

**MANAGEMENT PLAN
FOR
COMMERCIAL SHELLFISHING
IN HUMBOLDT BAY, CALIFORNIA**



**California Department of Public Health
Division of Drinking Water and Environmental Management
Environmental Management Branch
Environmental Health Services Section
Preharvest Shellfish Unit**

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I. EXECUTIVE SUMMARY

This Management Plan for commercial shellfishing in Humboldt Bay was developed pursuant to the National Shellfish Sanitation Program (NSSP) Model Ordinance, Chapter IV (2007). The Management Plan has been prepared for adoption in accordance with the procedures set forth in Division 104, Part 6, Chapter 5 of the California Health and Safety Code section 112150 et. seq. Any temporary closures to shellfish harvesting that may be declared pursuant to this Management Plan after its adoption shall be deemed to meet the requirements of Section 112160, Health and Safety Code, pertaining to notice and opportunity to submit data, views or arguments. This Management Plan establishes the standards and procedures used to regulate commercial shellfish harvesting in Humboldt Bay.

The primary purpose of the Management Plan is to define the criteria and procedures used by the State shellfish authority for determining when bivalve shellfish can be harvested for marketing from a shellfish growing area classified as *Conditionally Approved*. Harvest activities may only occur during times when the respective growing area is open to shellfish harvesting as described in this document.

The California Department of Public Health (CDPH) is the lead agency in the State shellfish sanitation program, which certifies and regulates sanitary procedures followed in the harvesting, handling, processing, storage and distribution of bivalve molluscan shellfish intended for sale for human consumption. Within the CDPH, the Environmental Management Branch in the Division of Drinking Water and Environmental Management regulates shellfish sanitation in the growing waters, while the Food and Drug Branch in the Division of Food, Drug, and Radiation Safety regulates shellfish sanitation after harvest. This Management Plan was prepared and is administered by the Environmental Management Branch's Environmental Health Services Section, Preharvest Shellfish Unit, in cooperation with the shellfish growers, wastewater treatment plant operators, public agencies, and the other involved parties discussed in this Management Plan. The NSSP requires that the shellfish growers, the wastewater treatment plants involved, and the applicable local and State agencies agree with the Management Plan. The failure of any one party to agree shall constitute justification to deny the application of the conditional classification to the growing area.

Oysters, clams and mussels are grown and harvested by four commercial firms in the northern portion of Humboldt Bay, commonly known as North Bay. All of the certified shellfish growing areas in North Bay are classified as *Conditionally Approved*. The purpose of the *Conditionally Approved* classification is to provide a mechanism for the declaration of harvest closures during predictable periods when the shellfish growing waters do not meet NSSP standards for harvesting shellfish for human consumption.

The Management Plan establishes procedures for emergency notification and harvest closures after discharges of inadequately treated sewage or other hazardous substance spills that may threaten the safety of harvested shellfish. Procedures are established for temporary harvest closures of the *Conditionally Approved* areas based on rainfall

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measurements recorded by a National Weather Service rain gauge, a California Department of Public Health Preharvest Shellfish Unit (CDPH/PSU) rain gauge, or other approved rain gauge designated by CDPH/PSU.

The Management Plan also stipulates that shellstock should not be removed from the growing areas during any closure except with written permission from the California Department of Public Health. Each Shellfish grower is responsible for water quality monitoring monthly during open harvest periods. The water quality monitoring data collected by the commercial shellfish growers are analyzed annually to determine the appropriate growing area classifications.

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III. ABBREVIATIONS AND DEFINITIONS

This document contains many acronyms and abbreviations. In general, an acronym or abbreviation will be given in parentheses () following the first time a title or term is used, and the abbreviation will be used in almost all cases in place of that term later. The following alphabetical list of abbreviations used in this document is provided to assist the reader:

ABBREVIATION	DESCRIPTION
AMWS	Arcata Marsh and Wildlife Sanctuary
ARF	Aqua Rodeo Farms
CSC	Coast Seafoods Company
DEH	Division of Environmental Health (within County Health Department)
DFG	California Department of Fish and Game
CDPH	California Department of Public Health
CDPH/DDWEM	Division of Drinking Water and Environmental Management
CDPH/EHSS	Environmental Health Services Section (within CDPH/EMB)
CDPH/EMB	Environmental Management Branch (within CDPH/DDWEM)
CDPH/FDB	Food and Drug Branch (within CDPH)
CDPH/PSU	California Department of Public Health, Preharvest Shellfish Unit
ELAP	Environmental Laboratory Accreditation Program
FC	Fecal coliform
FDA	U.S. Food and Drug Administration
HBHRCD	Humboldt Bay Harbor Recreation and Conservation District
HCSD	Humboldt Community Services District
HBOC	Humboldt Bay Oyster Company
H&S §	Section of the California Health and Safety Code
MGD	Million Gallons Per Day
mL	Milliliters
MPN	Most Probable Number
MOU	Memorandum of Understanding
NBSC	North Bay Shellfish Company
NSSP	National Shellfish Sanitation Program
PSP	Paralytic Shellfish Poisoning
RDO	Rainfall duty officer (a designated staff person in CDPH/PSU)
RWQCB	California Regional Water Quality Control Board, North Coast Region
SOP	Standard Operating Procedures
SRS	Systematic Random Sampling
SSP	Shellfish Sanitation Program
WDRs	Waste Discharge Requirements
WWTP	Wastewater treatment plant

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The following definitions shall apply to this document:

Harvest. The act of removing shellstock from growing waters and placing the shellstock on or in a manmade conveyance or other means of transport.

Shall. The term “shall” is used in this plan in its legal or regulatory sense to denote a mandatory requirement.

Shellfish grower or harvester. For the purposes of this plan, the terms “grower” and “harvester” refer to the same persons or firms and may be used interchangeably. Because the plan relates primarily to the management of shellfish harvesting, the term “harvester” will be found most frequently.

Direct marketing. Direct marketing means the sale of shellfish harvested without undergoing purification (relaying or depuration).

IV. INTRODUCTION

Humboldt Bay, located in Humboldt County, California (Figure 1), is one of two leading areas in California for the commercial production of bivalve molluscan shellfish, with approximately 4,000 acres of certified growing areas. All commercial shellfish growing areas are located in the north part of the bay, also known as North Bay. The shellfish growing area classifications of North Bay are shown in Figure 2. Four commercial shellfish harvesters are operating in the bay: Aqua Rodeo Farms (ARF), Coast Seafoods Company (CSC), Humboldt Bay Oyster Company (HBOC), and North Bay Shellfish Company (NBSC) (Table 1). Commercial shellfish production in North Bay is primarily Pacific oysters (*Crassostrea gigas*). Each of the growers also produces Kumamoto oysters (*C. sikamea*) and limited quantities of Manila clams (*Tapes semidecussata*). NBSC also produces Mediterranean or “southern” bay mussels (*Mytilus galloprovincialis*), and is involved in limited production of European flat oysters (*Ostrea edulis*) and Eastern oysters (*C. virginica*).

Because Humboldt Bay is subject to intermittent microbiological pollution from various sources, all of the commercial shellfish growing areas are classified as *Conditionally Approved*. The National Shellfish Sanitation Program (NSSP) Model Ordinance (2005), Chapter IV, requires development of a Management Plan for any *Conditionally Approved* growing area. This Management Plan sets forth the standards and criteria necessary to manage the harvesting of bivalve molluscan shellfish intended for human consumption.

This Management Plan establishes the standards and procedures used to regulate commercial shellfish harvesting in Humboldt Bay and has been prepared for adoption in accordance with the procedures set forth in Sanitary Control of Shellfish, (Division 104, Part 6, Chapter 5 of the California H&S Code § 112150 et. seq.) and will constitute an order of the Director of the California Department of Public Health (CDPH) as described in § 112160(c).

A key part of this plan is the establishment of standards, conditions and procedures for growing area closures at times of predictable elevated pollution following periods of significant rainfall, as well as for emergency closures established for unpredictable events, such as sewage spills or oil spills. They have been set forth in this plan such that when the specified events occur, predetermined actions are implemented. Any temporary closure to shellfish harvesting resulting from these pollution events that may be declared pursuant to this Management Plan shall be deemed to meet the requirements of H&S Code § 112160 (d), pertaining to notice and opportunity to submit data, views or arguments. Rainfall closures declared under this Management Plan are not considered “emergency actions” referred to in H&S Code § 112160 (e), but instead are dealt with as part of the Director’s order establishing this plan. Compliance by certified shellfish growers/harvesters with the conditions and procedures established in this Management Plan is mandatory as a condition of their Shellfish Growing Area Certificate.

V. ORGANIZATION AND RESPONSIBILITIES

Numerous agencies and individuals are involved parties in the management of Humboldt Bay shellfish growing areas. A detailed contact list is provided in Appendix A.

A. CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

CDPH is the lead agency responsible for the State shellfish sanitation program (SSP) and is the agency responsible for decision making regarding harvest closures and reopening of commercial shellfish growing areas. Within CDPH, the Deputy Director for Prevention Services has overall responsibility for the California SSP. Two major program segments are housed in the following branches:

1. Environmental Management Branch

The Chief of the Environmental Management Branch (EMB), through the Chief of the Environmental Health Services Section (EHSS), is responsible for the CDPH preharvest shellfish unit (CDPH/PSU). The chief of the CDPH/PSU heads a staff of several environmental scientists and coordinates activities as they relate to the evaluation, classification, and certification of commercial shellfish growing areas as well as management of the State's marine biotoxin monitoring and prevention program.

2. Food and Drug Branch

The Chief of the Food and Drug Branch (FDB) is responsible for the postharvest SSP as it relates to the regulation of shellfish handling, processing, storage and distribution after harvest, including the labeling and identification of shellfish moving in commerce. FDB provides assistance in the area of patrol and prevention of illegal shellfish harvesting.

B. U.S. FOOD AND DRUG ADMINISTRATION

A primary responsibility of the U.S. Food and Drug Administration (FDA) is to ensure conformity of state SSPs with the guidelines and procedures for the classification and management of shellfish growing areas as outlined in the NSSP Model Ordinance (2003). Conformity with the Model Ordinance ensures national uniformity of state programs and the health and safety of shellfish products in intra- and interstate commerce. FDA conducts annual reviews and evaluations of state SSPs, and provides recommendations, technical assistance, and training designed to improve the effectiveness of those programs.

C. CALIFORNIA DEPARTMENT OF FISH AND GAME

The California Department of Fish and Game (DFG) participates in the shellfish program through the terms of a "Memorandum of Understanding" between the DFG and the CDPH regarding the California Shellfish and Paralytic Shellfish Poisoning

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Prevention Program.” Within DFG, the Conservation, Education, and Enforcement Branch, with its game wardens, provides assistance to CDPH/PSU in the area of patrol and prevention of illegal shellfish harvesting by both sport and commercial harvesters. In addition, DFG’s Marine Resources Division issues and administers State aquaculture leases for the California Fish and Game Commission.

D. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, NORTH COAST REGION

The California Regional Water Quality Control Board, North Coast Region (RWQCB) is responsible for regulating dischargers of wastes to any body of water in the region. The RWQCB sets standards for waste dischargers, issues permits to them in the form of Waste Discharge Requirements (WDRs), and Monitoring and Reporting Programs (MRPs), and monitors their performance.

E. HUMBOLDT COUNTY DEPARTMENT OF PUBLIC HEALTH

The County Health Officer is responsible for all matters pertaining to public health within Humboldt County, including the County’s incorporated cities. Within this Department, the Director of the Division of Environmental Health (DEH) is responsible for enforcing the laws and regulations pertaining to environmental health, including the proper handling and disposal of sewage from private premises.

F. CITY OF EUREKA

The City of Eureka operates a wastewater collection and treatment system. The Director of Public Works is responsible for the sewage collection and storm drain systems, while the Utilities Operations Manager is responsible for the sewage treatment system. The Engineering Department operates the Elk River Wastewater Treatment Plant (WWTP), which discharges into the North Bay Channel through a permit issued by the RWQCB for ocean discharge south of the mouth of the Elk River. The Public Works/Building Department manages the Eureka Small Boat Basin marina. The Engineering Department Property Manager is responsible for administering tidelands leases for that portion of the bay within the Eureka city limits.

G. CITY OF ARCATA

The City of Arcata operates a wastewater collection and treatment system and a separate storm drain system. The Director of Public Works is responsible for the sewage collection system, while the Environmental Services Director is responsible for the sewage pump stations and the sewage treatment system, including the Arcata WWTP and the Arcata Marsh and Wildlife Sanctuary (AMWS). The Director of Environmental Services is also responsible for the management of all creeks and streams and the issuance and administration of aquaculture leases for the portion of the bay within the Arcata city limits.

H. HUMBOLDT COMMUNITY SERVICES DISTRICT

The Humboldt Community Services District (HCSD) serves the unincorporated areas surrounding the City of Eureka. It operates the sewage collection system in this area and contracts with the City of Eureka for treatment and discharge at the Elk River WWTP. As such, it is a party to the WDRs adopted by the RWQCB for the City of Eureka.

I. HUMBOLDT BAY HARBOR RECREATION AND CONSERVATION DISTRICT

The Humboldt Bay Harbor Recreation and Conservation District (HBHRCD) is responsible for the maintenance and operation of the Woodley Island Marina and for the issuance and administration of aquaculture leases for those portions of the bay within the District's control.

J. COMMERCIAL GROWERS

1. Aqua Rodeo Farms

ARF produces oysters and clams. ARF subleases a portion of NBSC's Parcel #1 lease. ARF produces Pacific, Kumamoto, and Olympia oysters, bay mussels and Manila clams. ARF's certified growing area consists of the south-central section of growing area C (Parcel #1) immediately south of Water Quality Station #31.

2. Coast Seafoods Company

CSC produces the majority of shellfish harvested from Humboldt Bay. Ownership of the shellfish growing areas resides with HBHRCD, the City of Eureka, by CSC or by other private parties. CSC produces Pacific and Kumamoto oysters, and Manila clams. CSC's certified growing areas consist of growing areas A and B in their entirety, and a portion of Area E (Figure 2.)

3. Humboldt Bay Oyster Company

HBOC was first certified to harvest shellfish in June 2003. HBOC subleases a growing area along the Mad River Channel from Kuiper Mariculture (a producer of shellfish seed) and a wet storage area in the Mad River Slough. Kuiper Mariculture holds a lease from HBHRCD. HBOC also subleases a portion of NBSC's Parcel #1 lease. HBOC produces oyster seed as well as market-size Pacific oysters, European flat oysters, bay mussels, and Manila clams. HBOC's certified growing areas consists of portions of Growing Areas C and E along the west side of the Mad River Channel, C (Parcel #1) immediately north of Water Quality Station # 31 and a wet storage area for harvested shellstock and for mussel culture area.

4. North Bay Shellfish Company

NBSC leases two parcels (Parcel #1 and Parcel #2) from the City of Arcata. NBSC produces Pacific, Kumamoto, and European flat oysters, bay mussels, and Manila clams. NBSC's certified growing areas consists of the south portion of growing Area C (Parcel #1), and the entirety of Area D.

VI. GROWING AREA CLASSIFICATION

A. CONDITIONALLY APPROVED AREAS

The certified shellfish growing areas of Humboldt Bay are classified as *Conditionally Approved* for commercial shellfish production in accordance with the NSSP Model Ordinance, Chapter IV (2005). The classified areas are limited to the northern arm of Humboldt Bay, known as North Bay (Figure 2).

The Mad River Slough (above the Samoa Boulevard Bridge) is used primarily as a holding area for shellstock previously harvested from the certified growing areas of North Bay. Two small areas about a half-mile north of the Mad River Slough bridge are used by NBSC and HBOC as shellfish holding areas (Figure 2), with HBOC's wet storage area located about 300 feet north-east of NBSC's wet storage area. The areas are classified as *Conditionally Approved*.

A shellfish growing area classified as *Conditionally Approved* is one which meets the NSSP water quality standards for an *Approved* area (an area from which shellfish may be harvested for direct marketing for human consumption), except during relatively short periods of time when it does not meet the standards and must be closed to harvesting. Direct marketing means the sale of shellfish harvested without having to undergo purification (relaying or depuration). The factors determining closed periods must be known, predictable, and not excessively complex. The purpose of the *Conditionally Approved* classification is to provide a mechanism, through this Management Plan, for the declaration of harvest closures when predictable pollution impacts may cause the growing water to fail to meet the standards for an *Approved* growing area.

