CALIFORNIA DEPT.OF PUBLIC HEALTH



Marine Biotoxin Monitoring Report

September 2020

Technical Report No. 20-26

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 several sites between Humboldt and Monterey counties in September, similar to the distribution observed in August (Figure 1). The relative abundance of Alexandrium remained elevated at the Trinidad Pier in Humboldt County, increasing slightly from observations in August (4%, September 17). Alexandrium increased in abundance



A chain of Alexandrium cells.

in outer Tomales Bay (1%, September 14) and decreased at Stillwater Cove in Monterey County (< 1%, September 2). This dinoflagellate was also observed in samples from Noyo Harbor in Mendocino County (September 30), Pacifica Pier in San Mateo County (September 20), and the Monterey Commercial Wharf (September 10).

PSP toxicity was detected in mussel samples from several sites in northern California counties in September (Figure 2). Low concentrations of PSP toxins have persisted in the outer Humboldt Bay sentinel mussel station since July. PSP toxicity was also detected at very low levels in mussel samples from the

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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.

September 2020



Figure 1. Toxic phytoplankton distribution in northern California.

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following locations: Hunter Rock (40 μ g/100 g) and Wilson Creek (43 μ g/100 g) in Del Norte County; Trinidad Head ($37 \mu g/100 g$) in Humboldt County; and Fort Bragg (37 µg/100 g) in Mendocino County. The low levels of toxins detected in August at sites between Sonoma and Monterey counties declined below the detection limit by September.

Domoic Acid

Pseudo-nitzschia was observed at most sites between Del Norte and Monterey counties in September, similar to observations in August (Figure 1). The relative abundance of this diatom was low at most sites, with the exception of persistent elevated numbers at the Pacifica Pier in San Mateo County. Pseudo-nitzschia remained common at this site (12%, September 1) and the cell mass increased significantly from observations in August.

> Domoic acid was not detected in any mussel or oyster samples in September.

Non-Toxic Species

A mix of diatoms and dinoflagellates was observed along the northern California coast in September. The diatom Chaetoceros was abundant in samples from Point St. George (Del Norte County, September 3) and Trinidad Pier and Humboldt Bay (Humboldt County, Sep-

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Figure 2. Distribution of shellfish biotoxins in northern California.

Figure 3. Toxic phytoplankton distribution in southern California.

Imperial Beach Pier

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tember 17 and 21, respectively). *Chaetoceros* was also common at several sites between Marin and Monterey counties. *Skeletonema* was also abundant in a sample from Pillar Point Harbor (September 2).

The dinoflagellates Akashiwo sanguineum and Prorocentrum micans were common to abundant at sites between Sonoma and Monterey counties. The bioluminescent dinoflagellate Noctiluca was common in a sample from Wilson Creek on September 17 and Protoperidinium was common at the Trinidad Pier on the same date.

Southern California Summary: Paralytic Shellfish Poisoning:

Alexandrium was observed at numerous sites between San Luis Obispo and Los Angeles counties in September (Figure 3). This represents an increase in distribution compared to observations in August. Alexandrium remained slightly elevated (1%) in a September 23 sample from offshore of Diablo Cove. This dinoflagellate was also present (1%) offshore of Santa Barbara at Mohawk Reef (September 10). Lower numbers of Alexandrium continued to be observed at other sites in San Luis Obispo County (Cayucos Pier on September 14 and mid Morro Bay throughout the month) and Goleta Pier in Santa Barbara County (September 9, 23, and 30).





Chains of the diatom *Pseudo-nitzschia*.

Figure 4. Distribution of shellfish biotoxins in southern California.

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New observations of *Alexandrium* occurred at Naples Pt. (Santa Barbara County, September 10), offshore of Ventura (September 4), and at two sites offshore of Palos Verdes (Los Angeles County, September 2 and 5).

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

Domoic Acid

Pseudo-nitzschia was observed at several sites between San Luis Obispo and Ventura counties, as well as in San Diego County, in September (Figure 3). This diatom was common (15%) is a September 2 sample from Goleta Pier. The cell mass was low in all samples.

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

Non-Toxic Species

Dinoflagellates dominated the phytoplankton assemblage along the



southern California coast in September. *Prorocentrum micans* was abundant, at significant densities, in samples from outer and mid Morro Bay and *Ceratium furca* was common offshore of Diablo Cove.

