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USE ATTAINABILITY ANALYSIS
FOR
WATSONVILLE SLOUGHS
Including Harkins, Galligan, Hanson and Struve Sloughs
IN
SANTA CRUZ COUNTY, CALIFORNIA

Central Coast Water Board
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Table of Contents

Table of Figures

Appendix

1. Introduction

Section 303(c) of the Clean Water Act (CWA) requires each State to develop water quality standards that protect the chemical, physical, and biological integrity of the State's waterbodies. Water quality standards under the Clean Water Act consist of three elements: Use Classification, Water Quality Criteria, and Anti-degradation Policy (CWA § 303(c)(2); 40 C.F.R §§ 130.3, 131.6, 131.10, 131.11). Use Classification, termed "beneficial uses" under California law, are "uses specified in water quality standards for each water body or segment whether or not they are being attained." (40 C.F.R § 131.3(f)). Beneficial uses must be consistent with the goal of CWA section 101(a)(2)[1], which is to provide for "the protection and propagation of fish, shellfish, and wildlife and ... recreation in and on the water" (the so-called "fishable/swimmable" uses), unless the state demonstrates that those uses are not attainable. Beneficial uses must also consider the use and value of water for public water supplies, agriculture and industry, and the water quality standards of downstream waters (40 C.F.R. § 131.10).

Beneficial uses for surface waters in the Central Coast Region of California are designated in The Water Quality Control Plan (Basin Plan) for the Central Coast Water Board. The Basin Plan lists the beneficial uses for approximately 1,000 water bodies under the Water Board's jurisdiction.

Watsonville Slough is located within the County of Santa Cruz. Beneficial uses for this waterbody include: Contact and Non-contact Recreation (REC-1 and REC-2), Wildlife Habitat (WILD), Warm Fresh Water Habitat (WARM), Spawning, Reproduction, and/or Early Development (SPWN), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Commercial and Sport Fishing (COMM), and Shellfish Harvesting (SHELL).

Harkins, Gallighan, Hanson and Struve Slough all have the same beneficial uses as Watsonville Slough, with the exception of Gallighan Slough, which does not have the beneficial use of BIOL. Since Harkins, Gallighan, Hanson, and Struve Sloughs are all tributary to Watsonville Slough, we will refer to them collectively as the Watsonville Sloughs in this report, unless specifically noted otherwise.

Recently, while reviewing bacteria water quality objectives related to Total Maximum Daily Loads (TMDLs), Water Board staff questioned the validity of assigning the SHELL beneficial use to the sloughs where it is highly unlikely that any shellfish are living. When the sloughs were designated as such, staff did not conduct a thorough examination to determine if the SHELL beneficial use was, in fact, appropriate. The definition of this beneficial use, which appears in the Basin Plan, is:

> **Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial or sport purposes. This includes waters that have in the past, or, may in the future contain significant shellfisheries.**

Beneficial uses attained on or after November 28, 1975 are "existing uses" and indicate that there is evidence that the use is occurring or that water quality is sufficient to allow the use to occur. A beneficial use that is determined to be "existing" may not be removed. To remove "fishable/swimmable" uses, the State must conduct a use attainability analysis (UAA), demonstrating that at least one of the conditions listed in 40 CFR 131.10(g) is met (U.S. EPA Water Quality Standards Handbook, pp. [2-6]-[2-8].)

[1] Hereto referred to as the fishable/swimmable use.

Staff have prepared this UAA to provide an assessment of the beneficial use of shellfish harvesting for Watsonville Sloughs. This UAA will serve as the basis for amending the Basin Plan to remove the beneficial use of shellfish harvesting for these waterbodies.

2. Description of Watersheds and Waterbodies

Watsonville Slough is located in the southern portion of Santa Cruz County, California and is the receiving water for approximately 13,000 acres of land under a variety of land uses. Three tributaries flow into Watsonville Slough, including Harkins Slough, Hanson Slough, and Struve Slough. Gallighan Slough is tributary to Harkins Slough (see Figure 1).

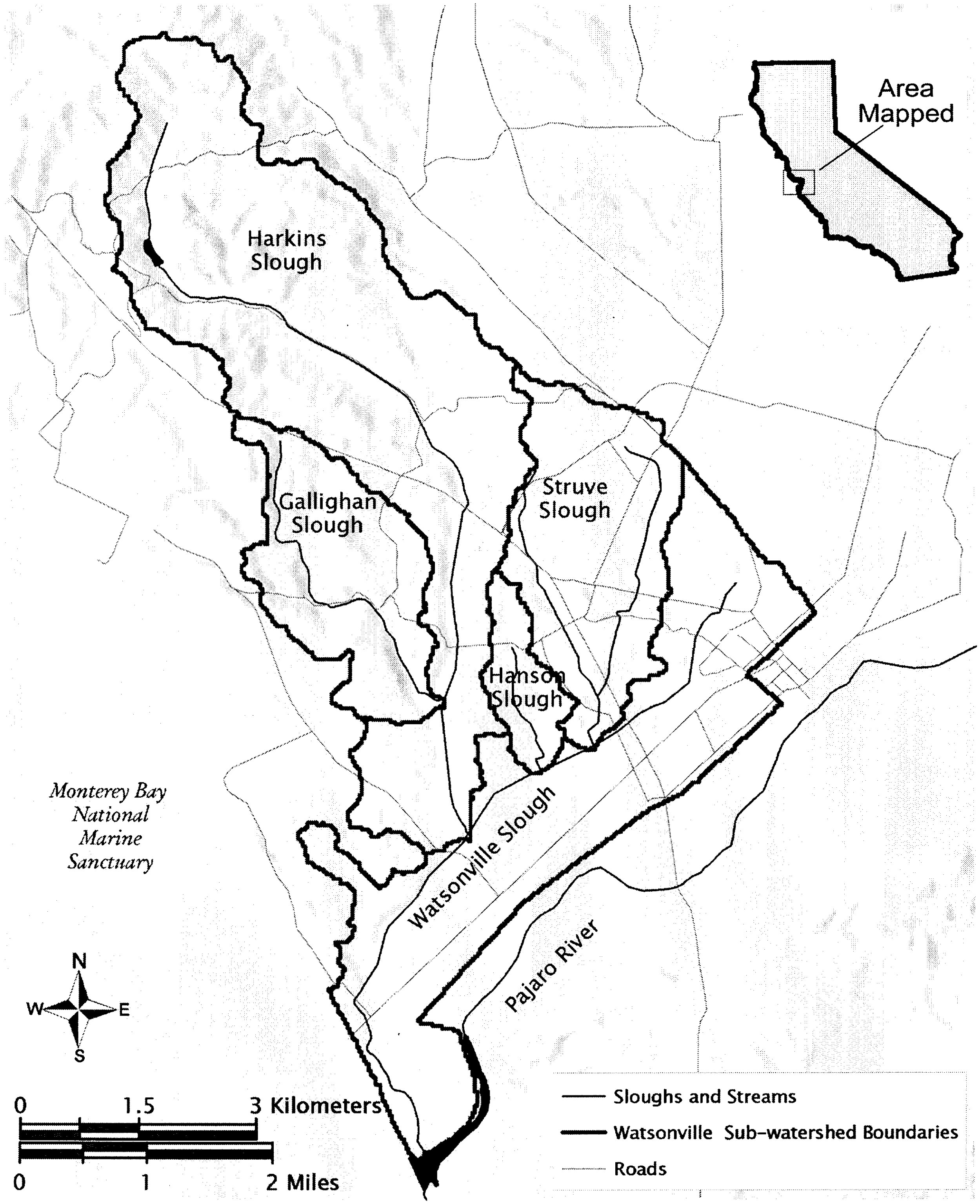


Figure 1: Subwatersheds of the Watsonville Sloughs
Source: Hager, et al., 2004.

Hydraulic modifications to the sloughs are extensive. The Shell Road Pump Station and tide gate, installed in the early 1940s in close proximity to the mouth of Watsonville Slough, permitted cultivation of the fertile lands nearby and eliminated tidal flushing, creating stagnant conditions upstream of the pump station (SH&G et al., 2003, Table 3-3). The lower lagoon portion of the Slough below the pump station is still subject to tidal influence throughout most of the year, while aquatic habitats upstream of the Shell Road tide gate and pump are freshwater (Ibid., p. 3-51).

Seasonal closure of the Pajaro River Lagoon at the mouth of the Pajaro River occurs usually in late summer as flows diminish, and also during early winter periods when storms promote the formation of sandbars that prevent river flow to the ocean at Monterey Bay. The closure ends when winter storms generate enough rainfall runoff to breach the beach berm and sandbars and flow to Monterey Bay. During closure Watsonville Slough Lagoon, which enters the Pajaro Lagoon from the north, is closed to tidal circulation.

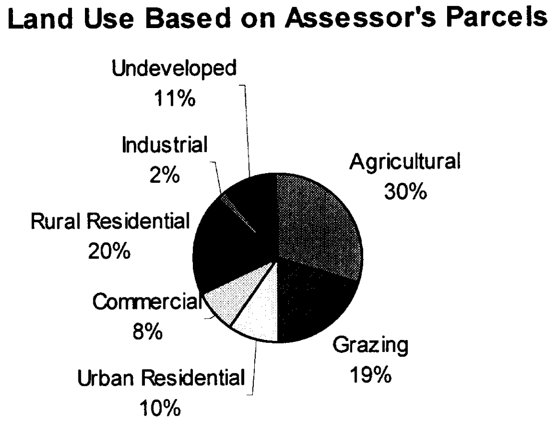
2.1 Land Use

Figure 2 illustrates the distribution of land use, based on county Assessor's parcel data, and land cover, based on interpreted satellite imagery. The watersheds are predominantly under agriculture and rural land uses. The following description is an excellent overview:

"California State Highway 1 roughly divides the watershed into eastern and western halves and is a major demarcation of land use. To the west, land is generally agricultural with isolated areas of industrial uses (Lee Road) and municipal landfills (Buena Vista Road). To the east, the Sloughs are generally surrounded by urban uses, denser and industrial in the south (City of Watsonville) and rural to the north (Larkin Valley). Land coverage in most areas includes marsh and riparian cover on the valley floors, and agricultural, urban, industrial and rural residential uses or undeveloped land on the hillsides. Land use encroaches into the valley floor wetlands to varying degrees leaving some areas wild and natural and others paved or completely clear of native vegetation. Channelization, diversion, filling of wetlands, damming and placement of culverts, pumps and tide gates have modified all of the streams and wetlands in the watershed from their natural state.