B. CLASSIFICATION MAINTENANCE

To maintain the *Conditionally Approved* classification, each of the certified shellfish harvesters shall take a minimum of one water sample per month when in an open status from each of the primary sampling stations. Each grower shall follow the systematic random sampling (SRS) schedule provided in the respective Sampling Plan. The samples shall be tested at a CDPH approved laboratory for fecal coliform assay, and the results sent directly to CDPH/PSU. See Section XII.A for additional information on water quality sampling requirements.

VII. PERFORMANCE STANDARDS

A. POTENTIAL NON-POINT SOURCES

Sources that cannot be attributed to a specific discharge location (ditch or pipe) are termed “non-point sources”. A number of non-point sources have been identified for Humboldt Bay, such as marinas, migratory and non-migratory wildlife, septic systems, and urban and agricultural runoff. Some non-point sources are associated with rainfall run-off (i.e., discharge from septic systems, and urban and agricultural run-off), while others are not (i.e., marinas, wildlife).

Following completion of improvements in July 1986 of the Arcata and Eureka sewage collection and treatment systems, the sources of pollution most frequently impacting the commercial shellfish growing and harvesting areas in North Bay have been the non-point sources. A prohibited area has been established in and around the two marinas (Figure 2) to protect existing and potential shellfish growing areas against discharges of untreated sewage from recreational and commercial craft using the marinas (a non-point source). Rainfall closure rules are established, as set forth in Section VIII, to mitigate the impact of other non-point sources from rainfall runoff on growing areas. Recent evaluations of water quality monitoring results confirm that these closures have been successful in keeping the certified shellfish growing areas within NSSP standards for water quality during the times the bay is open for shellfish harvesting.

B. POTENTIAL POINT SOURCES

Sources that can be attributed to a specific site or location are known as “point sources”. Three WWTPs discharge to Humboldt Bay. The RWQCB issues WDRs to each WWTP. The WDRs include performance standards prescribed in the NSSP Model Ordinance, Chapter IV (2005) to protect bay water quality for the beneficial use of shellfish harvesting. In addition, the RWQCB conducts site inspections of the WWTPs at least three times annually to ensure compliance with its WDRs. Upon request, RWQCB provides copies of the WDRs, Facilities Inspection Reports, and annual reports for these plants to the CDPH/PSU. These documents are reviewed by CDPH/PSU staff and maintained in the program’s file.

1. City of Arcata WWTP

This is the only major point source discharging directly to Arcata Bay. A *Prohibited* area is established as a safety zone around this outfall, as described in Section VII.C below (see Figure 2).

The critical performance standards for this facility include the requirements that no discharges of untreated sewage are permitted from the collection system, and the treatment and disinfection of the effluent in conformance with the NSSP approved growing area standard for fecal coliform, in accordance with its WDRs. The failure to

meet these critical performance standards may cause an immediate closure of the bay to commercial harvesting.

2. City of Eureka, Elk River WWTP

This plant receives sewage from the City of Eureka and from unincorporated areas south and east of the city under a contract with HCSD. It discharges into the North Bay Channel on the outgoing tide near the mouth of Elk River. Because the plant outfall is located more than 4 miles from the nearest shellfish growing area, and because the WWTP synchronizes the release times of its treated effluent discharges to coincide with the ebb tide only, causing effluent to clear Humboldt Bay on each tidal exchange, no closure zone has been established around the outfall.

The critical performance standards for this facility and its collection system incorporated in its WDRs include the requirements that no discharge of untreated sewage is permitted from the collection system, and that after treatment and disinfection the effluent meets the NSSP approved growing area standard for fecal coliform. Failure to meet these critical performance standards may cause CDPH to implement an immediate closure of the bay to commercial harvesting.

3. College of the Redwoods WWTP

The College has a small “package plant” of 0.1 mgd capacity which discharges into White Slough, a tributary to the South Bay. Disinfection limits for the discharge are based on NSSP standards for shellfish growing waters.

An immediate closure implemented by CDPH to commercial harvesting may not always be necessary when the WWTP fails to meet its performance standards. The treatment facility’s relatively small discharge and long distance (6 miles) from its location in the South Bay watershed to the growing areas does not warrant such action. Any discharge of effluent that has not received full disinfection in accordance with the facility’s WDRs would be evaluated by CDPH as possible cause for a closure of Arcata Bay.

C. PROHIBITED AREAS ESTABLISHED

Prohibited areas are those areas where the commercial harvesting of shellfish is not allowed. Water quality in these areas either has not been determined, or does not meet the NSSP standards for shellfish growing waters as determined during the sanitary survey of the area. The size of the *Prohibited* area for the specific areas identified below was based on calculations of potential fecal coliform levels and the amount of dilution required to reduce the fecal coliform to acceptable levels.

1. Arcata WWTP Discharge Closure Zone

A prohibited area is established in Arcata Bay as a safety zone extending from the discharge point of the Arcata WWTP at the mouth of Butcher Slough to a point near the “the ruins” of the old Arcata wharf (represented by secondary water quality station #41 (Figure 2)).

2. Marinas

A *Prohibited* area is established in the Eureka Channel and in the channel between Woodley and Indian (aka Gunther) Islands as a marina safety zone around the Woodley Island Marina and the Eureka Small Boat Basin marina (Figure 2). The Woodley Island Marina and the Eureka Small Boat Basin marina, operated by the HBHRCD and the City of Eureka, respectively, are both located in the Eureka Channel area, south of Arcata Bay and thus outside the shellfish growing area. A *Prohibited* area is established around these marinas, and encompasses about 0.4 square miles. Further information and calculations are addressed in the report “Addendum 1 to Commercial Shellfish Growing Area Sanitary Survey Report and Reevaluation for Humboldt Bay, California”, CDPH/PSU Technical Report No. 94-13.

3. Unclassified Areas

In general, the shoreline areas of North Bay, the Mad River Slough (with the exception of the two wet storage areas), the Eureka Slough and other tidal tributaries are unclassified and considered *Prohibited* for commercial harvesting of shellfish. In addition, all of Humboldt Bay lying south of the Eureka-Samoa Bridge has not been subject to a complete sanitary survey in accordance with the NSSP Model Ordinance, Chapter IV (2005), and therefore is unclassified and considered *Prohibited*. These areas include all of Entrance Bay and South Bay.

4. Violation of State Laws and Regulations

It is a violation of State laws and regulations to culture, harvest, or hold shellfish intended for sale for human food except in or from areas that have been specifically identified in a valid Shellfish Growing Area Certificate issued by CDPH/PSU. The holding of shellfish in any other waters prior to on shore processing, storage, and marketing is a prohibited activity. Any shellfish held in uncertified waters, or in water-filled tanks or containers that have not been specifically approved by CDPH/PSU for that purpose, are subject to embargo and/or destruction by CDPH/PSU.

VIII. HARVEST CLOSURE AND NOTIFICATION PROCEDURES

This section provides the closure criteria and notification procedures to be followed by certified commercial shellfish harvesters and by State and local agencies, to ensure prompt notification and subsequent closure of Humboldt Bay to shellfish harvesting. These procedures shall be followed whenever any pollution event or condition occurs as

described below, that is likely to degrade the water quality in any *Conditionally Approved* shellfish growing area of the bay to the degree that it does not meet the NSSP minimum standards for an *Approved* area.

A. RAINFALL CLOSURES

Since rainfall closures are an important management tool for the growing area, the grower should call the Growers Information Line (GIL) prior to harvesting during any period of rainfall. If the grower is still unsure as to the status of the growing area, he should contact the rainfall duty officer (RDO) at (510) 412-4633 to determine if the GIL is in the process of being updated (on weekends and off-hours, leave a message on the GIL). CDPH/PSU staff will make all reasonable efforts to ensure that the GIL is current and accurate. However, the GIL is not updated on a continuous basis, and changes that occur in the growing area status due to overnight rainfall will not be updated on the GIL until business hours the following day. If there has been rainfall in the past 24 hours, the grower shall not harvest unless there is an updated message on the GIL, CDPH/PSU staff states that the growing area is open, or the grower is able to obtain reliable information that the growing area is open. If the grower harvests before obtaining current information on the growing area status, and the growing area is closed, the grower shall be responsible to return all harvested shellfish to the same location it was harvested from.

1. Closure Zones

All certified growing areas in Humboldt Bay are divided amongst six rainfall closures zones as follows (Figure 2):

- a. Area “A” consists of CSC’s Bird Island growing area, the southern portion of the Mad River growing area, and the easternmost portion of the East Bay growing area.
- b. Area “B” consists of CSC’s southern portion of the Sand Island growing area, the western portion of the East Bay growing area, the Gunther Island growing area, and the Arcata Channel growing area. Also included in Area B is the northernmost Mad River growing area, including the adjacent “island” within the Mad River Channel.
- c. Area “C” consists of NBSC’s Parcel 1 growing area in Arcata Bay, HBOC and ARF’s sublease area of NBSC’s Parcel 1 in Arcata Bay, and the northern portion of HBOC’s growing areas located along the west side of the Mad River Channel.
- d. Area “D” consists of NBSC’s wet storage area in Mad River Slough and a five-acre portion of NBSC’s Parcel 2 lease in the Arcata Channel.
- e. Area “E” consists of the southern portion of HBOC’s growing areas located along the west side of the Mad River Channel, and the central and northeastern portion of CSC’s Sand Island growing areas.

f. Area “F” consists of HBOC’s wet storage area in Mad River Slough. This wet storage area is located about 300 feet northeast of NBSC’s wet storage area.

2. Closure Rules

All shellfish growing areas in the *Conditionally Approved* areas in Humboldt Bay adhere to the established rules summarized in Appendix D. These rules are as follows:

a. Area “A” will be closed to harvesting for a minimum period of 96 hours following any period in which the 24-hour rainfall total exceeds 1.2 inches; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds three inches, one additional day will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds five inches, one additional day will be added to the closure, for a total of two additional days added to the closure; and the start of the closure will be six hours after the rainfall threshold is exceeded.

b. Area “B” will be closed to harvesting for a minimum period of 96 hours following any period in which the 24-hour rainfall total exceeds 1.0 inches; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds three inches, one additional day will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds five inches, one additional day will be added to the closure, for a total of two additional days; and the start of the closure will be six hours after the rainfall threshold is exceeded.

c. Area “C” will be closed to harvesting for a minimum period of 72 hours following any period in which the 24-hour rainfall total exceeds 0.50 inches; and when the 24-hour rainfall exceeds 0.75, or 1.0 inches, 24 or 48 hours, respectively, will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds three inches, one additional day will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds five inches, one additional day will be added to the closure, for a total of two additional days added to the closure; and the start of the closure will occur six hours after the rainfall threshold is exceeded.

d. Area “D” will be closed to harvesting for a minimum period of 96 hours following any period in which the 24-hour rainfall total exceeds 0.50 inches; and when the 24-hour rainfall exceeds 0.75, or 1.0 inches, 24 or 48 hours, respectively, will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds three inches, one additional day will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds five inches, one additional day will be added to the closure, for a total of two additional days added to the closure; and the start of the closure will occur immediately after the rainfall threshold is exceeded.

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e. Area “E” will be closed to harvesting for a period of 120 hours following any period in which the 24-hour rainfall total exceeds 0.70 inch; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds three inches, one day will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds five inches, an additional day will be added to the closure, for a total of two days of additional closure; and the start of the closure will be six hours after the rainfall threshold is exceeded.

f. Area “F” will be closed to harvesting for a minimum period of 120 hours following any period in which the 24-hour rainfall total exceeds 0.50 inch; and when the 24-hour rainfall exceeds 0.75 or 1.0 inches, 24 or 48 hours, respectively, will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds three inches, one day will be added to the closure; and whenever a 24-hour rainfall threshold is exceeded, and the 7-day cumulative rainfall exceeds five inches, one day will be added to the closure, for a total of two additional days of closure; and the start of the closure will be immediately after the rainfall threshold is exceeded.

3. Extreme Environmental Conditions

If unusual heavy or prolonged rainfall, overloading of wastewater collection or treatment facilities, or other factors occur that exceed the conditions documented in the Sanitary Survey upon which this Management Plan is based, CDPH/PSU may order the closure period extended beyond the time set forth above. If an extended closure is imposed, CDPH/PSU will determine the reopening criteria and develop a data collection strategy based on the nature and severity of the event, and in consultation with the affected grower(s).

4. Movement of shellstock

The harvest of shellstock during a closure is prohibited. Harvesting is defined as the act of removing shellstock from growing waters and placing it on or in a manmade conveyance or other means of transport. There are three conditions outlined in this section when shellfish may be “harvested” during a shellfish closure solely for the purposes of sorting and culling prior to returning to the growing area, and not for market.

Rainfall closures are necessary for shellstock to depurate to acceptable levels after rainfall events. Closure times are based on depuration studies performed in the growing area and the time required for adequate depuration of contaminants. Depuration does not occur when shellstock is out of the water. Shellstock removed from growing waters during closure periods shall have the number of hours and minutes that the shellstock is out of the water added onto its respective closure time before it can be harvested for market. All shellfish must be in water for the entire length of time that it would otherwise have been had it not been removed from the growing waters before the end of the rainfall closure. If shellstock is removed from the growing waters

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during closed periods, it must be tagged to ensure that the shellstock is not harvested for market prior to the required depuration time.

In an effort to protect public health, CDPH has established procedures to prevent illegal harvesting of shellfish from closed growing areas. To verify compliance with the rainfall closure rules, CDPH conducts or arranges for patrols of closed growing areas, and audits the shellfish growers' harvest records. Growers shall maintain additional documentation for shellstock that is taken out of the water during a closure to ensure that the shellstock is traceable if an illness event occurs.

There are three identified conditions in which shellstock may be removed from the growing waters during a closure: 1) the shellstock is harvested and worked on (e.g., sorted, culled) on-site without leaving the specific lease/parcel; 2) the shellstock is harvested from the lease/parcel, transported to another area where it is worked on, then transported back to the same lease/parcel; and 3) the shellstock is harvested from the lease/parcel, worked on, then placed in a different lease/parcel.

The following actions are required by the grower when harvesting shellstock during a rainfall closure.

Condition 1: Shellstock is harvested but is worked on on-site, and is NOT removed from the area of the grower's lease/parcel.

Required Action: Notification by the grower to CDPH is not required. The grower must label the bag in such a manner to ensure that it will not be harvested until the number of hours it was out of the water has been added onto the reopening time for the growing area. Shellstock that has been moved shall be tagged to differentiate it from shellstock that has not been moved. The amount of time that shellstock is out of the water shall be recorded to ensure that the correct depuration time has occurred. Records of all these operations shall be maintained by the shellfish grower and made available to CDPH upon request.

Condition 2: Shellstock is harvested from the grower's lease/parcel during a closure, transported off the lease/parcel to be worked on, and then returned to the original lease/parcel. NOTE: Shellstock shall not be placed in, or come in contact with, uncertified growing waters.

Required Action: The grower shall contact the CDPH/PSU Sacramento office in writing, using the attached form in Appendix B a minimum of two working days prior to the start of work if possible, or as soon as possible, and must obtain written permission prior to start of work. This written permission must be on site while working with shellstock that has been temporarily removed from the growing water. Removed shellstock shall have the number of hours that shellstock was out of the water added onto the reopening times for harvest purposes in the same manner as described in Condition 1 above. Shellstock that has been moved shall be tagged to differentiate it from shellstock that has not been

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moved. Records of all these operations shall be maintained by the shellfish grower and made available to CDPH upon request.

Condition 3: Shellstock is harvested from one *Conditionally Approved* grower's lease/parcel and placed into another *Conditionally Approved* lease/parcel, owned by the same grower, during a closure. This activity is **prohibited** unless the grower receives approval by CCDPH for this activity. Both parcels must be under the control and authority of the named grower (i.e., product cannot be moved onto another shellfish grower's lease). NOTE: Shellstock shall not be placed in, or come in contact with, uncertified growing waters.

Required Action: The grower shall obtain prior authorization by CDPH and approval of a standard operating procedure (SOP) to ensure safety of the product.

