

Monthly Marine Biotoxin Report

July 2004

Technical Report No. 04-19

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of July 2004. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

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) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed along the entire Southern California coast (Figure 1). Small numbers of this dinoflagellate species were

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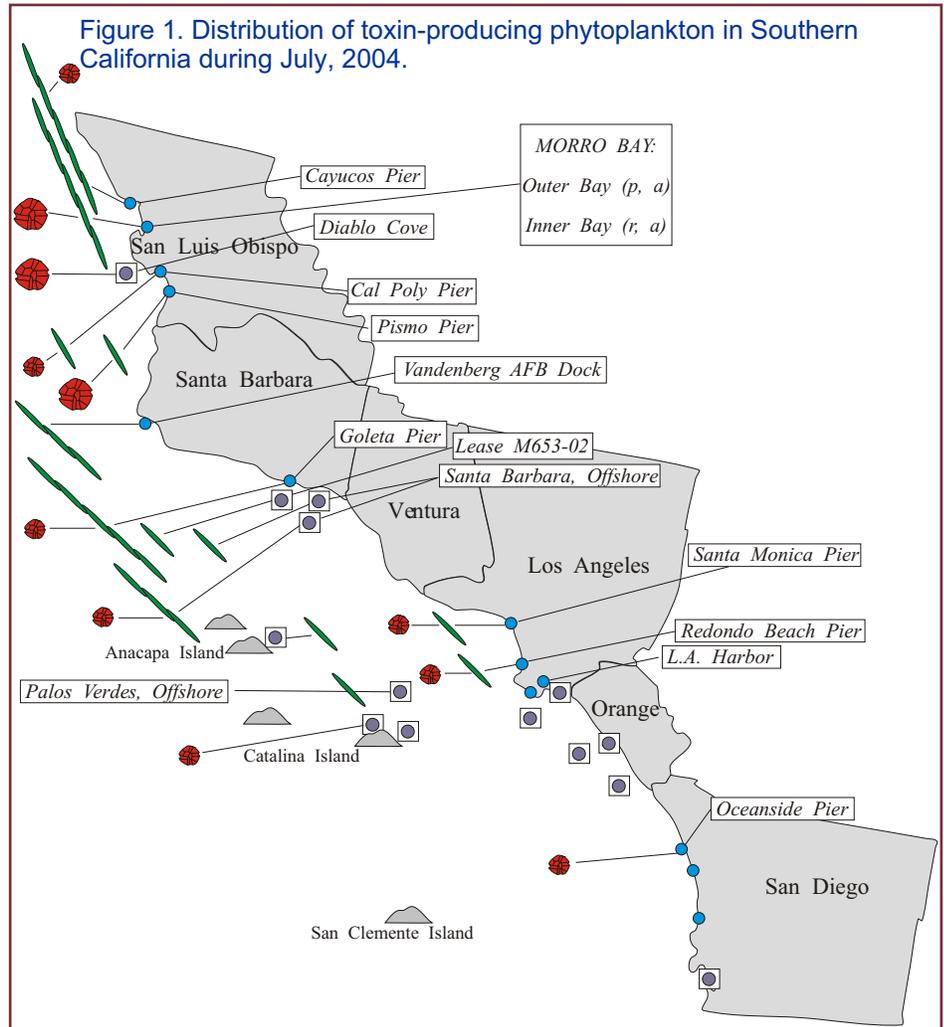


Figure 1. Distribution of toxin-producing phytoplankton in Southern California during July, 2004.

