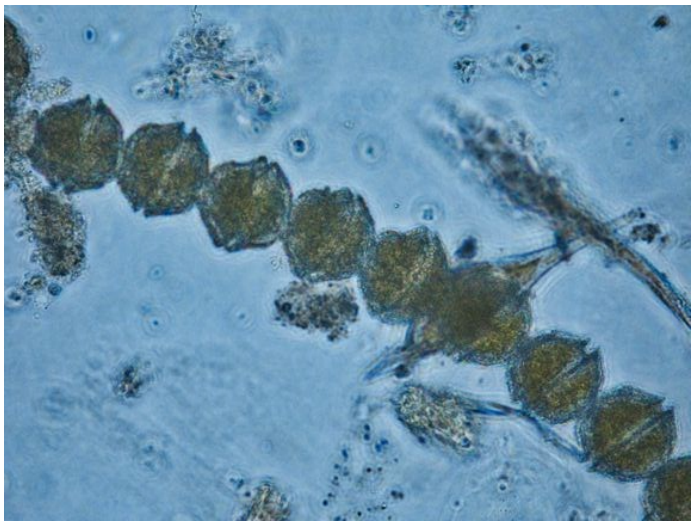
Marine Biotoxin Monitoring Report

December 2020

Technical Report No. 20-30

INTRODUCTION:

This report contains results from the California Department of Public Health (CDPH) monitoring programs for shellfish toxins and associated toxin-producing 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.



An unusually long chain of Alexandrium cells.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at numerous sites between Sonoma and Santa Cruz counties in December (Figure 1). This distribution represents a decrease in range compare to observations in November. New observations of *Alexandrium* were recorded for samples from the following locations: the Bodega Harbor sentinel mussel station in Sonoma County (December 28); the Drakes Bay sentinel mussel station (December 29) and Cavallo Point (December 20), both in Marin County; Ano Nuevo in San Mateo County (December 2); and the Santa Cruz Wharf (December 12 and 15) and Capitola Pier (December 31) in Santa Cruz County.

PSP toxicity continued to be detected in mussel samples from numerous sites between Del Norte and Marin counties in December (Figure 2). The dangerous levels of toxicity detected at sites in Del Norte, Humboldt, and Mendocino counties in November declined below the alert level, but remained detectable,

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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.