"Several County and City of Watsonville roads provide access and form important landmark crossings over the Sloughs. Harkins Slough Road crosses Watsonville, Struve, West Branch Struve, Hanson and Harkins Sloughs in the mid-area of the watershed. Main Street in the City of Watsonville, which is also State Highway 152, crosses Struve and Watsonville Sloughs. Beach Road occurs on the Pajaro River floodplain and connects downtown Watsonville to Sunset State Beach and the Pajaro Dunes development. Lee Road is a north-south road paralleling Highway 1, crosses Struve Slough, and connects Beach Road to Harkins Slough Road. Buena Vista Road connects the mouth of Larkin Valley to Highway 1, bisects the Gallighan Slough watershed and provides access to the municipal landfill sites before terminating at San Andreas Road at the western edge of the watershed. San Andreas Road connects Pajaro Valley and Beach Road to the terraces that bound the western edges of the lower Harkins and Gallighan Slough watersheds. Larkin Valley Road follows the path of upper Harkins Slough to the northern end of the watershed.

"The Union Pacific Railroad crosses the lower watershed from the southeast corner at Beach Road in Watsonville to the junction of San Andreas and Buena Vista Roads at the western edge of the Galligan Slough watershed. The railroad grade is mostly on fill with bridge and culvert crossings over Watsonville, Harkins and Galligan Sloughs." (SH&G, et al., 2003, pp. 2-1, 2-4, 2-5).



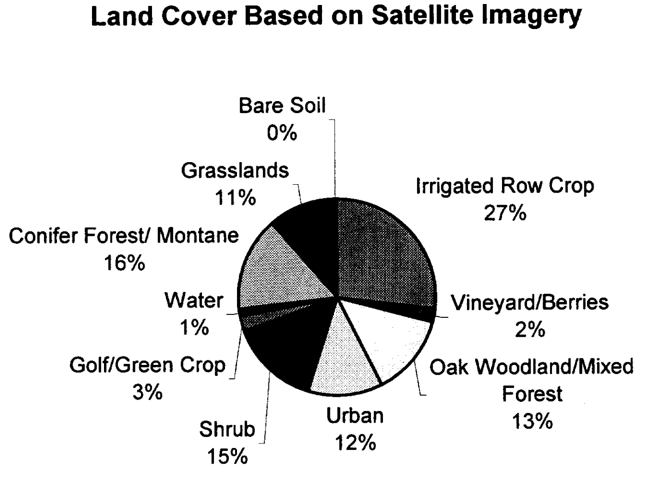


Figure 2. Land use and land cover by percentage of total area in Watsonville Sloughs.

Source: Land use from SH&G, et al., 2003; land cover from Hager et al., 2004.

2.2 Climate

The climate of the Watsonville Sloughs is described as Mediterranean with the moderating influence of the ocean and limited, but variable rainfall. Most of the average annual rainfall of 22.6 inches falls between December and February. SH&G, et al., report that, "year-to-year variability in rainfall is substantial, ranging between only 10.66 inches in calendar year 1976 to 48.35 in 1983. Extended periods of both drought (1976-77 and 1987-1993) and wet weather (1995-98) have occurred recently and the differences in rainfall are dramatic; for example 29.93 inches fell during the three winter months of water year 1998 (Dec., Jan., Feb.) while only 1.55 inches fell in the same months of water year 1976. The maximum daily rainfall recorded was 5.93 inches on February 14, 2000." (2003, p. 2-6).

2.3 Hydrology

Watsonville Slough is the remnant of a once more-extensive wetland and estuarine complex. The system has been historically modified to meet the needs of adjacent land uses such as agriculture and urban development. Many areas of the slough system have been channelized and filled to drain surface water. Two pump stations were also installed to enable the farming of the often-inundated lowlands and to manage flooding. The two pump stations are located at Shell Road and at the confluence of Harkins Slough. The Harkins Slough pump station is currently operated by the Pajaro Valley Water Management Agency and serves as a diversion project to deal with seawater intrusion. Additionally, there has been a history of land subsidence, which may have resulted from shallow groundwater pumping and the decomposition of an underlying peat. This subsidence, in addition to road crossings with inadequately sized culverts has led to impoundments of water in these areas and reduced water circulation throughout the slough system (Hager, et al., 2004, p. 2).

In the early 1940's, the Shell Road Pump Station and tide gates were constructed, as well as the levee that lines the left bank of Watsonville Slough from the Pajaro River to about the mid point between Shell Road and San Andreas Road; a casualty of these structures was a prominent tributary slough and extensive wetlands system present as late as 1931, as evidenced by aerial photographs from that time (SH&G, et al., pp. 2-15).

The hydraulic control structures on waterways affect water circulation and seasonal lake formation. Some structures act as fill dams across the waterways and exacerbate the winter inundation conditions. Harkins Slough Road crossings over Watsonville, Struve, and Harkins Sloughs are good examples of inundation, which persists due in part to these circulation-limiting structures. The Shell Road Pumps by design restrict tidal saltwater inflow to Middle Watsonville Slough and thus prevent circulation to the waterways above the control. Lower Harkins Slough is seasonally lowered by pumping near its confluence with Watsonville Slough to accommodate farmland drainage for planting of spring crops (SH&G, et al. pp. 3-12).

Closure of the Pajaro River Lagoon occurs annually and prevents tidal circulation into Watsonville Slough. Lagoon closure is due to the orientation of the lagoon and increased sediment transport by ocean currents during the first storms of the season. The sand bar that forms at the Lagoon outfall prevents the Pajaro River from emptying to the ocean and excess water is then backed up into Watsonville Sloughs (Hager, et al, 2004, p. 63).

The combined effect of these hydrologic modifications is to prolong periods of freshwater inundation and limit circulation of brackish and saline waters.

3. Methodology

A use attainability analysis (UAA) is a structured scientific assessment of the physical, chemical, biological, and economic factors affecting the attainment of a designated use (40 CFR 131.3). The purpose of a UAA is to provide information upon which to base the decision on whether a designated use is attainable or not.

Staff used the following methodology for this UAA: Staff analyzed existing water quality data, conducted reconnaissance work in the area, contacted persons with knowledge of the area and performed a literature review on the lifecycle and habitat requirements of shellfish. These methods allowed staff to compare information gathered to the six factors that may provide a legal basis for changing or removing a designated use (40 CFR 131.10(g)). These factors are:

1. Naturally occurring pollutant concentrations prevent the attainment of the use.

2. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met.

3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.

4. Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.

5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unless these conditions may be compensated, unrelated to water quality preclude attainment of aquatic life protection uses.

6. Controls more stringent than those required by Sections 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

To remove a designated use that is not an existing use, it must be demonstrated that attaining the designated use is not feasible because of one or more of the six conditions listed above. If a state wishes to remove any fishable/swimmable uses, it must perform a UAA (40 CFR. § 131.10(j)). Prior to removing a use, the state also must provide notice and an opportunity for a public hearing (40 CFR § 131.10(e)).

The determination of whether or not a use is "existing" must include an evaluation of both the actual occurrence of the use activity (e.g., has shellfish harvesting occurred?) and whether or not the level of water quality necessary to support the use has been achieved at any time since November 28, 1975. If the level of water quality necessary to support a use has been achieved within that time period, the use is considered "existing" and must be protected, regardless of whether or not the use activity has actually occurred.

Figure 3 shows the generalized methodology used in this UAA process. This methodology was taken from the Draft Impaired Waters Guidance (SWRCB, 2004) for completing a UAA. Explicit in these analyses is a determination of specific waterbody attributes that are either conducive to attaining or preventing a given use. These attributes are evaluated to determine if certain modifications or controls would allow the use to be attainable and, if so, the feasibility or reasonableness of those options.

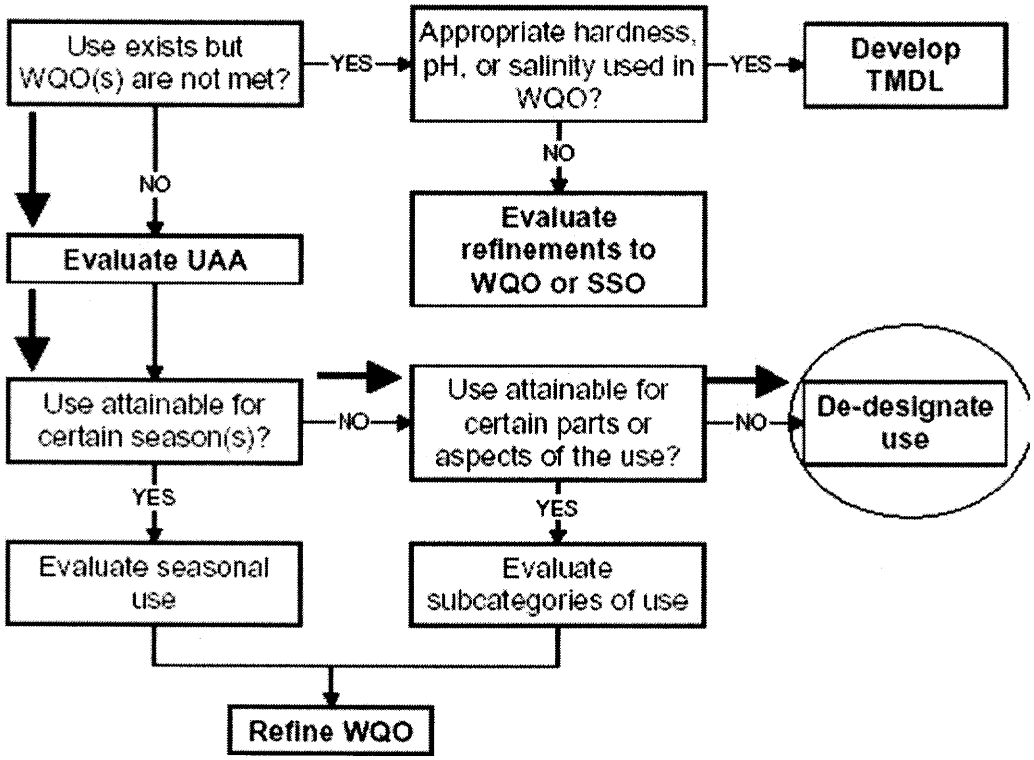


Figure 3: Summary of steps evaluated for determining to de-designate the SHELL beneficial use.

