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Water Quality Status Report For Marine Waters 1998

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KING COUNTY DEPARTMENT OF
NATURAL RESOURCES AND PARKS

WATER QUALITY STATUS REPORT FOR MARINE WATERS, 1998

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SUMMARY

The King County Department of Natural Resources operates and maintains two wastewater treatment plants and two combined sewer overflow treatment plants that discharge treated effluent into the central Puget Sound basin. One of King County's responsibilities is to conduct monitoring in marine waters to verify that these discharges are not degrading water quality within the vicinity of the treatment plants. The marine monitoring program has two components; point source monitoring which focuses on areas near treatment plant discharges and ambient monitoring which focuses on areas outside the immediate vicinity of known discharges. It is important to monitor areas outside the influence of point source discharges in order to assess background conditions in central Puget Sound.

In 1998, 19 offshore and 3 intertidal (nearshore) sediment stations, 5 offshore and 6 intertidal water stations, and 3 shellfish and macroalgae stations were sampled for the point source program. For the ambient program, 10 offshore and 3 intertidal sediment stations, 5 offshore and 16 intertidal water stations, 6 shellfish stations, and 4 macroalgae stations were sampled. Sediments were analyzed for organic compounds, metals, and conventional parameters with intertidal samples also being analyzed for bacteria. Water was analyzed for bacteria, nutrients, dissolved oxygen, chlorophyll, and physical parameters. Shellfish samples were analyzed for organics, metals, and bacteria. Macroalgae were analyzed for metals.

MONITORING RESULTS

Water Column

Temperature, salinity, and density values indicated a well-mixed water column throughout most of the year, but seasonal thermal stratification was evident in summer. All dissolved oxygen values were above 5.0 mg/L, the level at which potential problems could occur, with one exception. The station off West Point had a value of 4.5 mg/L at 55 meters during November--all other depths were 6.5 mg/L and above. Nutrients, such as nitrate+nitrite and ammonium, exhibited trends similar to previous years. Nitrate was most abundant in winter when not being taken up by phytoplankton and ammonium was highest in the

summer months. Major phytoplankton blooms occurred in April and July in 1998.

All offshore monitoring stations met the Washington State Class AA marine surface water standards for fecal coliform bacteria with the exception of two stations located in inner Elliott Bay. Levels at these stations met the geometric mean standard of 14 colonies/100 ml but exceeded the peak standard of 43 colonies/100 ml. The highest values for the Elliott Bay stations occurred during high rainfall periods and these sites receive higher freshwater input than other stations due to their proximity to the Duwamish River. Fecal coliform bacteria in the water column near the County's treatment plant discharges were found at low levels (usually less than 5 colonies/100 ml) if detected at all.

Fecal coliform counts at intertidal beaches are influenced by freshwater runoff from the surrounding watersheds. As a result, the number of stations exceeding the Class AA marine standards increased in the high rainfall months and at stations closer to freshwater sources. Twelve beaches exceeded both the geometric mean and peak standards; five exceeded the geometric mean but not the peak standard; and fourteen passed both standards. Beaches with the lowest bacteria counts were located near Seacrest Park and around the Duwamish Head area.

Sediment

Twelve offshore stations were sampled around the West Point Treatment Plant and six around the Carkeek Treatment Plant outfalls in order to meet NPDES requirements. Additional stations not required by NPDES requirements, including intertidal sediments, were sampled as well.

Sixteen metals were analyzed and some were either not detected (selenium and thallium) or seldom detected (antimony and silver). Arsenic, chromium, copper, lead, nickel, and zinc were detected in most samples; however, no concentrations exceeded Washington State Sediment Quality Standards (SQS) guidelines. Mercury was detected in the majority of samples and the station along the waterfront in Elliott Bay exceeded the SQS for mercury. Similar results have been obtained in previous sampling events for this station, where there is a known area of historical mercury contamination.

Of the 98 organic compounds analyzed, 24 were detected in offshore samples and 6 were detected in intertidal samples. Most of these compounds were polynuclear aromatic hydrocarbons (PAHs). Sampling generally showed the highest levels of organic compounds in the nearshore areas of Elliott Bay, however, no PAHs exceeded SQSs for these stations. One station located at the end of the West Point Treatment Plant outfall had two PAHs that exceeded SQSs: benzo(*g,h,i*)perylene and indeno(1,2,3-*c,d*)pyrene. One pesticide and three polychlorinated Aroclors (PCBs) were detected at two stations in Elliott Bay. The total PCB concentrations were below the SQS guideline. Organotins were infrequently detected in the offshore samples, with the exception of the Elliott Bay stations. Organotins, used in marine anti-fouling paints, are likely due to the proximity of these stations to the Elliott Bay Marina and ship traffic. The highest concentration, 228 µg/kg dry weight, was found at the station closest to the marina.

Three sediment toxicity tests were conducted on two of the West Point stations. The amphipod acute toxicity test passed standards for both stations. The chronic juvenile polychaete test indicated a reduction in individual and total dry weight and individual growth weight for the station at the end of the outfall but showed no reduction with respect to percent mortality for both stations. The echinoderm embryo acute toxicity test showed a significant difference between both stations and the reference station with respect to mortality and abnormal embryo development.

Shellfish

Shellfish from two point source and two ambient stations were analyzed for metals and organic compounds. Ten metals were detected and for the majority, concentrations varied only slightly between stations. State and federal criteria do not exist for acceptable levels of metals in shellfish tissues, however, the Food and Drug Administration (FDA) has established an Action Level in fish and shellfish tissues of 1.0 mg/kg for mercury. When this value is exceeded, the food product cannot be commercially traded. Mercury concentrations in shellfish were well below this Action Level. The FDA has also established guidance values termed "Levels of Concern" for mollusks for five metals: arsenic, cadmium, chromium, lead, and nickel. Shellfish results were below these Levels of Concern.

Of all the organic compounds analyzed, only benzoic acid was detected. Benzoic acid is a degradation product produced by metabolic processes and has always been detected in shellfish samples. No pesticides or PCBs were detected.

Fecal coliform concentrations varied from station to station and from month to month. Generally, stations near Seahurst and Carkeek Parks had the lowest values and the station at Alki Point had the highest value. The association between fecal coliform concentrations measured in shellfish and concentrations detected in water was examined and although there was a correlation for some stations and months, a consistent relationship was not evident.

Macroalgae

Algae samples were collected from seven stations (three point source and four ambient) and analyzed for metals. Six metals were either not detected or seldom detected. Six metals were detected in all samples (arsenic, cadmium, chromium, copper, nickel, and zinc) and no one station had consistently high values. Arsenic and copper were highest at the Magnolia station while zinc and nickel were highest at one of the West Point stations. Chromium was highest at the Richmond Beach station and cadmium highest at the Alki Point station. Concentrations detected in 1998 were similar to values detected in previous years with the exception of the nickel and zinc values at the West Point station; which were higher than previous values.

SECTION 1
INTRODUCTION TO THE KING COUNTY DEPARTMENT OF NATURAL RESOURCES WATER QUALITY MONITORING PROGRAM

OVERVIEW

The King County Department of Natural Resources invests heavily in water quality and water quality improvements through wastewater collection and treatment. As part of an intergovernmental effort to maintain and improve Puget Sound's water quality, King County oversees regional sewerage collection, treatment process, and disposal systems which discharge wastewater to the Central Puget Sound Basin and waters flowing into the Sound.

King County's Modeling, Assessment and Analysis Unit (MAA) supports an extensive marine and freshwater monitoring program. This program assesses water quality in the Central Basin of Puget Sound (provided in this report) and of the lakes and streams within King County (provided in a separate report). Primarily focusing on areas near the County's treatment plant outfalls, the marine monitoring program verifies that effluent discharges do not degrade water quality. Monitoring is extended to areas beyond the immediate vicinity of known discharges in order to assess the background, or ambient, conditions of central Puget Sound.

While the County's marine monitoring program focuses on water quality within King County boundaries, agencies such as Washington Department of Ecology (water and sediment quality), Washington Department of Fish & Wildlife (contaminants in fish tissues), and Washington Department of Health (shellfish growing areas) also monitor water quality in Puget Sound. These agencies have stations throughout the Sound. The main difference between these programs is that the County has a larger number of stations within a concentrated area and are targeted near wastewater treatment plant discharges. Although other agencies have monitoring stations located within King County; these stations do not overlap with the County's stations which allows a greater proportion of Puget Sound to be monitored.

This report summarizes the results of King County's National Pollutant Discharge Elimination System (NPDES) and ambient marine monitoring programs for 1998. This report is intended to provide an overview of the sites monitored, the matrices (e.g., water and sediment) sampled, and provide a summary of the analytical results. Also provided is a brief overview of the sampling area and wastewater collection and treatment processes which are relevant design elements of the County's sampling program.

SAMPLING AREA CHARACTERISTICS

Puget Sound is a fjord-like estuary that extends approximately 230 kilometers (km) in a north-south direction and is bordered by the Olympic mountains to the west and the Cascade mountain range to the east. The Sound consists of four major basins, including the Main (Admiralty Inlet and the Central Basin), Whidbey, Southern, and Hood Canal basins. Whidbey Basin is not a basin in the geological sense; its southern boundary is arbitrarily chosen to be an imaginary line running from Possession Point on Whidbey Island across the channel to Meadowdale in Snohomish County. The Sound's average depth is 106 meters (m). The Main Basin, with depths of greater than 280 meters, is shielded at the main entrance to the Sound by Admiralty Inlet Sill which impedes free exchange of deep waters. However, the Sound has near-oceanic salinity throughout the year, and is supplemented with cold, nutrient-rich, low-oxygen deep water upwelled off the coast of Washington during the summer months. Water from the Pacific Ocean enters the Sound through Admiralty Inlet and Deception Pass. Puget Sound contains approximately 168 billion cubic meters of water, with an average tidal change of 3.7 to 4.3 meters and an average water volume exchange of 8 billion cubic meters with each tidal cycle (King County, 1994). A mixed semi-diurnal tide, which is characterized by two unequal high tides and two unequal low tides occurring each day, dominates the tidal pattern within Puget Sound. These characteristics are conducive to maintaining overall favorable water quality conditions in Puget Sound.