Only under extreme circumstances will CDPH pre-approve this activity during closed harvest periods. Commercial shellfish growers must submit a plan to conduct this activity to CDPH. This plan must include procedures to prevent shellfish from Prohibited or closed water from commingling with shellfish from another lease/parcel. The plan shall be submitted in writing and will be the basis of a standard operating procedure (SOP) for such activity. CDPH reserves the right to reject any plan if it does not conform to specific NSSP guidance such as allowing shellstock to properly depurate during a closure. Shellstock that has been moved shall be tagged to differentiate it from shellstock that has not been moved. The amount of time that shellstock is out of the water shall be recorded to ensure that the correct depuration time has occurred. Records of all these operations shall be maintained by the shellfish grower and made available to CDPH upon request.

B. EMERGENCY CLOSURES: SEWAGE COLLECTION SYSTEM UPSETS

Accidental sewage releases from wastewater collection systems operated by the City of Arcata, the City of Eureka, or by HCSD occurs periodically and may adversely affect the water quality in shellfish growing areas. The potential for these sewage "upsets" to adversely impact shellfish growing waters is related to the estimated volume of the discharge, the location of the discharge with respect to the growing areas, and the timing of the discharge with respect to rainfall closures of the growing areas. In an effort to develop consistency in determining when a sewage "upset" is significant with respect to its potential to affect the growing areas, CDPH/PSU has been working cooperatively with the cities of Arcata and Eureka, the HCSD, the shellfish growers, the Humboldt County DEH, and the Humboldt County Public Health Laboratory in an effort to develop a response protocol for these collection system upsets.

The criteria for determining whether an emergency closure will be implemented, the responsibilities for notification, and the criteria for reopening the areas are provided in

detail in Appendix C. The workgroup has developed decision trees for use by the agencies responsible for the collection systems, the shellfish growers, and CDPH/PSU staff in determining with consistency and predictability when a growing area should be closed, and if a closure is implemented, when an area can be reopened. An example of a form for use in reporting upset events to CDPH/PSU is provided in Appendix C. The procedures in Appendix C apply only to sewage collection “upsets”, including collections systems failure or WWTP malfunction, bypasses, or hazardous substance spills. The procedures to be followed for the latter events are given below.

C. EMERGENCY CLOSURES: WWTP MALFUNCTIONS

A WWTP malfunction, in which inadequately treated or untreated wastewater is released to the Bay, shall be cause for an immediate emergency closure of the bay to shellfish harvesting until the impacts can be evaluated. The City of Arcata, the City of Eureka, and HCSD have notification and response systems that are activated in the event of problems either in the sewage collection systems or at the WWTPs. The criteria for determining whether an emergency closure will be implemented, the responsibilities for notification, and the criteria for reopening the areas are provided in detail in Appendix C.

D. EMERGENCY CLOSURES: HAZARDOUS SUBSTANCE SPILLS

In the event that the Office of Emergency Services (OES) is notified of a reported hazardous substance spill that could impact a shellfish growing area, they will contact the CDPH Duty Officer (on call 24 hours a day). The CDPH Duty Officer will notify the CDPH/PSU supervisor or the next manager in the chain of command. Additional involved agencies will have their own reporting requirements.

Upon notification of a hazardous substance spill CDPH/PSU will determine the status of the growing area and will notify the growers if a closure is warranted. A harvest closure resulting from a hazardous substance spill shall remain in effect while CDPH/PSU evaluates the event and determines the required actions. See Section X for the requirements for reopening.

E. OTHER EMERGENCY CLOSURES

Other emergency situations in which the discharge of a hazardous or deleterious substance to shellfish growing waters is presumed to be likely, but during which communications with CDPH/PSU may be compromised, such as after a natural or man-made disaster, will be evaluated by CDPH/PSU for possible closure of the growing areas.

F. NOTIFICATION PROCEDURES

CDPH/PSU will notify the grower whenever the rainfall threshold is exceeded and the growing area is closed. The grower shall acknowledge receipt of this notification within

24 hours. When determined, an estimated reopening time will be provided. The status of the growing area can be obtained by calling the 24-hour GIL at (510) 412-4644. Reopening requirements for rainfall closures are presented in Section X and for sewage spill-related closures in Appendix C. The following notification procedures apply:

1. California Department of Public Health

a. CDPH is the agency responsible for decision making regarding harvest closures and reopening of shellfish growing areas.

b. CDPH/PSU will maintain a telephone message recorder at the Richmond office, (510) 412-4644, to provide information about closures to commercial shellfish harvesters during non-business hours. CDPH/PSU will update the recorded message as needed and will monitor the line at least twice each day for recorded messages from the harvesters.

c. If CDPH/PSU decides to close a shellfish growing area to commercial shellfish harvesting, CDPH/PSU will notify each affected certified harvester by telephone of that decision. When CDPH/PSU decides to reopen a shellfish growing area to commercial shellfish harvesting, CDPH/PSU will notify each affected certified harvester by telephone of that decision. In the case of rainfall closures there are times when storm activities can interfere with the ability of CDPH/PSU to obtain current rainfall information. Beyond normal business hours and weekends CDPH/PSU may not be able to update the closure or reopening information immediately. If a harvester has any question or uncertainty regarding a closure or a reopening, they shall contact the GIL ((510) 412-4644) for guidance prior to resuming any harvest activities. If additional rainfall has occurred since the last GIL update, or if the grower is unsure about the harvest status of the growing area, they shall consider the area closed to harvest and contact the RDO at (510) 412-4631 for more information (on weekends and off-hours, leave a message on the GIL). The grower should also contact their shellfish growing area specialist during normal business hours for more information. If the grower harvests before obtaining current information on the growing area status, and the growing area is closed, the grower shall be responsible to return all harvested shellfish to the same location it was harvested from.

d. Harvester compliance with closures will be monitored by the following means:

(1) CDPH/PSU (or CDPH/FDB, or DFG patrol personnel upon request from CDPH/PSU) will field check the harvest area to look for harvesting activity during closure periods.

(2) CDPH/PSU will review harvester records of closure and harvesting dates.

(3) CDPH/PSU will spot check by telephone to ascertain whether harvester is conducting operations during closed periods.

(4) CDPH/PSU will maintain records of all compliance monitoring activities and findings.

e. CDPH/PSU will maintain a current contact listing of CDPH/PSU personnel and certified commercial growers and provide this listing to the WWTPs, the RWQCB, and other applicable parties.

f. Procedures for seasonal/rainfall closures

(1) CDPH/PSU will establish a duty roster of staff personnel designated to monitor rainfall at *Conditionally Approved* growing areas, including Humboldt Bay. A staff member will be designated to be on call for duty as the RDO for every day of the year, including weekends and holidays.

(2) The RDO will monitor weather forecasts and reports to determine whether significant rainfall is predicted or has occurred at the conditionally approved growing areas. If so, the RDO will contact designated rain gauge stations as needed to obtain current rainfall measurements to determine when the conditions requiring a rainfall closure are met. The designated rain gauge for rainfall closures of Humboldt Bay is the U.S. National Weather Service station at Woodley Island.

(3) When the RDO determines that conditions have occurred which require a shellfish harvest closure, he/she will notify each commercial harvester immediately by telephone that the bay is closed to harvesting and will inform them, if known, when it will reopen.

(4) The RDO will maintain records of rainfall measurements and harvest closure notifications.

g. Procedures for emergency closures

(1) Criteria for determining whether an emergency closure will be implemented as a result of a sewage spill and criteria for reopening growing areas are described in Appendix C. Upon notification of any pollution event that might be cause for an emergency closure of Humboldt Bay, CDPH/PSU will consult with the responsible agency to consider the extent and severity of the pollution. If an emergency closure is needed to protect sport shellfish harvesters, CDPH/PSU will consult with the Humboldt County DEH to determine the location and scope of sport shellfish closures.

(2) CDPH/PSU will notify the harvesters by telephone when it declares an emergency closure. When required under H & S § 112160, written confirmation will be sent to the commercial harvesters and copies will be sent to FDB, DFG, RWQCB, the FDA Regional Shellfish Specialist, and any other interested persons. Emergency closure letters shall contain the information required in H & S § 112160(d), so as to afford the recipients reasonable opportunity to submit data, views, or arguments.

(3) As soon as reasonably possible after declaring an emergency closure, CDPH/PSU will initiate an investigation of the effects of the pollution event on water and shellfish

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meat quality, including such factors as the volume, nature, and location of the discharge, hydrographic factors, and sampling data.

(4) CDPH/PSU will reopen the bay as soon as it determines that shellfish harvested from the bay do not exceed NSSP standards or do not otherwise pose a public health risk.

(5) CDPH/PSU will notify the commercial harvesters when it decides to reopen the growing area after a closure. When required under H & S § 112160, written confirmation will be mailed to the harvester within five (5) working days after the telephone notification, and copies will be sent to FDB, DFG, RWQCB, the FDA Regional Shellfish Specialist, and other interested parties.

(6) CDPH/PSU will provide to the WWTPs, the RWQCB, and to the Humboldt County DEH, a contact list of the certified shellfish growers and CDPH/PSU personnel to be called as required in this document. This listing will be updated as needed.

2. California Regional Water Quality Control Board, North Coast Region

The RWQCB or its designee will notify CDPH/PSU, as soon as it becomes known, of any pollution event, such as a sewage spill, collection system bypass, or malfunction of a WWTP, or any discharge of a hazardous chemical, pesticide, or petroleum product, which may adversely affect water or shellfish quality in Humboldt Bay. In addition, it will include the following mandatory requirements in its WDRs issued to the cities of Arcata and Eureka (HCSD is included as a party to Eureka's WDRs):

- a. To notify the certified shellfish harvesters, CDPH/PSU, and RWQCB as soon as possible of any sewage spill, collection system bypass, or malfunction of a WWTP which results in a potential or actual discharge of raw or incompletely treated sewage to Humboldt Bay.
- b. To develop and maintain written procedures incorporating the notification requirement in item (a) above, to post the procedures at the facility, and to provide a copy of the current notification procedures to RWQCB, CDPH/PSU, and Humboldt County DEH.

3. Humboldt County Division of Environmental Health

The Humboldt County DEH will notify CDPH/PSU of any pollution event, as soon as it becomes known, such as a discharge of a hazardous chemical, pesticide, or petroleum product, which may pose a threat to water and shellfish quality in Humboldt Bay. If any areas are closed to sport shellfish harvesting, it is the responsibility of the County DEH to cause the areas to be posted and to inform the public of such closures through news media releases.

4. City of Arcata (Environmental Services Department and Public Works Department), City of Eureka (Engineering Department and Public Works/Building Department), and HCSD.

In the event of a sewage spill, or malfunction of a WWTP which results in a potential or actual discharge of raw or incompletely treated sewage to Humboldt Bay or its tributaries, the city department or district having jurisdiction will notify the RWQCB, all of the certified shellfish harvesters immediately, and will notify CDPH/PSU and the Humboldt County DEH as soon as possible thereafter. It will report whether the discharge may exceed the critical performance standards set forth in Section VII.B. The Cities of Arcata and Eureka and HCSD will develop and maintain written notification procedures incorporating these instructions, post the procedures at their facilities, and provide a copy of the current procedures document to RWQCB, CDPH/PSU, and Humboldt County DEH.

5. Impact Assessment

The responsible party shall provide sufficient information to CDPH/PSU such that the magnitude of the impact to the growing area can be assessed. This information should include, but not be limited to, the location of the discharge, a detailed characterization of the discharge when petrochemicals and other hazardous materials are involved, the rate and volume of the discharge, the point of discharge into Humboldt Bay, and the identification and flow rate of any receiving waters, when appropriate. It is recommended that water samples be collected for the appropriate analysis from the area of impact, as well as from nearby sites outside the zone of impact. Under some circumstances it may also be necessary to analyze shellfish tissue samples to assess the impact to the product in the growing areas.

IX. CERTIFIED SHELLFISH GROWER RESPONSIBILITIES

This section contains the major responsibilities of the certified shellfish harvesters; additional responsibilities are included elsewhere in the Management Plan.

A. SEED

Each certified shellfish harvester shall obtain approval from CDPH/PSU of all sources of seed shellstock, in accordance with the NSSP, prior to placing the seed in the certified growing area.

B. HARVEST CLOSURE

Each certified shellfish harvester shall cease harvesting operations when notified by CDPH/PSU of a harvest closure or when otherwise required by the closure rules and procedures set forth in this Management Plan. Compliance with this Management Plan is mandatory as a condition of the Shellfish Growing Area Certificate issued by CDPH/PSU. Any violation of a harvest closure declared pursuant to this Management

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Plan may be cause for suspension or revocation of a certificate or for other disciplinary actions as provided by law. If the harvester has any questions or uncertainties regarding a rainfall closure, he should contact CDPH/PSU for guidance or clarification prior to commencing harvesting or marketing operations.

1. Business Hours

During normal State business hours, the harvester should call the CDPH/PSU field staff at (916) 449-5695. If a shellfish specialist cannot be reached the harvester should try alternate contacts on the current CDPH staff call down list (Appendix A).

2. Non-Business Hours

During non-business hours, the harvester should call the CDPH/PSU commercial shellfish GIL. After listening to the recorded message, if more information is needed, the harvester should leave a message identifying the caller and providing the telephone number for a return call.

C. RECEIVING AND ACKNOWLEDGING NOTIFICATION

Each certified shellfish harvester shall maintain a telephone with an answering service or recorder and provide the telephone number to CDPH/PSU. If notified of a closure by CDPH via the telephone message recorder, the harvester shall acknowledge receipt of that message within 24 hours by return call to the CDPH/PSU office in Richmond at 412-4638 or the CDPH/PSU shellfish GIL at (510) 412-4644. After the recorded message, the harvester shall leave a message identifying the caller by name and firm and acknowledging receipt of the closure notification.

D. REPORTS OF SEWAGE OR HAZARDOUS SUBSTANCE SPILL

If any certified shellfish harvester has knowledge or a report of any sewage or hazardous substance spill which may adversely affect water and shellfish quality in Humboldt Bay, or of any suspected illness resulting from the consumption of shellfish harvested from Humboldt Bay, he/she shall close the growing area to harvesting and shall notify CDPH/PSU immediately by telephone.

1. Business Hours

During normal business hours the commercial grower shall contact CDPH/PSU staff using the call-down list provided in Appendix A.

2. Non-Business Hours

During non-business hours, or if CDPH/PSU staff cannot be reached, the grower shall call the State Office of Emergency Services at (916) 262-1621, or (800) 852-7550. Provide your name, firm, and telephone number, the reason for the call, and ask to be

contacted by a staff person from the CDPH/PSU. The grower should also leave a message on the GIL at (510) 412-4644 regarding the details of the reported spill.

E. WASTEWATER TREATMENT PLANT NOTIFICATION

If any certified shellfish harvester has been notified by the City of Arcata, the City of Eureka, HCSD, or any other reliable source of a sewage or hazardous substance spill which may adversely affect water and shellfish quality in Humboldt Bay, and if the harvester cannot contact CDPH/PSU immediately, he/she shall consider the growing area closed and shall suspend harvesting operations immediately, and shall not resume such operations until approval to do so has been received from CDPH/PSU.

F. RECORD KEEPING

Each certified shellfish harvester shall keep records showing the dates and times of all harvest closures, reopenings, and harvest operations. These records shall be kept on a form similar to that shown in Appendix E. Completed forms shall be maintained in a file at the harvester's place of business for no less than two years. One copy of the completed form shall be submitted to the CDPH/PSU Sacramento office upon request. Since rainfall closures are an important management tool for the growing area, the grower should call the GIL (510) 412-4644 prior to harvesting during any rainfall activity. Storm activities can interfere with CDPH/PSU's ability to obtain current rainfall information. If the grower is still unsure as to the status of the growing area, he should contact the RDO at (510) 412-4631 to determine if the GIL is current, or, during off-hours or on weekends, leave a message on the GIL.

G. LIVE-ABOARDS

Each certified shellfish harvester shall immediately report the presence of any live-aboard boats that become located outside of the *Prohibited* zone adjacent to the Woodley Island and Eureka Boat Basin marinas (Figure 2) to the CDPH/PSU Shellfish Specialist at the Sacramento office.

H. WILDLIFE

It is the growers' responsibility to take measures to prevent wildlife (including birds and marine mammals) from defecating on floating shellfish culture bags, barges, floats, or floating wet storage structures from which shellfish are suspended from, or which are within 50 feet of any cultured shellfish. All growers shall consult with the appropriate agencies to determine which measures are acceptable and legal in preventing wildlife from contaminating shellfish. All growers are responsible for any State or Federal permits that may be required to prevent wildlife from contaminating shellfish.