3.1 Methodology Steps

Step 1: Is the designated use being attained?

A beneficial use that is currently being attained, or that has been attained anytime on or after November 28, 1975 (the date on which the Federal Water Quality regulations took effect), is defined as an "existing use." A beneficial use that is defined as an existing use is evidence that the use is occurring or that water quality is sufficient to allow the use to occur. An existing designated use may not be removed.

Staff researched reports, performed literature reviews and contacted knowledgeable individuals in order to ascertain if the use is being attained.

Step 2: Is water quality sufficient to attain the beneficial use?

Though a state may be unable to demonstrate a beneficial use exists, this does not preclude a waterbody from being in attainment. For example, a waterbody that is not being used as a drinking water supply source may be of sufficient quality and quantity to be a future source of drinking water. In this case, the beneficial use is being attained (although it is not being used) and that beneficial use may not be removed from the waterbody.

Therefore, for the SHELL beneficial use, we evaluated the concentration of bacteria present from 1975 to present (in the case of Watsonville Sloughs, we evaluated data as far back as we had access). Additionally, Water Board staff tried to determine if the hydrology, salinity and temperature of the water, along with the substrate of the waterbody, would allow shellfish to live in these environments.

Step 2a: Can the condition be compensated for with effluent discharges without violating water conservation requirements?
If the condition can be compensated for with effluent discharges without violating water conservation requirements, the use may not be removed.

Step 3: What factors preclude the attainment of the beneficial use?
This step determined what factors preclude the attainment of the beneficial use.

Step 4: Is restoration feasible?
In this step we evaluated if there was any practical way to be able to restore the beneficial use of shellfish harvesting.

4. Data Collection and Evaluation

4.1 Discussion of bacterial water quality objectives to protect the beneficial use of shellfish harvesting

The Central Coast Water Board Basin Plan's numeric water quality objective for bacteria for the SHELL beneficial use reads as follows:

> *At all areas where shellfish may be harvested for human consumption, the median total coliform concentration throughout the water column for any 30-day period shall not exceed 70/100 mL, nor shall more than 10% of the samples collected during any 30-day period exceed 230/100 mL for a five-tube decimal dilution test or 330/100 mL when a three-tube decimal dilution test is used.*

The California Department of Health Service standards for fecal coliform are as follows[2]:

> i. The total coliform median or geometric mean MPN of the water does not exceed 70 per 100 mL and not more than 10 percent of the samples exceed a MPN of 230 per 100 mL for a five-tube decimal dilution test.
>
> ii. The fecal coliform median or geometric mean MPN of the water does not exceed 14 per 100 mL and not more than 10 percent of the samples exceed a MPN of 43 for a five-tube decimal dilution test.

In California, the fecal coliform standard that California Department of Health Service (DHS) uses is most often used to classify shellfish growing areas.

Staff chose to use DHS standards for fecal coliform concentrations for the beneficial use of shellfish harvesting for the purposes of this UAA because they are the most conservative and are the most protective of the beneficial use of shellfish harvesting. The Basin Plan's total coliform standards will not be used because, 1) fecal coliform standards are more stringent and therefore more protective of water quality, 2) total coliform standards in the Basin Plan are not currently used to manage the shellfish growing areas in other areas of California by DHS, and, 3) the majority of data we have from the County

[2] These numbers are derived from the United States Department of Health and Human Services Food and Drug Administration (FDA), which operates a specific regulatory program directed at shellfish known as the National Shellfish Sanitation Program (1990). If these standards are not attained, the growing areas will be shut down on either a conditional or restricted basis.

of Santa Cruz is fecal coliform numbers as opposed to total coliform. DHS uses fecal coliform standards to determine whether or not a growing area should be open or closed, therefore, monitoring for fecal coliform would be more protective of the beneficial use of shellfish harvesting, since that is the numeric objective that determines whether the public may consume the shellfish, commercially or recreationally.

4.2 Water Quality Data

The County of Santa Cruz has been collecting bacterial water quality data in Watsonville Sloughs since 1976 (although the County has not consistently sampled each year). From June 16, 1976 to December 9, 2003, the Watsonville Sloughs have never achieved the DHS standard of 14 MPN fecal coliform (please see Appendix 1 for Water Quality Data). Please see Figure 4 for a map of locations for the most recent sampling campaigns conducted in 2003 for development of the Total Maximum Daily Load for Pathogens. County sampling locations were represented in the locations selected for the 2003 campaigns.

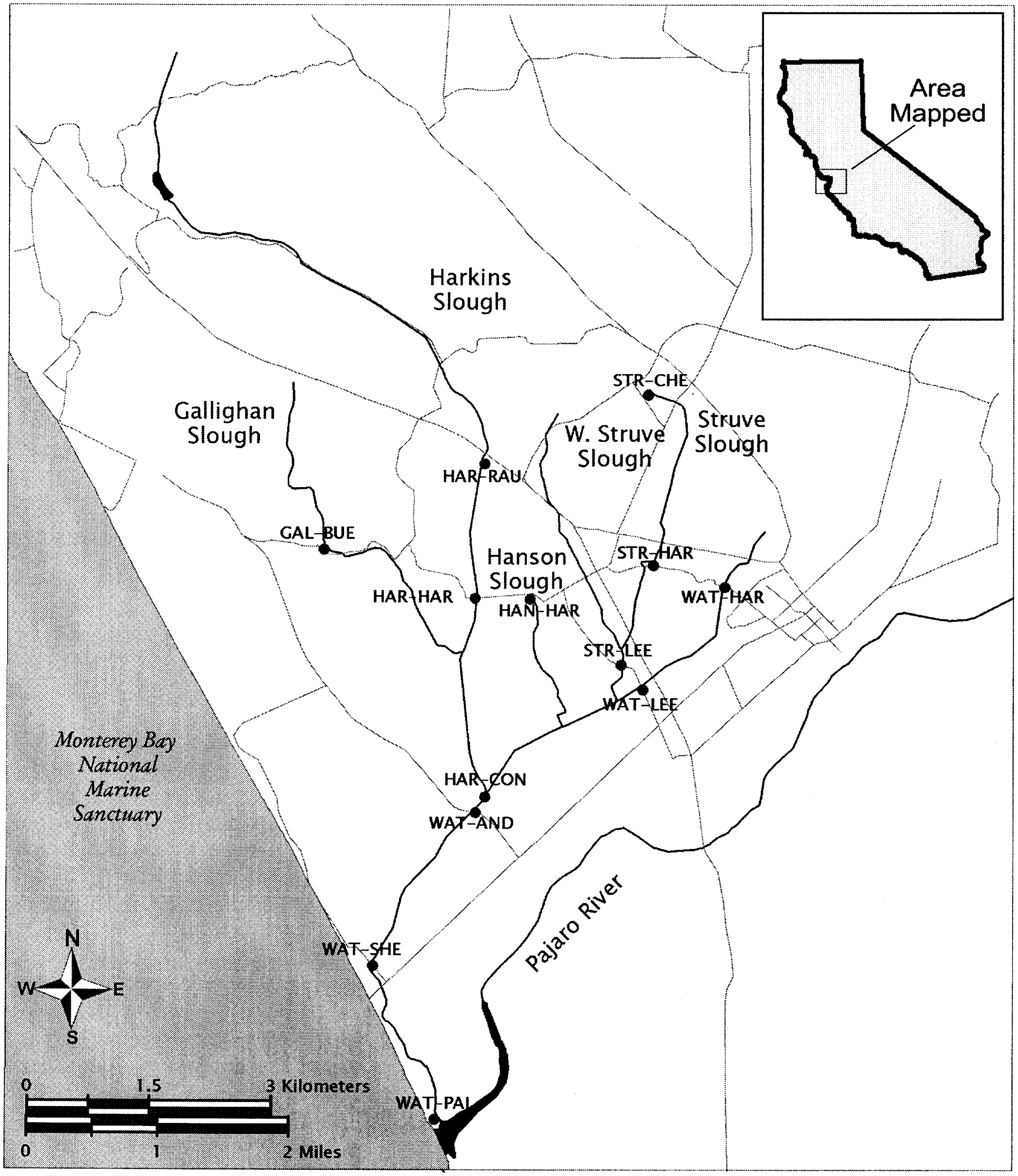


Figure 4: Location of sampling stations for Hager, et al., (2003) field sampling. Source: Hager, et al., 2004, Figure 5.1.

4.3 Site visit

Water Board staff visited the Watsonville Slough sites during reconnaissance and sampling campaigns conducted between February 2003 and July 2003, and in June 2005. Staff and contractors working under staff direction observed no shellfish during these site visits.

4.4 Information from other agencies

Staff contacted several other agencies to gather information on the potential activity of shellfish harvesting in Watsonville Sloughs. The following is what we discovered:

4.4.1 California Department of Health Services

Discussions with the California Department of Health Services (DHS) (pers. comm. A. Commandatore, 2/3/05) indicate that there have not been any commercial shellfish leases in the area. The closest historic commercial shellfishing lease was in Elkhorn Slough, located approximately five miles south. During historic shellfish operations, seed shellfish were used. In other words, Elkhorn Slough was not harvesting native shellfish for commercial sale.

