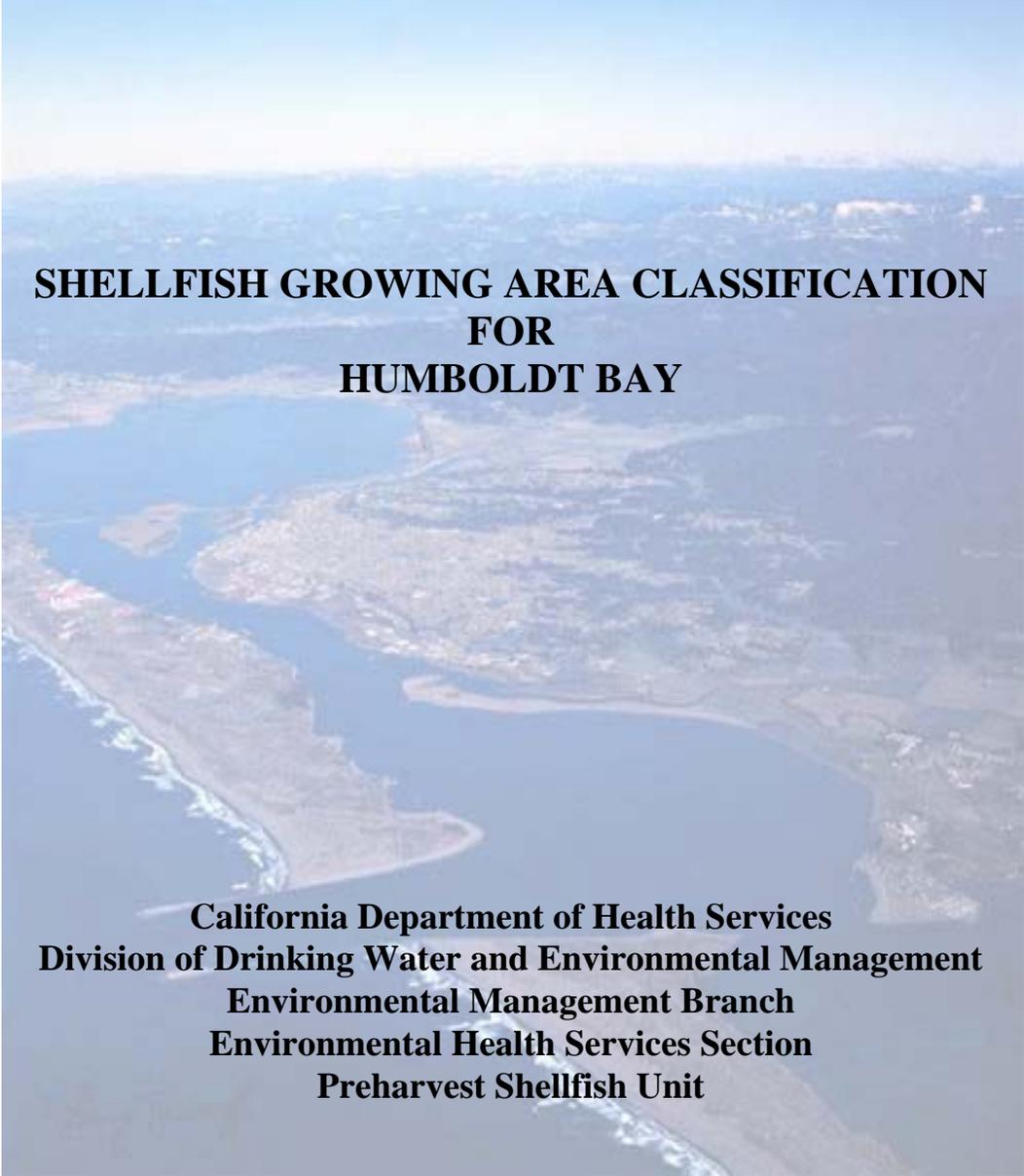


# 2006-2007 ANNUAL SANITARY SURVEY REPORT



**SHELLFISH GROWING AREA CLASSIFICATION  
FOR  
HUMBOLDT BAY**

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

**May 2007**

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

I. TABLE OF CONTENTS

I. TABLE OF CONTENTS..... 2

II. INTRODUCTION..... 3

III. SUMMARY ..... 3

    A. POLLUTION SOURCES..... 3

    B. CLOSURES..... 3

    C. SELF-MONITORING..... 4

    D. PARALYTIC SHELLFISH POISONING (PSP) AND DOMOIC ACID MONITORING. .... 4

    E. PROTOCOL FOR WASTEWATER UPSETS ..... 5

IV. CLASSIFICATION REEVALUATION ..... 6

V. RECOMMENDATIONS..... 6

    A. CLASSIFICATION ..... 6

    B. SELF-MONITORING PROGRAM..... 6

FIGURE 1. ARCATA BAY (NORTH HUMBOLDT BAY), CALIFORNIA, SHELLFISH GROWING AREA CLASSIFICATIONS, RAINFALL CLOSURE DESIGNATIONS, AND CLOSURE ZONES..... 7