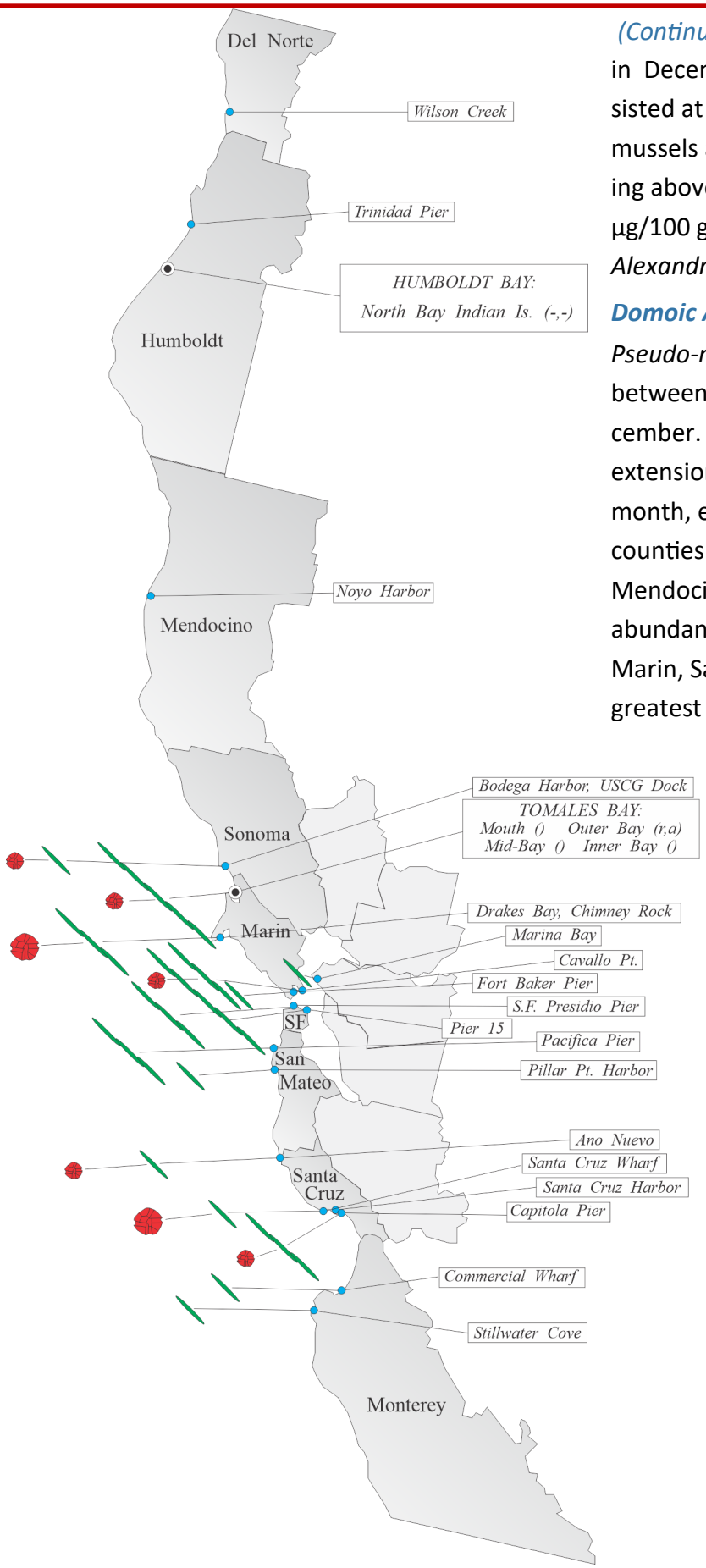

Figure 1. Toxic phytoplankton distribution in northern California.

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in December. Low toxin concentrations also persisted at sites in Sonoma and Marin counties, with mussels at the Drakes Bay sentinel station increasing above the alert level by December 29 (103 µg/100 g), coinciding with the observed increase in *Alexandrium* at this site.

Domoic Acid

Pseudo-nitzschia was observed at numerous sites between Sonoma and Monterey counties in December. This distribution represents a southward extension of the range compared to the previous month, expanding into Santa Cruz and Monterey counties while disappearing from sites between Mendocino and Del Norte counties. The relative abundance of this diatom increased at most sites in Marin, San Francisco, and San Mateo counties. The greatest cell masses of *Pseudo-nitzschia* were observed in samples from outer Tomales Bay (December 6, 13, and 20) and the Drakes Bay sentinel station (December 10).

Domoic acid was not detected in mussel or oyster samples collected in December.

Non-Toxic Species

Species diversity and relative abundance declined in December along the north-

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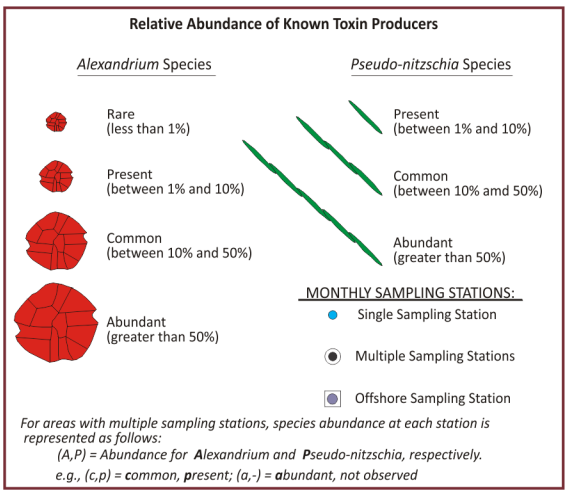