DHS does not conduct bacterial sampling for recreationally collected shellfish and therefore does not have data on if/where shellfish are collected in either of these waterbodies.

4.4.2 California Department of Fish and Game

Larry Espinosa of California Department of Fish and Game stated (pers. comm. 2/1/05) that he did not believe there would be any mussels in the Slough because of the muddy bottom and lack of rocky substrate. However, he believes clams may be present. To the best of his knowledge, no one had conducted studies or surveys to support his opinion that clams might be present. Additionally, he personally has not seen clams in Watsonville Sloughs. He hypothesized that Little Necks and Washingtons might be present and perhaps there are others species of clams as well.

He also made it very clear that even if there are no shellfish in the area, he thinks there is a potential for this use to exist. He would not be supportive of a Central Coast Water Board action to remove the beneficial use of shellfish harvesting from Watsonville Slough.

4.4.3 John Oliver, Ph.D. – Moss Landing Marine Laboratories

According to John Oliver (personal communication. 2/16/05), the presence of shellfish in Watsonville Sloughs is highly unlikely. Although he did not conduct specific studies looking for these types of organisms, based on his fieldwork in the area, he does not recall seeing any shellfish nor does he think the hydrology of the area would be conducive to supporting any viable population of shellfish. This is because the highly disturbed substrate [in Watsonville Slough] is not appropriate for clams. Additionally, a strong freshwater influence would prohibit shellfish from being present. He added that he has never encountered clams at the mouth of the Slough.

Dr. Oliver indicated that the only shellfish possibly present in the marine or brackish influenced areas of the Slough (this being the portion of Watsonville Slough downstream of Shell Road) would be the Bay mussel, but he indicated this is highly unlikely as this area gets too much freshwater for the mussels to survive. If there were mussels, the one place they might be is on the rock rip-rap placed near the mouth of the Watsonville Slough as it enters the Pajaro River Lagoon. Water Board staff surveyed this area for the presence of clams in June 2005 and found no mussels or other attached shellfish.

4.4.4 Julie Hagar – Cal State University, Monterey Bay Watershed Institute

The Water Board commissioned Watershed Institute researchers Fred Watson and Julie Hagar to conduct research to characterize pathogen and sediment impairment in the Watsonville Slough Watershed throughout 2003. Julie Hagar was present for all sampling events and stated that she never observed shellfish during her fieldwork (pers. comm. 1/26/05). She also assisted researchers collecting sediment cores in lower Watsonville Slough, which required them to excavate one foot of sediment to extract the sediment core. She reports that no shellfish were observed in this surface layer that was removed.

The Watershed Institute subcontracted with University of California, Berkeley researchers Roger Byrne and Liam Reidy to analyze sediment cores from Watsonville Slough to determine sedimentation rates there for an unrelated study. They found shell fragments in two cores, one collected close to the mouth of the Slough, and the other collected just upstream of the Beach Road tide gate. They report shell fragments in these cores at depths of between 260 and 290 cm below surface (Byrne and Reidy, 2004, pp. 196, 197). According to their dating analysis, sediments at these depths are more than 450 years old.

4.4.5 Robert Ketley – City of Watsonville

Staff contacted Robert Ketley with the Department of Public Works at the City of Watsonville. Neither he nor the colleagues he queried were aware of any shellfish or shellfish harvesting occurring in the freshwater portion of the Slough (personal communication 2/2/05). Additionally, he knows of no bivalves in the brackish-influenced portion of the Slough below Shell Road.

4.5 Literature Review

Staff conducted library research at California Polytechnic State University, San Luis Obispo and looked for literature to determine if shellfish are or were present in the Watsonville Sloughs. Additionally, staff looked for information regarding typical habitats for shellfish to see if the sloughs could support shellfish populations; i.e. do these waterbodies have the correct temperature, salinity, and substrate conditions.

Staff found no journal articles indicating that shellfish occur, or have occurred in any of the Watsonville Slough waterbodies, or that individuals collect, or have collected shellfish in these areas.

Staff reviewed textbooks indicating that the biological, chemical and physical requirements for shellfish reproduction and habitat are wide-ranging for all the different species of shellfish. For example, some shellfish are able to tolerate a wider range of salinities than others, while others have more specific requirements relative to temperature and salinity. Given the wide range of conditions in the Watsonville Sloughs staff could not rule out the possibility that biological, chemical, and physical conditions are appropriate for certain species of shellfish. However, the conditions in the Sloughs do not support the harvestable clam and mussel species whose natural range is that of the central coastal region of California.

4.6 Basin Plan designation questionable

The 1975 version of the Basin Plan does not include reference to Watsonville Slough and its tributary sloughs, nor does Resolution no. 76-05, which designated beneficial uses for certain waterbodies. It is unclear when Water Board staff designated beneficial uses for Watsonville Slough, however, the Sloughs are designated as having SHELL as a beneficial use in the 1994 version of the Basin Plan. Staff concludes that the designation was made inappropriately as a "blanket" designation for all coastal confluences in the region without consideration of site-specific, shellfish-dependent conditions such as hydrology, marine influence, substrate, or historical use information.

4.7 CEQA public scoping meeting

Staff held three public meetings to present plans, status, and findings of the assessment of the pathogen impairment in Watsonville Sloughs. These meetings occurred on December 3, 2002, July 9, 2003, and December 16, 2004. Additionally, formal Water Board adoption of the Pathogen TMDL will occur at a public hearing where the scope of this UAA is also described.

5. Evaluation of Attainability of the Shellfish Harvesting Beneficial Use

The shellfish harvesting beneficial use specifies uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial or sport purposes. This includes waters that have in the past, or, may in the future contain significant shellfisheries. In this next section, we evaluate the attainability of the shellfish harvesting beneficial use.

5.1 Attainability of shellfish harvesting beneficial use

5.1.1 Step 1: Is the beneficial use being attained?

The presence of shellfish and/or any records of shellfish being present since November 28, 1975 would demonstrate that the SHELL beneficial use exists. Staff's investigation found no known records, individuals or agency knowledge that shows shellfish harvesting has been occurring anytime after November 28, 1975.

5.1.2 Step 2: Is water quality sufficient to attain the beneficial use?

As presented in section 4, based on bacterial concentrations persistently higher than water quality objectives, water quality has never been sufficient to attain the beneficial use of shellfish harvesting since November 28, 1975.

Step 2a: Can the condition be compensated for with effluent discharges without violating water conservation requirements?
Watsonville Sloughs would not be considered Effluent Dominated Waterbodies. Nor would any amount of increased effluent discharges help to create an environment where shellfish would be able to survive.

5.1.3 Step 3: What factors preclude the attainment of the beneficial use?

Watsonville Slough below Shell Road - The habitat of this area does not appear to be conducive to support the growth and reproduction of shellfish. The Slough, below Shell Road, is seasonally influenced by saltwater, but the muddy bottom and deep channels are not favorable to supporting a viable shellfish population.

Watsonville Sloughs above Shell Road - Watsonville Slough, above Shell Rd., Galligan Slough, Harkins Slough, Hanson Slough and Struve Slough are all completely freshwater. Having no saltwater above Shell Road precludes a number of shellfish from living in this environment. Freshwater clams, namely Corbicula (Asian Clam), are most likely the only organisms that would be able to survive in this freshwater environment and there is no confirmation of their presence in these waterbodies.

5.1.4 Step 4: Is restoration feasible?

"Restoration" does not seem feasible because of the extensive hydromodification of the area. Additionally, even if changes were made to the waterbodies (which seems economically infeasible), the return of shellfish to the area is highly questionable as it is unclear when/if shellfish inhabited these areas in the last half of the 1900's.

6. Findings of the Use Attainability Analysis

6.1 Basis for Removal of Designated Use
The Clean Water Act (CWA) factors for allowing a State to remove a designated use are listed in 131.10(g). Based on staff's UAA, three factors preclude attainment of SHELL in Watsonville Sloughs.

(1) Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met;

(2) Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.

(3) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unless these conditions may be compensated, unrelated to water quality preclude attainment of aquatic life protection uses.

6.2 Alternatives for Addressing the SHELL Beneficial Use Designation

6.2.1 Alternative A – Removing the SHELL beneficial use

In this case, SHELL is not a use for these waterbodies and staff concludes that previous Regional Board staff designated them SHELL, assuming these waterbodies had shellfish harvesting present without actually evaluating them to confirm the use. Watsonville Sloughs have not demonstrated the SHELL beneficial use qualities nor have there been any societal demands to use either of these waterbodies in this way. Therefore, as a result of a combination of factors described in 40 CFR 131.10(g)(2), (4), and (5) of the Federal water quality standards regulation, Water Board staff concludes that the SHELL beneficial use of Watsonville Sloughs should be removed.

6.2.2 Alternative B – No action. Maintain SHELL beneficial use designation

In this case, the status quo is maintained. Not taking any action would make it difficult to write and enforce a pathogen TMDL for these waterbodies because the numeric targets would have to be SHELL targets, which are not occurring. Enforcing a TMDL with SHELL numeric targets may impose unnecessary economic impacts on the City, County, and landowners requiring them to adhere to a low level of bacteria concentration to protect a use that does not exist. Additionally, it may not be possible to get to a level that is this low due to natural background levels of coliform.

6.3 Addressing potential concerns

Higher allowable levels of bacteria may further impair the Estuary/Lagoon
There may be concern that de-designating SHELL could result in higher allowable concentrations of bacteria into the Watsonville Sloughs. The current bacteria levels in these waterbodies regularly exceed water quality objectives for REC-1 and REC-2 uses. The bacteria TMDLs that are currently under development for these waterbodies will establish substantial reductions in allowable bacteria loading, regardless of the proposed action to remove the SHELL beneficial use.