King County's marine water study region is located within the Central Basin extending southwest to Tramp Harbor and southeast to Normandy Park, west to

Vashon Island, and north to Richmond Beach. Elliott Bay, a large urban embayment, is also located within King County.

Water quality in Puget Sound is influenced by many complex factors, including human activities, ocean currents, and physical, biological and chemical aspects. The physical characteristics of the Sound help to maintain good water quality in King County, despite the Sound's industrial use and proximity to urban areas. Offshore water samples consistently indicate good water quality, however, nearshore sediments tend to accumulate contaminants from industrial and urban processes. Sediment carried in runoff from land plays a much greater role in the water quality of Puget Sound than in most oceanic areas. Being surrounded by hills, lakes, and rivers in an urbanized area with substantial rainfall gives the Sound a multitude of complex sediment sources. The most common sediment source is from rivers. The twelve largest rivers entering the Puget Sound estuary deliver approximately 1.8 million cubic meters of sediment annually. Their suspended load is highest during winter and early spring when heavy seasonal precipitation from winter storms erodes soil from the surrounding lowlands. Sediment sampling generally shows the highest levels of organic compounds in the nearshore areas of Elliott Bay, where urban runoff from storm drains, industrial sources, and nonpoint sources is the greatest.

WASTEWATER COLLECTION AND TREATMENT

Wastewater from homes, businesses, and industries within King County is transported through pipelines that belong to local sewer agencies and then through King County's system of much larger pipelines (interceptors) to the treatment plants operated by King County. At the plants, solids are separated from liquids. The liquids are then treated, disinfected, and discharged into Puget Sound. The solids are treated and the resulting rich organic material, known as biosolids, can be recycled and used to enrich agricultural and forest soils.

The County provides wastewater treatment and disposal services to cities and local sewer and/or water districts and more than 200 million gallons of wastewater are transported and treated each day. To accomplish this, King County currently operates and maintains two wastewater treatment plants, two

combined sewer overflow (CSO) treatment plants, 37 pump stations, and 391 kilometers of pipelines (Figure 1-1). The West Point Treatment Plant (TP) and the South Plant (formerly known as the East Division Reclamation Treatment

Figure 1-1. King County Wastewater Treatment Plant Locations

Plant at Renton) provide primary and secondary wastewater treatment. The Alki and Carkeek CSO Treatment Plants store combined flow and later pump it to the West Point TP or provide the equivalent of primary treatment and disinfection for discharges. Prior to July 1998, the Alki facility operated as a wastewater treatment plant. Following conversion to a CSO treatment facility in July, there were no discharges from this plant until November 1998. King County took over operation of the Vashon Island Wastewater TP in November 1999. Since data collection provided in this report was prior to that time, no information on the Vashon Island TP will be presented in this annual report but will be included in the 1999 annual report.

The wastewater and CSO treatment plants have outfalls that discharge directly into Puget Sound marine waters. The Clean Water Act states that all wastewater collection and treatment facilities that discharge effluent into surface waters are required to have a National Pollutant Discharge Elimination System (NPDES) permit. In Washington, the Washington State Department of Ecology (Ecology) administers this program by delegation from the U.S. Environmental Protection Agency. An NPDES permit sets limits on the quality and quantity of treated wastewater that is discharged.

The Treatment Process

The goal of the wastewater treatment process is to restore wastewater coming into the treatment plant to a level that does not adversely affect receiving waters. Treatment is accomplished by removing solids (organic matter and debris such as rocks, sand, leaves, and sticks), biodegradable organics, and pathogenic organisms.

Organic matter is a major component of the sludge (biosolids) produced when the solids are separated from the wastewater during the treatment process. However, some organic matter (activation sludge) is reincorporated in the wastewater as "starter" for the biological treatment process. Bacteria in the Sound attack and degrade organic matter and in the process consume oxygen in

the water, thereby reducing the amount of oxygen available to fish and other aquatic life. The amount of oxygen that bacteria consume is known as the biochemical oxygen demand (BOD). It is important to keep the BOD to a minimum by removing the maximum amount of organic material possible in wastewater before discharge.

In primary wastewater treatment, physical processes remove most of the floating and settleable solids. As wastewater enters the plant it passes through bar screens that catch large objects and debris, such as sticks and plastics. The wastewater then enters a grit chamber allowing sand and gravel to settle to the bottom. The material that is collected from the grit chamber is washed, dewatered, and sent to a landfill for disposal. The wastewater then moves to a series of sedimentation tanks, much like quiet ponds, that allow solids to settle out and form what is called primary sludge. Machines skim off any material, such as oil and fats, that are left floating on the surface. The sedimentation tanks remove approximately 50 to 70 percent of the solids. The primary sludge is pumped out for further treatment and recycling. Wastewater is then sent on for secondary treatment.

The secondary treatment process removes most of the remaining settleable and dissolved organic matter by biological processes. Wastewater is directed into large aeration tanks which bubble air through the water—in the same way rapids and waterfalls aerate a natural stream. Microbes (microscopic organisms such as bacteria and protozoa) are stimulated to consume biodegradable organic matter in these aeration tanks. Secondary sedimentation tanks (secondary clarifiers) are then used to allow much of the microbes, solids, heavy metals, and organic chemicals to settle out. Settling usually takes between four and eight hours. Most of these settled solids are recirculated back through the secondary treatment process and the remaining solids are combined with primary sludge and converted into biosolids. Finally, the wastewater is disinfected with chlorine before being discharged. Most of the solids and pollutants have been removed from the final effluent. Figure 1-2 shows an overview of the treatment process.

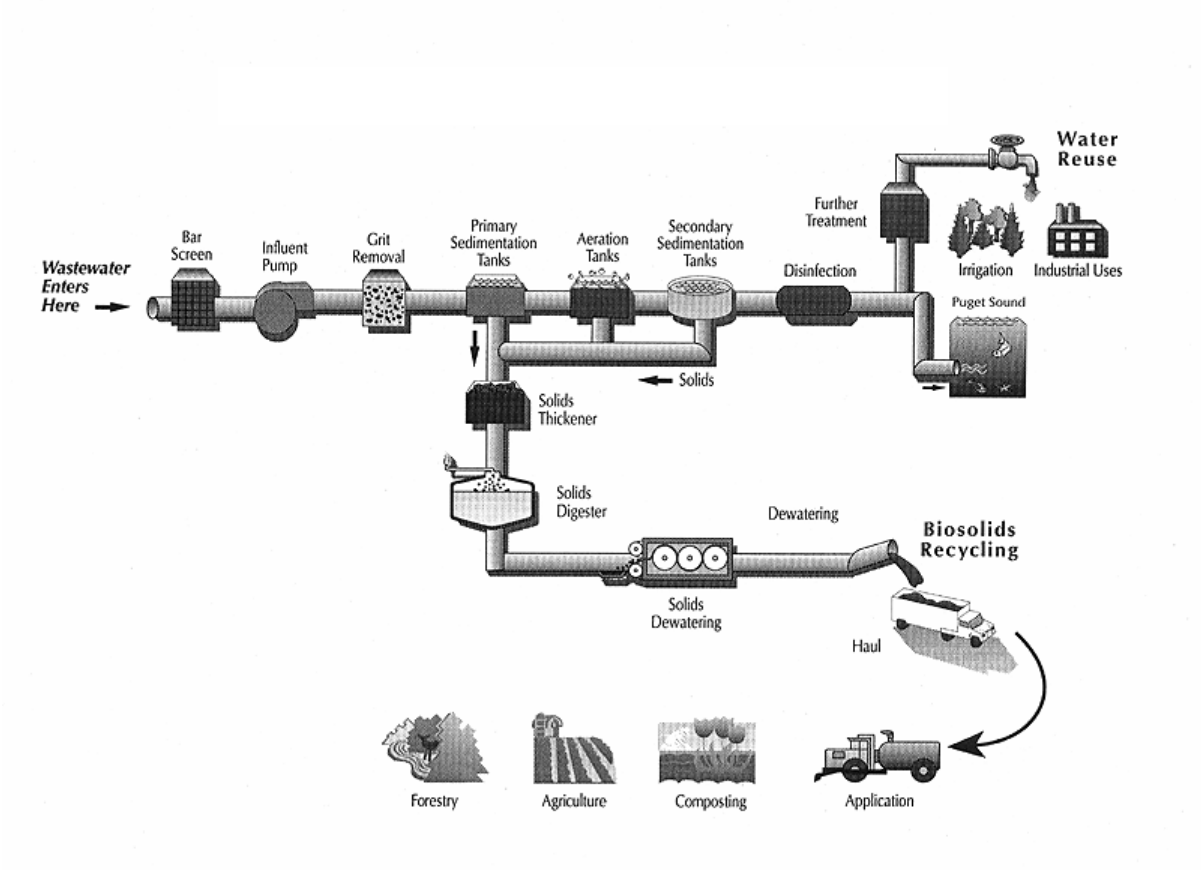

Figure 1-2. The Wastewater Secondary Treatment Process

Combined Sewer Overflows

Combined sewer systems carry both sanitary sewage and storm water runoff in a single pipe. Combining sewer systems was the standard practice until about the mid 1900s, therefore, all sewers built in Seattle from 1892 until the early 1940s were combined sewers. When new sewer systems are installed today, storm water is separated from residential, commercial, and industrial wastewater.

The City of Seattle originally built a combined sewerage system to collect wastewater and storm water for direct discharge into local water bodies following treatment. The city also built overflow pipes designed to discharge high volumes of untreated wastewater and storm water into the nearest water body during heavy rains when the storm-related flows exceeded the system's capacity. Today, remnants of the combined sewerage system are part of King County's wastewater collection system.

In combined sewer systems, trunk sewers and interceptors have fixed capacities while combined flow varies with the amount of rainfall. Consequently, during periods of heavy rain wastewater volumes may exceed the capacity of sewer pipes that transport the water to treatment plants. To prevent damage to the treatment plants and to prevent sewers from backing up into homes and businesses, combined sewers are designed to overflow at certain points. Typically, these overflows are designed so that the overflows are discharged to marine waters and rivers where the flushing action of tides and currents can disperse pollutants.