Relative Abundance of Known Toxin Producers

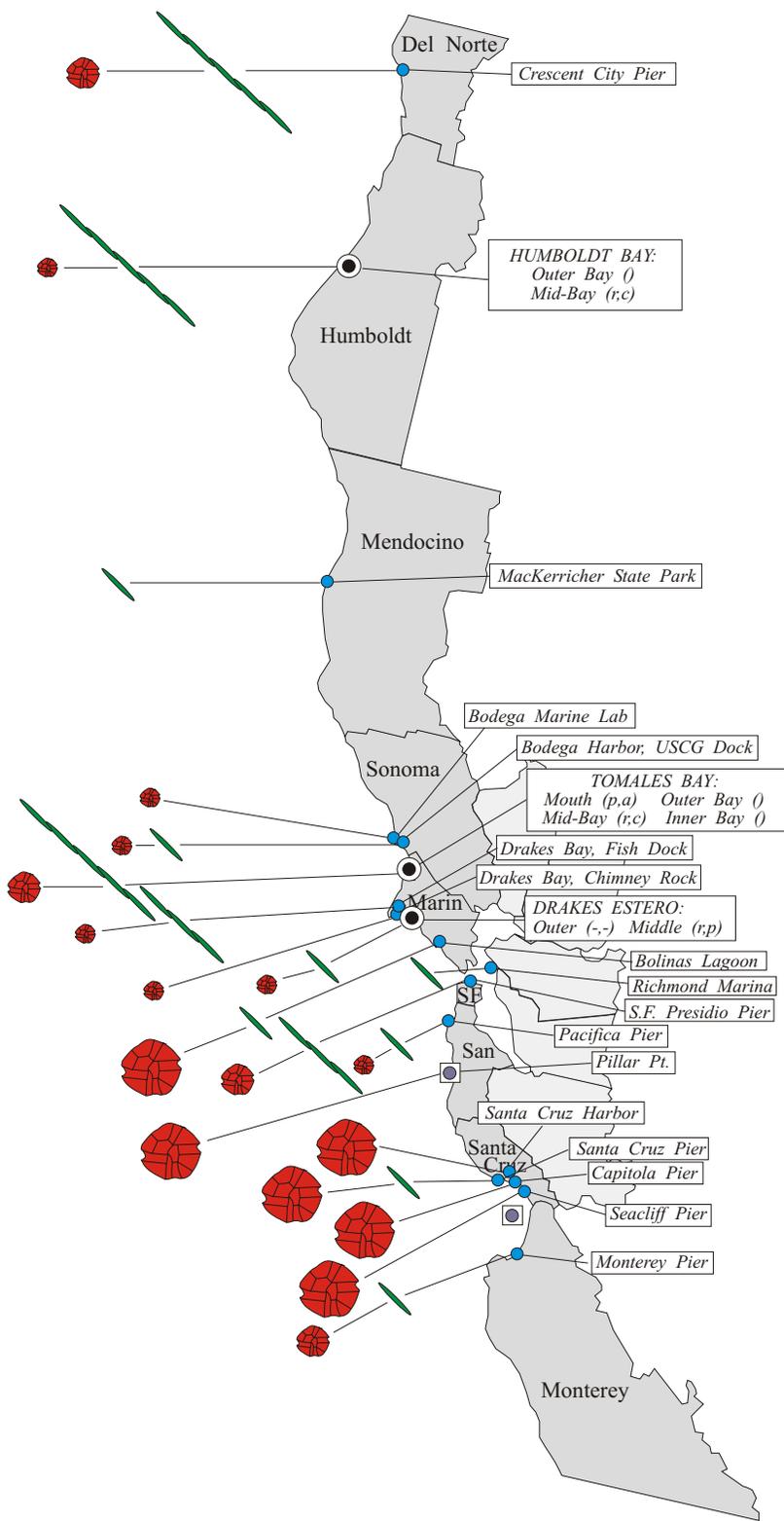
Alexandrium Species	Pseudo-nitzschia Species
 Rare (less than 1%)	 Present (less than 10%)
 Present (between 1% and 10%)	 Common (between 10% and 50%)
 Common (between 10% and 50%)	 Abundant (greater than 50%)
 Abundant (greater than 50%)	

MONTHLY SAMPLING STATIONS:

-  Single Sampling Station
-  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*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during July, 2004.



(Continued from Page 1)

observed at sites in Santa Barbara and Los Angeles counties. *Alexandrium* was also observed in samples collected offshore near Catalina Island. The distribution of this dinoflagellate increased significantly at sites in San Luis Obispo County, where it was observed throughout the month.

Coinciding with the increase in *Alexandrium* at San Luis Obispo sites, the concentration of PSP toxins increased at several locations in this region (Figure 3). In mussel samples from Morro Bay, PSP toxicity increased from 43 ug on July 5 to 203 ug on July 11. By July 19 the level of toxins had decreased to 70 ug, remaining at this level through July 24.