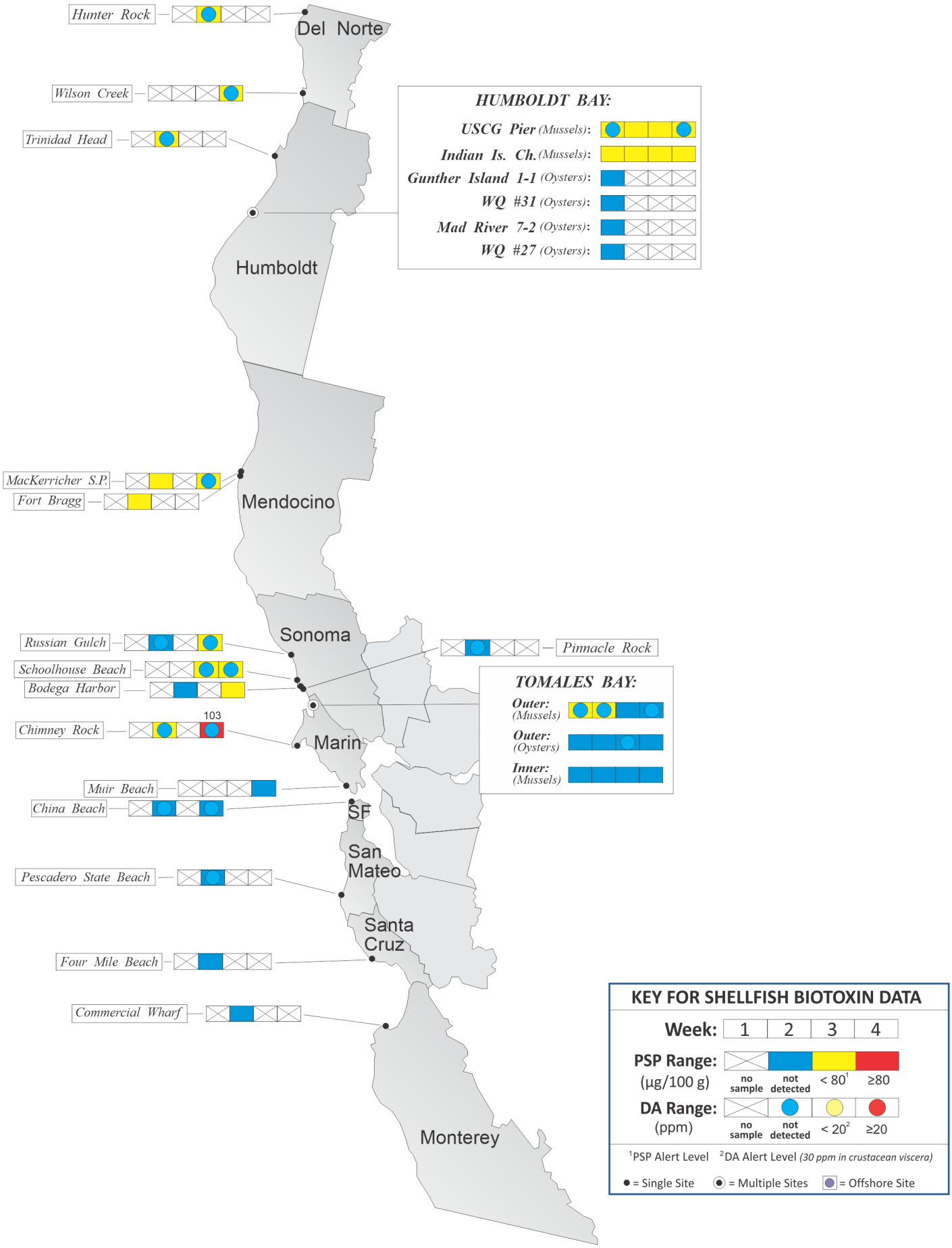

Figure 2. Distribution of shellfish biotoxins in northern California.