Several of these combined sewerage systems have been separated (such as the University Regulator) so that wastewater is transported to the nearest treatment plant and storm water is transported to a storm water facility before being discharged into local waters.

King County has a 600 million dollar program to lessen or remove CSO discharges. In addition to the two CSO treatment facilities (Alki and Carkeek) which capture and either store and pump the combined flow they receive to the West Point TP or treat and discharge it, there will be several additional treatment facilities built over the next 30 years which will lessen the amount of untreated wastewater entering Puget Sound waters.

SECTION 2
WATER QUALITY MONITORING PROGRAMS

In 1998, the King County Department of Natural Resources (DNR) operated two wastewater treatment plants and two CSO treatment plants with outfalls discharging directly into Puget Sound marine waters. The Clean Water Act states that all wastewater collection and treatment facilities that discharge effluent into surface waters are required to have a National Pollutant Discharge Elimination System (NPDES) permit. In Washington, the Washington State Department of Ecology (DOE) administers this program by delegation from the U.S. Environmental Protection Agency (EPA).

The NPDES permit sets limits on the quality and quantity of treated wastewater that is discharged through individual outfalls. In compliance with NPDES requirements and to verify that the facilities are meeting the goals of the Clean Water Act, King County has conducted an extensive point source monitoring program for over 20 years to assess the quality of each facility's effluent, the receiving water around each outfall, and nearby beaches.

Water quality may be affected by two types of pollution: point source and nonpoint source. Point source pollution is defined by its entry into the aquatic environment from a specific location, such as an outfall pipe, and can be generated from a variety of industrial and municipal facilities, such as sewage treatment plants and manufacturing facilities. Nonpoint source pollution comes from any source that is not a point source and includes runoff from streams, groundwater, storm water, etc. Land use, such as agricultural and urban usage, affects the quality of the runoff. King County's marine monitoring program is designed to assess potential effects from both types of pollution in both nearshore and offshore environments. The stations monitored by the program fall into one of two categories; ambient (or nonpoint source) and point source. Within these categories, stations are classified as either intertidal (littoral zone to mean lower low water) or offshore (bottom depth greather than 10 feet).

Observing conditions in areas that do not demonstrate direct effects from individual point sources provide essential background water quality data. King County has established a marine ambient monitoring program in the Central Puget Sound Basin, with stations well removed from the influence of point source discharges. King County's goals for ambient monitoring are to better

understand the regional water quality problems, establish priorities for preventative actions, and provide background data needed to identify trends that might indicate impacts from long-term cumulative pollution. An overview of the County's marine monitoring program is provided below in Figure 2-1 and can also be found in Table 2-1.

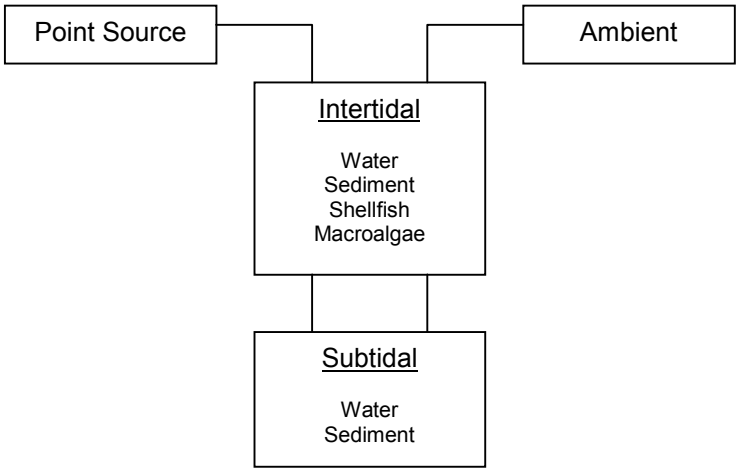

Figure 2-1. Overview of Matrices Sampled

AMBIENT AND POINT SOURCE MONITORING PROGRAMS

The ambient and point source monitoring programs focus on marine waters and their underlying sediments. Many marine pollutants are in particulate form. As these contaminated particles settle out of the water column, pollutant concentrations in the underlying sediments tend to increase. Most sources of contamination are found in nearshore areas where pollutants tend to accumulate in sediments close to these sources. Benthic organisms that live on or in contaminated sediments tend to accumulate these contaminants through contact or ingestion (bioaccumulation). Pollutants also tend to concentrate as they move from one trophic level to the next (biomagnification), as contaminated organisms become prey to animals higher up in the food web. Contaminated sediments have an important impact on human and marine environmental health, especially in nearshore areas which are generally high contact areas for marine organisms and people.

Table 2-1. Summary of 1998 Monitoring Program

Location	Matrix	Parameter	# of Stations Sampled *Ambient*	*Point Souce*
Intertidal	Water	Bacteria	16	6
	Sediment	Organics	3	3
		Metals	3	3
		Conventionals [1]	3	3
	Shellfish	Organics	2	2
		Metals	2	2
		Bacteria	6	3
	Macroalgae	Metals	4	3
Subtidal	Water	Bacteria	5	5
		GWQP [2]	5	5
	Sediment	Organics	10	19
		Metals	10	19
		Conventionals	10	19
		Benthic infauna	--	6
		Toxicity tests	--	2

[1] Conventionals include total solids, total volatile solids, total sulfide, total organic carbon, and grain size.
[2] GWQP = general water quality parameters.

Nutrients and pathogens which may cause water quality problems in marine waters are also typically seen in nearshore area in the vicinity of contamination sources. While excess nutrients do not cause immediate harm to organisms living in the water column, excess nutrients can increase the amount of phytoplankton and algae which can deplete oxygen to levels incapable of sustaining aquatic organisms when it decays.

Marine Ambient Monitoring Program

The 1998 ambient monitoring program included sampling and analysis of intertidal and offshore water, sediment, shellfish tissue, and macroalgae collected from 32 stations (see Table 2-1). This program provides background information for comparison of data obtained from the point source monitoring

program. Parameters measured included physical properties such as water clarity and temperature, and nutrient abundance (nitrogen and phosphorus compounds as well as silica). Dissolved oxygen, chlorophyll, and bacteria were also monitored. Organic compounds (e.g., polynulcear aromatic hydrocarbons, pesticides, and polychlorinated biphenyls), metals, and bacteria were monitored in intertidal and subtidal sediments. Figure 2-2 shows ambient monitoring station locations and Table 2-2 gives a summary of parameters measured at each station. Station coordinates are given in Appendix E.

Marine Point Source Monitoring Program

King County collected subtidal water, sediment, shellfish tissues, and macroalgae samples for the 1998 point source monitoring program at 29 stations. Point source stations include those that are required by the County's NPDES permit (eg., subtidal sediment sites near the West Point Treatment Plant outfall) and those that are not required but are in close proximity to point source discharges (eg., intertidal stations near the West Point Treatment Plant). Station locations are presented in Figure 2-3 and station coordinates are provided in Appendix E.

Water was analyzed for temperature, salinity, water clarity, dissolved oxygen, nutrients, chlorophyll and bacteria. Sediment was analyzed for organic compounds, metals, conventional parameters (such as total organic carbon, total sulfides, and grain size). Benthic infauna and toxicity tests were also conducted for several stations (Table 2-3).

Both fecal coliform and enterococcus bacteria were measured in water, sediment, and shellfish tissues. Enterococcus is being considered as an indicator of bacterial contamination in marine waters, therefore, both types of bacteria were analyzed in anticipation of possible changes in bacterial monitoring procedures. Although there are no regulatory standards for fecal coliform bacteria in shellfish tissues, samples were analyzed for informative purposes.

Figure 2-2. 1998 Ambient Monitoring Stations

Table 2-2. 1998 Ambient Monitoring Stations and Parameters Measured

STATION	LOCATION	OFFSHORE/ INTERTIDAL	SEDIMENT			WATER		SHELLFISH			ALGAE
			Organics*	Metals	Conventional	Bacteria	GWQP **	Organics	Metals	Bacteria	Metals
KSBP01	Point Jefferson	Offshore				◆	◆				
KSRU02	LW Ship Canal	Offshore				◆	◆				
LSNT01	Dolphin Point	Offshore				◆	◆				
JSTU01	Point Wells	Offshore				◆	◆				
KSPS01	Shilshole Bay	Offshore	◆	◆	◆						
LSML01	West Seattle	Offshore	◆	◆	◆						
LTDF01	inner Elliott Bay	Offshore	◆	◆	◆						
LSCI01	central basin	Offshore	◆	◆	◆						
LSCK01	central basin	Offshore	◆	◆	◆						
LSCW02	outer Elliott Bay	Offshore	◆	◆	◆						
LSDZ01	inner Elliott Bay	Offshore	◆	◆	◆						
LSEZ01	inner Elliott Bay	Offshore	◆	◆	◆						
LTCA02	inner Elliott Bay	Offshore	◆	◆	◆						
LTED04	Elliott Bay	Offshore	◆	◆	◆	◆	◆				
JSWX01	Richmond Beach	Intertidal				◆					
JSVW04	Richmond Beach	Intertidal	◆	◆	◆	◆		◆	◆	◆	◆
KSXS02	Magnolia	Intertidal	◆	◆	◆						◆
KSUR01	Magnolia bluff	Intertidal									◆
MTEC01	Seahurst Park	Intertidal	◆	◆	◆	◆				◆	
KSLU03	Golden Gardens	Intertidal				◆				◆	
MTLD03	Normandy Park	Intertidal				◆		◆	◆	◆	
MSSM05	Tramp Harbor	Intertidal				◆				◆	
KRJY01	Fay Bainbridge	Intertidal				◆				◆	
KSQU01	Shilshole Bay	Intertidal				◆					
KSYV02	Magnolia	Intertidal				◆					◆
LTAB01	inner Elliott Bay	Intertidal				◆					
LTEH02	inner Elliott Bay	Intertidal				◆					
LSGY01	Seacrest	Intertidal				◆					
LSFX01	Duwamish Head	Intertidal				◆					
LSHV01	West Seattle	Intertidal				◆					
LSTU01	Lincoln Park	Intertidal				◆					
LSVW01	Fauntleroy Cove	Intertidal				◆					