TABLE 1. SUMMARY OF FECAL COLIFORM COMPLIANCE MONITORING DATA FROM 6/1/2004 TO 3/8/2007, FOR CERTIFIED SHELLFISH GROWING AREAS IN HUMBOLDT BAY ..... 8

TABLE 2. SEWAGE UPSET THRESHOLD VOLUMES FOR CITY OF EUREKA AND HUMBOLDT COMMUNITY SERVICES DISTRICT WATERWAYS ..... 9

TABLE 3. RAINFALL CLOSURE RULES FOR SHELLFISH GROWING AREAS IN HUMBOLDT BAY, AS SPECIFIED IN THE *MANAGEMENT PLAN FOR COMMERCIAL SHELLFISHING IN HUMBOLDT BAY, CALIFORNIA, JANUARY 2007*..... 10

TABLE 4. SAMPLING DATES FOR SYSTEMATIC RANDOM SAMPLING FOR 2007..... 11

TABLE 5. UPSET THRESHOLDS FOR THE CITY OF ARCATA WATERWAYS (REVISED NOVEMBER 2005)..... 12

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

## II. INTRODUCTION

This report is the Annual Sanitary Survey Update for the commercial shellfish growing areas located within the northern-most area of Humboldt Bay known as Arcata Bay. The annual update report is required pursuant to the National Shellfish Sanitation Program (NSSP) Model Ordinance, Chapter IV (2005). The purposes of this survey are to reevaluate existing pollution sources, evaluate any newly identified actual or potential pollution sources, and to analyze bacteriological sampling results to determine if the current sanitary survey data and the resulting classification are correct. This annual sanitary survey update was based on the data for primary water quality stations monitored monthly under the systematic random sampling (SRS) strategy. In addition, monthly NPDES monitoring reports submitted by the Cities of Arcata and Eureka were evaluated for changes that could impact the shellfish growing areas. This annual update report covers the period from April 2006 through March 2007, and includes water quality sampling data from the preceding 30 months.

All existing certified Humboldt Bay shellfish growing areas are located in the “North Bay”, also known as “Arcata Bay, which is the prominent northern arm of Humboldt Bay. Four commercial shellfish harvesters are certified to commercially harvest shellfish from their leases in Arcata Bay: Aqua Rodeo Farms (ARF), Coast Seafoods Company (CSC), North Bay Shellfish Company (NBSC), and Humboldt Bay Oyster Company (HBOC). On December 11, 2006 HBOC submitted an application for a shellfish growing area certificate to CDHS to harvest from Area C, Parcel #1, North end of Sand Island. This growing area is leased to NBSC and was most recently subleased to Jeff Huffmon of Emerald Coast Seafoods who ceased operating in Arcata Bay in 2006. HBOC was subsequently issued a Growing Area Certificate for this area in December 2006. All shellfish growing areas in Arcata Bay are classified as *Conditionally Approved*. Commercial shellfish production in the Arcata Bay is primarily Pacific oysters (*Crassostrea gigas*). There are 17 primary water quality-monitoring stations that are sampled monthly under the SRS strategy as detailed in the NSSP Model Ordinance, Chapter IV (2005). Mussel samples are submitted weekly by CSC to the California Department of Health Services' (CDHS) Laboratory in Richmond for paralytic shellfish poisoning (PSP) toxin assay.

## III. SUMMARY

### A. POLLUTION SOURCES

CDHS conducted site visits during the past year to actual and potential pollution sources within the Humboldt Bay watershed and each was evaluated for its impact on water quality in Humboldt Bay. No significant changes have occurred in actual or potential pollution sources, or in hydrographic and meteorological characteristics, for the shellfish growing areas in Arcata Bay.

### B. CLOSURES

NBSC and ARF complied with all closures established during 2006 – 2007.