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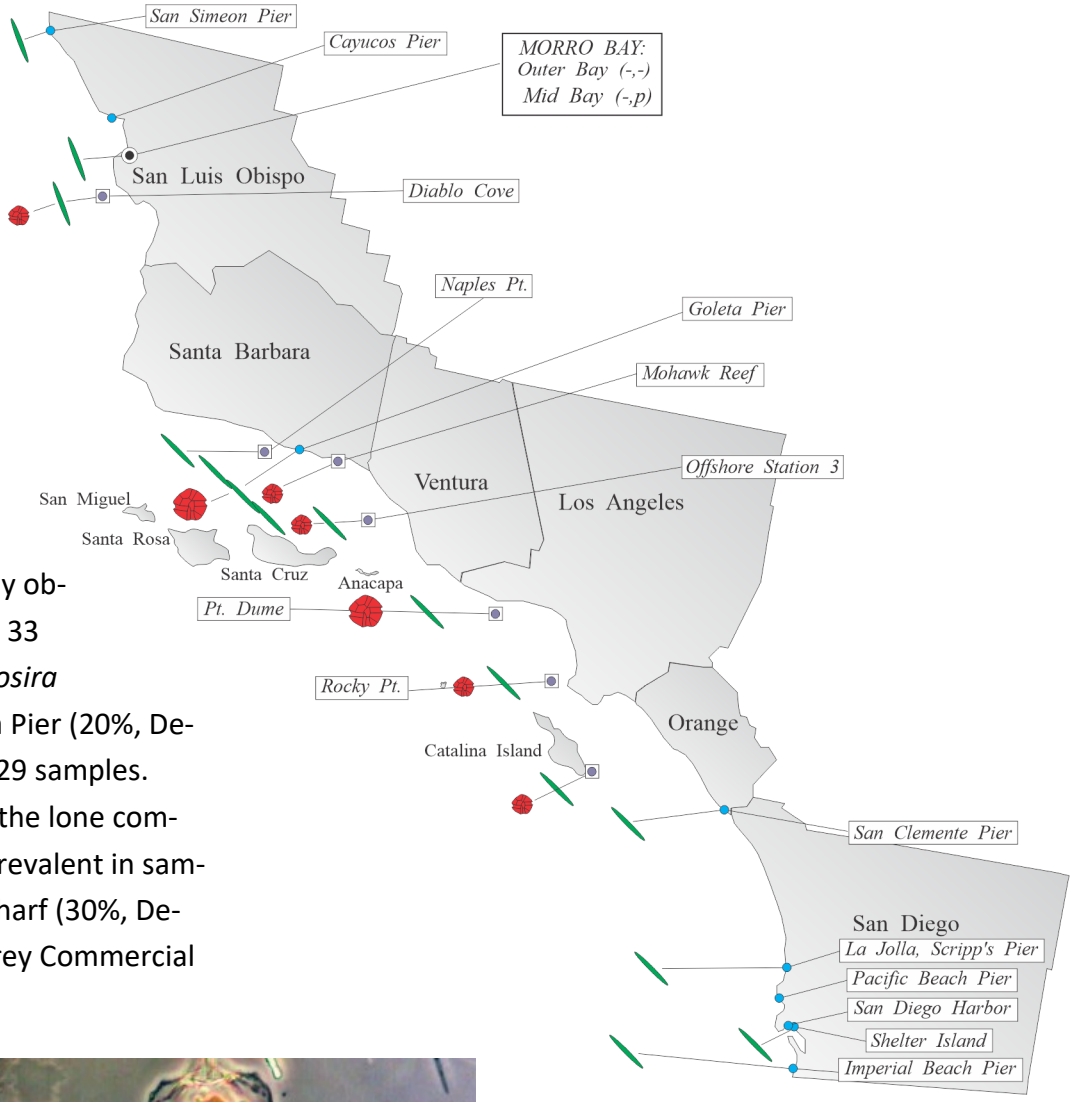
ern California coast. The diatom *Chaetoceros* was common at the Pacifica Pier (25%, December 13) and the Capitola Pier (30%, December 31). This diatom was frequently observed, occurring in 32 of 44 northern California samples. *Thalassionema* was common in outer Tomales Bay (20%, December 27) and was the most frequently observed species, occurring in 33 samples. Similarly, *Thalassiosira* was common at the Pacifica Pier (20%, December 5) and observed in 29 samples. *Akashiwo sanguineum* was the lone common dinoflagellate, being prevalent in samples from the Santa Cruz Wharf (30%, December 15) and the Monterey Commercial Wharf (30%, December 3).