* Includes semi-volatile organics, pesticides, and PCBs.
** GWQP = general water quality parameters

Figure 2-3. 1998 Point Source Monitoring Stations

Table 2-3. 1998 Point Source Monitoring Stations and Parameters Measured

			SEDIMENT				WATER		SHELLFISH			ALGAE
STATION	LOCATION	OFFSHORE/ INTERTIDAL	Organics *	Metals	Conventional	benthic comm	Bacteria	GWQP **	Organics	Metals	Bacteria	Metals
WP430N	West Point outfall	Offshore	◆	◆	◆							
WP215N	West Point outfall	Offshore	◆	◆	◆							
WP230P	West Point outfall	Offshore	◆	◆	◆							
WP215S	West Point outfall	Offshore	◆	◆	◆							
WP430S	West Point outfall	Offshore	◆	◆	◆							
WPD430N	West Point outfall	Offshore	◆	◆	◆	◆						
WPD215N	West Point outfall	Offshore	◆	◆	◆	◆						
WP230D	West Point outfall	Offshore	◆	◆	◆	◆						
WPD215S	West Point outfall	Offshore	◆	◆	◆	◆						
WPD430N	West Point outfall	Offshore	◆	◆	◆	◆						
WP1500N	West Point outfall	Offshore	◆	◆	◆							
WP1500S	West Point outfall	Offshore	◆	◆	◆	◆						
KSSK02	West Point outfall	Offshore					◆	◆				
KSSN04	West Point	Intertidal	◆	◆	◆		◆		◆	◆	◆	◆
KSSN05	West Point	Intertidal					◆					◆
LSEP01	Renton outfall	Offshore					◆	◆				
CP245/W310	Carkeek Park	Offshore	◆	◆	◆							
CP246/W312	Carkeek Park	Offshore	◆	◆	◆							
CP246/W315	Carkeek Park	Offshore	◆	◆	◆							
CP246/W319	Carkeek Park	Offshore	◆	◆	◆							
CP248/W308	Carkeek Park	Offshore	◆	◆	◆							
KSIV01	Carkeek Park	Offshore	◆	◆	◆							
KSIW02	Carkeek Park	Offshore					◆	◆				
KSHZ03	Carkeek Park	Intertidal	◆	◆	◆		◆				◆	
KTHA01	Carkeek Park	Intertidal					◆					
LSKR01	Alki Point	Intertidal	◆	◆	◆		◆		◆	◆	◆	◆
LSKS01	Alki Point	Intertidal					◆					
LSKQ06	Alki outfall	Offshore					◆	◆				
LTBC41	Denny Way	Offshore	◆	◆	◆		◆	◆				

* Includes semi-volatile organics, pesticides, and PCBs. Organotins were analyzed for subtidal sediments.
** GWQP- general water quality parameters.

WATER COLUMN MONITORING

Water column monitoring is an important component of the County's water quality monitoring programs and is structured to detect natural seasonal changes in the water column as well as identify changes from anthropogenic input. General water quality parameters (temperature, salinity, transparency, dissolved oxygen, chlorophyll-*a*, phaeopigment, ammonia, nitrate+nitrite, total phosphorus, silica, and total suspended solids) are monitored at multiple depths for ten sites. Temperature, salinity, and bacteria are the only parameters measured at station KSRU02 located near the mouth of the Lake Washington Ship Canal. Bacteria are monitored at all 32 sites.

Bacteria

Biologists and agencies responsible for protecting public health define water quality in terms of several variables, one of those being the presence of bacteria. Fecal coliform bacteria are found in the feces of humans and other warm-blooded animals. These bacteria may enter the aquatic environment directly from humans and animals, from agricultural and storm runoff, and from wastewater. Although fecal coliform bacteria are usually not pathogenic, they may occur along with disease-causing bacteria so their presence indicates the potential for pathogenic bacteria to be present. Generally, a high fecal coliform count suggests that there is a greater possibility for pathogenic bacteria to be present. Fecal coliform bacteria are typically found in higher numbers than pathogenic bacteria and are easier and safer to test in the laboratory.

Regulatory standards have been established for acceptable levels of fecal coliform bacteria for various water uses, including recreation and fish and wildlife habitat. It should be noted that although fecal coliform bacteria are commonly used as an indicator for the presence of pathogens, there are limitations to the use of these data. There is no recognized numerical association between the number of fecal coliform bacteria and the number of pathogens measured in a sample. In addition, the presence of viruses and naturally occurring toxic organisms (such as dinoflagellates) are not indicated by the presence of fecal coliforms, therefore, these organisms must be measured independently.

Temperature and Salinity

Water temperature is an important factor in an estuary. As water temperature rises, biological and chemical activity increases while the capacity of water to hold dissolved oxygen decreases. Water temperature is dependent upon various factors, including depth, season, amount of mixing from tides, wind, storms, amount of freshwater input, and degree of stratification.

Both temperature and salinity influence water column stratification, although salinity is more important in determining stratification in estuaries. Estuaries usually exhibit changes in salinity as freshwater input increases or decreases. Salinity also fluctuates with tides, amount of input of high salinity water from deep Pacific oceanic water, amount of precipitation, and degree of water column mixing from winds. Generally, salinity increases with water depth unless the estuary is well-mixed.

Dissolved Oxygen

Dissolved oxygen concentration is an important factor controlling the presence or absence of marine species. Aquatic plants and animals require a certain amount of oxygen dissolved in the water for respiration and basic metabolic processes. Waters that contain high amounts of dissolved oxygen are generally considered healthy ecosystems and are capable of sustaining various species of aquatic organisms.

Several factors influence dissolved oxygen concentrations. Seasonal climatic fluxuations can cause water temperature to rise in the spring and summer, reducing the capacity of water to hold dissolved oxygen. In winter, deep oceanic water from the Pacific Ocean containing naturally low levels of oxygen enters Puget Sound. Moreover, anthropogenic input of organic matter and phytoplankton decay may decrease levels of oxygen. Bacteria that utilize organic matter for food consume dissolved oxygen. Hypoxia results when the rate of oxygen consumption mostly by bacteria decomposing organic material in the water column exceeds the rate of oxygen production by photosynthesis and by replenishment at the air/water interface from the atmosphere. When the system is overloaded with organic material, oxygen consumption by bacteria may increase to the point where conditions can no longer support marine life (eutrophication), putting fish and other aquatic organisms at risk.

Transparency

Transparency (or water clarity) is measured to determine the depth to which enough light penetrates to support plant growth (euphotic zone). Several factors affect transparency including the amount of suspended silt and soil particles and the amount of phytoplankton and zooplankton in the water column. In addition to transparency, total suspended solids are also monitored. Freshwater input (particularly after storms) and wave action also affect transparency. Low transparency conditions which persist over an extended period of time can degrade the health of a water body as the decreased amount of light penetration reduces the area for aquatic plants and primary producers to grow. In addition, many marine organisms feed by filtering water and large amounts of suspended matter may obstruct their filter-feeding systems.

Nutrients

The addition of nutrients, such as nitrate and phosphate, into marine waters can have a considerable effect on the water quality, particularly for nearshore habitats where nutrient input typically occurs and tends to be confined. Nutrients may enter marine waters from wastewater discharges, nonpoint runoff, and from riverine and oceanic sources. The greatest impact these nutrients may have is the sudden increase in aquatic plant growth, or biomass.

The amount of light that penetrates the water column and the amount of nutrients in the water column affect phytoplankton growth. Nitrogen is the primary limiting nutrient that determines the growth of phytoplankton in marine waters (Valiela, 1984). Although nitrogen occurs naturally in the marine environment, abnormal increases from sources such as wastewater or fertilizers can cause significant increases in phytoplankton growth. An increase in phytoplankton biomass may cause a decline in dissolved oxygen as the phytoplankton cells respire and decay. This depression in dissolved oxygen levels can become critical in areas of reduced circulation. The marine waters within King County have not experienced any significant eutrophication problems, mainly due to the high degree of mixing in the central basin of Puget Sound (PSWQAT, 2000).

Nitrogen Compounds. Nitrate, nitrite, and ammonium are forms of inorganic nitrogen used by phytoplankton in the aquatic environment. Nitrates and

nitrites are formed through the oxidation of ammonium by nitrifying bacteria. As mentioned above, nitrogen is usually the limiting nutrient in marine waters. Therefore, an increase in nitrogen compounds could lead to phytoplankton blooms. When blooms occur, water conditions (such as reduced water clarity and dissolved oxygen) may become unfavorable for aquatic organisms. Input of nitrogen compounds may originate from sources such as wastewater from municipal discharges and agricultural runoff.

Phosphorus. Phosphorus is an essential element for aquatic plants and a fundamental element in the metabolic process for both plants and animals. Total phosphorus includes both organic phosphorus and inorganic phosphate. Inorganic phosphates are rapidly taken up by algae and other aquatic plants, although phosphates are usually not the limiting nutrient in marine waters. However, large inputs could cause algal blooms which could lead to unfavorable conditions. Sources of phosphorus potentially entering the marine environment include wastewater from municipal discharges, industrial wastes, nonpoint agricultural runoff, rivers and streams, and the Pacific Ocean.

Silica. Silica is a micronutrient needed by diatoms, radiolarians, some sponges and other siliceous organisms for skeletal growth. Silica can be used as an indicator of plankton blooms, along with chlorophyll-*a*, as silica concentrations will decrease in the photic zone from an increase in phytoplankton uptake. Sediments act as a sink for silica which may be regenerated by various physical and biological processes and reused by organisms on the seafloor and in overlying waters.