Contamination from wildlife can be erratic and therefore unpredictable. The commercial shellfish growers must have on file with CDPH/PSU either a *Wildlife Management Plan* to prevent product contamination or an approved Standard Operating Procedure (SOP)

detailing method used to mitigate fecal contamination of the product caused by this wildlife. The SOP shall include product descriptions, areas designated for product grow-out, transfer, and harvest, and specific procedures and time frames for purposes of mitigating wildlife impact on marketable product. The SOP must have approval by CDPH/PSU prior to implementation and shall be revised yearly or as procedures change. This SOP and *Wildlife Management Plan* are part of a pilot program intended to mitigate the impact of marine mammals and birds to shellfish and growing waters while preventative measures are being implemented, or when measures have been proven ineffective.

X. REOPENING PROCEDURES

A. RAINFALL CLOSURES

Prior to reopening following a closure due to rainfall, the grower shall contact the GIL (510) 412-4644 to determine if any changes have occurred in the reopening sample time for the growing area. If there is any uncertainty about the message or if no message is found on the GIL, the grower shall contact the RDO at (510) 412-4631.

1. Growing areas A, B, C, D, E, and F will be to reopened after a rainfall closure period described in section VIII, unless additional rainfall necessitates extending the rainfall closure. As soon as possible after a rain event has passed CDPH/PSU staff will post a tentative reopening time on the GIL.

2. In addition to the rainfall closure criterion established for area D, additional confirmatory samples will be required prior to reopening for growing Area D2, the five-acre section of NBSC's Parcel #2. Area D2 will be reopened only after a shellfish sample collected for FC analysis on or after the last day of the rainfall closure period for Area D is found to meet the shellfish market standard of 230 fecal coliform/100 g shellfish meat. When an adequate number samples show that the shellfish consistently meets the market standard after the proposed rainfall closure period, the requirement for shellfish samples may be dropped.

a. The analyses will be required prior to each scheduled reopening of the area until a sufficient number of shellfish meat samples are analyzed to ascertain that the market meat standard for FC is met consistently during open status after a rainfall closure.

b. If the shellfish samples collected in do not consistently meet the shellfish standard after rainfall events the closure rules will be adjusted and further shellfish samples will be required to assess the adjusted rules.

B. SEASONAL CLOSURES

There are currently no seasonal closures implemented for Humboldt Bay.

C. SEWAGE OR HAZARDOUS SUBSTANCE SPILLS

1. Investigation

As soon as reasonably possible after declaring an emergency closure, CDPH/PSU will initiate an investigation of the effects of the pollution event on water and shellfish meat quality, including such factors as the volume, nature, and location of the discharge, hydrographic factors, and sampling data. Criteria for determining whether an emergency closure will be implemented as a result of a sewage spill are described in Appendix C.

2. Harvest Reopening

Criteria for reopening growing areas after a sewage spill are described in Appendix C. Due to the variable and unpredictable nature of hazardous material spills, reopening criteria for these events will be determined on a case by case basis.

3. Notification

CDPH/PSU will notify the commercial harvesters when it decides to reopen the growing area after an emergency closure. When required under H & S § 112160, written confirmation will be mailed to the harvester within five (5) working days after the telephone notification, and copies will be sent to FDB, DFG, RWCQB, the FDA Regional Shellfish Specialist, and other interested parties.

XI. PREVENTION OF ILLEGAL HARVESTING (PATROL)

A. ILLEGAL HARVESTING OF SHELLFISH

CDPH/PSU staff coordinates regular patrols activities of shellfish growing areas during harvest closures to prevent illegal harvesting activity on the part of growers or unauthorized individuals. In addition to this Management Plan, three other documents describe the activities of CDPH/PSU and DFG in preventing illegal harvesting of shellfish, preventing the movement of contaminated and/or hazardous shellfish into avenues of commerce. These documents are: (1) the MOU between DFG and CDPH, signed August 1991; (2) CDPH' "Patrol Policy for Commercial Shellfishing in California"; and (3) CDPH' "Contingency Plan for Marine Biotoxins in California Shellfish".

B. DEPARTMENT OF FISH AND GAME, WILDLIFE PROTECTION DIVISION

DFG's Wildlife Protection Division field office for the Humboldt Bay area is headquartered in the State Building, 619 2nd Street, Eureka. DFG maintains patrol of areas with significant naturally occurring shellfish resources, e.g., clams in the south part of Humboldt Bay, for illegal commercial harvesting. DFG patrol activities generally are concentrated during periods of very low tides, although enforcement activities may

occur at any time. DFG officers have a broad range of enforcement duties, shellfish being only one part of their responsibilities.

The provisions of this Management Plan as it applies to the obligations of the commercial shellfish harvester are enforced by CDPH/PSU, not DFG. DFG agrees to assist CDPH, when requested by CDPH/PSU, by redirecting some of its patrol effort to monitor commercial harvesters for compliance with harvest closures. If DFG patrol personnel find or suspects any commercial shellfish harvesting in violation of a harvest closure established pursuant to this plan, DFG will report their finding to CDPH/PSU.

C. ILLEGAL MARKETING

DFG makes periodic checks for the illegal marketing of uncertified shellfish by means of market and restaurant inspections. This activity also is carried out by local environmental health agencies. Shellfish in the marketplace are inspected for proper identification and records of purchase. The County DEH or CDPH/FDB can confiscate and destroy any shellfish that lack proper identification or have been subject to improper handling or storage. DFG can take action on shellfish that lack proper identification.

XII. WATER MONITORING

The certified shellfish growers are responsible for providing water quality monitoring data from their growing areas, as required by the NSSP Model Ordinance, Chapter IV (2005), with coordination and oversight from CDPH/PSU. Each grower submits samples according to a sampling plan issued to each grower and approved by CDPH/PSU. Failure to maintain the required sampling schedule is a violation of the NSSP requirements and may result in reclassification of the growing area to *Prohibitive* as well as disciplinary actions including, but not limited to, the revocation and or suspension of the growing area certificate as provided for by law. The following is a summary of the requirements associated with routine monitoring of shellfish growing waters.

A. WATER SAMPLING REQUIREMENTS

Water samples are collected at least monthly during periods when the growing area is open for harvesting. Sampling shall be accomplished using the systematic random sampling protocol in accordance with the current Sampling Plan for Water Quality Monitoring issued to each certified harvester. If a sampling date occurs during a closure, the sampling shall be conducted on the first day of reopening. In order to obtain rainfall data, additional samples should be collected whenever possible during periods of adverse pollution conditions, such as immediately following rainstorms or on the first days of reopening following a closure.

The grower shall notify CDPH/PSU in writing prior to the scheduled sampling date when sampling will not occur on the scheduled date (and the area is in the open status) and shall request an alternate date. A reason for the deviation from the sampling plan schedule must be provided. If CDPH/PSU does not approve the request, the grower will

be required to sample on the original date specified in the schedule. Samples collected on incorrect dates will not be identified as a compliance sample, and will not be used in the calculations for verifying classification the area.

B. TRANSPORTATION

Growers shall provide their own boats for routine and all necessary sampling equipment for routine water quality monitoring. Water quality sampling runs with CDPH/PSU staff may be scheduled with the growers for additional survey work, special studies, and to audit water sampling technique by the growers. Growers shall be responsible for transporting samples to the certified laboratory and meeting proper holding times and temperature limitations as detailed in the sampling plans.

C. LABORATORY

The Humboldt County Public Health Laboratory in Eureka, a State certified laboratory, analyzes samples taken by growers. Analytical results are to be mailed directly from the laboratory to CDPH/PSU. The CDPH Microbial Diseases Laboratory in Richmond may analyze supplemental samples submitted under the direction and coordination of CDPH/PSU. Any laboratory that analyses water or shellfish samples for the SSP must be certified to perform these analyses by CDPH' Environmental Laboratory Accreditation Program (ELAP).

D. WATER SAMPLES EXCEEDING NSSP CRITERIA

Water sample results that exceed NSSP criteria may indicate a public health threat, and must be responded to immediately. A two-tiered response protocol is described in the following paragraphs. *In any case when a sample exceeding NSSP criteria results in a growing area closure, the closure shall be effective at the date and time the sample was collected. Reopening following satisfactory sample results shall be effective at the date and time that sample results are received from the laboratory.*

Any sample collected from an open area that contains fecal coliform concentrations greater than 43 MPN/100 mL but less than 107 MPN/100 mL¹ must be re-sampled immediately at the certified grower's expense. Re-sampling must be conducted within 24 hours of notification of initial sample results². If re-sampling is not conducted within the specified time frame, the portion of the lease or growing area represented by the sampling station in question shall be closed for harvest until re-sampling is conducted and results demonstrate that fecal coliform concentrations have returned to acceptable levels. The grower should refrain from harvesting from the area represented by the

¹ The 99th percentile of a population with a geometric mean of 14 MPN/100 mL and an 90th percentile of 43 MPN/100 mL.

² This requirement is contingent on laboratory support and growing area status. CDPH recognizes that re-sampling cannot be conducted when the lab is not accepting samples (e.g., on weekends and holidays), but must be conducted as soon as possible when the lab reopens. If the growing area closes due to rainfall, re-sampling should be conducted on the day of scheduled reopening.

sampling station until re-sample results are received and determined acceptable relative to the growing area standards.

If re-sampling results are greater than 43 MPN/100 mL fecal coliform, the represented portion of the lease or growing area shall immediately be closed to harvest. The area will be considered for reopening when further re-sampling produces a result below 14 MPN/100 mL fecal coliform. In certain cases, CDPH staff may consider reopening based on a re-sample result below 43 MPN/100 mL *combined with a declining trend in fecal coliform levels at the compliance sampling station and surrounding areas*. In order to establish fecal coliform trends in surrounding areas it is recommended that re-sampling be conducted both at the primary compliance station(s) and other surrounding stations. CDPH will advise grower on what stations should be sampled.

A sample collected from an open area that contains greater than 107 MPN/100 mL fecal coliform shall result in immediate closure of the portion of the growing area represented by the sampling station from which the elevated sample was collected. The area will be considered for reopening when re-sampling produces a result below 14 MPN/100 mL fecal coliform or a result below 43 MPN/100 mL *combined with a declining trend in fecal coliform levels at the compliance sampling station and surrounding areas*. Reopening criteria are as described above.

If re-sampling continues to yield elevated fecal coliform levels CDPH/PSU will conduct an investigation, which may include additional sampling, to confirm the elevated indicator levels and determine the source, and will notify all relevant agencies. If a source is identified, CDPH/PSU will refer the matter to the appropriate regulatory agency for corrective action. The shellfish growing area will remain closed until the pollution problem is corrected, and the growing area is determined to be free of pathogens and to meet NSSP standards, or until the area is correctly reclassified by CDPH/PSU. CDPH will analyze the most recent water quality data and determine if the current classification is correct or if the growing area needs to be closed or reclassified.

XIII. MARINE BIOTOXIN MONITORING

A. CONDITIONS AND PROCEDURES

All growers are responsible for monitoring domoic acid and paralytic shellfish poisoning (PSP) biotoxins in their shellfish growing areas. CSC submits weekly sentinel mussel samples to the CDPH laboratory from two locations in the bay; the United States Coast Guard dock and Indian Island. A positive result from Indian Island will result in the submission of oyster sample(s) from the nearest certified growing area being harvested in the North Bay. The latter sample taken from the actual growing area will be evaluated relative to the thresholds and time frames located in Tables 3 and 4. In addition to shellfish samples, CSC submits weekly samples of phytoplankton to the CDPH laboratory for identification. All samples submitted to the CDPH laboratory should be accompanied by a CDPH sample submission sheet. Biotoxin sampling

described below shall be conducted during, and for at least two weeks prior to any harvest activities.

1. Phytoplankton Observations.

Coast Seafood Company collects weekly samples of phytoplankton at designated sites in the bay. CSC is encouraged to continue sample submission of phytoplankton for the early detection of toxic blooms. CDPH will provide training in the sampling of phytoplankton.

2. Domoic Acid Analysis.

a. If phytoplankton sampling identifies significant numbers of *Pseudo-nitzschia spp.* in the bay, then CSC, HBOC, NBS and ARF shall collect weekly samples of all harvested species for domoic acid analysis. Samples shall be submitted to a lab certified for domoic acid analysis by the CDPH Environmental Laboratory Accreditation Program (ELAP). It is the responsibility of the grower to identify an appropriate ELAP-certified lab. Samples shall be collected as closely as possible to the time of harvest. Specific requirements for maximum time between sampling and harvest are described in Table 3. If the CDPH laboratory is used, all samples shall arrive at the laboratory no later in the week than Thursday morning, and preferably by Wednesday morning. More frequent sampling may be required to adequately track an impending or existing bloom. Sampling shall continue until domoic acid and *Pseudo-nitzschia* levels fall to acceptable levels as determined by CDPH/PSU, and declining trends are observed in the bay and surrounding waters.

b. If significant numbers of *Pseudo-nitzschia* are identified in the bay, CDPH/PSU may require CSC, HBOC, NBS and ARF to collect a sample of each harvest lot and immediately test it for the presence of domoic acid using a commercially-available diagnostic kit. CSC shall follow the protocol provided by CDPH (Appendix F). Assay results and other required information shall be recorded on page 2 of the sample submission form provided. The test strip shall be labeled as described in the assay protocol (Appendix F). A digital photograph of the developed test strip shall be taken and emailed to Gregg.Langlois@cdph.ca.gov and Eric.Trevena@cdph.ca.gov. Test strips shall be shipped to CDPH with the remaining shellfish sample to the address provided on the sample submission form.

3. Field Sampling Protocol

CSC, HBOC, NBS and ARF shall follow the field sampling protocol for marine biotoxins provided by CDPH for sample collection, preparation, and submission (Appendix F).

4. Additional Sampling

CSC, HBOC, NBS and ARF shall increase the sampling frequency; expand sampling to include any other commercial shellfish species designated in the Shellfish Growing Area

Certificate, and/or cease harvesting as directed by CDPH in response to the occurrence of toxic phytoplankton blooms.

B. CLOSURE CRITERIA

1. Domoic Acid Alert Level

In compliance with the NSSP Model Ordinance, the alert level for domoic acid is reached when the concentration of the toxin in shellfish meat equals or exceeds 20 micrograms per gram of tissue (i.e., 20 parts per million [ppm]).

Due to the uncertainty involved with domoic acid toxicity, a special management protocol was developed (Table 3.) that details response activities for different concentrations of this biotoxin. This protocol may be modified as experience with domoic acid toxicity is gained.

2. Paralytic Shellfish Poisoning Alert Level

In compliance with the NSSP Model Ordinance, the alert level for PSP toxin is reached when the concentration of the toxin in shellfish meat equals or exceeds 80 micrograms of PSP toxin per 100 grams of meat.

Due to the uncertainty involved with PSP toxicity, a special management protocol was developed (Table 4.) that details response activities for different concentrations of this biotoxin. This protocol may be modified as experience with PSP toxicity is gained.

3. Samples Exceeding the Alert Level

CSC shall immediately implement a harvest closure when a biotoxin concentration is detected at or above the respective alert level in one or more samples of commercial product in the growing area prior to harvest, or in commercial channels after harvest. CSC shall contact FDB to discuss issues pertaining to harvested product.

4. Failure to Submit Required Samples

It is the responsibility of CSC, HBOC, NBSC and ARF to collect and ship the required samples to a certified laboratory for biotoxin analysis. Failure to submit the required samples or failure of the analytical laboratory to provide results in a timely manner may result in an immediate harvest closure. CDPH will notify FDB, who will determine if a product recall is warranted.

C. SIZE OF CLOSED AREA

The initial closure of a commercial shellfish growing area will include the entirety of the certified areas within the bay, estuary or body of water in which the growing area is located, unless otherwise determined in a signed biotoxin management agreement. The

size of the closure zone may be reduced if current sample data is available from adjacent areas (greater than two miles away from the affected area) that demonstrate that region to be free of dangerous levels of toxin. The closure order may be modified later to a smaller area pending the results of follow-up sampling and evaluation of data from additional sites. In reopening any commercial area, or any part of that area located within two miles by water of any site where toxin in a shellfish sample was detected above the alert level, the criteria in section F apply.