In August 2006, CDHS reviewed two months of HBOCs' harvest records. Based on the

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

review, CDHS officially notified HBOC on September 8, 2006 of four occasions that shellfish were commercially harvested from a growing area that was closed to harvesting due to rainfall. Subsequent to the notification CDHS met with HBOC to discuss the circumstances surrounding the harvest dates during the closures. HBOC explained that the harvest records submitted to CDHS for review were reconstructed from product sales logs because the original harvest log was lost. The dates of the product sales did not reflect the actual dates of harvest for the four occasions in question. Despite the failure by HBOC to maintain the original harvest log they are highly confident that oysters were only harvested under “open” conditions. HBOC developed a corrective action plan outlying procedural changes targeted to comply with the terms and conditions stated in the Management Plan to ensure harvesting occurs only during “open” harvest conditions. Since notified of the harvest violations, HBOC has submitted monthly harvest records to CDHS for review, fulfilled all of the requirements requested by CDHS in the September 8, 2006 notification letter and has been in compliance with the rainfall closures.

In August 2006, CDHS Reviewed two months of CSCs’ harvest records. Based on the records review, CDHS officially notified CSC on October 18, 2006 of three occasions that shellfish were removed from a growing area that was closed due to rainfall without obtaining approval from CDHS. Subsequent to the notification; CDHS met with CSC to review the procedures developed to track product movement during closures. CSC has initiated submission of a written requests to CDHS prior to removal of shellstock from closed growing areas for sorting and culling as required under the conditions of the Management Plan.

### C. SELF-MONITORING

Each certified grower was in compliance with the conditions of their respective self-monitoring program for monthly water quality sampling. Sewage spills, rainfall closures and laboratory requests accounted for months when samples were collected on dates other than the predetermined days of the month established in the sampling plan. There are currently 17 primary water quality-monitoring stations that are sampled monthly under the systematic random sampling (SRS) strategy as specified in the NSSP Model Ordinance, Chapter IV (2005). Sampling results from the 17 primary sample sites are summarized in Table 1. The monthly SRS samples for the last 30 sampling events were used to calculate the geometric mean and the 90<sup>th</sup> percentile.

### D. PARALYTIC SHELLFISH POISONING (PSP) AND DOMOIC ACID MONITORING.

CSC submitted weekly mussel samples to the DHS Microbial Diseases Laboratory for paralytic shellfish poisoning (PSP) toxin assay.

CSC was in compliance with the required weekly submittal of shellfish samples for PSP toxin assay. The remaining growers are only required to submit samples upon request. CSC has been especially helpful in collecting plankton samples and additional mussel samples from the U. S. Coast Guard Station dock near the mouth of Humboldt Bay. These additional samples assisted CDHS’ efforts to provide early detection of potential toxic algal blooms that could lead to elevated levels of biotoxins that would impact the growing areas in Arcata Bay.

## E. PROTOCOL FOR WASTEWATER 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. Determination of the threshold volumes of sewage that would necessitate the closing of the shellfish growing areas was based on an initial fecal coliform concentration in raw sewage of  $1 \times 10^8$  MPN/100 mL.

To determine the actual FC concentration in the influent sewage, in 2003 the City of Arcata began taking influent samples at 6 locations within the Arcata sewage collection system. Evaluation of the first year of data indicated that the maximum FC concentration detected was  $1 \times 10^7$  MPN. The threshold volumes were recalculated based on this estimate, resulting in a ten-fold increase in the threshold volumes for the Arcata tributaries. In July 2005, the Humboldt County Public Health Laboratory notified the City of Arcata and CDHS that the reported sewage sample results prior to June 1, 2005 were incorrect due to a dilution calculation error, which resulted in the reported results being 10% lower. In November 2005, CDHS issued a revised threshold table for Arcata, revising the threshold volumes back to their original levels.

In late 2005 CDHS worked with water quality engineers with the technical support unit of FDA to conduct a more thorough analyses of the influent FC data. The graphical analysis they performed indicated that there is sample site-specific variability in the data set and that it would be inappropriate to treat the entire data set as deriving from the same population. There appeared to be three different concentrations of sewage.

Independent of the graphical analyses performed by FDA, CDHS statistically analyzed the influent FC data. The results of the statistical analysis performed supports the FDA conclusion that there is significant variability among the six influent sampling station that preclude combining the data for analysis and determination of a single measure (e.g. a geometric mean) for FC concentration in influent sewage. The sample sites (A,B,C,D,E and F) were statistically divided into three groups based on similarities that allowed for the application of different maximum FC concentrations for determination of sewage upset thresholds for each group. The FC concentration of the three data groupings are as follows:

Sample points A, D and F =  $3.8 \times 10^7$  MPN/100 mL  
Sample points C and B =  $8.0 \times 10^6$  MPN/100 mL  
Sample point E =  $9.0 \times 10^7$  MPN/100 mL

The threshold volumes in table 5 are based on the preceding FC concentrations. These revised thresholds were implemented in November 2005 and are included in the *Management Plan For Commercial Shellfishing In Humboldt Bay, California, December 2006*. The City of Arcata has stopped taking influent samples into their waste water treatment system. The sewage upset threshold volumes for the City of Eureka and Humboldt Community

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

Services District Waterways remains unchanged (Table 2).