Chlorophyll and Pheopigments

Chlorophyll-*a* is a green pigment used by algae and green plants during the process of photosynthesis to convert light, carbon dioxide, and water to sugar. Chlorophyll-*a* concentration is the most direct indicator of phytoplankton biomass since all marine planktonic algae contain this photosynthetic pigment. However, chlorophyll-*a* concentrations are not an exact assessment of phytoplankton abundance. The ratio of phytoplankton biomass to chlorophyll varies with species, nutritional status, and environmental conditions. Pheopigments, such as pheophorbide-*a* and pheophytin-*a*, are degradation products of chlorophyll and are produced when phytoplankton cells are grazed upon by zooplankton. High concentrations of pheopigments relative to

chlorophyll a indicate a high level of grazing in an aquatic ecosystem. Several factors influence phytoplankton abundance, including amount of solar radiation, extent of grazing, water temperature, nutrient availability, and water column stratification.

Water Column Sampling Methods

Field Methods. Subtidal water column samples were collected in accordance with the *Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissues in Puget Sound* (PSEP, 1996) by the King County Environmental Services Section. A brief description is provided below.

Subtidal water samples were collected from the *R/V Liberty*, a 42-ft boat, equipped with a hydraulic crane on the rear-deck. From January to the end of October, samples were collected by mounting 5-liter Niskin bottles at specified depths on a weighted hydro-wire and lowering the bottles using a hydraulic boom. Once the bottles were in place, the boom operator inititated the tripping sequence by releasing a messenger on the wire. Bottles were retrieved and samples immediately placed into sample containers. Starting at the end of October, subtidal water column profiles were sampled by a SeaBird Electronics Model 25 conductivity-temperature-depth (CTD) profiler. Parameters measured by the CTD included: temperaure, salinity, density, dissolved oxygen, photosynthetically active radiation (PAR), optical backscatterance, and chlorophyll-*a*. The CTD was lowered into the water using a hydraulic boom and allowed to equilibrate for 5 minutes at the surface before being lowered to a few meters from bottom depth. Five-liter Niskin bottles were mounted onto the CTD for collecting discrete water samples at predetermined depths for nutrients, total suspended solids, and bacteria samples. The CTD was electronically programmed to trip individual bottles at specific depths. All bottles were programmed to trip as the CTD ascended through the water column. The CTD was then brought on deck and discrete water samples were immediately drawn from the Niskin bottles and placed into appropriate sample containers. Dissolved oxygen samples were immediately preserved with a minimum of 2 milliliters (mL) of $MnSO_4$ (manganous sulfate) and 2 mL of AIA (alkali iodide azide), then stored in the dark. With the exception of dissolved oxygen bottles, sample containers were stored on ice until delivered to the King County Environmental Laboratory.

Transparency (water clarity) measurements were collected using an 8-inch-diameter black-on-white Secchi disk. Secchi depths were recorded to the nearest 0.5 meter. As readings may vary depending upon environmental conditions (e.g., waves and glare) and the individual collecting the reading, all field crew were trained to collect measurements using the same procedure. From January to the end of October, temperature measurements were obtained with a digital thermometer and recorded to the nearest tenth of a degree Celsius (^{o}C). From the end of October to the end of December, temperature measurements were collected using the CTD.

Intertidal water samples were collected by inverting sampling bottles just below the water surface and then capping the bottle before removing the container. Samples were collected from approximately knee-deep water when possible. At some sites where accessibility is difficult, such as LTAB01 located in Elliott Bay, samples were collected with a container lowered on a rope and then transferred into the sample container.

Laboratory Methods. With the exception of temperature, Secchi disk transparency, and CTD parameters which were measured in the field, all water column parameters were analyzed at the King County Environmental Laboratory. Laboratory methods and detection limits are provided in Table 2-4.

Fecal coliform and enterococcus bacteria were analyzed according to Standard Methods 9222D and 9230C, respectively (APHA, 1992).

All samples were analyzed within their respective hold times and quality assurance/quality control procedures included the use of blanks, duplicates, and spikes where appropriate. All data were reviewed by section supervisors prior to entry into the LIMS (Laboratory Information Management System) database.

SEDIMENT MONITORING

Sediment monitoring is a component of the County's ambient and point source monitoring programs as many pollutants (organics and trace metals) tend to be associated with particles that settle out onto bottom sediments. At sufficient concentrations, these compounds may be harmful to benthic organisms and may be bioaccumulated. Conventional parameters (total solids, total volatile solids,

Table 2-4. Laboratory Methods and Detection Limits for General Water Quality Parameters

Parameter	Units[1]	MDL[2]	RDL[3]	Method [4]
Salinity	psu	0.005	0.01	SM2520-B
Dissolved Oxygen	mg/L	0.5	1	SM4500-O-B
Chlorophyll-*a*	mg/m^3	0.01	0.05	SM10200-H
Phaeophytin	mg/m^3	0.01	0.05	SM10200-H
Ammonium (NH_4^+)	mg/L	0.02	0.04	SM4500-NH3-H
Nitrite+Nitrate (NO_3+NO_2)	mg/L	0.05	0.1	SM4500-NO3-F
Total Phosphorous	mg/L	0.005	0.01	SM4500-P-B,E
Total Suspended Solids (TSS)	mg/L	0.5	1	SM2540-D
Silica (SO_4)	mg/L	0.05	0.1	SM4500-SI-D

[1]psu = practical salinity units
mg/L = milligram per liter
mg/m^3 = milligram per meter cubed
[2] MDL = method detection limit
[3] RDL = reported detection limit
[4] Source = APHA 1992

grain size distribution, total organic carbon, and total sulfides) are also monitored as these parameters affect the bioavailability and/or toxicity of pollutants as well as influence the concentration of pollutants accumulated. A more detailed description of why conventional parameters are measured is provided below.

Total Solids

Total solids are the inorganic and organic particles remaining after a sediment sample has been dried. This parameter is measured in order to convert chemical concentrations from a wet weight to a dry weight basis for uniformity.

Total Volatile Solids

Volatile solids are primarily organic solids that burn in the presence of oxygen at a given temperature (usually 550 or 600 ^oC). The solids or ash remaining behind is comprised of the non-volatile or fixed solids. The volatile solid value is used as an estimate of organic matter in a sample.

Grain Size Distribution

This is a measure of the size range of particles contained in a given sample. Grain size is usually separated into four main categories: silt, clay, sand, and gravel. Grain size has an influence on chemical concentrations found in sediments and sediments with a large proportion of small particles (silt and clay) tend to have higher chemical concentrations.

Total Organic Carbon

This is a measure of the total amount of particulate and nonparticulate organic carbon contained in a sample. In the same manner as grain size, total organic carbon also has an influence on chemical concentrations contained in sediments. The higher the organic carbon content, the higher chemical concentrations tend to be. This is particularly true for organic compounds.

Total Sulfides

Sulfides are formed by the anaerobic breakdown of organic matter. Total sulfides represent the amount of all sulfide compounds in a given sample, and are measured as they may be toxic to some benthic organisms at low concentrations and can create unaesthetic conditions for humans.

Sediment Sampling Methods

Field Methods. Subtidal sediment samples were collected by the King County Environmental Services Section from the *R/V Liberty*, a 42-foot boat equipped with a hydraulic crane on the rear-deck. Samples were collected with two stainless steel 0.1-m^2 modified van Veen grab samplers deployed in tandem. The sampler was decontaminated between sites by scrubbing with a brush to remove excess sediment, followed by an on-board rinsing and thorough *in-situ* rinsing. If sample acceptability criteria were met, the top two centimeters of sediment from a minimum of five subsamples were composited and homogenized before transference to the appropriate sample containers. Sediment samples were collected in accordance with the *Puget Sound Estuary*

Program (PSEP) Recommended Protocols (PSEP, 1996) and the County's *Standard Protocol for Marine Sediments* (King County, 1997).

Intertidal samples were collected by hand-held core tubes. Once the required sample amount was obtained, sediments were homogenized in a stainless steel bowl before being transferred to appropriate sample containers. All sampling equipment was site-specific and not reused. All samples were stored on ice until submitted to the laboratory.

Amphipods used for toxicity testing were collected off West Beach on Whidbey Island at a water depth of 60 meters or less. Contents of the van Veen sampler were sieved through a 1-mm stainless screen. The retained amphipods were then washed into a clean cooler containing unsieved sediment and seawater from the collection site. Upon arrival at the laboratory, the cooler was placed in a 15°C environmental chamber.

Laboratory Methods. The King County Environmental Laboratory analyzed all chemical parameters with the exception of particle size distribution and total sulfide. These two analyses were performed by a subcontracted laboratory. Methods and detection limits are provided in Table 2-5. All metals were analyzed using inductively coupled plasma (ICP) emission spectrometry with the exception of mercury. Mercury was analyzed by cold-vapor atomic absorption spectrophotometry. Semivolatile organics were extracted with an organic solvent and then analyzed by gas chromatography/mass spectrometry (GC/MS). Pesticides and PCBs were extracted with organic solvents and then analyzed using a gas chromatograph equipped with an electron capture detector (ECD). All samples were analyzed within their respective hold times and quality assurance/quality control procedures included the use of blanks, duplicates, and surrogates and spikes where appropriate. All data were reviewed by section supervisors prior to entry into the LIMS database.

Sediment toxicity tests are performed on sediments collected from around the wastewater treatment plant outfalls which exceed state standards for chemical parameters. Three sediment toxicity tests were performed in 1998. A 10-day acute toxicity test using the amphipod *Rhepoxynius abronius* was conducted by the KCEL according to *Recommended Guidelines for Conducting Bioassays on Puget Sound Sediments* (PSEP, 1995). Mortality is the primary endpoint for this test. Sublethal endpoints, such as emergence of amphipods during the

Table 2-5. Laboratory Methods and Detection Limits for Sediment Parameters

Parameter	Units	MDL	Method
Total Solids	%	0.005	SM2540-G
Total Volatile Solids	%	0.005	SM2540-G
Total Oil & Grease	mg/kg	100	SM5520-B
Total Organic Carbon	mg/kg	5	SM5310-G
Total Sulfide	mg/kg	10	SM4500-S
Metals, total, ICP	mg/kg	variable[1]	Metro 16-02-004
Mercury, total, CVAA	mg/kg	0.019	Metro 16-01-001
Semivolatile Organics	µg/kg	variable[1]	SW 846 8270
Pesticides/PCBs	µg/kg	variable[1]	SW 846 8080
Organotins	µg/kg	0.3	NAOO, 1989
Grain Size Distribution	%	---	PSEP, 1991

[1]Detection limits vary with parameter analyzed. Detection limits for individual samples and analytes are provided in Appendix B.

exposure period and failure to rebury in sediment at the end of the test were also recorded.