D. SPECIES RESTRICTIONS

A closure of a commercial growing area may be limited to the shellfish species determined to have reached the alert level, or it may include all shellfish in the growing area.

E. SAMPLING DURING A MARINE BIOTOXIN CLOSURE

Follow-up sampling will be continued throughout a closure. All commercially harvestable shellfish species in the growing area will be sampled unless otherwise specified by CDPH. CDPH will determine sampling sites and times. Sites will be selected so that no part of any certified growing area is more than two miles by water from a sampling site for the species of shellfish harvested in that growing area. *It is important that growers coordinate sampling efforts as directed by CDPH in order to obtain synoptic measures of biotoxin levels throughout the growing areas. Failures to coordinate sampling efforts will likely result in delays in reopening times, and may necessitate additional sampling.* To be considered for reopening, successive samples will be collected at least three (3) days apart (i.e., 72 hours).

F. REOPENING CRITERIA

Prior to being considered for reopening from a biotoxin closure, CSC, HBOC, NBSC and ARF shall collect successive samples at least three (3) days apart (i.e., 72 hours) that are found to be below the federal alert level for the toxin of concern. Reopening shall be contingent upon these sampling results and downward trends in biotoxin levels in the surrounding area.

Harvesting during a growing area closure by a certified commercial grower is a serious violation and may result in suspension or revocation of their growing area certificate.

XIV. GROWING AREA REEVALUATION

CDPH/PSU will review and reevaluate water quality and other sanitary survey data at least annually in accordance with procedures set forth in the Model Ordinance, Chapter IV (2005), to confirm the classifications of Humboldt Bay, and to determine if changes

are needed in the closure rules. Its findings will be presented in an annual growing area sanitary survey update report.

When a growing area fails to meet the water quality standards for its classification, the NSSP requires that if the annual reevaluation determined that conditions have changed based on the information and data collected during the annual review and that the growing area classification is incorrect, immediate action shall be initiated to reclassify the area. If determined that an emergency condition or situation exists, then the growing area will be immediately (within 24 hours) placed in the closed status.

XV. AGREEMENT OF INVOLVED PARTIES

The NSSP Model Ordinance, Chapter IV (2007) section @.03.C.4 (a) requires that "The Management Plan shall be developed by the authority in coordination with, the local shellfish industry, the individuals responsible for the operation of any WWTPs involved and any local or State agencies." In addition, NSSP Model Ordinance Chapter IV (2005) section @. 03.C.4 (b) states "Failure of any one party to agree shall constitute sufficient justification to deny creation of a Conditionally Approved area." This Management Plan is in effect as long as the area remains certified and may be modified when conditions warrant it, with the concurrence of the involved parties. (The Sanitary Survey Report is updated annually; any significant changes in this report will necessitate a revision to the Management Plan).

A. PUBLIC AGENCIES

Authorized persons from the following public agencies are requested to review this Management Plan and to sign and return a statement of agreement provided in Appendix G, which states that "The undersigned has read and understands the purpose of the *Conditionally Approved* classification of the commercial shellfish growing areas in Humboldt (Arcata) Bay and the conditions of its Management Plan, dated _____, and agrees to comply with the conditions and procedures set forth in the Management Plan."

1. CDFG, Wildlife Protection Division;
2. RWQCB, North Coast Region; and
3. Humboldt County Department of Public Health, DEH

B. PERMITTED FACILITIES

Authorized persons in the following agencies are requested to review this plan and to sign and return a statement of understanding provided in Appendix G, which states that "The undersigned has read and understands the purpose of the *Conditionally Approved* classification of the commercial shellfish growing areas in Humboldt (North) Bay and the conditions of its Management Plan, dated _____, and understands that the

MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

emergency notification procedures set forth in the Management Plan will be a mandatory requirement of the Waste Discharge Requirements adopted for the agency by the California Regional Water Quality Control Board.”

1. City of Arcata, Department of Environmental Services;
2. City of Arcata, Department of Public Works;
3. City of Eureka, Engineering Department;
4. City of Eureka, Public Works/Building Department; and
5. Humboldt Community Services District

C. COMMERCIAL SHELLFISH GROWER

Compliance with this Management Plan is mandatory for the commercial shellfish growers as a condition of their Shellfish Growing Area Certificate issued by CCDPH/PSU. Noncompliance may result in suspension or revocation of the certificate. The 5 Humboldt Bay commercial shellfish companies are requested to review this document and to sign and return the statement provided in Appendix G, which states that “The undersigned has read and understands the purpose of the *Conditionally Approved* classification of the commercial shellfish growing areas in Humboldt (North) Bay and the conditions of its Management Plan, dated _____, and understands that compliance with the conditions and procedures set forth in the Management Plan is mandatory as a condition of Shellfish Growing Area Certificate issued by the California Department of Public Health.”

D. FORWARDING OF SIGNED STATEMENTS

Signed statements shall be mailed to:

California Department of Public Health, EMB
850 Marina Bay Parkway, # G165
Richmond, CA 94804

XVI. SUMMARY OF AGREEMENTS

A. CALIFORNIA DEPARTMENT OF FISH AND GAME

Upon request from CDPH, to field check commercial shellfish growing areas during closed periods to monitor for illegal harvesting activity, and to report compliance monitoring activities and findings to CDPH.

B. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, NORTH COAST REGION

1. Notification

To notify, or to require designated persons or agencies to notify, CDPH/PSU of any pollution events, as soon as they become aware of discharges of hazardous chemicals, pesticides, or petroleum products, which may pose a threat or adversely affect water and shellfish quality in Humboldt Bay.

2. Performance Standards

To include in the Waste Discharge Requirements for all WWTPs whose wastes discharge into Humboldt Bay (including the City of Arcata WWTP, the City of Eureka's Elk River WWTP, and the College of the Redwoods WWTP) performance standards designed to preserve the water quality in the bay for the beneficial use of shellfish harvesting.

3. Waste Discharge Requirements

To include the following requirements in the Waste Discharge Requirements issued to the City of Arcata and the City of Eureka:

a. Notify both the North Coast RWQCB, Coast Seafoods Company, North Bay Shellfish Company, Aqua Rodeo Farms, Emerald Coast Seafoods, and Humboldt Bay Oyster Company immediately, and to notify CDPH/PSU and the County DEH as soon as possible, of any sewage spill, collection system bypass, or malfunction of a WWTP which results in a potential or actual discharge of raw or incompletely treated sewage to Humboldt Bay or its tributaries.

b. Develop and maintain written notification procedures incorporating the notification requirement in XVI.B.1. above, to post the procedures at the facility, and to provide a copy of the current notification procedures to RWQCB, CDPH/PSU, and the Humboldt County DEH.

c. Provide a copy to CDPH/PSU of all Waste Discharge Requirements and updates or amendments, proposed or adopted, for any WWTPs whose wastes discharge to Humboldt Bay.

d. Provide a copy to CDPH/PSU of all facilities inspection reports and annual reports completed for all WWTPs whose wastes discharge to Humboldt Bay.

C. HUMBOLDT COUNTY DEPARTMENT OF PUBLIC HEALTH, DIVISION OF ENVIRONMENTAL HEALTH

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To notify CDPH/PSU of any pollution events, as soon as they become aware of discharges such as sewage, hazardous chemicals, pesticides, or petroleum products, which may pose a threat or adversely affect water and shellfish quality in Humboldt Bay.

D. CITY OF ARCATA, CITY OF EUREKA, HCSD

To provide verbal notification to each certified shellfish grower and to other required parties in accordance with this Management Plan.

TABLES

MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

Table 1. Commercial shellfish growers operating in Humboldt Bay, California.

Grower/harvester	Shellfish growing area certificate number	Source of lease	Area of lease (acres)	Location	Products
Coast Seafood Company 25 Waterfront Drive Eureka, CA 95501 Greg Dale, Manager	SGA07-005	HBHRCD, City of Eureka, private ownership by CSC and other private parties	1744	Area A: Mad River and Bird Is. Growing area; Area B: Sand Is., Gunther Is., and East Bay growing area	Pacific and Kumamoto Oysters, Manila clams
North Bay Shellfish Company 2550 Daffodil McKinleyville, CA 95519 Scott Sterner, Owner	SGA07-210, SGA07-210D, SGA07-210A	City of Arcata, HBHRCD	162	Area C: Parcel #1; Area D2: Parcel #2; Area D1; Mad River Slough wet storage	Pacific, Kumamoto, and European Flat Oysters, bay mussels
Aqua Rodeo Farms PO Box 371 Eureka, CA 95502 Sebastian Elrite, Owner	SGA07-210C	City of Arcata	10	Area C: Parcel #1	Pacific, Kumamoto and European Flat Oysters, Manila clams
Humboldt Bay Oyster Company P.O. Box 2237 McKinleyville, CA 95519 Todd and Holly Van Herpe, Owners	SGA07-621, SGA07-621A, SGA07-621B	HBHRCD	5	Area E: Mad R. Channel south; Area C: Mad R. Channel north; Area F: Mad R. Slough wet storage	Pacific and Kumamoto Oysters, Manila clams
	SGA07-210B	City of Arcata	10	Area C: Parcel #1	

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Table 2. Sampling schedule for marine biotoxin monitoring in Humboldt Bay.

COMPANY	FREQUENCY	SAMPLE TYPE	LOCATION	DESCRIPTION
Humboldt Bay				
- Coast Seafood Company	Weekly ³	Mussels	Indian Island & US Coast Guard Station	Sentinel
	Non-routine ⁴	Oysters	Harvest Area	Current Harvest Area
- North Bay Shellfish Company	Non-routine ⁴	Mussels	Mad River Slough	Wet Storage
	Non-routine ⁴	Oysters	Harvest Area	Current Harvest Area
- Aqua Rodeo Farms	Non-routine ⁴	Oysters	Harvest Area	Current Harvest Area
-Humboldt Bay Oyster Company	Non-routine ⁴	Oysters	Harvest Area	Current Harvest Area

³ One sample per week unless directed by CDHS to sample more frequently

⁴ Sampling as directed by CDHS

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Table 3. Management decision criteria for domoic acid toxicity in bivalve shellfish.

ALERT LEVEL	DOMOIC ACID CONCENTRATION ¹	ACTION ^{2,3}
<i>Jellett Result Negative⁴ (optional):</i>		
No Alert	Nondetectable: < 1 ppm	<ul style="list-style-type: none"> - Routine Sampling; - Harvest date must be < 96 hours from sampling date.
1st Stage	1 – 5 ppm	<ul style="list-style-type: none"> - Harvest date must be < 48 hours from sampling date; - Immediate resample⁵; - Additional sampling as directed.
2nd Stage	5 – 9 ppm	<ul style="list-style-type: none"> - Harvest date must be < 24 hours from sampling date; - Immediate resample; - Immediate harvest closure if harvest lot laboratory results have not been obtained; - Twice-weekly sampling at minimum⁵; - Expand sampling to adjacent growing areas.
<i>Jellett Result Positive⁴ (optional):</i>		
3rd Stage	10 – 19 ppm	<ul style="list-style-type: none"> - Batch release^{3,5}; - Immediate harvest closure if harvest lot laboratory results have not been obtained; - Immediate resample; - Twice-weekly sampling at minimum⁵; - Expand sampling to adjacent growing areas.
4th Stage	≥ 20 ppm	<ul style="list-style-type: none"> - Closure of growing area; - Batch release^{3,5} of shellstock from adjacent harvest areas that remain open; - Twice-weekly sampling⁵; - Expand sampling to adjacent growing areas.

¹ As determined by NSSP-approved analytical method. Specified concentrations are subject to change based on acquisition of new data.

² No harvesting can be conducted without quantitative PSP and Domoic Acid results from samples collected within 96 hours prior to harvest.

³ For each alert stage, the alert shall be continued until either (a) a higher stage alert is declared, or (b) two successive samples taken over a minimum period of three days have domoic acid levels consistent with a lower alert stage and downward trends in biotoxin levels in the surrounding area.

⁴ Applies to both the rapid extraction and methanol extraction methods.

⁵ Contingent upon arrangement with certified laboratory.

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Table 4. Management decision criteria for PSP toxicity in bivalve shellfish.

ALERT LEVEL	PSP TOXIN CONCENTRATION ¹	ACTION ^{2,3}
<i>Jellett Result Negative⁴:</i>		
No Alert	Nondetectable: < ~34 ug/100g	<ul style="list-style-type: none"> - Routine Sampling; - Harvest date must be < 96 hours from sampling date.
<i>Jellett Result Positive⁴:</i>		
1st Stage	Detectable: < 50 ug/100g	<ul style="list-style-type: none"> - Harvest date must be < 48 hours from sampling date; - Immediate resample; - Additional sampling as directed.
2nd Stage	Detectable: < 60 ug/100g	<ul style="list-style-type: none"> - Harvest date must be < 24 hours from sampling date; - Immediate resample; - Immediate harvest closure if harvest lot laboratory results have not been obtained; - Twice-weekly sampling at minimum⁴; - Expand sampling to adjacent growing areas.
3rd Stage	60 - 79 ug/100 g	<ul style="list-style-type: none"> - Batch release^{3,5}; - Immediate harvest closure if harvest lot laboratory results have not been obtained. - Immediate resample; - Twice-weekly sampling at minimum⁴; - Expand sampling to adjacent growing areas.
4th Stage	≥ 80 ug/100 g	<ul style="list-style-type: none"> - Closure of growing area; - Batch release^{3,5} of shellstock from adjacent harvest areas that remain open; - Twice-weekly sampling⁴; - Expand sampling to adjacent growing areas.

¹ As determined by NSSP-approved analytical method. Specified concentrations are subject to change based on acquisition of new data.

² No harvesting can be conducted without quantitative PSP and Domoic Acid results from samples collected within 96 hours prior to harvest.

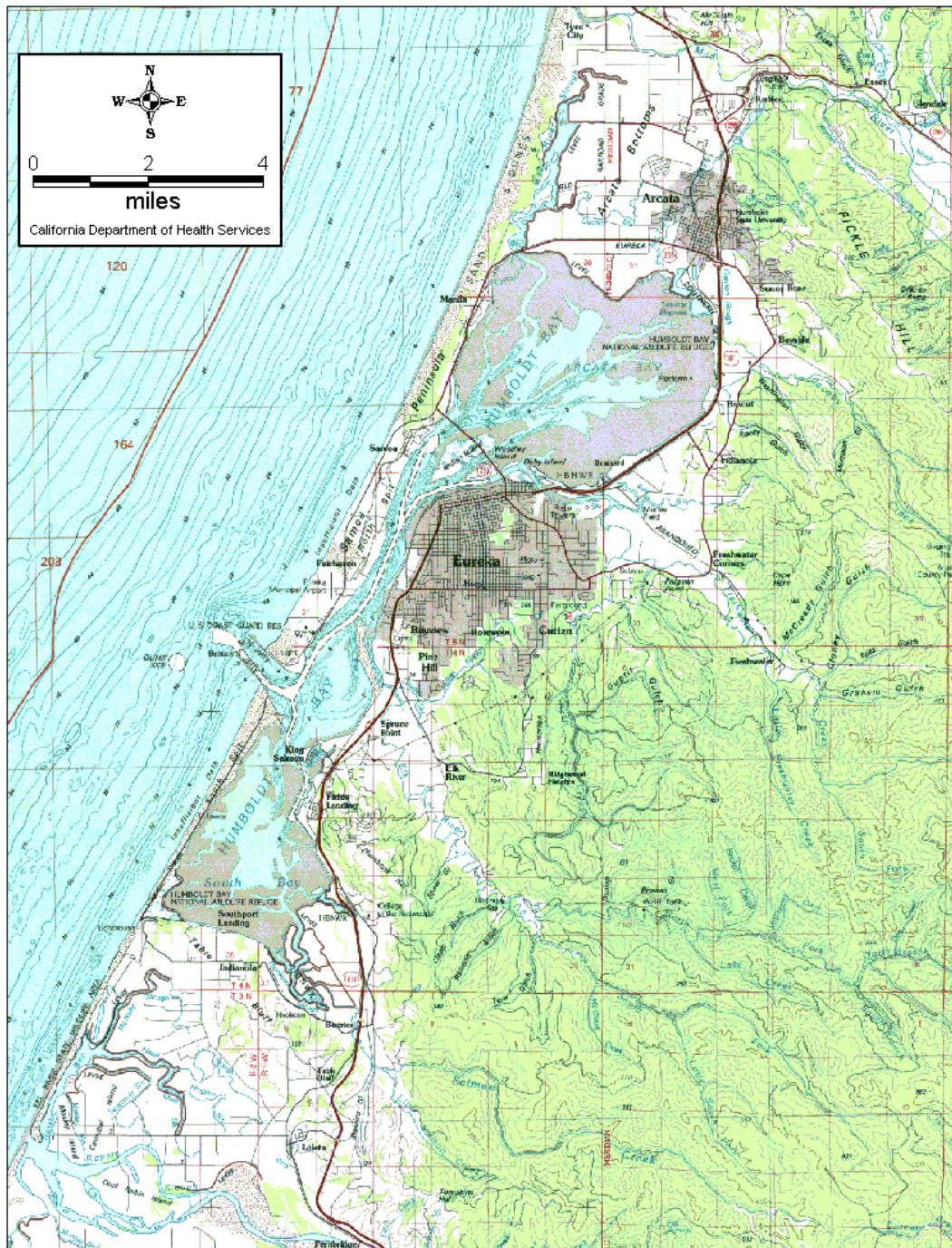
³ For each alert stage, the alert shall be continued until either (a) a higher stage alert is declared, or (b) two successive samples taken over a minimum period of three days have PSP toxin levels consistent with a lower alert stage and downward trends in biotoxin levels in the surrounding area (see note 4, below).