6.4 Recommended Alternative

Staff recommends alternative A. In making this recommendation, staff has considered all factors set out in §13241 of the Porter-Cologne Water Quality Control Act:

(a) *Past, present, and probable future beneficial uses of water.*
It is highly unlikely that shellfish harvesting occurred in the recent past (i.e. the last 50 years, 1950 - present) as there is no evidence that shellfish occur in these waters, shellfish harvesting does not occur currently, and it is highly unlikely that shellfish harvesting will be a beneficial use in the future.

(b) *Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.*
Water quality objectives are currently not being met to support the beneficial use of SHELL, however the Watsonville Sloughs TMDL, currently under development, will address bacterial water quality objectives and bacterial loading in the context of the REC-1 and REC-2 beneficial uses. Removing the SHELL beneficial use will not affect the environmental characteristics of the waterbodies.

(c) *Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.*
Although past and current water quality conditions do not allow for the attainment of SHELL beneficial use, the implementation plan for the Pathogen TMDL for these waterbodies is a coordinated control strategy to improve water quality conditions. Removing the SHELL beneficial use will allow that strategy to be focused on attaining REC-1 beneficial use water quality objectives rather than water quality objectives for SHELL.

(d) *Economic considerations.*
With regard to economic considerations, staff expects costs of the recommended alternative to be less than the costs to achieve the SHELL beneficial use.

(e) *The need for developing housing within the region.*
Alternative A will have no significant impact on the need for developing housing within the region.

(f) *The need to develop and use recycled water.*
The need to develop and use recycled water will not be affected by the proposed alternative.

The recommended alternative is also consistent with the Anti-degradation Policy, as it will not lower the water quality of the Sloughs, relative to existing conditions. The intent is to attain water quality objectives for REC-1 not currently being achieved.

6.5 Future Considerations

Amending the potential SHELL designated use of Watsonville Sloughs does not preclude re-designation of this use should conditions within these waterbodies change in the future. For example, should some major hydrologic changes modify the habitat of these waterbodies to the point where shellfish would be able to grow and thrive, the beneficial use would be modified.

7. References

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APPENDIX 1: FECAL COLIFORM DATA FOR WATSONVILLE SLOUGHS 1976-2003

Date/Time	SiteCode	DataTypeCode	AnalysisMethod	DataValue	Unit	LabCode	NonDetect?	geomean
18-Feb-03	GAL-BUE	Fecal coli	SM 9221E	220	MPN	MoCo	FALSE	
27-Feb-03	GAL-BUE	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
14-Mar-03	GAL-BUE	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
18-Mar-03	GAL-BUE	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	
20-Mar-03	GAL-BUE	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	
19-Jun-03	GAL-BUE	Fecal coli	SM 9221E	70	MPN	MoCo	FALSE	
26-Jun-03	GAL-BUE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
01-Jul-03	GAL-BUE	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	
18-Nov-03	GAL-BUE	Fecal coli	SM 9221E	1100	MPN	MoCo	FALSE	344
27-Feb-03	HAN-HAR	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	1600
17-Apr-03	HAR-916	Fecal coli	SM 9221E	50	MPN	BC	FALSE	50
17-Apr-03	HAR-BUE	Fecal coli	SM 9221E	230	MPN	BC	FALSE	230
12-Dec-79	HAR-CON	Fecal coli	Membrane filtration	283	CFU/100mL	SCEH	FALSE	
22-Apr-80	HAR-CON	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	
24-Sep-80	HAR-CON	Fecal coli	Membrane filtration	550	CFU/100mL	SCEH	FALSE	
18-May-81	HAR-CON	Fecal coli	Membrane filtration	11800	CFU/100mL	SCEH	FALSE	
01-Oct-81	HAR-CON	Fecal coli	Membrane filtration	300	CFU/100mL	SCEH	FALSE	
11-May-82	HAR-CON	Fecal coli	Membrane filtration	673	CFU/100mL	SCEH	FALSE	
28-Sep-82	HAR-CON	Fecal coli	Membrane filtration	50	CFU/100mL	SCEH	FALSE	
06-Apr-84	HAR-CON	Fecal coli	Membrane filtration	430	CFU/100mL	SCEH	FALSE	
23-May-97	HAR-CON	Fecal coli	Membrane filtration	460	CFU/100mL	SCEH	FALSE	
02-Jan-02	HAR-CON	Fecal coli	Membrane filtration	500	CFU/100mL	?	FALSE	
06-Feb-02	HAR-CON	Fecal coli	Membrane filtration	500	CFU/100mL	?	FALSE	
13-Mar-02	HAR-CON	Fecal coli	Membrane filtration	800	CFU/100mL		FALSE	
10-Apr-02	HAR-CON	Fecal coli	-	20	CFU/100mL		TRUE	
18-Feb-03	HAR-CON	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
27-Feb-03	HAR-CON	Fecal coli	SM 9221E	220	MPN	MoCo	FALSE	358
14-Mar-03	HAR-CON	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	413
18-Mar-03	HAR-CON	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	570
20-Mar-03	HAR-CON	Fecal coli	SM 9221E	130	MPN	MoCo	FALSE	518
19-Jun-03	HAR-CON	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	354
26-Jun-03	HAR-CON	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	391
01-Jul-03	HAR-CON	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	425
08-Jul-03	HAR-CON	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	419
16-Jul-03	HAR-CON	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	342
18-Nov-03	HAR-CON	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	290
09-Jan-02	HAR-EFF	Fecal coli	Membrane filtration	1100	CFU/100mL	?	FALSE	
06-Feb-02	HAR-EFF	Fecal coli	Membrane filtration	1400	CFU/100mL	?	FALSE	
13-Mar-02	HAR-EFF	Fecal coli	Membrane filtration	2200	CFU/100mL	?	FALSE	
10-Apr-02	HAR-EFF	Fecal coli	Membrane filtration	20	CFU/100mL	?	FALSE	
08-May-02	HAR-EFF	Fecal coli	Membrane filtration	33	CFU/100mL	?	FALSE	295
17-Apr-03	HAR-H1U	Fecal coli	SM 9221E	2400	MPN	BC	FALSE	2400
16-Jun-76	HAR-HAR	Fecal coli	Membrane filtration	870	CFU/100mL	SCEH	FALSE	
06-Feb-90	HAR-HAR	Fecal coli	Membrane filtration	260	CFU/100mL	SCEH	FALSE	
25-Feb-92	HAR-HAR	Fecal coli	Membrane filtration	0.1	CFU/100mL	SCEH	FALSE	
11-Jul-94	HAR-HAR	Fecal coli	Membrane filtration	640	CFU/100mL	SCEH	FALSE	
12-Sep-94	HAR-HAR	Fecal coli	Membrane filtration	380	CFU/100mL	SCEH	FALSE	
13-Oct-94	HAR-HAR	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	
22-Nov-94	HAR-HAR	Fecal coli	Membrane filtration	380	CFU/100mL	SCEH	FALSE	
12-Dec-94	HAR-HAR	Fecal coli	Membrane filtration	1120	CFU/100mL	SCEH	FALSE	
01-May-95	HAR-HAR	Fecal coli	Membrane filtration	650	CFU/100mL	SCEH	FALSE	
31-Jul-95	HAR-HAR	Fecal coli	Membrane filtration	200	CFU/100mL	SCEH	FALSE	
30-Aug-95	HAR-HAR	Fecal coli	Membrane filtration	420	CFU/100mL	SCEH	FALSE	
25-Sep-95	HAR-HAR	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	
23-Oct-95	HAR-HAR	Fecal coli	Membrane filtration	980	CFU/100mL	SCEH	FALSE	
20-Nov-95	HAR-HAR	Fecal coli	Membrane filtration	220	CFU/100mL	SCEH	FALSE	
17-Dec-95	HAR-HAR	Fecal coli	Membrane filtration	1350	CFU/100mL	SCEH	FALSE	208
17-Jan-96	HAR-HAR	Fecal coli	Membrane filtration	16050	CFU/100mL	SCEH	FALSE	253
10-Jun-96	HAR-HAR	Fecal coli	Membrane filtration	19	CFU/100mL	SCEH	FALSE	212
06-Aug-96	HAR-HAR	Fecal coli	Membrane filtration	680	CFU/100mL	SCEH	FALSE	382
18-Feb-03	HAR-HAR	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	391
27-Feb-03	HAR-HAR	Fecal coli	SM 9221E	1600	MPN	BioVir	FALSE	430
27-Feb-03	HAR-HAR	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	551
27-Feb-03	HAR-HAR	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	606
27-Feb-03	HAR-HAR	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	620
14-Mar-03	HAR-HAR	Fecal coli	SM 9221E	1100	MPN	MoCo	FALSE	643
18-Mar-03	HAR-HAR	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	728
18-Mar-03	HAR-HAR	Fecal coli	SM 9221E	700	MPN	BioVir	FALSE	753