Domoic Acid

Pseudo-nitzschia was observed along the entire Southern California coast in July. The relative abundance increased dramatically in Santa Barbara at the beginning of the month but declined rapidly, with cell densities low throughout this time (Figure 1). By the end of July the relative abundance of this diatom increased significantly at sites along the San Luis Obispo coast. Samples collected and observed by the Morro Bay National Estuary Program volunteers at the end of the month contained 80% *Pseudo-nitzschia* and a moderate cell mass. High relative abundances of *Pseudo-nitzschia* were also

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Relative Abundance of Known Toxin Producers

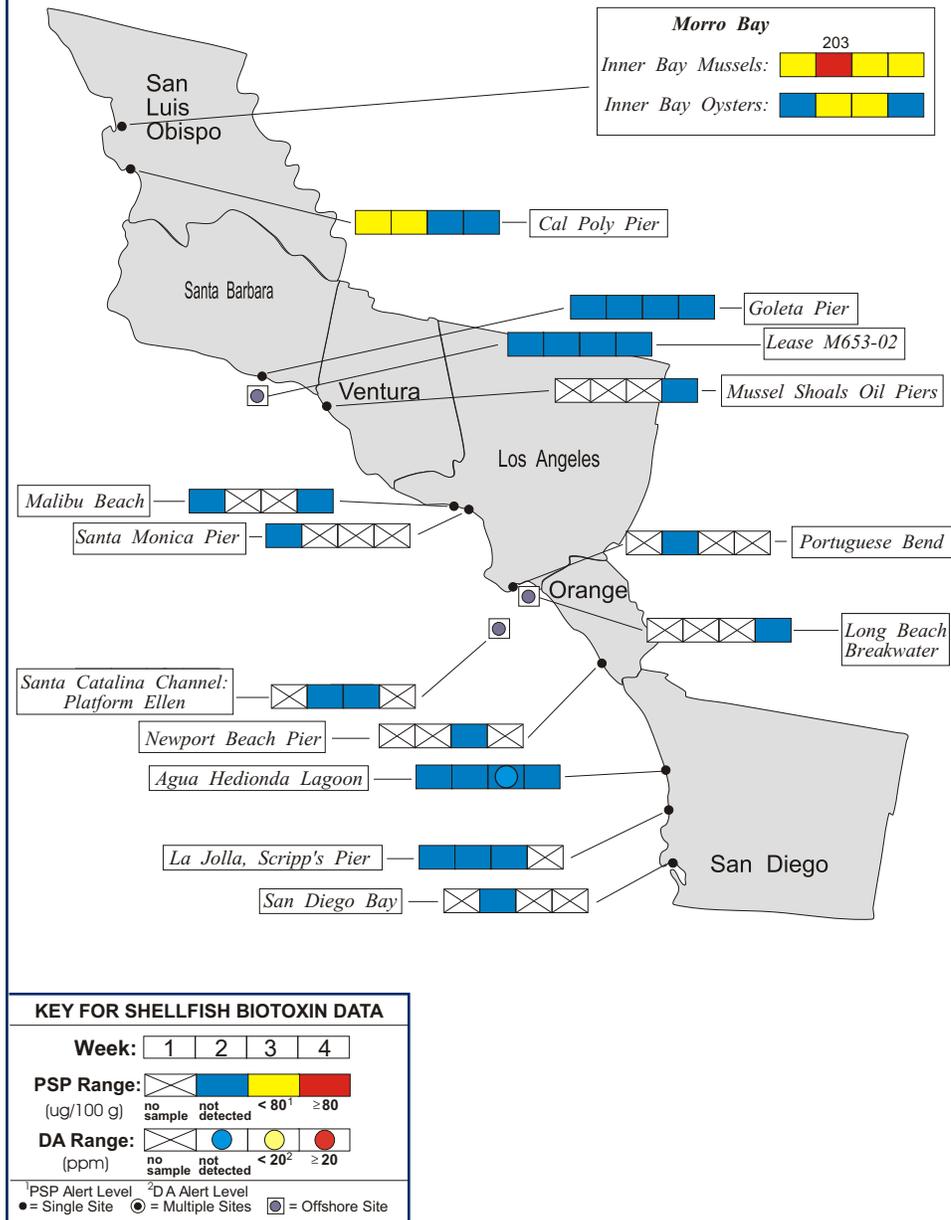
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (between 1% and 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
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 (A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
 e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during July, 2004.