⁴ Jellett results are only to be used to establish increasing alert stages, and not for declining alert stages.

⁵ Contingent upon arrangement with certified laboratory.

FIGURES

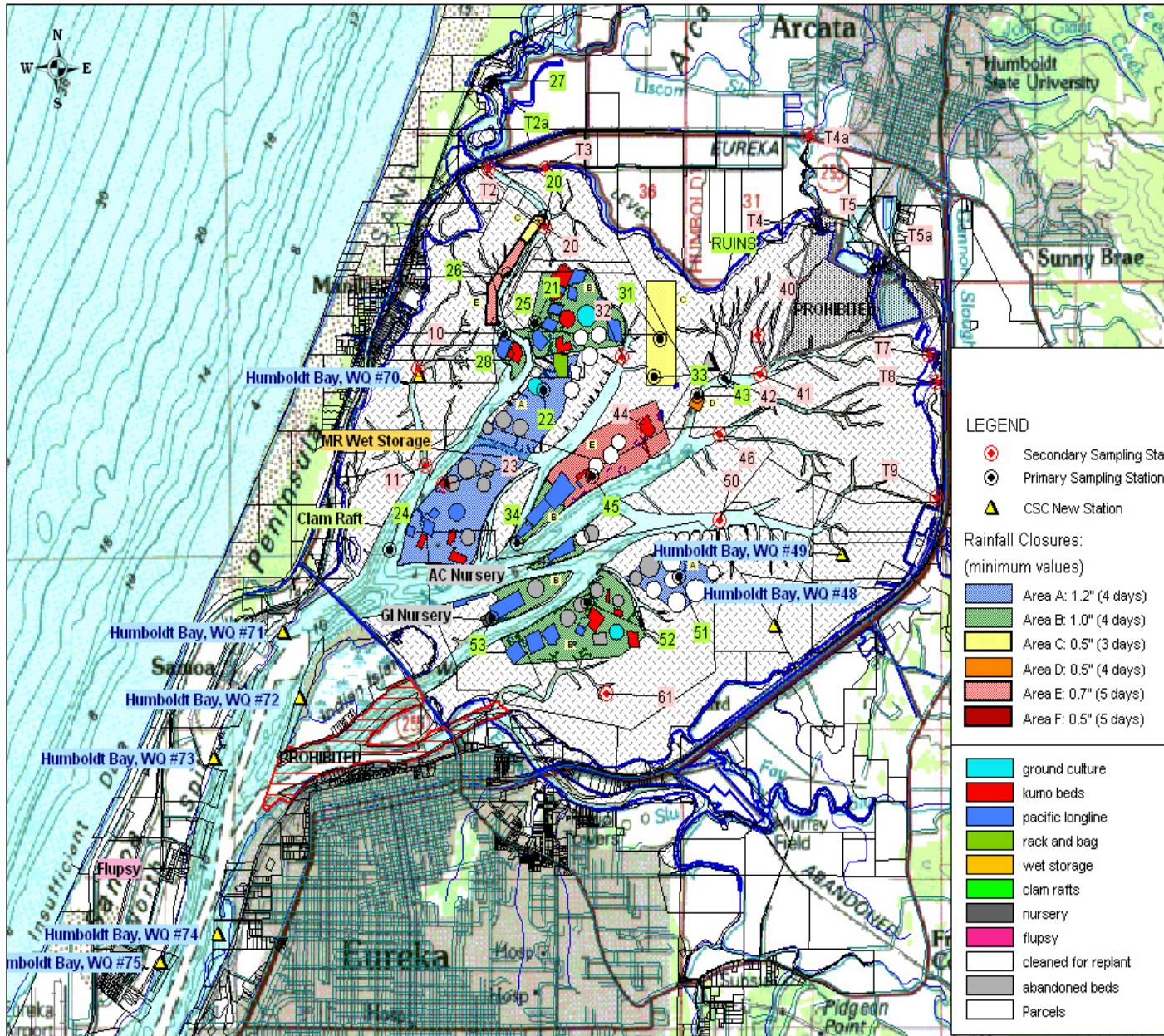
Figure 1. The location of Humboldt Bay and surrounding communities.



MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

Figure 2. Arcata Bay (North Humboldt Bay), California.

Shellfish growing area classifications, growing area designations, and the prohibited safety zone around Arcata WWTP outfall, the Woodley Island Marina and the Eureka Small Boat Basin. Numbered circles represent the location of primary water quality stations.



APPENDICES

MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

Appendix A. Contact list for commercial shellfishing in Humboldt Bay

CDPH/PSU CALL-DOWN CONTACT LIST

Eric Trevena
Preharvest Shellfish Unit
Environmental Management Branch
(916) 449-5695; Cell: (916) 997-6361

Gregg Langlois
Chief, Preharvest Shellfish Unit
Environmental Management Branch
(510) 412-4635

Jill Baltan
Preharvest Shellfish Unit
Environmental Management Branch
(510) 412-4633

Peter Krottje
Preharvest Shellfish Unit
Environmental Management Branch
(510) 412-4638

Raymond Tom
Preharvest Shellfish Unit
Environmental Management Branch
(916) 449-5694

AFTER HOURS SHELLFISH NOTIFICATION
Office of Emergency Services
800-852-7550 or 916-262-1621

DISTRIBUTION AND CONTACTS LIST

Agencies:

Tim Sample, Regional Shellfish Specialist
U.S. Food and Drug Administration
1000 Second Avenue, Suite 2400
Seattle, WA 98104
(206) 553-7001, Ext 40

Michael Antee, Regional Shellfish Specialist
U.S. Food and Drug Administration
1000 Second Avenue, Suite 2400
Seattle, WA 98104

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(206) 553-7001, Ext 13

Hugo Cornejo
California Department of Public Health
MS 7602
PO Box 997435
Sacramento, CA 95899-7435
Phone: (916) 650-6704

Glenn Takeoka, Chief
Department of Public Health
Environmental Health Services Section, MS 7404
P.O. Box 997377,
Sacramento, CA 95899-7377
(916) 449-5693

Gregg Langlois, Chief
Preharvest Shellfish Unit
850 Marina Bay Parkway, # G164
Richmond, CA 94804
(510) 412-4633

Greg Laret, Chief
Wildlife Protection Division
California Department of Fish and Game
1416 Ninth Street, Sacramento, CA 95814
(916) 653-4094

Kirsten Ramey
Associate Marine Biologist
California Department of Fish and Game
Aquaculture and Bay Management Project
619 Second Street
Eureka, CA 95501

Lt. Andy Roberts, Marine Region
California Department of Fish and Game
619 Second Street, Eureka, CA 95501
(707) 445-6496

CDFG Aquaculture Coordinator
California Department of Fish and Game
Executive Office
1416 9th Street
Sacramento 95814
(916) 651-7824

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Vicky Frey, Environmental Scientist
California Department of Fish and Game
(707) 445-7830

Charles Reed
California Water Resources Control Board, North Coast Region
5550 Skylane Boulevard, Suite A, Santa Rosa, CA 95403
(707) 576-2752

Lisa Bernard, Sanitary Engineering Associate
California Regional Water Quality Control Board
(707) 576-2677

Director
Humboldt County Division of Environmental Health
100 H Street, Suite 100
Eureka, CA 95501
(707) 445-6215

Jerry Hurst, Laboratory Director
Humboldt County Department of Public Health
529 "I" Street,
Eureka, CA 95501
(707) 268-2179

Mark Andre, Deputy Director, Environmental Services Department
City of Arcata
736 "F" Street
Arcata, CA 95521
(707) 822-8184

William Gilmer, Superintendent
Water/Wastewater/Sewage Collection System
City of Arcata
(707) 825-2155

Brent Siemer, City Engineer
City of Eureka
531 "K" St.
Eureka, CA 95501-1146
(707) 441-4194

Mike Knight, Director
Public Works/Building Department
City of Eureka

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(707) 441-4207

Utilities Operations Manager
City of Eureka
(707) 441-4360

David Hull, Chief Executive Officer
Humboldt Bay Harbor Recreation and Conservation District
P.O. Box 1030, Eureka, CA 95502-1030
(707) 443-0801

Tom Cooke, General Manager
Humboldt Community Services District
5055 Walnut Dr., P.O. Box 158
Cuttan, CA 95534
(707) 443-4559

Nancy Dean, Meteorologist in Charge
U.S. Department of Commerce, National Weather Service
300 Startare Dr.
Eureka, CA 95501
(707) 443-5610

Growers:

John Petrie, President
Coast Seafoods Company
14711 NE 29th Place, Suite 111
Bellevue, WA 98007
(206) 885-7743

Timothy Morris, National Operations Manager
Coast Seafoods Company
(360) 875-5557

Greg Dale, Eureka Operations Manager
Coast Seafoods Company
25 Waterfront Dr.
Eureka, CA 95502
(707) 442-2947

Scott Sterner, Owner
North Bay Shellfish Company
2550 Daffodil,
McKinleyville, CA 95519
(707) 839-4723

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Sebastian Elrite, Owner
Aqua Rodeo Farms
P. O. Box 371
Eureka, CA 95502
(707) 444-3854

Todd and Holly Van Herpe, Owners
Humboldt Bay Oyster Company
P. O. Box 2237
McKinleyville, CA 95519
(707) 840-0309

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Appendix B. Notification of Shellstock Movement During a Growing Area Closure

Shellstock removed from growing waters during closure periods shall have the number of hours that the shellstock was out of the water added onto its respective closure time before it can be harvested. All shellfish must be in water for the entire length of time that it would otherwise have been had it not been harvested before the end of the rainfall closure. If shellstock is removed from growing waters during closed periods, it must be tagged to ensure that the shellstock is not harvested for direct marketing prior to the required depuration time.

Email or fax this form to CDPH/PSU at:
Email: etrevena@cdph.ca.gov
Fax: (916) 449-5665

Company Name: _____

Date of Movement: From _____ To: _____

Location of Product: _____

Species of Product Moved: _____

Reason for Movement: _____

Estimated date(s) product will be returned: _____ Location: _____

_____ Location: _____

_____ Location: _____

_____ Location: _____

Comments (Including method used to ensure shellstock requiring added holding time before harvesting is adequately identified (required for approval)) _____

Name _____ Signature _____ Date _____

Preharvest Shellfish Unit acknowledgement of shellstock movement.

Signature _____ Date _____

Appendix C. Wastewater upset response procedures

The following procedures shall be followed in the event of a failure in the wastewater collection or treatment system resulting in a “wastewater upset”. A wastewater upset occurs whenever inadequately treated wastewater has exited the confines of the wastewater treatment or collection system and has the potential to enter Humboldt Bay or one of its tributaries.

In the event of a wastewater upset that results in a potential or actual discharge of inadequately treated effluent into Humboldt Bay and its tributaries, the responsible agency will notify CDPH and the grower(s) of the location and estimated volume of wastewater released to the waterbody. Upon notification of a sewage spill the shellfish growers shall consider their growing areas closed to harvesting. CDPH/PSU will contact the shellfish growers to confirm that notification of the wastewater upset event has been received, and that growers have ceased harvest operations prior to the start of the upset. Harvesting shall not occur until after CDHS/PSU has evaluated the event and determined the required actions. If harvesting has occurred after the start of the spill, growers should consult CDPH Food and Drug Branch to determine the disposition of harvested shellstock.

Spill Volume Thresholds

CDHS/PSU will establish that spill has been abated and determine if spill volume and location warrant closure of the growing area. Minimum spill volume thresholds that will result in closure are presented in Tables C-1 and C-2. For spill locations not specified in Tables C-1 and C-2, thresholds will be determined by interpolation or extrapolation from a nearby location in Table C-1 or C-2. If this is not possible, threshold spill volume for the new location will be calculated in the manner described in the Humboldt Bay Sanitary Survey

CDPH/PSU may modify the above procedure based on the specific conditions of the reported spill. After the determination has been made, CDPH/PSU will notify growers of the status of the growing area(s).

Spill Attenuation

CDPH/CSU will conduct analyses to estimate when fecal coliform concentrations resulting from an upset will be attenuated to acceptable levels (14 MPN/100 mL) through tidal flushing. Attenuation analysis will be conducted as described in the Humboldt Bay Sanitary Survey. The analysis only accounts for tidal flushing, and ignores bacterial die-off. This conservative approach is appropriate because die-off rates of many of the pathogenic viruses associated with sewage, and for which fecal coliforms serve as imperfect indicators, are unknown.

CDPH/PSU will instruct growers to begin collecting samples when the attenuation analysis indicates acceptable water quality. If this date falls within a rainfall closure, sampling will not be conducted until the rainfall closure ends. Growers should not sample until instructed to do so by CDPH.

Sampling and Opening Criteria

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When instructed by CDPH, growers will collect one water quality sample at each site specified in Table C-1 or C-2 and deliver samples to an ELAP-certified laboratory for fecal coliform analysis. Fecal coliform results must be equal to or lower than 14 MPN/100mL for the growing area to be considered for reopening. In addition, consistent, acceptable levels of fecal coliforms must be obtained from all sites in the surrounding area, and the source of contamination must have been abated. If results for any sampling stations are above the acceptable level, growers will be instructed to resample. Sampling will continue until all sampling stations meet the above target. Results from all sampling stations must meet the target before the growing area can be reopened.

Table C-1. Revised Sewage Upset Threshold Volumes to Close Shellfish Growing Waters⁵ to Harvest Activities: City of Arcata waterways

Tributary	Threshold Volume (Gallons)	Sampling Sites
Tide Gates (Arcata bottoms)	30	All primary sites plus T2
Janes Creek	200	All primary sites plus 41
McDaniel Slough	500	All primary sites plus 41
Jolly Giant Creek	600	All primary sites plus 41
Butcher Slough	600	All primary sites plus 41
Campbell Creek	1,000	All primary sites plus 41 and 44
Fickle Hill Creek	1,000	All primary sites plus 41 and 44
Grotzman Creek	1,000	All primary sites plus 41 and 44
Beith Creek	1,000	All primary sites plus 41 and 44
Gannon Slough	1,000	All primary sites plus 41 and 44
Jacoby Creek	1,000	All primary sites plus 41 and 44

⁵ Volumes are based on the distance to the nearest growing waters

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Table C-2. Sewage Upset Threshold Volumes to Close Shellfish Growing Waters⁶ to Harvest Activities: City of Eureka and Humboldt Community Services District waterways.