#### IV. CLASSIFICATION REEVALUATION

The fecal coliform standard for a *Conditionally Approved* area include a 90th percentile not to exceed 43 MPN and a geometric mean not to exceed 14 MPN. The past 30 samples for each primary water quality station in Humboldt Bay collected during open harvest periods under the Systematic Random Sampling System continue to meet NSSP standards for classification as *Conditionally Approved* classification (Table 1).

A *Conditionally Approved* area is one that 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 due to water quality impacts and is closed to harvesting. Direct marketing means the sale of shellfish harvested without undergoing 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 for the declaration of harvest closures when the growing areas do not meet the *Approved* area standards. The current fecal coliform sampling results support the rainfall closure rules established in the Management Plan for Commercial Shellfishing in Humboldt Bay, California, December 2006 (Table 5).

#### V. RECOMMENDATIONS

##### A. CLASSIFICATION

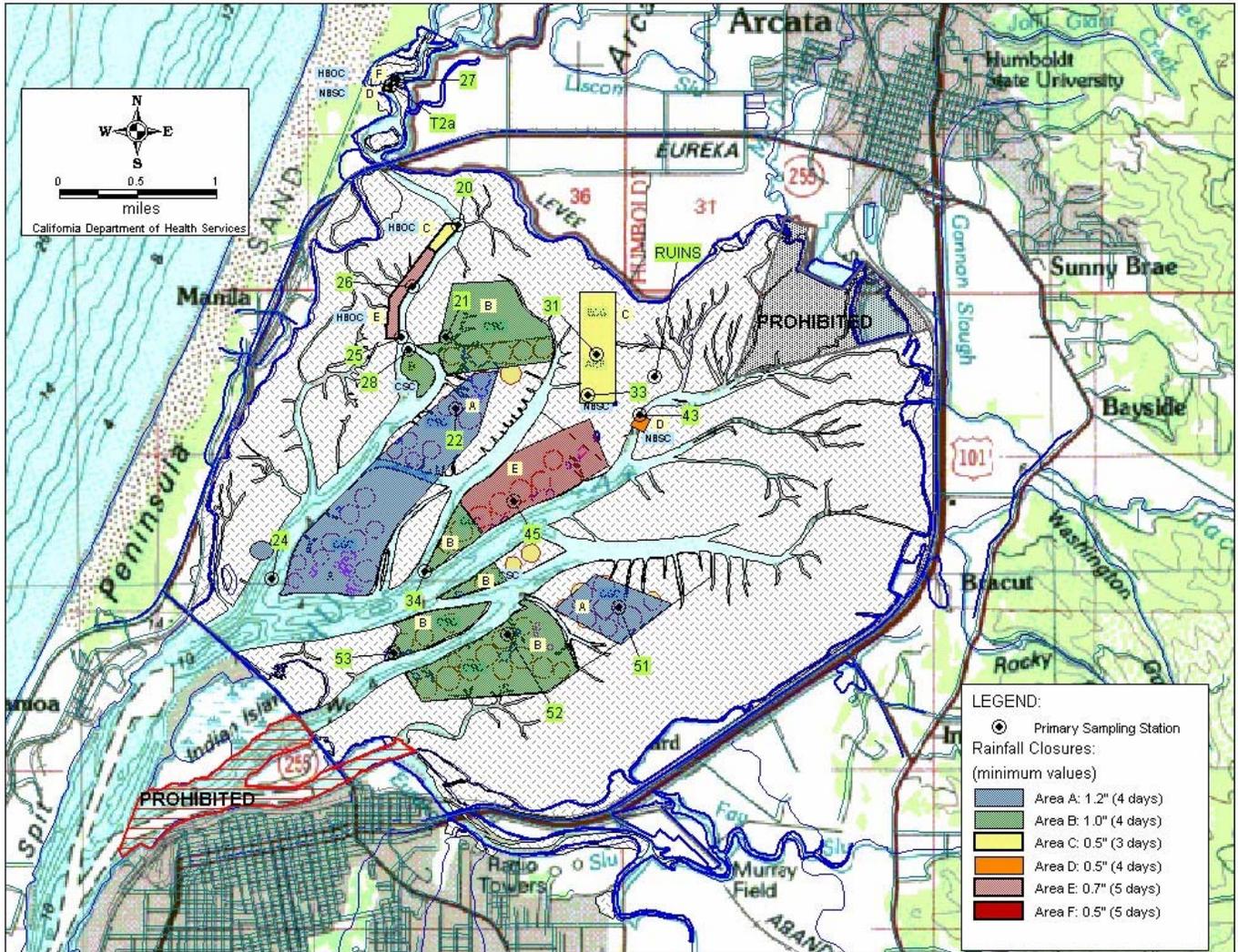
Continue with the *Conditionally Approved* classification of the certified shellfish growing areas as specified in the *Management Plan for Commercial Shellfishing in Humboldt Bay, California, December 2006*.