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observed at Cayucos Pier on July 24.

Non-toxic Species

The San Luis Obispo coast was dominated by diatoms (*Coscinodiscus*, *Chaetoceros*) in the Morro Bay region, with a mix of dinoflagellates (*Prorocentrum*, *Ceratium*). *Prorocentrum* was more abundant offshore of Diablo Canyon and southward at Avila and Pismo. A bloom of the diatom *Hemialus* was detected offshore around Catalina Island. In contrast, the onshore assemblage along the coast between Los Angeles and San Diego was dominated by dinoflagellates (*Lingulodinium*, *Ceratium*), although *Hemialus* was also common throughout this region.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium distribution increased along most of the Northern California coastline in July (Figure 2). The greatest numbers of this dinoflagellate were observed at several Santa Cruz sites in northern Monterey Bay by mid month. An additional increase appeared to occur at the end of the month in Santa Cruz Harbor and in Monterey at the commercial pier.

Low levels of PSP toxins persisted in sentinel mussels from Humboldt Bay

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Health Services, 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 program 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 health is threatened.

For More Information Please Call:
 (510) 412-4635

For Recorded Biotoxin Information Call:
 (800) 553-4133

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throughout the month (Figure 4). The elevated level of PSP toxins detected in shellfish from Drakes Estero (Marin County) in June increased through July 7. Mussels from the sentinel buoy in the main channel contained 1602 ug at this time. Toxin levels declined throughout the rest of the month but remained above the alert level until July 22. Sentinel mussels from Santa Cruz Pier had also increased above the alert level in late June and continued to increase through the second week of July (141 ug). Toxin levels declined then increased again between July 21 (68 ug) and July 28 (770 ug).

Domoic Acid

Pseudo-nitzschia distribution and relative abundance were similar to observations in June (Figure 2). The June bloom of this diatom at Crescent City (Del Norte County) had declined by the end of the month. By mid-July the bloom reappeared, reaching 90% relative abundance and very high cell mass by the end of the month.

The elevated level of domoic acid detected in razor clams from Del Norte County in June continued into July (Figure 4). Three clam samples dug on July 2 contained widely varying concentrations of domoic acid: 11 ppm, 26 ppm, and 54 ppm. The latter sample was of cleaned (eviscerated) razor clams. We would like to express our appreciation to Dale Watson, the U.C. Sea Grant Extension office in Crescent City, and the Department of Fish and Game biologists for their help in obtaining plankton and razor clam samples. Their efforts have allowed us to track this bloom and alert the public to the dangers associated with this event.

Non-toxic Species

The Northern California coastline was dominated by diatoms throughout July, with

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Figure 4. Distribution of shellfish biotoxins in Northern California during July, 2004.