Tributary	Threshold Volume (Gallons)	Effected Growing Areas	Sampling Sites
Storm Drains	218	All	All primary sites plus T11
Ryan Creek	45	East Bay, Sand Is., and Gunther Is. Beds	34, 45, 51, 52, 53
	2,000	All Areas	All primary sites plus T11
Ryan Slough	45	East Bay, Sand Is., and Gunther Is. Beds	34, 45, 51, 52, 53
	2,000	All Areas	All primary sites plus T11
Freshwater Creek	45	East Bay, Sand Is., and Gunther Is. Beds	34, 45, 51, 52, 53
	2,000	All Areas	All primary sites plus T11
Freshwater Slough	45	East Bay, Sand Is., and Gunther Is. Beds	34, 45, 51, 52, 53
	2,000	All Areas	All primary sites plus T11
Eureka Slough	45	East Bay, Sand Is., and Gunther Is. Beds	34, 45, 51, 52, 53
	2,000	All Areas	All primary sites plus T11
Fay Slough	45	East Bay, Sand Is., and Gunther Is. Beds	34, 45, 51, 52, 53
	2,000	All Areas	All primary sites plus T11
Martin Slough	20,222	All	All primary sites
Swain Slough	20,222	All	All primary sites
Elk River	20,222	All	All primary sites

⁶ Volumes are based on the distance to the nearest growing waters

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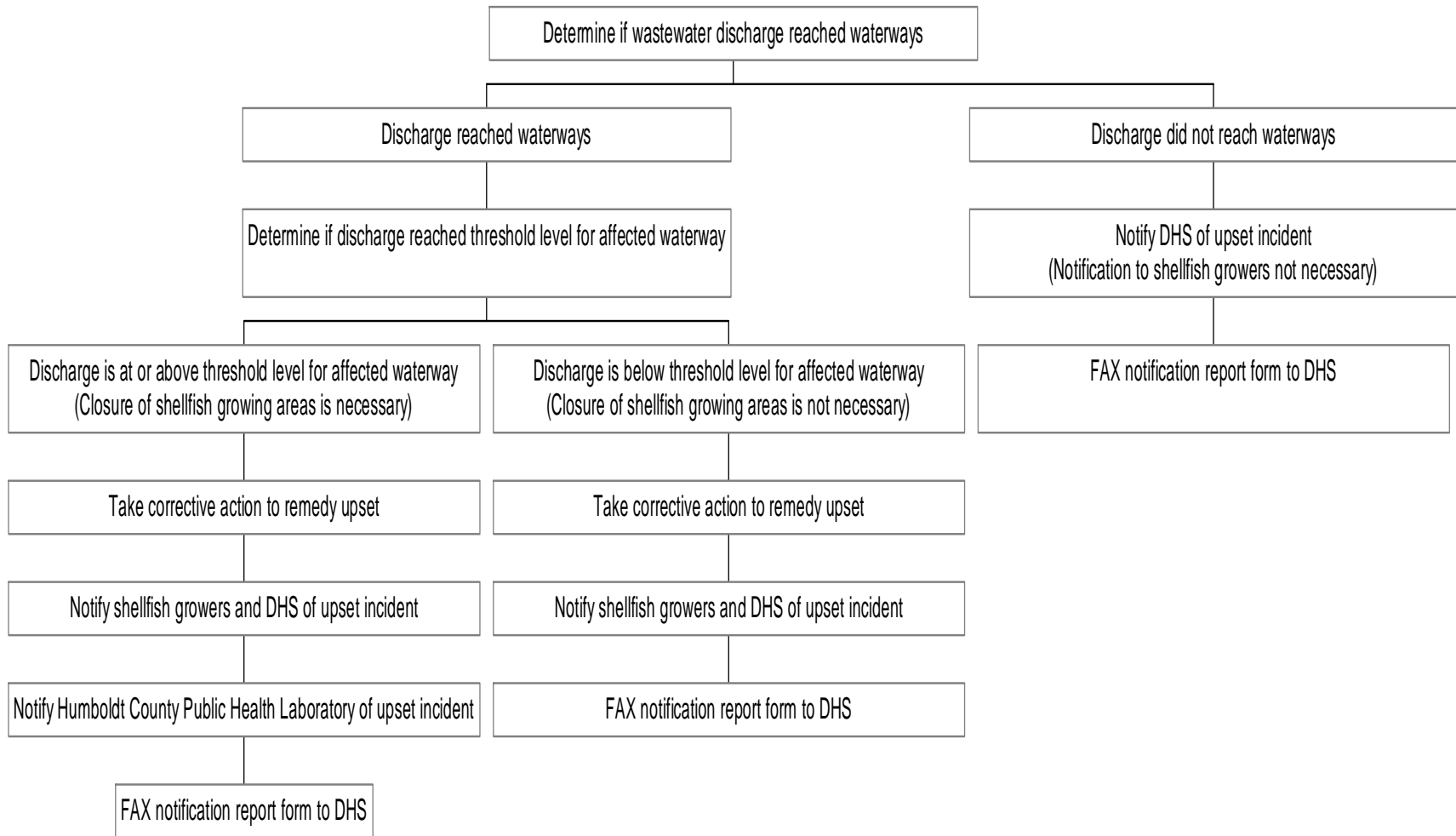


Figure C-1. Wastewater upset decision tree for wastewater authority

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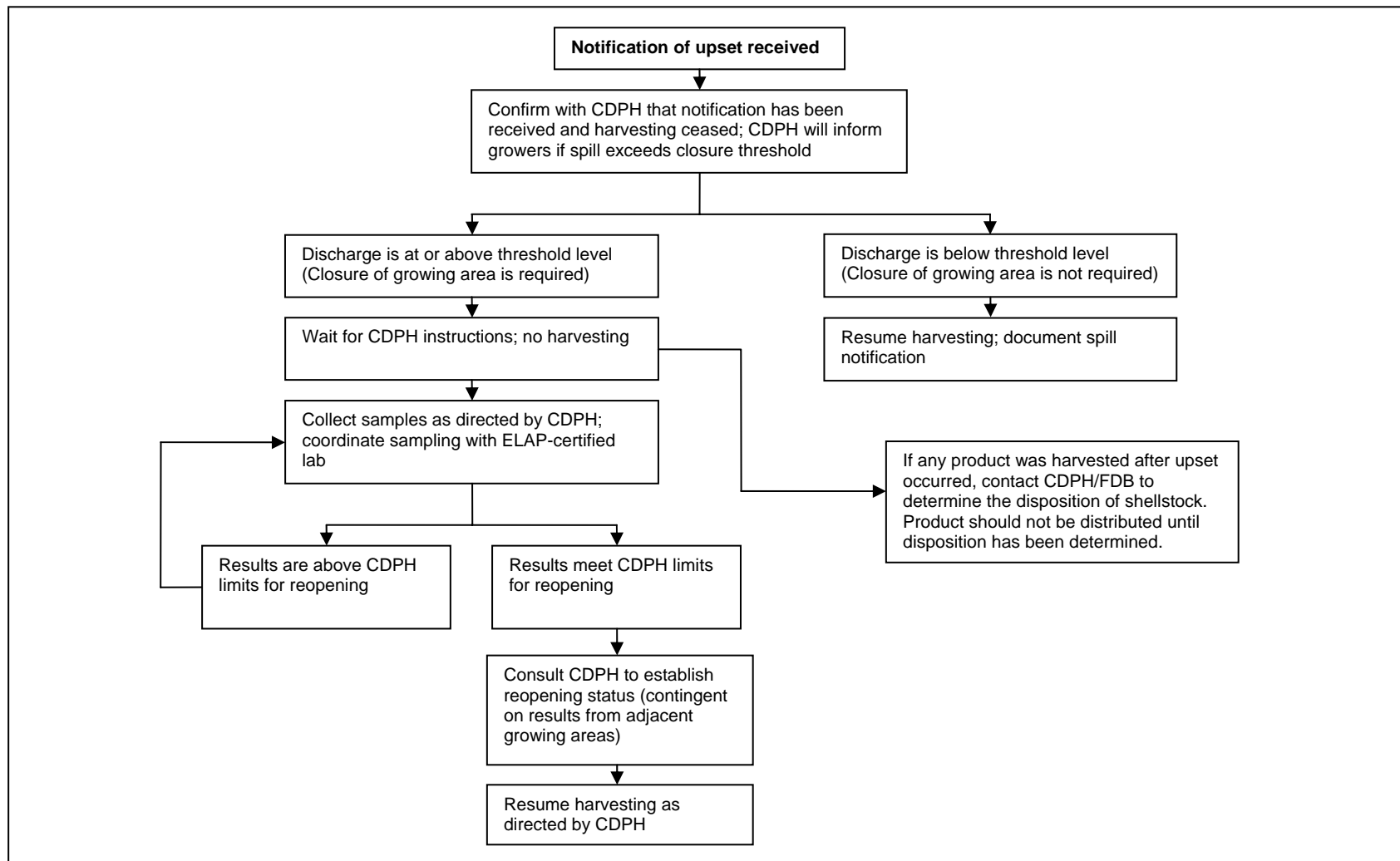


Figure C-2. Wastewater upset decision tree for shellfish growers

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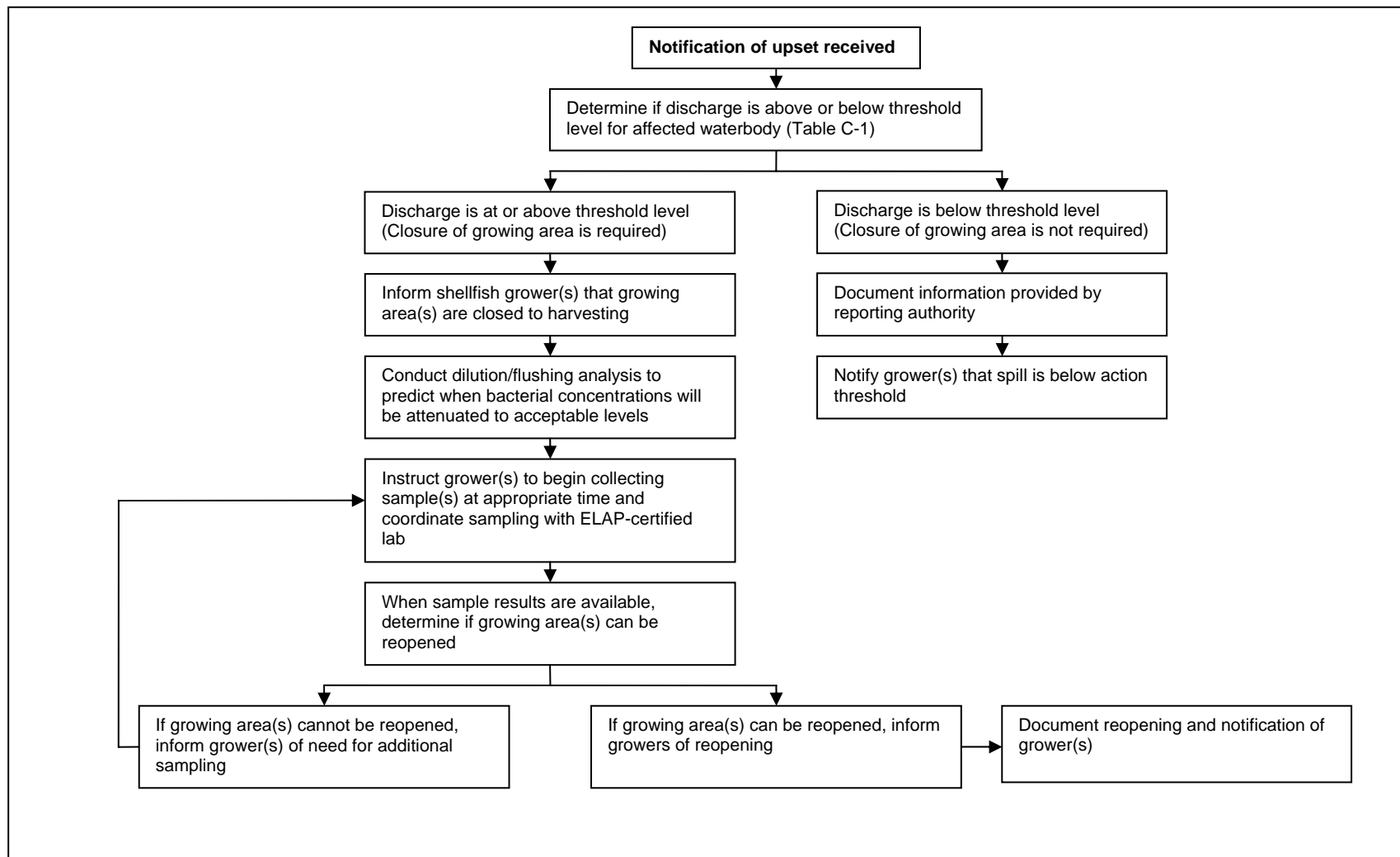


Figure C-3. Wastewater upset decision tree for California Department of Public Health

Table C-6. Example of a form used to report a sewage upset to CDPH/PSU

Fax to: (916) 449-5665
Attention: Eric Trevena
Date and Time Faxed:

CITY OF ARCATA

UPSET REPORT FORM

1. **Upset Date/Time:**
2. **CDPH Notified:** **Yes** **No**
3. **Upset Location:**
4. **Upset Reported by:**
5. **Upset Responders:**
6. **Weather:** Description:

Previous 24-hr rainfall total (0900 – 0900):

Previous 5-day rainfall total:

Forecast (if known):
7. **Upset Discharge Rate:**
8. **Discharge Duration:**
9. **Total Estimated Volume Discharged:**
10. **General Description of Upset path prior to entering storm drain inlet or receiving water:**
11. **Storm Drain System – Did the Upset enter the storm drain system?**
Yes No N/A DATE

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If yes, please identify the location:

Was the Upset able to be contained and removed from the storm drain system?

Contained: Yes No

Removed: Yes No

Comments:

12. Tributary – Did the Upset enter a tributary? Yes No N/A

Location:

Unattenuated threshold volume (use matrix):

Estimated flow of tributary (specify determination method):

Estimated distance for “slug” to reach the Bay:

13. Tidal Information

High Tide					Low Tide			
Date	a.m.		p.m.		a.m.		p.m.	
	Time	Feet	Time	Feet	Time	Feet	Time	Feet

14. Tidal Gate Status: Open Closed No Tide Gate

15. If Sample Collected:

Sample to be collected at the source of the upset.

Sample Location:

Sample Date and Time:

Sample Location Conditions:

Weather Conditions:

Sample Delivered: North Coast Laboratory Hum. Co. Public Health Laboratory

16. Person Completing This Form:

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Table C-7. Contact number to report sewage upsets affecting Humboldt Bay

The following is a list of persons to contact pursuant to the current *Management Plan for Commercial Shellfishing in Humboldt Bay* in cases of sewage or hazardous substance releases to the surface waters in the Humboldt Bay watershed. All of the commercial shellfish growers must be contacted first, followed by one staff member of the California Department of Public Health (CDPH) in second priority. Please note that at any time individual CDPH staff may be in the field or otherwise unavailable for consultation in the event of a spill and the caller should attempt to contact another staff member in the order given.