APPENDIX 1: FECAL COLIFORM DATA FOR WATSONVILLE SLOUGHS 1976-2003

Date/Time	SiteCode	DataTypeCode	AnalysisMethod	DataValue	Unit	LabCode	NonDetect?	geomean
20-Mar-03	HAR-HAR	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	1039
19-Jun-03	HAR-HAR	Fecal coli	SM 9221E	270	MPN	MoCo	FALSE	954
26-Jun-03	HAR-HAR	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	1174
01-Jul-03	HAR-HAR	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	1239
08-Jul-03	HAR-HAR	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	1146
16-Jul-03	HAR-HAR	Fecal coli	SM 9221E	9000	MPN	MoCo	FALSE	1728
05-Aug-03	HAR-HAR	Fecal coli	SM 9221E	9000	MPN	MoCo	FALSE	2053
05-Aug-03	HAR-HAR	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	2224
05-Aug-03	HAR-HAR	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	2400
09-Sep-03	HAR-HAR	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	2798
18-Nov-03	HAR-HAR	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	3262
09-Dec-03	HAR-HAR	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	3402
17-Apr-03	HAR-PEA	Fecal coli	SM 9221E	170	MPN	BC	FALSE	170
18-Feb-03	HAR-RAU	Fecal coli	SM 9221E	500	MPN	MoCo	FALSE	
27-Feb-03	HAR-RAU	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
14-Mar-03	HAR-RAU	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
14-Mar-03	HAR-RAU	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
14-Mar-03	HAR-RAU	Fecal coli	SM 9221E	600	MPN	MoCo	FALSE	
18-Mar-03	HAR-RAU	Fecal coli	SM 9221E	500	MPN	MoCo	FALSE	
20-Mar-03	HAR-RAU	Fecal coli	SM 9221E	700	MPN	MoCo	FALSE	
17-Apr-03	HAR-RAU	Fecal coli	SM 9221E	170	MPN	BC	FALSE	
19-Jun-03	HAR-RAU	Fecal coli	SM 9221E	130	MPN	MoCo	FALSE	
26-Jun-03	HAR-RAU	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	
01-Jul-03	HAR-RAU	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	
08-Jul-03	HAR-RAU	Fecal coli	SM 9221E	8	MPN	MoCo	FALSE	
16-Jul-03	HAR-RAU	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	
18-Nov-03	HAR-RAU	Fecal coli	SM 9221E	90	MPN	MoCo	FALSE	234
06-Mar-90	STR-ABD	Fecal coli	Membrane filtration	220	CFU/100mL	SCEH	FALSE	
13-Mar-90	STR-ABD	Fecal coli	Membrane filtration	350	CFU/100mL	SCEH	FALSE	
20-Mar-90	STR-ABD	Fecal coli	Membrane filtration	1760	CFU/100mL	SCEH	FALSE	
27-Mar-90	STR-ABD	Fecal coli	Membrane filtration	390	CFU/100mL	SCEH	FALSE	479
04-Apr-89	STR-AIR	Fecal coli	Membrane filtration	1950	CFU/100mL	SCEH	FALSE	
04-Apr-89	STR-AIR	Fecal coli	Membrane filtration	250	CFU/100mL	SCEH	FALSE	
04-Apr-89	STR-AIR	Fecal coli	Membrane filtration	700	CFU/100mL	SCEH	FALSE	
11-Apr-89	STR-AIR	Fecal coli	Membrane filtration	11750	CFU/100mL	SCEH	FALSE	
18-Apr-89	STR-AIR	Fecal coli	Membrane filtration	800	CFU/100mL	SCEH	FALSE	
25-Apr-89	STR-AIR	Fecal coli	Membrane filtration	7500	CFU/100mL	SCEH	FALSE	
02-May-89	STR-AIR	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	
17-Apr-03	STR-AIR	Fecal coli	SM 9221E	220	MPN	BC	FALSE	
05-Aug-03	STR-AIR	Fecal coli	SM 9221E	1700	MPN	MoCo	FALSE	1026
17-Apr-03	STR-CH1	Fecal coli	SM 9221E	300	MPN	BC	FALSE	
05-Aug-03	STR-CH1	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
26-Aug-03	STR-CH1	Fecal coli	SM 9221E	110	MPN	WAT	FALSE	808
05-Aug-03	STR-CH2	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	16000
05-Aug-03	STR-CH3	Fecal coli	SM 9221E	189	MPN	MoCo	FALSE	
26-Aug-03	STR-CH3	Fecal coli	SM 9221E	140	MPN	WAT	FALSE	163
18-Feb-03	STR-CHE	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
27-Feb-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
14-Mar-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
18-Mar-03	STR-CHE	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	
20-Mar-03	STR-CHE	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	
17-Apr-03	STR-CHE	Fecal coli	SM 9221E	500	MPN	BC	FALSE	
17-Apr-03	STR-CHE	Fecal coli	SM 9221E	800	MPN	BC	FALSE	
17-Apr-03	STR-CHE	Fecal coli	SM 9221E	700	MPN	BC	FALSE	
19-Jun-03	STR-CHE	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	
26-Jun-03	STR-CHE	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	
01-Jul-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	BioVir	FALSE	
01-Jul-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
08-Jul-03	STR-CHE	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	
16-Jul-03	STR-CHE	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	
05-Aug-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	3228
18-Aug-03	STR-CHE	Fecal coli	SM 9221E	1700	MPN	MoCo	FALSE	3241
26-Aug-03	STR-CHE	Fecal coli	SM 9221E	9000	MPN	WAT	FALSE	3119
09-Sep-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	3119
12-Sep-03	STR-CHE	Fecal coli	SM 9221E	230	MPN		FALSE	3183
18-Nov-03	STR-CHE	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	3612
09-Dec-03	STR-CHE	Fecal coli	SM 9221E	230	MPN	MoCo	FALSE	3430
11-Apr-89	STR-GDD	Fecal coli	Membrane filtration	200	CFU/100mL	SCEH	FALSE	200

APPENDIX 1: FECAL COLIFORM DATA FOR WATSONVILLE SLOUGHS 1976-2003

Date/Time	SiteCode	DataTypeCode	AnalysisMethod	DataValue	Unit	LabCode	NonDefect?	geomean
04-Apr-89	STR-GVD	Fecal coli	Membrane filtration	700	CFU/100mL	SCEH	FALSE	
11-Apr-89	STR-GVD	Fecal coli	Membrane filtration	180	CFU/100mL	SCEH	FALSE	
13-Mar-90	STR-GVD	Fecal coli	Membrane filtration	520	CFU/100mL	SCEH	FALSE	403
18-Feb-03	STR-HAR	Fecal coli	SM 9221E	13	MPN	MoCo	FALSE	
27-Feb-03	STR-HAR	Fecal coli	SM 9221E	1600	MPN	BioVir	FALSE	
27-Feb-03	STR-HAR	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
14-Mar-03	STR-HAR	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	
18-Mar-03	STR-HAR	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	
20-Mar-03	STR-HAR	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	
19-Jun-03	STR-HAR	Fecal coli	SM 9221E	800	MPN	MoCo	FALSE	
26-Jun-03	STR-HAR	Fecal coli	SM 9221E	230	MPN	MoCo	FALSE	
01-Jul-03	STR-HAR	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
08-Jul-03	STR-HAR	Fecal coli	SM 9221E	500	MPN	MoCo	FALSE	
16-Jul-03	STR-HAR	Fecal coli	SM 9221E	220	MPN	MoCo	FALSE	
18-Nov-03	STR-HAR	Fecal coli	SM 9221E	1100	MPN	MoCo	FALSE	196
11-Apr-89	STR-LAN	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	80
11-Feb-92	STR-LEE	Fecal coli	Membrane filtration	380	CFU/100mL	SCEH	FALSE	
25-Feb-92	STR-LEE	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	
11-Jul-94	STR-LEE	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	
12-Sep-94	STR-LEE	Fecal coli	Membrane filtration	280	CFU/100mL	SCEH	FALSE	
13-Oct-94	STR-LEE	Fecal coli	Membrane filtration	20	CFU/100mL	SCEH	FALSE	
22-Nov-94	STR-LEE	Fecal coli	Membrane filtration	540	CFU/100mL	SCEH	FALSE	
12-Dec-94	STR-LEE	Fecal coli	Membrane filtration	820	CFU/100mL	SCEH	FALSE	
06-Feb-95	STR-LEE	Fecal coli	Membrane filtration	0.1	CFU/100mL	SCEH	FALSE	
03-Apr-95	STR-LEE	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	
01-May-95	STR-LEE	Fecal coli	Membrane filtration	1000	CFU/100mL	SCEH	FALSE	
05-Jun-95	STR-LEE	Fecal coli	Membrane filtration	380	CFU/100mL	SCEH	FALSE	
05-Jul-95	STR-LEE	Fecal coli	Membrane filtration	420	CFU/100mL	SCEH	FALSE	
31-Jul-95	STR-LEE	Fecal coli	Membrane filtration	100	CFU/100mL	SCEH	FALSE	
30-Aug-95	STR-LEE	Fecal coli	Membrane filtration	540	CFU/100mL	SCEH	FALSE	
06-Aug-96	STR-LEE	Fecal coli	Membrane filtration	207	CFU/100mL	SCEH	FALSE	129
07-Jan-97	STR-LEE	Fecal coli	Membrane filtration	400	CFU/100mL	SCEH	FALSE	129
11-Mar-97	STR-LEE	Fecal coli	Membrane filtration	0.9	CFU/100mL	SCEH	FALSE	96
22-Apr-97	STR-LEE	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	91
04-Jun-97	STR-LEE	Fecal coli	Membrane filtration	470	CFU/100mL	SCEH	FALSE	94
23-Jul-97	STR-LEE	Fecal coli	Membrane filtration	820	CFU/100mL	SCEH	FALSE	121
18-Feb-03	STR-LEE	Fecal coli	SM 9221E	4	MPN	MoCo	FALSE	87
27-Feb-03	STR-LEE	Fecal coli	SM 9221E	8	MPN	MoCo	FALSE	64
14-Mar-03	STR-LEE	Fecal coli	SM 9221E	8	MPN	MoCo	FALSE	86
18-Mar-03	STR-LEE	Fecal coli	SM 9221E	20	MPN	MoCo	TRUE	82
20-Mar-03	STR-LEE	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	63
19-Jun-03	STR-LEE	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	71
19-Jun-03	STR-LEE	Fecal coli	SM 9221E	800	MPN	MoCo	FALSE	75
19-Jun-03	STR-LEE	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	86
26-Jun-03	STR-LEE	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	100
01-Jul-03	STR-LEE	Fecal coli	SM 9221E	340	MPN	MoCo	FALSE	103
08-Jul-03	STR-LEE	Fecal coli	SM 9221E	130	MPN	MoCo	FALSE	96
16-Jul-03	STR-LEE	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	136
18-Nov-03	STR-LEE	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	168
26-Jun-03	STR-PIP	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
01-Jul-03	STR-PIP	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	
16-Jul-03	STR-PIP	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
05-Aug-03	STR-PIP	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	
26-Aug-03	STR-PIP	Fecal coli	SM 9221E	2400	MPN	WAT	FALSE	
09-Sep-03	STR-PIP	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	946
08-Jul-03	STR-TRB	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
05-Aug-03	STR-TRB	Fecal coli	SM 9221E	1100	MPN	MoCo	FALSE	
26-Aug-03	STR-TRB	Fecal coli	SM 9221E	1300	MPN	WAT	FALSE	
09-Sep-03	STR-TRB	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	1210
16-Jun-76	WAT-AND	Fecal coli	Membrane filtration	2100	CFU/100mL	SCEH	FALSE	
18-Feb-03	WAT-AND	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
27-Feb-03	WAT-AND	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
14-Mar-03	WAT-AND	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	
18-Mar-03	WAT-AND	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	
20-Mar-03	WAT-AND	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
19-Jun-03	WAT-AND	Fecal coli	SM 9221E	500	MPN	MoCo	FALSE	
26-Jun-03	WAT-AND	Fecal coli	SM 9221E	16000	MPN	MoCo	FALSE	
26-Jun-03	WAT-AND	Fecal coli	SM 9221E	300	MPN	BioVir	FALSE	

