

# **Marine Biotoxin Monitoring Report**

November 2020

Technical Report No. 20-29

# **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 agencies and volunteers for each monitoring effort are provided.

# Northern California Summary: Paralytic Shellfish Poisoning

*Alexandrium* was observed at sites in most coastal counties in November (Figure 1). This distribution was similar to observations between September and October, however *Alexandrium* was observed at fewer sites in November. The relative abundance of *Alexandrium* increased inside Humboldt Bay (2%, November 16) and Tomales Bay (5%, November 3) compared to



A chain of three Alexandrium cells with several chains of Pseudo-nitzschia..

observations in October. New observations of *Alex-andrium* were recorded for samples from Wilson Creek in Del Norte County (November 12) and the Pacifica Pier in San Mateo County (November 22 and 29).

PSP toxicity was detected in mussel samples from numerous sites between Del Norte and Marin counties in November (Figure 2). The low levels of toxicity detected in Humboldt Bay mussels in October increased well above the alert level in November.

#### (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.

#### November 2020



Figure 1. Toxic phytoplankton distribution in northern California.

## (Continued from page 1)

There was a dramatic rise in PSP toxin concentrations between November 2 and 9, increasing from  $61 \mu g/100 g$  to  $1619 \mu g/100 g$  in outer bay sentinel mussels and from 33  $\mu$ g/100 g to 1036  $\mu$ g/100 g farther inside the bay at the Indian Island station. Toxicity remained well above the alert level throughout the month. Lower concentrations of these toxins, well below the alert level, were also detected in oyster samples farther inside Humboldt Bay at several North Bay aquaculture leases. Alert levels of PSP toxins were also detected in mussels from the following locations: MacKerricher State Park in Mendocino County (672 µg/100 g and 175  $\mu$ g/100 g on November 14 and 30, respectively); Russian Gulch Beach in Sonoma County (98 µg/100 g on November 15); and Schoolhouse Beach, also in Sonoma County (86  $\mu$ g/100 g on November 12).

> Low concentrations of PSP toxins continued to be detected in mussels from outer Tomales Bay throughout the month and in oysters in an outer bay aquaculture lease through November 4.

#### **Domoic Acid**

*Pseudo-nitzschia* was observed at sites in all coastal counties between Del Norte and San Mateo in November. The relative abundance of this diatom re-

#### Relative Abundance of Known Toxin Producers Alexandrium Species Pseudo-nitzschia Species Present (between 1% and 10%) Rare (less than 1%) Present Common (between 10% amd 50%) (between 1% and 10%) Common (between 10% and 50%) Abundant (greater than 50%) MONTHLY SAMPLING STATIONS: Single Sampling Station Abundant (greater than 50%) Multiple Sampling Stations Offshore Sampling Station For areas with multiple sampling stations, species abundance at each station is represented as follows: (A,P) = Abundance for Alexandrium and Pseudo-nitzschia, respectively. e.g., (c,p) = common, present; (a,-) = abundant, not observed

#### (Continued on page 4)



Figure 2. Distribution of shellfish biotoxins in northern California.

Figure 3. Toxic phytoplankton distribution in southern California.

## (Continued from page 2)

mained elevated at the Humboldt Bay Indian Island sentinel station (40%, 25%, and 15% on November 2, 9, and 16, respectively), as well as farther inside the bay near the East Bay aquaculture leases in North Bay (30%, November 2). *Pseudo-nitzschia* was also common in samples from the Pt. Arena Pier in southern Mendocino County (15%, No-

vember 3) and outer Tomales Bay (15% and 20% on November 15 and 29, respectively). The greatest cell masses of this diatom were observed in samples from the Humboldt Bay Indian Island station (November 2) and the outer Tomales Bay site (November 29).





A chain of the diatom *Pseudo-nitzschia*, with the dinoflagellate Prorocentrum micans (center-left).

Domoic acid was detected in mussels from sites in Humboldt and Mendocino counties in November (Figure 2). Low concentrations of domoic acid were detected in mussels from the following sites: the outer Humboldt Bay sentinel station (11 and 9.6 ppm on November 2 and 9, respectively), the Humboldt Bay Indian Island station (4.8, 3.1, and 5.2 ppm on November 2, 9, and 16, respectively); and at MacKerricher State Park (3.5 ppm on November 14).

Imperial Beach Pier

Figure 4. Distribution of shellfish biotoxins in southern California.

# (Continued from page 4)

#### **Non-Toxic Species**

The diatom *Skeletonema* was common to abundant inside Humboldt Bay and common inside Tomales Bay. *Chaetoceros* was common in samples from the Pacifica Pier (San Mateo County).

The dinoflagellate Akashiwo sanguineum was common to abundant inside Tomales Bay (20 -75%), the Richmond Marina Bay harbor inside San Francisco Bay (20 - 64%), Pacifica Pier (20 - 25%), and the Monterey Commercial Wharf (84%). Prorocentrum micans was common inside Tomales Bay.

# Southern California Summary: Paralytic Shellfish Poisoning:

Alexandrium was observed at numerous sites between San Luis Obispo and Los Angeles counties in November, including a rare occurrence in Avalon Bay, Catalina Island (Figure 3). While the cell numbers were low in all samples containing Alexandrium, this dinoflagellate remained slightly



elevated in a November 5 sample from Diablo Cove in San Luis Obispo County .

PSP toxins were not detected in any mussel or oyster samples in November (Figure 4).