A 96-hour acute toxicity echinoderm embryo test using the sea urchin *Strongylocentrotus purpuratus* was also conducted by the KCEL according to *Standard Guide for Conducting Statis Acute Toxicity Tests with Echinoid Embryos* and *Recommended Guidelines for Conducting Bioassays on Puget Sound Sediments* (PSEP, 1995). Sea urchins were obtained from a commercial supplier. A combined measure of mortality and abnormal development (effective mortality) is the primary endpoint for this test.

A 20-day chronic toxicity test using the juvenile polychaete, *Neanthes arenaceodentata*, was conducted by a subcontract laboratory according to Protocol for Juvenile Neanthes Sediment Bioassay (EVS, 1995) and *Recommended Guidelines for Conducting Bioassays on Puget Sound Sediments* (PSEP, 1995). The juvenile polychaetes were obtained from a laboratory culture supllied by the subcontract laboratory. The endpoints for this test were survival and growth (change in dry weight).

Specific quality assurance/quality control procedures for all three toxicity tests may be found in the *1998 NPDES Sediment Baseline Monitoring Plan for the West Point Outfall-Sampling and Analysis Plan* (King County, 1998).

SHELLFISH AND ALGAE

The uptake of contaminants by marine organisms occurs through ingestion of food and detrital particles, water exchange at feeding and respiratory surfaces, and adsorption of chemicals onto body surfaces. These contaminants may be stored in skeletal material, concretions, and soft tissues (Kennish, 1998). Biological monitoring is a component of the County's ambient and point source monitoring programs, as contaminants may be bioaccumulated by shellfish and algae.

Clam tissues are monitored for organic and metal contaminants and bacteria (fecal coliform and enterococcus). These measurements provide an indication of potential impacts to both shellfish and to humans that consume them. Chlorinated organics (chlorine atoms attached to organic compounds) have been used in pesticides since the 1940s and tend to accumulate in lipid tissue. Percent lipids in shellfish are also monitored as this parameter affects the concentration of organic pollutants accumulated.

Algae are monitored for metals as it is well documented that algae absorb metals directly from seawater (Phillips, 1994; Hou and Yan, 1998). Algae are used as a biomonitor to assess metal concentrations in intertidal areas as it is difficult to measure metal concentrations in seawater.

Shellfish and Algae Sampling Methods

Field Methods. The King County Environmental Services Section collected shellfish samples. Butter clams from each sampling station were collected by digging with shovels in the vicinity of siphon holes. A tarp was placed next to the digging site and excavated sediment was placed on the tarp to minimize disturbance to other organisms. The sediment was replaced after clams of sufficient size were removed. After the required amount of shellfish was obtained, the clams were placed in watertight plastic bags and stored on ice until delivered to the laboratory. Clams collected for metals and organics

analyses were wrapped in aluminum foil prior to placement in plastic bags. A minimum of five butter clams (*Saxidomus giganteus*) were collected for each composite sample, with a minimum of 100 grams of tissue necessary for analysis.

Algae samples were collected by the King County Environmental Services section. Algae samples, composed entirely of *Ulva fenestrata*, were collected in glass jars and consisted of only attached healthy algae (i.e., discolored or free-floating algae were not collected). It is the sampling policy to collect only the most prevalent edible algae wherever possible, and there was sufficient *Ulva fenestrata* at all the sampling stations to adhere to this policy. After the required amount of algae were obtained, the jars were stored on ice until delivered to the laboratory.

Laboratory Methods. Shellfish samples were processed in accordance with PSEP recommended protocols (PSEP, 1996). Before the clams were opened, the shells were cleaned with a brush and tap water to remove sand and other material adhering to the shells. The shells were then given a final rinse with deionized water. Tissues from each clam were removed with stainless steel scalpels, composited with their liquor, and then homogenized with a stainless steel blender. Samples were frozen until analyzed with the exception of the sample portion removed for fecal coliform analysis. The fecal coliform and enterococcus analyses were initiated immediately following processing.

Algae samples were processed at the King County Environmental Laboratory. Algae were rinsed with deionized water to remove sand and other material adhering to the blades. Sample portions obtained for each station were processed in a stainless steel blender. Samples were then frozen until analyzed.

The King County Environmental Laboratory analyzed all shellfish and algae parameters. Methods and detection limits are provided in Table 2-6. All metals were analyzed using ICP emission spectroscopy with the exception of mercury. Mercury was analyzed by cold-vapor atomic absorption spectrophotometry. Semi-volatile organics were extracted with an organic solvent and then analyzed by GC/MS. Pesticides and PCBs were extracted with organic solvents and then analyzed using a GC equipped with an ECD. Bacteria samples were processed within eight hours of sample collection and analyzed by multiple-tube fermentation technique.

All samples were analyzed within their respective hold times and quality assurance/quality control procedures included the use of blanks, duplicates, and surrogates and spikes where appropriate. All data were reviewed by section supervisors prior to entry into the LIMS database.

Table 2-6. Laboratory Methods and Detection Limits for Shellfish and Algae

Parameter	Units	MDL	Method
Total Solids	%	0.005	SM2540-G
Total Lipids	%	0.1	KCEL OR 07-01-001
Metals, total, ICP-MS	mg/kg	variable[1]	KCEL 16-02-003
Mercury, total, CVAA	mg/kg	0.004	KCEL 16-01-003
Semivolatile Organics	µg/kg	variable[1]	SW 846 8270
Pesticides/PCBs	µg/kg	variable[1]	SW 846 8080
Fecal Coliform Bacteria	MPN/100g	20	KCEL MC 6.1.2
Enterococcus Bacteria	MPN/100g	20	KCEL MC 6.3.2

[1]Detection limits vary with parameter analyzed. Detection limits for individual samples and analytes are provided in Appendix C.

BENTHIC INFAUNA

Marine benthic communities are useful indicators of sediment quality as they spend the majority of their lives in direct contact with sediments. Benthic organisms can accumulate harmful metal and organic pollutants by ingesting contaminated sediment, eating contaminated prey, or by adsorbtion from the overlying or pore water. There is potential for contaminants to be passed up the food web to other organisms, since benthos are themselves food for fish and other animals.

Benthic communities can be investigated in many ways. Diversity indices, which are a reflection of the numbers and abundances of individuals within a community, are a common and useful method of assessing communities. Total abundance, or the total number of organisms, as well as total species abundance are other ways of describing communities.

Benthic community analysis was conducted in 1998 as part of King County's NPDES monitoring to determine if the wastewater discharge at West Point is having an impact on the surrounding benthos. Samples were collected from six sites around the outfall. Sediment chemistry analysis was conducted concurrent with benthic sampling. Communities were investigated by calculating diversity indices, calculating total and species abundances, looking at populations of pollution tolerant and sensitive species, and by determining proportion of individuals in major taxonomic groups. Spatial variation and correlation with physical conditions (sediment grain size, water currents) was also explored.

Field and Identification Methods

Samples were collected using the entire contents of a single 0.1 m^2 van Veen grab. Three replicates samples were collected at each site. After collection, samples were immediately sieved through a 1 millimeter screen and all material retained on the screen was preserved with 10% buffered formalin. Samples were later rinsed of formalin and stored in 70% alcohol. Preserved animals were sorted into the major taxonomic groups: Polychaeta, Crustacea, Mollusca, and miscellaneous (e.g., echinoderms, nemerteans, sipunculans). Samples were then sent out to taxonomic experts for further identification.

All animals were identified to the lowest possible taxonomic level, usually species. Identifications were performed by Jeff Cordell (Crustacea), Kathy Welch (Polychaeta), Allan Fukuyama (Mollusca), Valerie Hironaka and Allan Fukuyama (Echinodermata and misc.), and Phil Lambert (Holothuroidea). Quality assurance identifications were performed by Kevin Li (Crustacea), Eugene Ruff (Polychaeta), Susan Weeks (Mollusca), and Scott McEuen (Echinodermata and misc.).

Following identification, the data set was reviewed and some species were eliminated as they represented incidental catches (e.g., nematodes), were pelagic species (e.g., copepods), or were colonial organisms that could not be accurately quantified (e.g., bryozoans and ascidians). It should be noted that colonial organisms were included in the tabulated data as either present or absent but elimated from the calculation of diversity and abundance indices.

REGULATORY STANDARDS

Regulatory standards and guidelines for water quality have historically focused on those parameters that are of concern to human health. As a result, monitoring programs and criteria were concerned with bacteriological characteristics of surface waters. The focus of water quality guidelines has since expanded to include the health of aquatic organisms, resulting from the widespread use of pesticides, industrial and commercial uses of the Seattle waterfront, and the overall increase in concerns about water quality in Puget Sound. Washington State has implemented water quality standards for both surface waters and marine sediments.

The use of bacterial indicators and water quality criteria is necessary in order to evaluate data obtained from monitoring programs. Water quality management decisions are then based upon these findings. In addition to their use as assessment tools, environmental quality guidelines provide a basis for the development of site-specific water quality objectives for environmental contaminants. These guidelines may also be used to identify the need for source controls to reduce the input of contaminants into marine waters.

The EPA has established nationwide water quality criteria for specific pollutants, such as trace metals and PAHs. The priority is on those pollutants that show immediate toxic effects or have the potential to accumulate in the food chain. The Clean Water Act requires the State to adopt federal water quality criteria or promulgate their own standards which afford equal or better protection to sensitive organisms.

Washington State Standards for Water

Washington State currently has marine surface water quality standards for several contaminants, including metals, pesticides, and PCBs. These standards were derived for the protection of a variety of uses, including human health and the propagation and protection of fish, shellfish, and wildlife. Water quality standards for these compounds are not provided in this report, since the compounds were not analyzed as part of the ambient or point source monitoring programs. However, these standards may be obtained from the Washington State Department of Ecology and are available on their website at http://www.wa.gov/ecology/wq/standards.