APPENDIX 1: FECAL COLIFORM DATA FOR WATSONVILLE SLOUGHS 1976-2003

Date/Time	SiteCode	DataTypeCode	AnalysisMethod	DataValue	Unit	LabCode	NonDetect?	geomean
01-Jul-03	WAT-AND	Fecal coli	SM 9221E	800	MPN	MoCo	FALSE	
01-Jul-03	WAT-AND	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
01-Jul-03	WAT-AND	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	
01-Jul-03	WAT-AND	Fecal coli	SM 9221E	300	MPN	BioVir	FALSE	
08-Jul-03	WAT-AND	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	
18-Nov-03	WAT-AND	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	1146
21-Dec-87	WAT-BEA	Fecal coli	Membrane filtration	20	CFU/100mL	SCEH	FALSE	
01-Feb-88	WAT-BEA	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	
13-Jun-89	WAT-BEA	Fecal coli	Membrane filtration	10	CFU/100mL	SCEH	FALSE	
11-Jun-94	WAT-BEA	Fecal coli	Membrane filtration	840	CFU/100mL	?	FALSE	
12-Sep-94	WAT-BEA	Fecal coli	Membrane filtration	320	CFU/100mL	SCEH	FALSE	
13-Oct-94	WAT-BEA	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	
22-Nov-94	WAT-BEA	Fecal coli	Membrane filtration	20	CFU/100mL	SCEH	FALSE	
12-Dec-94	WAT-BEA	Fecal coli	Membrane filtration	860	CFU/100mL	SCEH	FALSE	
06-Feb-95	WAT-BEA	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	
03-Apr-95	WAT-BEA	Fecal coli	Membrane filtration	240	CFU/100mL	SCEH	FALSE	
01-May-95	WAT-BEA	Fecal coli	Membrane filtration	700	CFU/100mL	SCEH	FALSE	
05-Jun-95	WAT-BEA	Fecal coli	Membrane filtration	320	CFU/100mL	SCEH	FALSE	
05-Jul-95	WAT-BEA	Fecal coli	Membrane filtration	640	CFU/100mL	SCEH	FALSE	
31-Jul-95	WAT-BEA	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	
30-Aug-95	WAT-BEA	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	146
25-Sep-95	WAT-BEA	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	160
23-Oct-95	WAT-BEA	Fecal coli	Membrane filtration	120	CFU/100mL	SCEH	FALSE	172
20-Nov-95	WAT-BEA	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	197
17-Dec-95	WAT-BEA	Fecal coli	Membrane filtration	200	CFU/100mL	SCEH	FALSE	179
17-Jan-96	WAT-BEA	Fecal coli	Membrane filtration	850	CFU/100mL	?	FALSE	191
09-Jul-96	WAT-BEA	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	199
10-Jul-96	WAT-BEA	Fecal coli	Membrane filtration	160	CFU/100mL	SCEH	FALSE	228
06-Aug-96	WAT-BEA	Fecal coli	Membrane filtration	120	CFU/100mL	SCEH	FALSE	200
07-Jan-97	WAT-BEA	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	193
18-Feb-97	WAT-BEA	Fecal coli	Membrane filtration	5500	CFU/100mL	SCEH	FALSE	238
11-Mar-97	WAT-BEA	Fecal coli	Membrane filtration	180	CFU/100mL	SCEH	FALSE	217
22-Apr-97	WAT-BEA	Fecal coli	Membrane filtration	2420	CFU/100mL	SCEH	FALSE	248
04-Jun-97	WAT-BEA	Fecal coli	Membrane filtration	700	CFU/100mL	SCEH	FALSE	250
23-Jul-97	WAT-BEA	Fecal coli	Membrane filtration	160	CFU/100mL	SCEH	FALSE	252
28-Oct-97	WAT-BEA	Fecal coli	Membrane filtration	40	CFU/100mL	SCEH	FALSE	232
11-Dec-97	WAT-BEA	Fecal coli	Membrane filtration	110	CFU/100mL	SCEH	FALSE	237
18-Feb-03	WAT-HAR	Fecal coli	SM 9221E	50	MPN	MoCo	FALSE	
18-Feb-03	WAT-HAR	Fecal coli	SM 9221E	23	MPN	MoCo	FALSE	
27-Feb-03	WAT-HAR	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	
14-Mar-03	WAT-HAR	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	
18-Mar-03	WAT-HAR	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	
20-Mar-03	WAT-HAR	Fecal coli	SM 9221E	13	MPN	BioVir	FALSE	
20-Mar-03	WAT-HAR	Fecal coli	SM 9221E	20	MPN	MoCo	TRUE	
20-Mar-03	WAT-HAR	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	
20-Mar-03	WAT-HAR	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	
19-Jun-03	WAT-HAR	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	
26-Jun-03	WAT-HAR	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	
26-Jun-03	WAT-HAR	Fecal coli	SM 9221E	1100	MPN	MoCo	FALSE	
26-Jun-03	WAT-HAR	Fecal coli	SM 9221E	800	MPN	MoCo	FALSE	
26-Jun-03	WAT-HAR	Fecal coli	SM 9221E	130	MPN	BioVir	FALSE	
01-Jul-03	WAT-HAR	Fecal coli	SM 9221E	50	MPN	MoCo	FALSE	88
08-Jul-03	WAT-HAR	Fecal coli	SM 9221E	50	MPN	MoCo	FALSE	88
16-Jul-03	WAT-HAR	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	104
18-Nov-03	WAT-HAR	Fecal coli	SM 9221E	280	MPN	MoCo	FALSE	108
09-Jan-02	WAT-HSD	Fecal coli	Membrane filtration	240	CFU/100mL	?	FALSE	
06-Feb-02	WAT-HSD	Fecal coli	Membrane filtration	1300	CFU/100mL	SCEH	FALSE	
13-Mar-02	WAT-HSD	Fecal coli	Membrane filtration	800	CFU/100mL	?	FALSE	
10-Apr-02	WAT-HSD	Fecal coli	Membrane filtration	110	CFU/100mL	SCEH	FALSE	407
23-May-77	WAT-HSU	Fecal coli	Membrane filtration	380	CFU/100mL	?	FALSE	
27-Apr-78	WAT-HSU	Fecal coli	Membrane filtration	800	CFU/100mL	SCEH	FALSE	
22-Apr-80	WAT-HSU	Fecal coli	Membrane filtration	1540	CFU/100mL	SCEH	FALSE	
24-Sep-80	WAT-HSU	Fecal coli	Membrane filtration	4040	CFU/100mL	SCEH	FALSE	
18-May-81	WAT-HSU	Fecal coli	Membrane filtration	1936	CFU/100mL	SCEH	FALSE	
01-Oct-81	WAT-HSU	Fecal coli	Membrane filtration	2510	CFU/100mL	SCEH	FALSE	
11-May-82	WAT-HSU	Fecal coli	Membrane filtration	2130	CFU/100mL	SCEH	FALSE	
28-Sep-82	WAT-HSU	Fecal coli	Membrane filtration	130	CFU/100mL	?	FALSE	
06-Apr-84	WAT-HSU	Fecal coli	Membrane filtration	5060	CFU/100mL	SCEH	FALSE	