I. Shellfish Growers. All of the following growers ***must*** be contacted in the event of a sewage upset:

Company	Contact	Work Phone	Cell Phone
Coast Seafoods Company	Greg Dale	(707) 442-2947	(707) 834-5801
North Bay Shellfish Company	Scott Sterner	(707) 839-4723	(707) 845-2118
Aqua Rodeo Farms	Sebastian Elrite	(707) 444-3854	(707) 496-3532
Humboldt Bay Oyster Company	Todd Van Herpe	(707) 840-0309	(707) 499-2388

II. California Department of Public Health. One of the following individuals must be contacted:

Contact	Work Phone	Cell Phone	Pager	Home Phone
Eric Trevena	(916) 449-5695	(916) 997-6361		(209) 367-9452
Gregg Langlois	(510) 412-4635	(510) 750-2554		(925) 937-9298
Marc Commandatore	(510) 412-4631	(916) 997-4186		(510) 524-1307
Jill Baltan	(510) 412-4633	(916) 997-4576		(510) 777-9148
Ray Tom	(916) 449-5694	(510) 750-2558		
Peter Krottje	(510) 412-4638	(916) 997-4178		

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Shellfish Grower Information Line (GIL). This line has information on the current closure status of each growing area. It can be used as a last resort to record messages in the case no CDPH staff can be reached: (510) 412-4644

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Appendix D. Rainfall closure criteria for Humboldt Bay by growing area

Grow ing Area	Grower Description of Area	Start Closure	24-Hour Cumulative Rainfall Threshold >	Closure Length = End of Storm plus	7-Day Cumulative Rainfall	
					If > 3.0 inches, add to closure:	If > 5.0 inches, add to closure:
A	Coast Seafood Company South Mad River growing area, Bird Island Growing area, and the east section of East Bay growing area	Six (6) hours after the 24- hour cumulative rainfall of 1.2" is exceeded	1.2 Inch	96 hrs (4 days)	24 hrs	48 hrs
B	Coast Seafood Company north Mad River growing area, western portion of East Bay growing area, Gunther Island growing area, south Sand Island Growing area, and the Arcata Channel growing area	Six (6) hours after the 24- hour cumulative rainfall of 1.0" is exceeded	1.0 Inch	96 hrs (4 days)	24 hrs	48 hrs
C	Parcel 1 Northbay Shellfish, Aqua Rodeo Farms, and Humboldt Bay Oyster Company; Humboldt Bay Oyster Company, north growing area	Six (6) hours after the 24- hour cumulative rainfall of 0.5" is exceeded	0.5 Inch 0.75 Inch 1.0 Inch	72 hrs (3 days) 96 hrs (4 days) 120 hrs (5 days)	24 hrs 24 hrs 24 hrs	48 hrs 48 hrs 48 hrs
D	North Bay Shellfish, wet storage area; North Bay Shellfish, Parcel 2	The hour that the 24-hour cumulative rainfall of 0.5" is exceeded	0.5 Inch 0.75 Inch 1.0 Inch	96 hrs (4 days) 120 hrs (5 days) 144 hrs (6 days)	24 hrs 24 hrs 24 hrs	48 hrs 48 hrs 48 hrs
E	Humboldt Bay Oyster Company, south growing area; Coast Seafoods Company, north Sand Island growing area	Six hours after the 24-hour cumulative rainfall of 0.7" is exceeded	0.7 Inch	120 hrs (5 days)	24 hrs	48 hrs
F	Humboldt Bay Oyster Company, wet storage area	The hour that the 24-hour cumulative rainfall of 0.5" is exceeded	0.5 Inch 0.75 Inch 1.0 Inch	120 hrs (5 days) 144 hrs (6 days) 168 hrs (7 days)	24 hrs 24 hrs 24 hrs	48 hrs 48 hrs 48 hrs

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Appendix E. Harvest log for shellfish harvesters operating in Humboldt Bay

Grower _____ Month _____ Year _____

Harvest time and date	Growing area	Quantity harvested	Time/date of previous reopening	Time/date of subsequent closure

Appendix F. Marine Biotoxin Monitoring Procedures

This appendix contains two protocols for marine biotoxin monitoring. Procedure 1 is to be used for collecting shellfish samples to be submitted to the California Department of Public Health for biotoxin analysis. Procedure 2 should be used when performing field biotoxin analysis using Jellett test strips and when collecting phytoplankton samples. Training in both procedures will be provided to the grower by CDPH.

Procedure 1 was developed by the California Department of Public Health. Procedure 2 was developed by the California Department of Public Health and the University of California Santa Cruz as part of the Cal-PreEMPT Program, with support from the National Oceanographic and Atmospheric Administration's Monitoring and Event Response for Harmful Algal Blooms (MERHAB).

PROCEDURE 1: COLLECTING SHELLFISH SAMPLES TO BE SENT TO CDPH FOR BIOTOXIN ANALYSIS (NOT ANALYZED IN THE FIELD)

Prepared By

California Department of Public Health
Environmental Management Branch
and
Environmental Microbial Diseases Laboratory

INTRODUCTION

The following field sampling protocol will accommodate analysis for both paralytic shellfish poisoning (PSP) toxins and domoic acid (DA). Because a preservative cannot be used at the time of sample collection, it is imperative that the field collectors take care to ensure the integrity of each sample.

1. **SAMPLING:** A sample should consist of a single species of bivalve shellfish (mussels, oysters, clams, etc.) collected randomly from the sampling site. Each sample should include a **minimum of 15 individuals and at least 250 grams of drained shellfish meat**; this provides adequate material for both analyses with a reserve as insurance against a possible lab accident. This is equivalent to a volume of about one (1) cup of shucked meats. It takes up to 40 small sea mussels (about 2 inches shell length) to produce 250 grams of meat. Avoid collecting only a few very large specimens: this may provide misleading information on the presence or absence of toxin.
2. **FIELD PREPARATION OF SAMPLES:**
 - a. Shucked samples.
 - (1) Thoroughly clean the outside of shellfish with water.
 - (2) Open shell by cutting the adductor muscle(s). Do not use heat or anesthetic before opening shell. **Cut carefully to avoid damage to body of mollusk.**
 - (3) Rinse the opened shellfish to remove sand or other foreign materials if needed.
 - (4) For mussels, cut off byssal threads (attachment hairs) with scissors and discard, saving all meat.
 - (5) Open shell and drain off excess liquid. Remove meat from shell without damaging tissue.
 - (6) Drain shucked meat on a #10 mesh sieve without layering for five (5) minutes.
 - (7) Place drained meat into a wide-mouthed, 16-ounce sample bottle. About 1/2 to 2/3 of a sample bottle of shellfish meat provides the desired amount. NOTE: Do not overfill; be sure to leave an air space to accommodate expansion upon freezing.
 - (8) Tighten cap securely. Refrigerate immediately in the field.
 - (9) **Freeze sample** as soon as possible; ensure that sample is frozen prior to shipment.
 - (10) Fill out sample submission slip; be sure to record sample **bottle number** and **type of shellfish** (e.g., Pacific oyster, bay mussel, etc.). A list of representative sample types and their associated codes is presented in Table 1. In addition, please record the **sample location and sampling date**, and **include your name and telephone number** so that we may contact you immediately. The presence of high toxin concentrations may necessitate immediate resampling.

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- b. Unshucked samples: If you have been instructed or authorized to send unshucked shellfish samples, clean the outside of shellfish, wrap in newspaper to cover sharp edges, place in a heavy gauge plastic bag and seal, double bag the sample, and check for leaks. Refrigerate immediately.
3. **SHIPPING:** Rapid testing of samples for PSP and DA is extremely important. Samples should be shipped as soon as possible by the most rapid means available, while taking care that they arrive at the laboratory in an unspoiled condition.
- a. Place frozen sample(s) in an insulated shipping container with an adequate quantity of frozen ice packs and sandwiched in absorbent materials to soak up any leakage or condensation.
- b. Place sample submission slip(s) on top of the Styrofoam lid; close and seal the shipping container.
- c. Containers returned to you from the laboratory will have mailing labels inside a plastic mailing envelope taped onto the lid or side. Remove the label addressed to you and reverse labels so that the box is addressed to the laboratory. Remove or cover any old UPS or other shipping label(s) that could cause confusion.
- d. Package should be addressed to:
- California Department of Public Health
MDL/EMDS
ATTN: Specimen Receiving MS B106
850 Marina Bay Parkway
Richmond, CA 94804
- e. Send package by Courier Service, In accordance with prior arrangements.
- (1) Next-day courier service may be provided in some locations by EMB: call (510) 412-4635 for information; or
- (2) You may use your own courier at your own expense.
- f. Avoid sending samples at the end of the week or just before holidays. Prolonged transit time causes increased risk of spoilage.
- g. All questions regarding this protocol should be directed to the EMB office at (510) 412-4635.

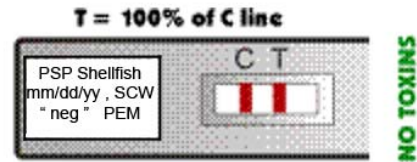
SAMPLE TYPE	CODE
Wild Sea Mussels (<i>Mytilus californianus</i>)	WSMU
Sentinel Sea Mussels	SSMU
Wild Bay Mussels (<i>Mytilus edulis</i>)	WBMU
Sentinel Bay Mussels	SBMU
Cultured Bay Mussels	CBMU
Cultured Pacific Oysters (<i>Crassostrea gigas</i>)	CPOY

Table 1. Common sample types and their respective codes.

PROCEDURE 2: PHYTOPLANKTON SAMPLING AND FIELD BIOTOXIN ANALYSIS

Labeling

Label Jellett test strips and shellfish extract vial with the following information: toxin, sample type (e.g. mussel, oyster or phytoplankton), date, location, test strip results (+/-), and your initials. Use the back of the test strip for more space, if needed. See example:



Phytoplankton Samples

Collecting & Observing Phytoplankton Sample:

1. Use plankton net to obtain 300 mL sample: retrieve net very slowly
2. Record total length of the tow (depth x number of repetitions, e.g. 30 feet x 5 tows = 150 feet)
3. Swirl net sample to resuspend, and fill 125 mL bottle containing formalin just to the shoulder
4. Pour the remaining sample into a clean bottle without formalin
5. Allow live sample to settle for 15 minutes
6. Pipette several drops of the settle material to a microscope slide and place a coverslip on the drops, or use a small flat glass capillary tube to pull up a quantity of the settle material
7. Observe the slide/capillary for the presence of *Pseudo-nitzschia* or *Alexandrium* and record estimate of percent composition or relative abundance (Absent, Rare, Present, Common, Abundant).
8. Note other most common species along with an estimate of percent composition or abundance.
9. Fill out data sheet with observations and percentages
10. Repeat steps 6 through 9 for a total of three separate observations
11. Field sheets should be photocopied before shipping to CDPH

Shellfish Samples

Collecting Shellfish Sample:

1. Collect a minimum of 15 large mussels, more if they are small
2. Rinse outside of shell, remove byssal threads, and shuck mussels placing tissue in #10 sieve and allow to drain for 5 minutes
3. Fill 600 mL beaker to at least 300 mL with shucked meat and thoroughly puree meat using blender
4. Pour approximately 10 mL pureed meat into 50 mL tube and pour remainder into 500 mL sample collection jar and refrigerate immediately

Preparing the Shellfish Extract:

1. Add 10 mL Jellett *Extraction Liquid* to tube containing 10 mL pureed shellfish

- and shake vigorously to ensure complete mixing
2. Place paper paint filter over a 500 mL beaker and pour shellfish mixture into filter. Allow to filter for 5 minutes
 3. Transfer shellfish extract filtrate from beaker into small vial, cap, label with date, location, and initials

★ This extract can be used for BOTH the ASP and PSP tests ★

Testing the Shellfish Extract: Domoic Acid/ASP (also refer to green Jellett instructions):

1. Open sealed envelope containing Domoic Acid test strip: ensure desiccant pouch is blue (discard test strip if desiccant is pink).
2. Add 1 mL of water to the vial provided (white cap).
3. Add 100 µL of shellfish extract to vial containing 1 mL of water. Cap and shake thoroughly. Discard pipette.
4. Number the two buffer vials (red cap, green cap) "1" and "2" to avoid mixing them up
5. Tap small vials of buffer 3 times on hard surface. Place in rack and remove cap (red) from vial #1.
6. Add 100 µL of the shellfish extract to the buffer solution using the new pipette provided (fill to black line).
7. Mix shellfish extract and buffer: insert pipette and fill and empty into buffer vial 3 times.
8. Add 100 µL of the buffer/extract solution to the buffer vial #2 (green cap) using the pipette provided (black line).
9. Mix contents of second vial thoroughly: insert pipette and fill and empty into buffer vial 3 times.
10. Fill pipette to black line (100 µL) with solution from second buffer vial.
11. Dispense into sample well of test strip (S). Discard pipette.
12. Record start time and wait 45 - 75 minutes before reading results.
13. Label front of diagnostic kit as shown at beginning of this protocol.

Interpreting Test Strip (also refer to Jellett instructions):

1. When time interval has expired, record current time on shellfish field sheet and observe diagnostic kit.
2. Use the Jellett strip control card with sample strips (included in the Jellett test kit package) to interpret the test results. The T-line becomes fainter as the toxin level increases.
3. Test strip **C-line** is **equal to or fainter** than Invalid test on Control Card: your test is **Invalid**.
4. Test strip **T-line** is **darker** than Positive T-line on control card: test is **Negative**.
5. Test strip **T-line** is **equal to or fainter** than Positive T-line on control card: test is **Positive**.
6. Record results and any observations on the field sheet. Record results on front of strip.
7. Take a digital photo of the Jellett test strip.
8. Place diagnostic kit in Ziploc bag, seal, place in envelope with shellfish field sheet.

Documentation

1. make copies of all field sheets and retain copies; ship originals as described below
2. email a digital photo of all completed test strips to gregg.langlois@cdph.ca.gov

Shipping Samples:

- ◆ Place plankton field sample bottle in a Ziploc bag. Place plankton field sheet and all test strips in another Ziploc bag. Enclose both in a third bag and label "For EMB".
- ◆ Place shellfish field sheet in a Ziploc. Put all bags, the small vial of extract (when requested), and the 500 mL bottle of pureed shellfish in a shipping box with blue ice for shipment to CDPH via Next Business Morning delivery.

Appendix G. Statements of Agreement

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STATEMENT OF AGREEMENT FOR
PUBLIC AGENCIES

The undersigned has read and understands the purpose of the *Conditionally Approved* classification of the commercial shellfish growing areas of Humboldt Bay and the conditions of its Management Plan, dated January 2009, and agrees to comply with the conditions and procedures set forth in the Management Plan

Signature

Name (print or type)

Agency

Date

Mail completed form to:

Environmental Management Branch
California Department of Public Health
850 Marina Bay Parkway, #G165
Richmond, CA 94804

MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

STATEMENT OF AGREEMENT FOR PERMITTED FACILITIES

The undersigned has read and understands the purpose of the *Conditionally Approved* classification of the commercial shellfish growing areas of Humboldt Bay and the conditions of its Management Plan, dated January 2009, and concurs with the emergency notification procedures set forth in this Management Plan.

Signature

Name (print or type)

Agency

Date

Mail completed form to:

Environmental Management Branch
California Department of Public Health
850 Marina Bay Parkway, #G165
Richmond, CA 94804

MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

STATEMENT OF AGREEMENT FOR HARVESTER

The undersigned has read and understands the purpose of the *Conditionally Approved* classification of the commercial shellfish growing areas of Humboldt Bay and the conditions of its Management Plan, dated January 2009, and understands that compliance with the conditions and procedures set forth in the Management Plan is mandatory as a condition of the Shellfish Growing Area Certification issued by the California Department of Public Health.

Signature

Name (print or type)

Company

Date

Mail completed form to:

Environmental Management Branch
California Department of Public Health
850 Marina Bay Parkway, #G165
Richmond, CA 94804

MANAGEMENT PLAN FOR HUMBOLDT BAY, JANUARY 2010

Appendix H. Log of changes to document

TECHNICAL REPORT #	DATE	PAGE	REASON FOR CHANGE
Correspondence	11/25/2002	N/A	Rescinded all seasonal closures
03-06	June 2003	N/A	Humboldt Bay Oyster Company issued an initial Shellfish Growers Certificate.
03-07	June 2003	N/A	A portion of Parcel #2 (NBSC) classified as <i>Conditionally Approved</i> and NBSC issued initial Shellfish harvesters certificate for area
04-01	12/19/2003	26	Added grower requirements to control wildlife defecation in growing areas
04-01	12/19/2003	47	Added "Upsets" Protocol (Appendix C)
04-01	12/19/2003	40, 57	Rainfall closure rules revised for Area A and Area B (Appendix D). Reallocation of rainfall closure Areas A, B and E (Figure 2). Secondary threshold cumulative duration has been revised from 10 days to 7 days
04-01	12/19/2003	66	Added Appendix G
04-01	12/19/2003	31	Added Section XIII: Marine Biotoxin Monitoring
04-01	12/19/2003	38	Added Table 2: Sampling schedule for marine biotoxin monitoring in Humboldt Bay
04-01	12/19/2003	60	Added Appendix F: Marine biotoxin monitoring and control program for commercial shellfish growers.
04-01	1/30/04	26	Added section on notice of live-aboards
04-01	1/30/04	39	Added Table 3: Management decision criteria for Domoic acid
04-01	1/30/04	21	Added section on closures due to natural or man-made disasters
04-01	1/30/04	62	Added Appendix G: Statements of agreement
05-02	2/1/05	31	Updated Marine Biotoxin Monitoring section to include sampling of additional species.
06-02	1/6/2006	30	Added sampling requirements when a scheduled sample date is missed
06-02	1/6/2006	51	Added Appendix B - Notification of Shellstock Movement During a Growing Area Closure
07-02	12/14/2006	19	Clarified conditions and requirements for moving shellstock during rainfall closures
07-02	12/14/2006	23	Clarified notification procedures for reopening after rainfall closures