Volunteer (Richard Buddington, Stuart Jackson)	2
	CDPH Marine Biotoxin Program	1
Monterey	Monterey Abalone Company	2
	CDPH Volunteer (Serena Lomonico)	1
San Luis Obispo	California Polytechnic State University	2
	CDPH Marine Biotoxin Program	1
	Grassy Bar Oyster Company	5
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	4
Ventura	Ventura County Environmental Health Department	1
Los Angeles	CDPH Volunteer (Steven Field)	1
	Los Angeles County Health Department	1
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarm, Inc.	4
	Scripps Institue of Oceanography	1

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





A colony of the diatom Asterionella.

The dinoflagellate Protoperidinium.



The diatom Lithodesmium, when viewed along its length (valve view), is triangular in shape.