APPENDIX 1: FECAL COLIFORM DATA FOR WATSONVILLE SLOUGHS 1976-2003

Date/Time	SiteCode	DataTypeCode	AnalysisMethod	DataValue	Unit	LabCode	NonDetect?	geomean
02-Jan-02	WAT-HSU	Fecal coli	Membrane filtration	300	CFU/100mL	?	FALSE	
09-Feb-02	WAT-HSU	Fecal coli	Membrane filtration	800	CFU/100mL	?	FALSE	
13-Mar-02	WAT-HSU	Fecal coli	Membrane filtration	300	CFU/100mL	?	FALSE	
10-Apr-02	WAT-HSU	Fecal coli	Membrane filtration	50	CFU/100mL	?	FALSE	790
22-Nov-94	WAT-LEE	Fecal coli	Membrane filtration	900	CFU/100mL	SCEH	FALSE	
12-Dec-94	WAT-LEE	Fecal coli	Membrane filtration	900	CFU/100mL	SCEH	FALSE	
06-Feb-95	WAT-LEE	Fecal coli	Membrane filtration	460	CFU/100mL	SCEH	FALSE	
01-May-95	WAT-LEE	Fecal coli	Membrane filtration	1200	CFU/100mL	SCEH	FALSE	
05-Jun-95	WAT-LEE	Fecal coli	Membrane filtration	1260	CFU/100mL	SCEH	FALSE	
31-Jul-95	WAT-LEE	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	
25-Sep-95	WAT-LEE	Fecal coli	Membrane filtration	260	CFU/100mL	SCEH	FALSE	
23-Oct-95	WAT-LEE	Fecal coli	Membrane filtration	550	CFU/100mL	SCEH	FALSE	
20-Nov-95	WAT-LEE	Fecal coli	Membrane filtration	60	CFU/100mL	SCEH	FALSE	
17-Dec-95	WAT-LEE	Fecal coli	Membrane filtration	45	CFU/100mL	SCEH	FALSE	
10-Jan-96	WAT-LEE	Fecal coli	Membrane filtration	361	CFU/100mL	SCEH	FALSE	
17-Jan-96	WAT-LEE	Fecal coli	Membrane filtration	1500	CFU/100mL	SCEH	FALSE	
06-Aug-96	WAT-LEE	Fecal coli	Membrane filtration	580	CFU/100mL	SCEH	FALSE	
07-Jan-97	WAT-LEE	Fecal coli	Membrane filtration	50	CFU/100mL	SCEH	FALSE	
11-Mar-97	WAT-LEE	Fecal coli	Membrane filtration	30	CFU/100mL	SCEH	FALSE	289
22-Apr-97	WAT-LEE	Fecal coli	Membrane filtration	100	CFU/100mL	SCEH	FALSE	250
04-Jun-97	WAT-LEE	Fecal coli	Membrane filtration	100	CFU/100mL	SCEH	FALSE	216
23-Jul-97	WAT-LEE	Fecal coli	Membrane filtration	100	CFU/100mL	SCEH	FALSE	195
15-Sep-97	WAT-LEE	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	163
28-Oct-97	WAT-LEE	Fecal coli	Membrane filtration	340	CFU/100mL	SCEH	FALSE	149
25-Nov-97	WAT-LEE	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	155
25-Jan-98	WAT-LEE	Fecal coli	Membrane filtration	72	CFU/100mL	SCEH	FALSE	142
25-Mar-98	WAT-LEE	Fecal coli	Membrane filtration	1380	CFU/100mL	SCEH	FALSE	151
26-Apr-98	WAT-LEE	Fecal coli	Membrane filtration	230	CFU/100mL	SCEH	FALSE	165
01-Jul-98	WAT-LEE	Fecal coli	Membrane filtration	350	CFU/100mL	SCEH	FALSE	189
25-Aug-98	WAT-LEE	Fecal coli	Membrane filtration	284	CFU/100mL	SCEH	FALSE	186
18-Feb-03	WAT-LEE	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	153
27-Feb-03	WAT-LEE	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	147
14-Mar-03	WAT-LEE	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	185
18-Mar-03	WAT-LEE	Fecal coli	SM 9221E	80	MPN	BioVir	FALSE	197
18-Mar-03	WAT-LEE	Fecal coli	SM 9221E	110	MPN	MoCo	FALSE	198
20-Mar-03	WAT-LEE	Fecal coli	SM 9221E	1700	MPN	MoCo	FALSE	240
19-Jun-03	WAT-LEE	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	258
26-Jun-03	WAT-LEE	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	324
01-Jul-03	WAT-LEE	Fecal coli	SM 9221E	500	MPN	MoCo	FALSE	332
08-Jul-03	WAT-LEE	Fecal coli	SM 9221E	230	MPN	MoCo	FALSE	343
16-Jul-03	WAT-LEE	Fecal coli	SM 9221E	800	MPN	MoCo	FALSE	403
18-Nov-03	WAT-LEE	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	418
12-Dec-79	WAT-PAJ	Fecal coli	Membrane filtration	179	CFU/100mL	SCEH	FALSE	
12-Dec-79	WAT-PAJ	Fecal coli	Membrane filtration	179	CFU/100mL	SCEH	FALSE	
22-Apr-80	WAT-PAJ	Fecal coli	Membrane filtration	1820	CFU/100mL	SCEH	FALSE	
22-Apr-80	WAT-PAJ	Fecal coli	Membrane filtration	1820	CFU/100mL	SCEH	FALSE	
19-Dec-89	WAT-PAJ	Fecal coli	Membrane filtration	0.1	CFU/100mL	SCEH	FALSE	
19-Dec-89	WAT-PAJ	Fecal coli	Membrane filtration	0.1	CFU/100mL	SCEH	FALSE	
10-Apr-90	WAT-PAJ	Fecal coli	Membrane filtration	420	CFU/100mL	SCEH	FALSE	
10-Apr-90	WAT-PAJ	Fecal coli	Membrane filtration	420	CFU/100mL	SCEH	FALSE	
17-Apr-90	WAT-PAJ	Fecal coli	Membrane filtration	460	CFU/100mL	SCEH	FALSE	
17-Apr-90	WAT-PAJ	Fecal coli	Membrane filtration	460	CFU/100mL	SCEH	FALSE	
24-Apr-90	WAT-PAJ	Fecal coli	Membrane filtration	110	CFU/100mL	SCEH	FALSE	
24-Apr-90	WAT-PAJ	Fecal coli	Membrane filtration	110	CFU/100mL	SCEH	FALSE	
01-May-90	WAT-PAJ	Fecal coli	Membrane filtration	0.1	CFU/100mL	SCEH	FALSE	
01-May-90	WAT-PAJ	Fecal coli	Membrane filtration	0.1	CFU/100mL	SCEH	FALSE	
23-Dec-91	WAT-PAJ	Fecal coli	Membrane filtration	60	CFU/100mL	SCEH	FALSE	37
23-Dec-91	WAT-PAJ	Fecal coli	Membrane filtration	60	CFU/100mL	SCEH	FALSE	34
27-Feb-00	WAT-PAJ	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	34
27-Feb-00	WAT-PAJ	Fecal coli	Membrane filtration	140	CFU/100mL	SCEH	FALSE	28
02-Mar-00	WAT-PAJ	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	23
02-Mar-00	WAT-PAJ	Fecal coli	Membrane filtration	80	CFU/100mL	SCEH	FALSE	36
06-Mar-00	WAT-PAJ	Fecal coli	Membrane filtration	240	CFU/100mL	SCEH	FALSE	60
06-Mar-00	WAT-PAJ	Fecal coli	Membrane filtration	240	CFU/100mL	SCEH	FALSE	58
02-May-00	WAT-PAJ	Fecal coli	Membrane filtration	480	CFU/100mL	SCEH	FALSE	58
02-May-00	WAT-PAJ	Fecal coli	Membrane filtration	480	CFU/100mL	SCEH	FALSE	59
18-Feb-03	WAT-PAJ	Fecal coli	SM 9221E	130	MPN	MoCo	FALSE	54
27-Feb-03	WAT-PAJ	Fecal coli	SM 9221E	220	MPN	MoCo	FALSE	56

APPENDIX 1: FECAL COLIFORM DATA FOR WATSONVILLE SLOUGHS 1976-2003

Date/Time	SiteCode	DataTypeCode	AnalysisMethod	DataValue	Unit	LabCode	NonDetect?	geomean
14-Mar-03	WAT-PAJ	Fecal coli	SM 9221E	240	MPN	MoCo	FALSE	59
18-Mar-03	WAT-PAJ	Fecal coli	SM 9221E	130	MPN	MoCo	FALSE	96
18-Mar-03	WAT-PAJ	Fecal coli	SM 9221E	130	MPN	MoCo	FALSE	155
18-Mar-03	WAT-PAJ	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	166
20-Mar-03	WAT-PAJ	Fecal coli	SM 9221E	240	MPN	MoCo	FALSE	182
19-Jun-03	WAT-PAJ	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	160
26-Jun-03	WAT-PAJ	Fecal coli	SM 9221E	20	MPN	MoCo	FALSE	140
01-Jul-03	WAT-PAJ	Fecal coli	SM 9221E	110	MPN	MoCo	FALSE	143
08-Jul-03	WAT-PAJ	Fecal coli	SM 9221E	22	MPN	MoCo	FALSE	132
16-Jul-03	WAT-PAJ	Fecal coli	SM 9221E	110	MPN	MoCo	FALSE	125
16-Jul-03	WAT-PAJ	Fecal coli	SM 9221E	40	MPN	MoCo	FALSE	111
16-Jul-03	WAT-PAJ	Fecal coli	SM 9221E	80	MPN	MoCo	FALSE	98
18-Nov-03	WAT-PAJ	Fecal coli	SM 9221E	17	MPN	MoCo	FALSE	79
18-Feb-03	WAT-SHE	Fecal coli	SM 9221E	300	MPN	MoCo	FALSE	
27-Feb-03	WAT-SHE	Fecal coli	SM 9221E	1600	MPN	MoCo	FALSE	
14-Mar-03	WAT-SHE	Fecal coli	SM 9221E	1700	MPN	MoCo	FALSE	
18-Mar-03	WAT-SHE	Fecal coli	SM 9221E	500	MPN	MoCo	FALSE	
20-Mar-03	WAT-SHE	Fecal coli	SM 9221E	170	MPN	MoCo	FALSE	
19-Jun-03	WAT-SHE	Fecal coli	SM 9221E	800	MPN	MoCo	FALSE	
26-Jun-03	WAT-SHE	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	
01-Jul-03	WAT-SHE	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	
08-Jul-03	WAT-SHE	Fecal coli	SM 9221E	300	MPN	BioVir	FALSE	
08-Jul-03	WAT-SHE	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	
08-Jul-03	WAT-SHE	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	
08-Jul-03	WAT-SHE	Fecal coli	SM 9221E	900	MPN	MoCo	FALSE	
16-Jul-03	WAT-SHE	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	
05-Aug-03	WAT-SHE	Fecal coli	SM 9221E	1300	MPN	MoCo	FALSE	
05-Aug-03	WAT-SHE	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	896
05-Aug-03	WAT-SHE	Fecal coli	SM 9221E	5000	MPN	MoCo	FALSE	1081
09-Sep-03	WAT-SHE	Fecal coli	SM 9221E	2400	MPN	MoCo	FALSE	1110
18-Nov-03	WAT-SHE	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	1153
09-Dec-03	WAT-SHE	Fecal coli	SM 9221E	3000	MPN	MoCo	FALSE	1299