##### B. SELF-MONITORING PROGRAM

Continue with the self-monitoring program for water quality with oversight and guidance by the CDHS Preharvest Shellfish Unit (PSU). Table 4 indicates the sampling dates for sampling at the primary sites in 2007 and the first two months of 2008. If an area is in a “Closed” status or if the conditions are unsafe for sampling, then the sampling date shall be the earliest possible date that the area is in an “Open” status, or that the conditions are safe for sampling.

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
 HUMBOLDT BAY, CALIFORNIA

Figure 1. Arcata Bay (North Humboldt Bay), California, shellfish growing area classifications, rainfall closure designations, and closure zones.



2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

Table 1. Summary of fecal coliform compliance monitoring data from 6/1/2004 to 3/8/2007, for certified shellfish growing areas in Humboldt Bay.

Company	Growing Area	Sample Station	Number of Samples	Geometric Mean <sup>1</sup>	90 <sup>th</sup> Percentile <sup>2</sup>
Coast Seafood Company	A	22	30	2.73	8.03
	A	24	30	2.91	7.75
	A	51	30	3.04	9.33
	B	21	30	3.08	7.75
	B	28	30	3.47	9.63
	B	34	30	4.27	20.82
	B	52	30	3.54	10.36
	B	53	30	4.06	14.22
	E	45	30	3.62	13.07
Aqua Rodeo Farms; Humboldt Bay Oyster Co.	C	31	30	3.10	8.61
North Bay Shellfish Company	C	33	30	3.66	14.41
North Bay Shellfish Company	D	43	30	4.79	20.48
North Bay Shellfish Company	D	T2a	30	4.58	14.30
Humboldt Bay Oyster Company	C	20	30	2.63	4.44
Humboldt Bay Oyster Company	E	25	30	3.17	7.60
Humboldt Bay Oyster Company	E	26	30	2.81	6.84
Humboldt Bay Oyster Company	F	27	30	4.78	16.89

Notes:

1. The geometric mean is the antilog of the mean of the logs of the sample fecal coliform (FC) MPN values. This value cannot exceed 14/100 ml for shellfish growing waters within the *Approved* classification.
2. The 90<sup>th</sup> percentile is the antilog of the mean of the logs of the FC values summed with the product of the FC standard deviation multiplied by 1.28. This value cannot exceed 43 for shellfish growing waters within the *Approved* or *Conditionally Approved* classification.

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

Table 2. Sewage Upset Threshold Volumes for City of Eureka and Humboldt Community Services District Waterways

<b>Tributary</b>	<b>Threshold Volume (Gallons)</b>	<b>Effected Growing Areas</b>	<b>Sampling Sites</b>
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

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

Table 3. Rainfall closure rules for shellfish growing areas in Humboldt Bay, as specified in the *Management Plan for Commercial Shellfishing in Humboldt Bay, California, January 2007*.

Growing Area	Grower and 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 North bay 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

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

Table 4. Sampling Dates for Systematic Random Sampling for 2007

Water quality sampling shall occur at the primary sites in Humboldt Bay on the first Tuesday of *each month* in accordance with the following schedule:

Sampling Dates:

January 2, 2007  
February 6, 2007  
March 6, 2007  
April 3, 2007  
May 1, 2007  
June 5, 2007  
July 10, 2007  
August 7, 2007  
September 4, 2007  
October 2, 2007  
November 6, 2007  
December 4, 2007  
January 2, 2008  
February 5, 2008

2006 – 2007 ANNUAL SANITARY SURVEY UPDATE REPORT  
HUMBOLDT BAY, CALIFORNIA

Table 5. Upset thresholds for the City of Arcata waterways (revised November 2005).

<b>Tributary</b>	<b>Threshold Volume (Gallons)</b>	<b>Sampling Sites</b>
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