Figure 3. Toxic phytoplankton distribution in southern California.



Chains of the diatom *Pseudo-nitzschia* in a sample from Pacifica Pier.

Southern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium continued to be observed at numerous sites between San Luis Obispo and Los Angeles counties in December (Figure 3). This dinoflagellate continued to be observed offshore of Los Angeles in Avalon Bay, Catalina Island, a rare occurrence as noted in the November report. The percent composition of *Alexandrium* declined in samples from Diablo Cove (San Luis Obispo County) compared to observations in November. However

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there was an increase of this dinoflagellate in samples from the Goleta Pier in Santa Barbara County (1%, December 2) and offshore of Pt. Dume (2%, December 13) in Los Angeles County. The cell mass was low in all samples.

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

Domoic Acid

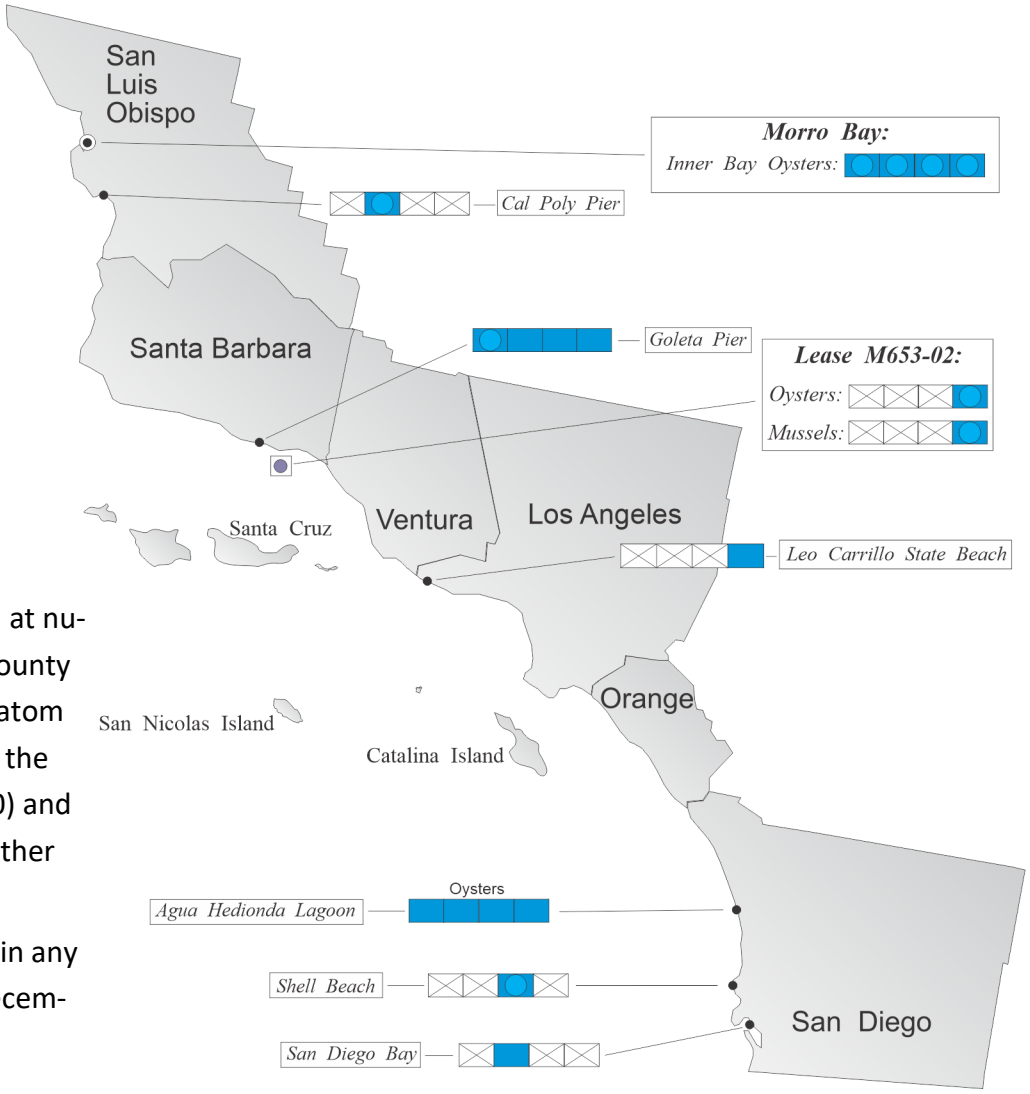
Pseudo-nitzschia was observed at numerous sites in every coastal county in December (Figure 3). This diatom was common in a sample from the Goleta Pier (10%, December 30) and present in low numbers in all other samples.