Washington State Standards for Fecal Coliform Bacteria

Washington State divides surface water uses into five classes: AA, A, B, C, and Lake. Bacteria concentrations in samples taken from marine waters for both the ambient and point source monitoring programs are compared with the Class AA marine water standard and freshwater samples are compared to the Class AA freshwater standard (Table 2-7).

The state fecal coliform standards are expressed as geometric mean values. The reason for this is due to the high variability in fecal coliform counts, as bacteria tend to multiply exponentially. Transforming the data using natural logarithms can reduce this variability. This reduces the apparent differences between very high and very low numbers and also simplifies plotting the data by numerically compensating for the exponential growth rate of bacteria. Sample results obtained for King County's monitoring programs are expressed as a moving geometric mean to facilitate comparisons with state bacteria standards. This value is obtained by taking the geometric mean value for the 30 most recent samples as directed by the National Shellfish Sanitation Program guidelines for systematic random sampling.

As well as the moving geometric mean standard, no more than 10 percent of the samples used to obtain the moving geometric mean value may exceed a defined upper limit. For the Class AA marine water standard this value is 43 colonies/100 ml and 100 colonies/100 ml for the freshwater Class AA standard. Fecal coliform levels below the method detection limit (MDL) are reported as <MDL. In order to calculate geometric means, any value reported as <MDL was assumed to be one.

The moving geometric mean is calculated by taking the results of the 30 most recent samples and applying the formula shown below. When a new value is determined, it becomes part of the moving mean and the oldest value is dropped.

Computing Geometric Means.

Each geometric mean is calculated by taking the sum of the natural logarithms of the sample values, dividing that number by the number of samples, and then taking the inverse natural logarithm. The formula is given below,

$$\text{geometric mean} = \text{antilog}\ \frac{1}{n}\Sigma \log Y$$

*where **n** equals the number of fecal coliform observations and **Y** equals an individual observation (colonies/100 ml).*

Table 2-7. Fecal Coliform Bacteria Standards (colonies/100 ml)

Class	Moving Geometric Mean[a]	Peak[b]	Comments
AA: Freshwater Marine	50 14	100 43	Exceptional quality suitable for water supply (domestic, industrial, and agricultural), stock watering, fish and shellfish, recreation, and wildlife habitat.
A: Freshwater Marine	100 14	200 43	Can be used for the same purpose as Class AA, but differs in the allowed maximum temperature, minimum level of dissolved oxygen, and pH.
B: Freshwater Marine	200 100	400 200	Listed as "good"; it can be used for industrial and agricultural water supply and secondary contact recreation.
C: Both	200	400	Listed as "fair"; it can be used for industrial water supply, fish migration, secondary contact recreation, commerce, and navigation.
Lake	50	100	Meets or exceeds the requirements for all or substantially all uses listed for Class AA waters.

[a] Geometric mean of the 30 most recent samples.

[b] Not more than 10 percent of the 30 most recent samples may exceed this value.

Source: WAC 173-201a, November 25, 1992; NSSP, 1995.

Washington State Standards for Sediment

Chemicals may occur in sediments as part of the natural environment, however, it is more likely that sediments become contaminated by industrial andmunicipal discharges and non-point sources. Sediment quality guidelines provide a means of assessing sediment quality which leads to informed management decisions regarding the sediments and overlying waters.

Several studies conducted in Puget Sound have found some sediments that are contaminated with pollutants such as petroleum hydrocarbons, PAHs, PCBs, and metals. Several of these contaminated sites have been associated with adverse effects on the fish and shellfish that come into contact with these compounds.

In 1991, Ecology promulgated the Sediment Management Standards (SMS) guidelines which contain numeric criteria for specific organic and metal compounds (Table 2-8). The standards specify, based on the best available knowledge, the levels of sediment contaminants at which no adverse effects to marine organisms are expected. These standards are derived from the Puget Sound Apparent Effects Thresholds (AETs) for selected compounds, which are based on biological testing results (EPA, 1988). Concentrations of compounds that do not exceed the SMS values are not expected to have long-term adverse effects on marine biological resources.

The standards for ionizable organic compounds and metals are presented on a dry weight basis (the wet weight concentration divided by the decimal fraction of the total solids value) while the nonionizable organic compounds are organic carbon normalized.

The presence of contaminants in sediments does not necessarily indicate that the sediments are toxic to marine organisms. An important factor to the toxicity of contaminants is how much of a toxic compound is available for uptake directly into an organism or accumulated through the food chain. In general, organic compounds, which make up the largest class of chemicals of concern, tend to become associated with the organic matter contained in sediments. The nonpolar, nonionizable organic compounds (such as chlorinated hydrocarbons, aromatic hydrocarbons, and phthalates) have a tendency to adhere to organic matter in water and sediments whereas substances that form ions (such as salts, acids, bases, phenols, and metals) dissolve in water.

Organic matter in sediment is a food source for many benthic organisms (organisms that live on or near bottom sediments). Too little organic matter will not support these organisms and too much will reduce the number due to natural toxic effects associated with microbial activity. The organic carbon content of sediments has been shown to be related to the bioavailability and toxicity of some organic compounds to aquatic organisms (Di Toro et al., 1991).

The toxicity of organic compounds in sediments appears to be more closely correlated to the concentration of organic carbon in the sediments rather than the dry weight concentration. Thus, a more accurate measure of contaminant toxicity can be assessed if the data are “normalized” for the total organic carbon

Table 2-8. Washington State Sediment Management Standards

Contaminant	Sediment Quality Standard	Lowest Apparent Effects Threshold
Metals	mg/kg dry weight	
Arsenic	57	
Cadmium	5.1	
Chromium	260	
Copper	390	
Lead	450	
Mercury	0.41	
Silver	6.1	
Zinc	410	
Nonionizable Organic Compounds	mg/kg organic carbon	µg/kg dry weight
Total LPAHs [a]	370	5200
Naphthalene	99	2100
Acenapthylene	66	1300
Acenapthene	16	500
Flourene	23	540
Phenanthrene	100	1500
Anthracene	220	960
2-Methylnaphthalene	38	670
Total HPAHs [b]	960	12000
Fluoranthene	160	1700
Pyrene	1000	2600
Benzo(*a*)anthracene	110	1300
Chrysene	110	1400
Total Benzofluoranthenes	230	3200
Benzo(*a)* pyrene	99	1600
Indeno(1,2,3-*c,d*)pyrene	34	600
Dibenzo(*a,h*)anthracene	12	230
Benzo(*g,h,i*)perylene	31	670
Nonionizable Organic Compounds	mg/kg organic carbon	µg/kg dry weight
1,2-Dichlorobenzene	2.3	35
1,4-Dichlorobenzene	3.1	110
1,2,4-Trichlorobenzene	0.81	31
Hexachlorobenzene	0.38	22
Dimethyl phthalate	53	71
Diethyl phthalate	61	200
Di-n-butyl phthalate	220	1400
Butyl benzyl phthalate	4.9	63
Bis (2-ethylhexyl) phthalate	47	1300
Di-n-octyl phthalate	58	6200
Dibenzofuran	15	540
Hexachlorobutadiene	3.9	11
N-Nitrosodiphenylamine	11	28
Total PCBs	12	130
Ionizable Organic Compounds	mg/kg dry weight	
Phenol	0.42	
2-Methylphenol	0.063	
4-Methylphenol	0.67	
2,4-Dimethylphenol	0.029	
Pentachlorophenol	0.36	
Benzyl alcohol	0.057	
Benzoic acid	0.65	

[a] Represents the sum of the following low molecular weight PAHs: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene.

[b] Represents the sum of the following high molecular weight PAHs: Fluoranthene, Pyrene, Chrysene, Benz(*a*)anthracene, Benzo(*a*)pyrene, total Benzofluoranthenes, Indeno(1,2,3-*c,d*)pyrene, Dibenzo(*a,h*)anthracene, and Benzo(*g,h,i*)perylene.

Source: Ecology, 1995

(TOC) content. For this reason, the State standards for nonionizable organics are based upon concentrations that have been TOC normalized (Michelson, 1992). Organic carbon normalization is achieved by dividing the dry weight concentration by the decimal fraction of TOC content. However, when TOC values are very low (e.g. <0.2 %) it is not appropriate to normalize contaminant values, as even background levels may exceed regulatory standards. When the TOC content is less that 0.2%, dry weight values are more appropriate to use than organic carbon normalized values.

Washington State Standards for Biota

In addition to contaminants found in water and sediment, several contaminants have the potential to accumulate in the tissues of aquatic biota, such as fish and shellfish. Bioaccumulation in biota may affect not only the species directly accumulating the contaminants, but humans and other species that consume the affected species. Numerical tissue-residue guidelines provide a basis for assessing the hazards that tissue-laden contaminants pose to human health and wildlife, and therefore, a basis for regulating contaminant inputs into the environment. Ecology does not currently have tissue-residue standards; however, heavy metal concentrations in shellfish samples were compared with EPA guidelines.

SECTION 3
SUMMARY OF 1998 MONITORING DATA

This section summarizes both ambient and point source monitoring data for 1998. A total of 32 ambient stations and 29 point source stations were sampled in 1998. Also included is a summary of 1998 precipitation data as pollutants, particularly fecal coliform bacteria, are introduced into intertidal and offshore waters following rainstorms. All data for stations monitored are presented in Appendices A through E. Station locator maps are provided in Section 2.

A summary of the results obtained for specific parameters (e.g., salinity, temperature, bacteria) and matrices (e.g., water, sediment, shellfish) are provided in this section. The results for ambient and point source samples are combined in order to facilitate the interpretation of results in this section.