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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

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C. furca was also common at all three Santa Barbara County sampling locations, with Cochlodinium common in a September 10 sample from Naples Reef. Samples from offshore of Pt. Dume (Los Angeles County) and Imperial Beach Pier (San Diego County) also contained a significant amount of C. furca. C. fusus was abundant At Imperial Beach Pier and common at the Pacific Beach Pier in San Diego County. The only diatom present in significant numbers was Chaetoceros, which was common offshore of Diablo Cove (September 23) and at Goleta Pier (September 2).

QUARANTINES:

On September 1 CDPH issued a press release rescinding the July 1 PSP health advisory for sportharvested clams and scallops from San Francisco and San Mateo counties. This health advisory remained in effect for Santa Cruz and Monterey counties.

On September 29 CDPH rescinded the July 1 PSP health advisory for sport-harvested clams and scallops from Santa Cruz and Monterey counties.

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

Table 1. Program participants collecting phytoplankton samples.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY			
Tolowa Dee-ni' Nation	2	Yurok Tribe Environmental Program	
HUMBOLDT COUNTY			
Humboldt State University Marine Lab	2	Pacific Shellfish	4
MENDOCINO COUNTY		CDPH Volunteer (Kristin Gordon)	
SONOMA COUNTY		CDPH Marine Biotoxin Program	
MARIN COUNTY		CDPH Volunteers (Brent Anderson, Nacho Martin)	
CDPH Marine Biotoxin Program	2	Hog Island Oyster Company	6
CONTRA COSTA COUNTY		CDPH Marine Biotoxin Program	
SAN FRANCISCO COUNTY		None Submitted	
SAN MATEO COUNTY		CDPH Marine Biotoxin Program	
The Marine Mammal Center	4	San Mateo County Environmental Health Dept.	4
SANTA CRUZ COUNTY		CDPH Volunteer (Nacho Martin)	
Monterey Bay National Marine Sanctuary	3	U.C. Santa Cruz	5
MONTEREY COUNTY			
Monterey Abalone Company	2	Pacific Grove Museum of Natural History	4
SAN LUIS OBISPO COUNTY			
CDPH Volunteers (Jeff Re	kip Rotstein, Dan Hoskins)		
Grassy Bar Oyster Company	4	Monterey Bay National Marine Sanctuary	
Tenera Environmental	4	U.C. Santa Barbara	
SANTA BARBARA COUNTY			
Santa Barbara Channelkeeper	3	U.C. Santa Barbara	5
VENTURA COUNTY		Coastal Marine Biolabs	
LOS ANGELES COUNTY			
Los Angeles County Sanitation District	1	Los Angeles Water Keeper	4
ORANGE COUNTY		CDPH Volunteer (Truong Nguyen)	2
SAN DIEGO COUNTY			
CDPH Volunteer (<i>Melissa Roa</i>)	1	Scripps Institute of Oceanography	4
Tijuana River National Estuary Research	3	U.S. Navy Marine Mammal Program	4

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 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.

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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

Table 2. Program	i participants	collecting	shellfish	samples.
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COUNTY	AGENCY	#		
Del Norte	Tolowa Dee-ni' Nation			
	Yurok Tribe Environmental Program			
Humboldt	Humboldt County Environmental Health Department			
	Pacific Shellfish	8		
Mendocino	Mendocino County Environmental Health Department	1		
Sonoma	CDPH Marine Biotoxin Program			
Marin	Cove Mussel Company	4		
	Hog Island Oyster Company	8		
San Francisco	CDPH Marine Biotoxin Program	1		
San Mateo	CDPH Marine Biotoxin Program	1		
	San Mateo County Environmental Health Department	2		
Santa Cruz	CDPH Volunteer (Richard Buddington)	1		
	CDPH Marine Biotoxin Program	1		
Monterey	CDPH Volunteers (Serena Lomonico, Mark Donaldson)	3		
	Monterey Abalone Company	1		
San Luis Obispo	Grassy Bar Oyster Company	4		
Santa Barbara	Santa Barbara Mariculture Company	4		
	U.C. Santa Barbara	4		
Ventura	Ventura County Environmental Health Department	1		
Los Angeles	None Submitted			
Orange	None Submitted			
San Diego	Carlsbad Aquafarm, Inc.	5		
	U.S. Navy Marine Mammal Program	1		

"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 divaricatum* was observed at numerous sites between Sonoma and Santa Barbara counties.



The dinoflagellate Ceratium macroceros.



A bloom of the large dinoflagellate *Noctiluca scintillans* was observed at Pacifica Pier, with lower numbers observed in Del Norte, Humboldt, Marin, and Los Angeles counties.