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

Non-Toxic Species

Species diversity was greatly reduced in all December samples. The diatom *Chaetoceros* was common at numerous sites between San Luis Obispo and Los Angeles counties, with the highest percent composition observed in a December 22 sample from the Goleta Pier (40%). Chaetoceros was also the most frequently observed diatom in southern California, being observed in 34 of 40 samples. *Bacteriastrum* was

Figure 4. Distribution of shellfish biotoxins in southern California.



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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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common in samples from Los Angeles and Orange counties. The dinoflagellate *Lingulodinium polyedrum* was common offshore of Rocky Pt. on the Palos Verdes peninsula in Los Angeles County (40%, December 24). The cell mass was low for all samples collected in December.

QUARANTINES:

On December 31 CDPH warned consumers not to eat sport-harvested mussels, clams, or scallops from Marin County due to dangerous levels of PSP toxins in the region. In addition, the October 30 PSP advisory for Sonoma County was rescinded.

On December 28 CDPH rescinded the November 12 PSP advisory for Humboldt County.

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

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

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Table 1. Program participants collecting phytoplankton samples.

COUNTY	AGENCY	#
DEL NORTE	Yurok Tribe Environmental Program	1
HUMBOLDT	Humboldt State University Marine Lab	1
	Pacific Shellfish	4
MENDOCINO	CDPH Volunteer (*Kristin Gordon)*	2
SONOMA	CDPH Marine Biotoxin Program	1
MARIN	CDPH Volunteers (*Nacho Martin, Tommy Parisi)*	2
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	4
CONTRA COSTA	CDPH Marine Biotoxin Program	2
SAN FRANCISCO	CDPH Volunteer (*Eugenia McNaughton)*	2
	Exploratorium	1
SAN MATEO	CDPH Volunteer (*Tommy Parisi)*	1
	The Marine Mammal Center	3
	San Mateo County Environmental Health Dept.	2
	U.C. Santa Cruz	1
SANTA CRUZ	CDPH Volunteer (*Nacho Martin)*	3
	Monterey Bay National Marine Sanctuary	2
	U.C. Santa Cruz	3
MONTEREY	Monterey Abalone Company	2
	Pacific Grove Museum of Natural History	4
SAN LUIS OBISPO	CDPH Volunteers (*Skip Rotstein, Dan Hoskins)*	2
	Grassy Bar Oyster Company	2
	Monterey Bay National Marine Sanctuary	3
	Tenera Environmental	2
SANTA BARBARA	Santa Barbara Channelkeeper	2
	U.C. Santa Barbara	5
VENTURA	Coastal Marine Biolabs	1
LOS ANGELES	CDPH Volunteer (*Cal Parsons)*	3
	Los Angeles Water Keeper	8
ORANGE	CDPH Volunteer (*Truong Nguyen)*	1
SAN DIEGO	CDPH Volunteer (*Melissa Roa, Randy Dick)*	4
	Scripps Institute of Oceanography	4
	Tijuana River National Estuary Research	2
	U.S. Navy Marine Mammal Program	2

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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 finfish like sardines and anchovies.