#### (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)

#### Domoic Acid

*Pseudo-nitzschia* was observed at numerous sites in every coastal county in November (Figure 3). This diatom was common in samples from offshore of Pt. Dume in Los Angeles County (15%, November 21) and at the Imperial Beach Pier in San Diego County (10% on November 17 and 25). The cell numbers were low in all samples. Domoic acid was not detected in any mussel or oyster samples in November (Figure 4).

#### **Non-Toxic Species**

Diatoms dominated the southern California coast in November. *Chaetoceros* was ubiquitous along the coast and *Bacteriastrum* was common in samples from Ventura and Los Angeles counties. The highest cell masses observed were for *Dactyliosolen* and *Thalassionema*, both observed at the Rocky Point offshore site in Los Angeles County.

#### **QUARANTINES:**

On November 18 CDPH warned consumers not to eat sportharvested mussels, clams, or scallops from Mendocino County due to dangerous levels of PSP toxins in the region.

On November 12 CDPH warned consumers not to eat sportharvested mussels, clams, or scallops from Humboldt County due

Tab	le 1.	Program	participants	collecting p	hytop	lan	kton	sampl	es.
-----	-------	---------	--------------	--------------	-------	-----	------	-------	-----

AGENCY	#	AGENCY	#	
DEL NORTE COUNTY	Yurok Tribe Environmental Program	1		
HUMBOLDT COUNTY				
Humboldt State University Marine Lab	2	Pacific Shellfish	7	
MENDOCINO COUNTY				
CDPH Volunteer (Kristin Gordon)	4	U.C. Santa Barbara	1	
SONOMA COUNTY	CDPH Marine Biotoxin Program			
MARIN COUNTY		CDPH Volunteers (Brent Anderson, Tommy Parisi)		
CDPH Marine Biotoxin Program	4	Hog Island Oyster Company	10	
CONTRA COSTA COUNTY	CDPH Marine Biotoxin Program			
SAN FRANCISCO COUNTY	CDPH Volunteer (Eugenia McNaughton)	1		
SAN MATEO COUNTY	The Marine Mammal Center	4		
San Mateo County Environmental Health Dept.	4	U.C. Santa Cruz	1	
SANTA CRUZ COUNTY	CDPH Volunteer (Nacho Martin)			
Monterey Bay National Marine Sanctuary	3	U.C. Santa Cruz	4	
MONTEREY COUNTY				
Monterey Abalone Company	1	Pacific Grove Museum of Natural History	2	
SAN LUIS OBISPO COUNTY		CDPH Marine Biotoxin Program	1	
CDPH Volunteers (Jeff Rei	kip Rotstein, Dan Hoskins)	3		
Grassy Bar Oyster Company		Monterey Bay National Marine Sanctuary		
Tenera Environmental	2			
SANTA BARBARA COUNTY				
Santa Barbara Channelkeeper	2	U.C. Santa Barbara		
VENTURA COUNTY		Coastal Marine Biolabs	1	
LOS ANGELES COUNTY	CDPH Volunteer (Cal Parsons)			
Los Angeles County Sanitation District	1	Los Angeles Water Keeper	5	
ORANGE COUNTY				
CDPH Volunteer (Truong Nguyen)	1	Crystal Cove Alliance	1	
SAN DIEGO COUNTY				
CDPH Volunteer (Melissa Roa)	1	Scripps Institute of Oceanography	5	
Tijuana River National Estuary Research		U.S. Navy Marine Mammal Program	2	

to dangerous levels of PSP toxins in the region.

On October 31 CDPH lifted the annual mussel quarantine for all 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 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 advised to remove and discard the dark parts (i.e., the digestive organs

#### Page 6

# (Continued from page 6)

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 finfish like sardines and anchovies. Table 2. Program participants collecting shellfish samples.

COUNTY	AGENCY	#	
Del Norte	Yurok Tribe Environmental Program	1	
Humboldt	Aqua Rodeo Farms		
	Humboldt Bay Oyster Company	4	
	Humboldt County Environmental Health Department	1	
	North Bay Shellfish Company	3	
	Pacific Shellfish	20	
Mendocino	CDPH Volunteer (Kristin Gordon)	2	
	Mendocino County Environmental Health Department	1	
Sonoma	CDPH Volunteer (Cynthia Jackson)	1	
	CDPH Marine Biotoxin Program	3	
Marin	CDPH Volunteer ( <i>Jamie Sutton</i> )	1	
	CDPH Marine Biotoxin Program	2	
	Cove Mussel Company	1	
	Hog Island Oyster Company	12	
	Point Reyes Oyster Company	2	
	Starbird Mariculture	3	
San Francisco	None Submitted		
San Mateo	CDPH Volunteer ( <i>Nacho Martin</i> )	1	
	CDPH Marine Biotoxin Program	1	
	San Mateo County Environmental Health Department	2	
Santa Cruz	CDPH Volunteers (Richard Buddington, Stuart Jackson)	2	
	CDPH Marine Biotoxin Program	1	
Monterey	None Submitted		
San Luis Obispo	CDPH Volunteers (Wesley Jarman, Stuart Helmintoller, Anna Hartig)	3	
	CDPH Marine Biotoxin Program	1	
	Grassy Bar Oyster Company	5	
Santa Barbara	Santa Barbara Mariculture Company	1	
	U.C. Santa Barbara	4	
Ventura	None Submitted		
Los Angeles	CDPH Volunteer (Steven Field)	1	
Orange	None Submitted		
San Diego	Carlsbad Aquafarm, Inc.	4	
	CDPH Volunteer ( <i>Kimmo Rantalainen</i> )	1	
	U.S. Navy Marine Mammal Program	1	

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 dinoflagellate Ceratium azoricum.



The chained diatom Lithodesmium.



Two cells of the diatom *Ditylum*, with a mix of other diatoms.