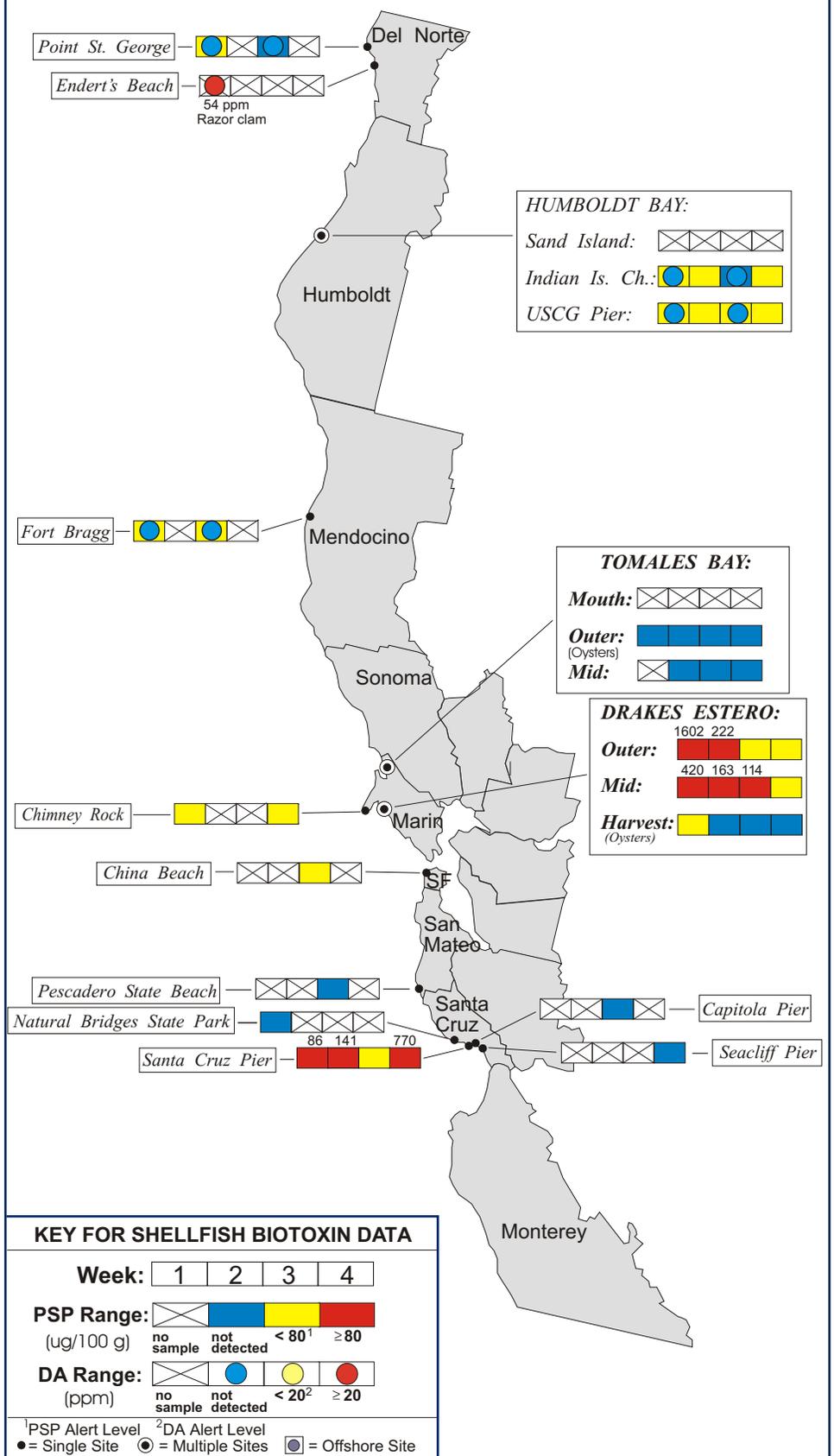


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during July, 2004.

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COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
	Sea Grant Extension Program	3
	California Department of Fish and Game	1
Humboldt	Coast Seafood Company	9
Mendocino	Mendocino County Environmental Health Department	2
Sonoma	None Submitted	
Marin	Cove Mussel Company	3
	CDHS Marine Biotoxin Program Volunteer (Marjorie Siegal)	1
	CDHS Marine Biotoxin Monitoring Program	1
	Hog Island Oyster Company	5
	Johnson Oyster Company	36
	Marin Oyster Company	3
San Francisco	San Francisco County Health Department	2
San Mateo	San Mateo County Environmental Health Department	1
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	3
Monterey	Monterey Abalone Company	1
San Luis Obispo	Williams Shellfish Company	8
	U.C. Santa Barbara Marine Science Institute	4
Santa Barbara	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara Marine Science Institute	4
Ventura	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Health Department	2
	Aquarium of the Pacific Long Beach	3
	Los Angeles Regional Water Quality Control Board	1
Orange	CDHS Marine Biotoxin Program Volunteer (Mike Femessey)	1
	Ecomar, Inc.	2
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	3
	U.S. Navy	1

dinoflagellates most dominant in Tomales Bay (*Gymnodinium*, *Prorocentrum*), Princeton Harbor (*Gonyaulax spinifera*), and Monterey Bay (*Ceratium*, *Prorocentrum*). A massive red tide was also reported, initially around Seacliff Pier in Santa Cruz; more on this event in the August report.