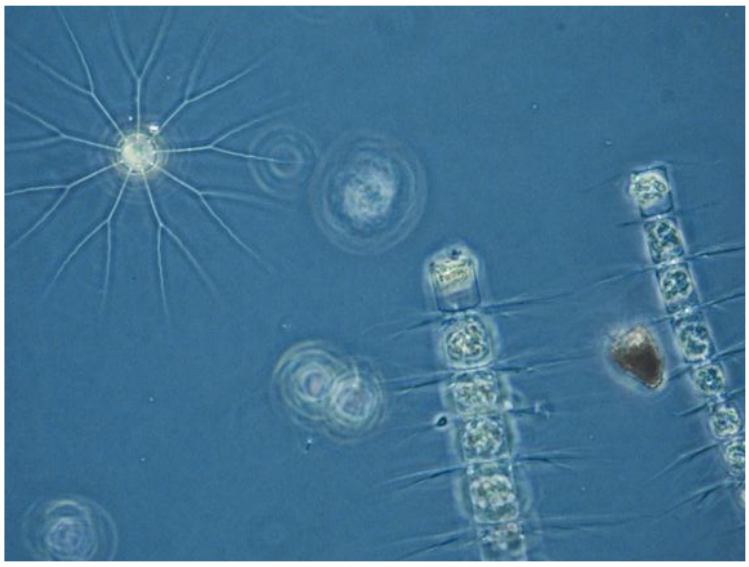
Sportharvesters should only collect shellfish from areas that are not affected by a current health advisory or quarantine. Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

Table 2. Program participants collecting shellfish samples.

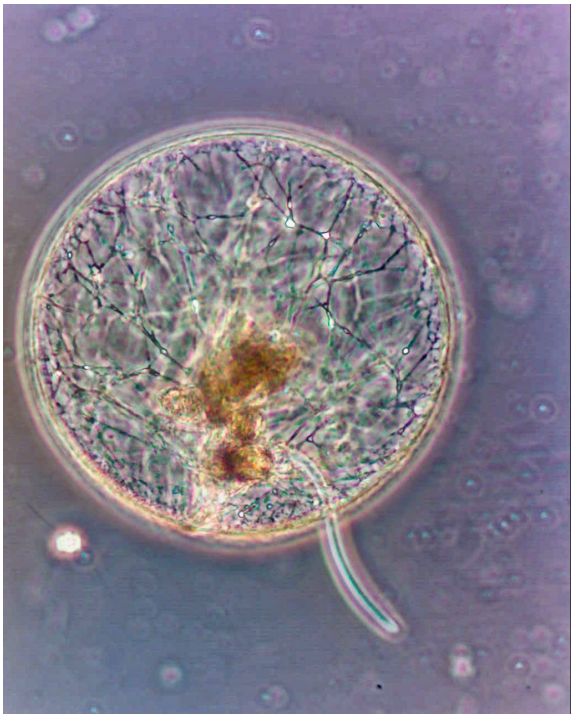
COUNTY	AGENCY	#
Del Norte	Tolowa Dee-ni' Nation	1
	Yurok Tribe Environmental Program	1
Humboldt	Aqua Rodeo Farms	1
	CDPH Volunteer (*Georgianna Wood)*	1
	Humboldt Bay Oyster Company	1
	Humboldt County Environmental Health Department	1
	Pacific Shellfish	12
Mendocino	CDPH Volunteer (*Kristin Gordon)*	2
	Mendocino County Environmental Health Department	1
Sonoma	CDPH Volunteer (*Cynthia Jackson)*	2
	CDPH Marine Biotoxin Program	5
Marin	CDPH Volunteer (*Rand Dobleman)*	1
	CDPH Marine Biotoxin Program	2
	Cove Mussel Company	2
	Hog Island Oyster Company	8
	Starbird Mariculture	2
San Francisco	CDPH Marine Biotoxin Program	2
San Mateo	CDPH Marine Biotoxin Program	1
Santa Cruz	CDPH Volunteers (*Richard Buddington)*	1
	CDPH Marine Biotoxin Program	1
Monterey	Monterey Abalone Company	1
San Luis Obispo	California Polytechnic State University	1
	Grassy Bar Oyster Company	4
Santa Barbara	Santa Barbara Mariculture Company	2
	U.C. Santa Barbara	5
Ventura	None Submitted	
Los Angeles	CDPH Volunteer (*Steven Field)*	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarm, Inc.	5
	CDPH Volunteer (*Kimmo Rantalainen)*	1
	U.S. Navy Marine Mammal Program	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.