QUARANTINES:

The health advisory issued by the State Health Director on June 10 remained in effect. This advisory warned consumers to avoid eating sport-harvested shellfish from Humboldt and Del Norte counties and was the result of dangerous levels of domoic acid in razor clams collected from this region.

The annual quarantine on the sport-harvesting of mussels went into effect on April 23, one week ahead of the normal May 1 start date. This action was taken as a result of elevated levels of domoic acid in Santa Cruz County and, subsequently, along the Santa Barbara coast.

The annual mussel quarantine applies only to sport-harvested mussels along the entire California coastline, including all bays and estuaries. This quarantine does not affect the commercial shellfish growing areas in California. All commercial shellfish growers certified by the State of California are required to submit routine samples for biotoxin analysis, allowing us to closely monitor for the occurrence of any toxin. Harvesting closures are imposed if toxin levels reach the federal alert level.

Contact the "Biotoxin Information Line" at 1-800-553-4133 or (510) 412-4643 for a current update on marine biotoxin activity.



Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during July, 2004.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	5
Humboldt	Coast Seafood Company	4
Mendocino	DHS Volunteer (Rouyaishyana)	1
Sonoma	DHS Marine Biotoxin Monitoring Program	1
	DHS Volunteer (Cathleen Cannon)	1
Marin	CDHS Volunteers (Bret Anderson, Richard Plant, Marjorie Siegel, Mary Von Tolksdorf)	12
	Johnson Oyster Company	14
	DHS Marine Biotoxin Monitoring Program	2
Contra Costa	DHS Marine Biotoxin Monitoring Program	2
San Francisco	CDHS Volunteer (Eugeria Mcnaughton)	2
San Mateo	San Mateo County Environmental Health Department	2
	CDHS Volunteer (Sandy Emerson)	1
Santa Cruz	Santa Cruz Environmental Health Department	4
	U.C. Santa Cruz	5
	California Department of Parks and Recreation	2
Monterey	CDHS Volunteer (Jerry Norbin)	2
San Luis Obispo	CDHS Volunteers (Renee and Auburn Atkins, Richard Welch)	4
	Morro Bay National Estuary Program	10
	Tenera Environmental	1
	U.C. Santa Barbara Marine Science Institute	4
	Morro Bay Natural History Museum	2
Santa Barbara	U.C. Santa Barbara Marine Science Institute	7
	Santa Barbara Mariculture Company	5
	Vanderberg Air Force Base	1
	Santa Barbara Chankeeper	2
Ventura	Catalina Tall Ships Expeditions	1
Los Angeles	Catalina Tall Ships Expeditions	4
	Aquarium of the Pacific, Long Beach	2
	Los Angeles County Sanitation District	2
	Los Angeles County Health Department	2
	CDHS Volunteer (Richard Weaver)	2
	Los Angeles Regional Water Quality Control Board	1
Orange	Orange County Sanitation District	2
	Ocean Institute	1
San Diego	San Diego County Environmental Health Department	1
	CDHS Volunteer (Paul Sims, Jeff Kermod)	4
	Scripps Institute of Oceanography	4

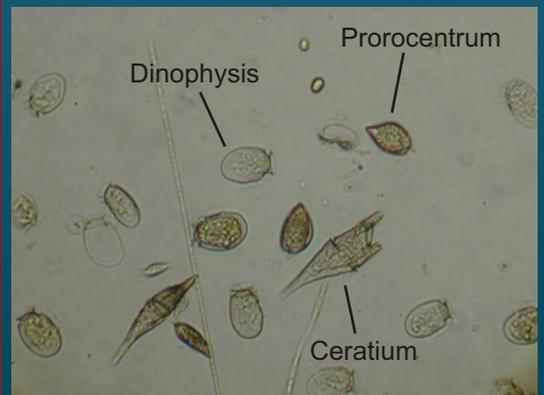
PHYTOPLANKTON GALLERY



Alexandrium was common at sites along the Santa Cruz coast inside Monterey Bay.



Chains of the diatom *Pseudo-nitzschia* in a plankton sample from Morro Bay.



The dinoflagellates *Prorocentrum*, *Dinophysis*, and *Ceratium* were common along parts of the coast of San Luis Obispo and Santa Barbara.