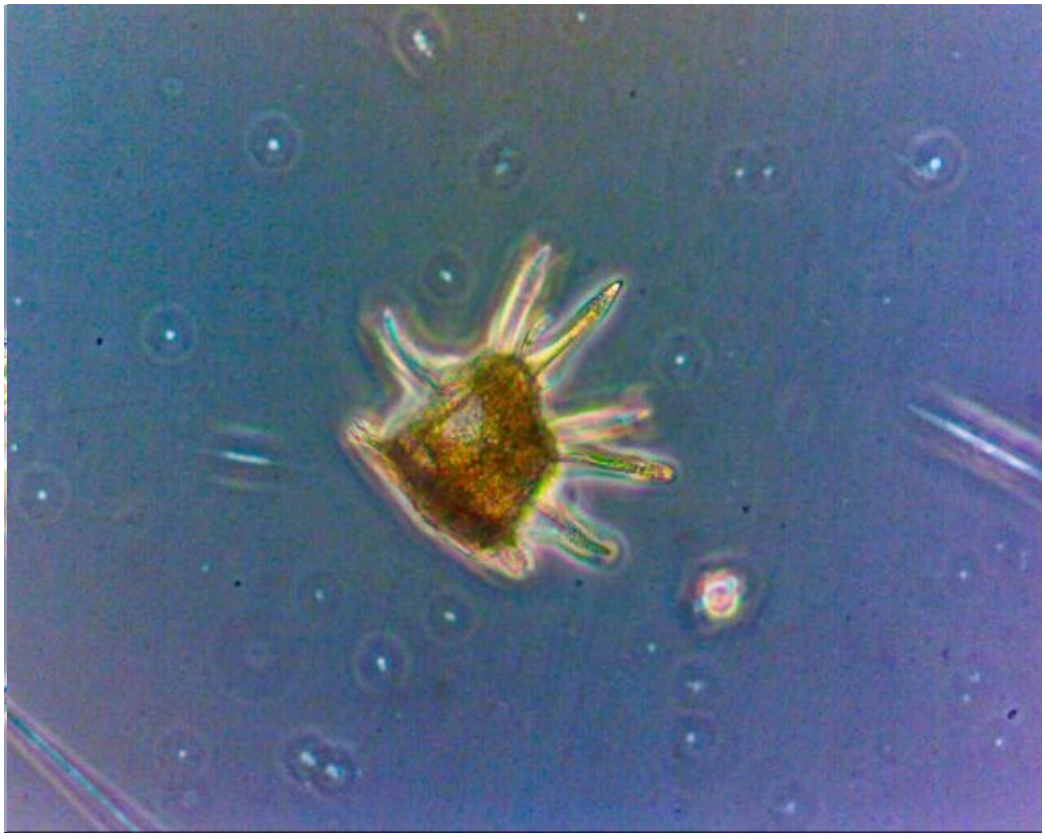
Phytoplankton Gallery



Two views of the diatom *Bacteriastrum*:(1) two chains of cells in girdle view (lower right); and (2) one chain in valve view (looking top-down; upper left).



The heterotrophic dinoflagellate *Noctiluca*.



A rare glimpse of the dinoflagellate *Ceratocorys*, observed in a sample from Avalon Bay, Catalina Island.