1998 PRECIPITATION DATA

The monthly total precipitation for Seattle in 1998 is shown in Figure 3-1. For comparative purposes, precipitation totals do not include snow or ice pellet accumulations as the 30-year average does not include these data. The numbers were obtained from the National Climatic Data Center at the Sea-Tac International Airport station (NOAA, 1998). The total precipitation in 1998 was 44.1 inches (in.), which was 1 in. more than the 5-year average, 7 in. more than the 30-year average, and 1 in. more than the 1997 total. A record-setting wet November (11.6 in.) and December (9.0 in.) were the months with the highest rainfall, which accounted for 47% of the total rainfall for 1998. Four months received less than one inch of rainfall (April, July, August, and September), with only 5.6 inches of rain falling in the six month period of April through September.

This rainfall pattern is consistent with the recent El Nino (1997-98) / La Nina (1998-99) events, with a drier winter in early '98 and a wetter winter than average in late '98.

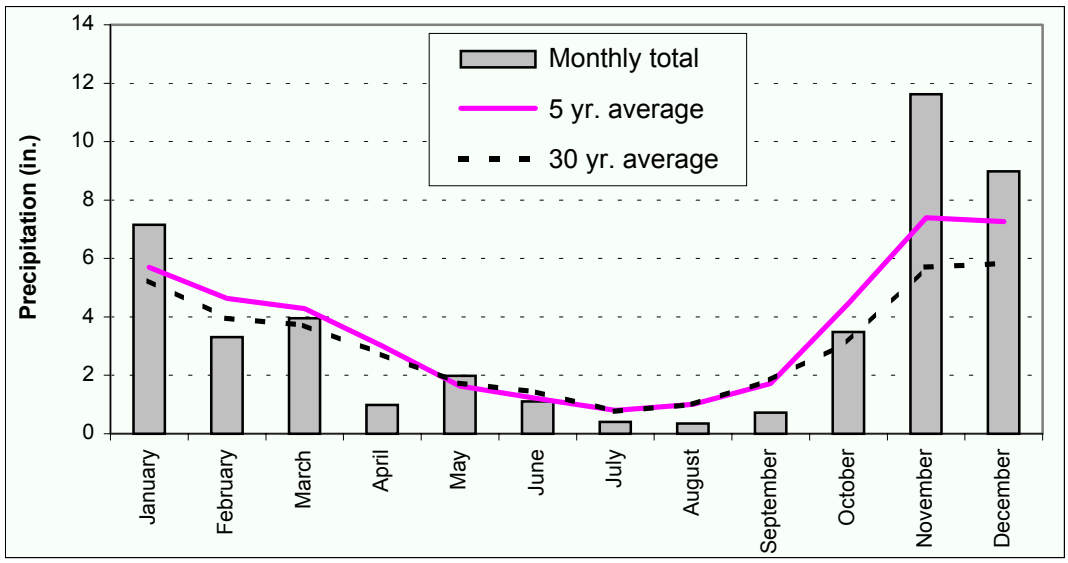

Figure 3-1. Monthly Precipitation for 1998

WATER COLUMN DATA RESULTS

Water column sampling is an important component of King County's water quality monitoring program and includes both offshore and intertidal sampling sites (see Figures 2-1 and 2-2). The monitoring program is structured to detect natural seasonal changes in the water column as well as identify anthropogenic inputs and influences.

Water quality parameters, including temperature, salinity, dissolved oxygen, Secchi disk transparency, nutrients, and chlorophyll-*a*, were measured at ten subtidal stations. Bacteria were measured at ten subtidal and twenty-two intertidal stations. (Station KSRU02 located near the Ballard Locks in the Lake Washington Ship Canal was only monitored for salinity, surface water temperature, and bacteria.)

Bacteria in Water Column

Fecal coliform and enterococcus bacteria were monitored at 10 subtidal water column stations (5 ambient and 5 point source), and 21 intertidal water stations. Two freshwater stations (KTHA01 and KSRU02) are monitored and compared

to freshwater bacteria standards. All other stations are compared to saltwater standards. Washington State marine water Class AA fecal coliform standards for surface waters state that organism counts shall not exceed a geometric mean value of 14 colonies/100 ml and not more than 10 percent of the samples used for calculating the geometric mean value may exceed 43 colonies/100 ml. Freshwater Class AA fecal coliform standards state that organism counts shall not exceed a geometric mean value of 50 colonies/100 ml and not more than 10 percent of the samples used for calculating the geometric mean value may exceed 100 colonies/100 ml (WAC 173-201, 1991). King County uses results from the 30 most recent samples (surface samples only) to obtain a geometric mean value as per the guidelines in the National Shellfish Sanitation Program (NSSP, 1995). Surface samples are used as these tend to be the highest values and represent the water level where most contact occurs with people and intertidal organisms.

Enterococcus bacteria standards do not currently exist in Washington State. It is possible that this organism will be used as an indicator of the presence of pathogenic bacteria in the future, therefore, King County will continue to monitor the levels of this organism. There was no correlation between the amount of fecal coliform and the amount of enterococcus bacteria detected, which has also been the case with past sampling. enterococcus data are presented in Appendix A but will not be discussed further.

All the water column stations met Class AA marine water standards for fecal coliform bacteria with the exception of the two stations located in inner Elliott Bay: LTBC41 and LTED04 (Tables 3-1 and 3-2). Levels at these stations met the geometric mean standard of 14 colony forming units (cfu)/100 ml but were above the peak standard. It should be noted that for station LTBC41 located near the Denny Way CSO, as well as several others, the geometric mean was calculated using less than 30 samples. For station LTBC41, 5 of the last 20 samples exceeded 43 cfu/100 ml and for station LTED04, 4 of the last 30 samples exceeded 43 cfu/100 ml. All but two of the over 43 cfu/100 ml values occurred between November and January for both stations. The other two over 43 cfu/100 ml values occurred in May when over an inch of rain fell in the three days prior to sampling. These two stations in inner Elliott Bay receive higher freshwater input than other subtidal stations due to their proximity to the Duwamish River. The freshwater station in the Lake Washington Ship Canal met Class AA freshwater fecal coliform standards.

Table 3-1. 1998 Ambient Monitoring--Fecal Coliform Bacteria

Station	Meets Class AA Marine Water Standards: Geometric mean (14 colonies/100 ml)	Meets Class AA Marine Water Standards: Peak [a] (43 colonies/100 ml)	Comments
Intertidal			
Stations north of Ship Canal			
JSWX01	Yes	Yes	Station is south of fuel docks at Richmond Beach.
JSVW04	No	No	8 of the last 30 samples are > 43 colonies/100 ml.
KSLU03	No	No	9 of the last 30 samples are > 43 colonies/100 ml.
KSQU01	No	No	13 of last 30 samples are > 43 col./100 ml. Near Ship Canal.
KRJY01	Yes	Yes	Only sampled from May to September.
Stations between Ship Canal and Alki Point			
KSYV02	No	No	9 of the last 30 samples are > 43 colonies/100 ml.
LTAB01	No	No	6 of the last 30 samples are > 43 colonies/100 ml.
LTEH02	No	No	15 of last 30 samples are > 43 col./100 ml. Inner Elliott Bay stn.
LSGY01	Yes	Yes	Geometric mean was calculated using less than 30 samples.
LSFX01	Yes	Yes	Geometric mean was calculated using less than 30 samples.
LSHV01	Yes	Yes	Located north of Alki Point near Alki Drive.
Stations south of Alki Point			
LSVW01	No	No	18 of last 30 samples are >= 100 col./100 ml. In Fauntleroy Cove.
LSTU01	Yes	No	7 of the last 30 samples are > 43 colonies/100 ml.
MTEC01	Yes	No	8 of last 30 samples are > 43 col./100 ml. Sampled May-Sep.
MSSM05	No	No	15 of last 30 samples are > 43 col./100 ml. Sampled May-Sep.
MTLD03	--	--	Only sampled in Aug.Not enough data to compare to standards.
Offshore			
Point Jefferson			
KSBP01	Yes	Yes	Station is between Carkeek Park and Jefferson Head.
Ship Canal			
KSRU02[b]	Yes	Yes	Station is located in the Lake Washington Ship Canal.
Point Wells			
JSTU01	Yes	Yes	Station is just offshore from Point Wells.
Elliott Bay			
LTED04	Yes	No	Station is lcoated in inner Elliott Bay. Geometric mean was calculated using 20 samples.
Dolphin Point			
LSNT01	Yes	Yes	Station is between the north tip of Vashon Island and Fauntleroy Cove.

[a] -- Not more than 10 percent of the 30 most recent samples may exceed this value.

[b] -- Station results are compared with Class AA freshwater standards which state the geometric mean value not exceed 50 colonies/100ml and not more than 10 percent of the most 30 recent samples may exceed 100 colonies/100

Table 3-2. 1998 Point Source Monitoring--Fecal Coliform Bacteria

Station	Meets Class AA Marine Water Standards: Geometric mean (14 colonies/100 ml)	Meets Class AA Marine Water Standards: Peak[a] (43 colonies/100 ml)	Comments
Intertidal			
Carkeek Park			
KSHZ03	No	No	11 of last 30 samples are > 43 col./100 ml. Near mouth of Piper's Creek.
KTHA01 [b]	No	No	24 of last 30 samples are >100 col./100 ml. Freshwater station in Piper's Creek.
West Point			
KSSN04	Yes	Yes	Located north of the West Point lighthouse.
KSSN05	Yes	No	6 of last 30 samples are > 43 colonies/100 ml.
Alki Point			
LSKR01	No	No	14 of last 30 samples are > 43 colonies/100 ml.
LSKS01	No	No	23 of last 30 samples are > 43 colonies/100 ml.
Offshore			
Carkeek Park			
KSIW02	Yes	Yes	Geometric mean was calculated using less than 30 samples.
West Point			
KSSK02	Yes	Yes	Geometric mean was calculated using less than 30 samples.
Denny Way			
LTBC41	Yes	No	5 of last 20 samples >43 col./100 ml. Geomean calculated using < 30 samples.
Alki Point			
LSKQ06	Yes	Yes	Station is just off the Alki TP outfall.
Renton outfall			
LSEP01	Yes	Yes	Geometric mean was calculated using less than 30 samples.

[a] -- Not more than 10 percent of the 30 most recent samples may exceed this value.
[b] -- Station results are compared with Class AA freshwater standards which state the geometric mean value may not exceed 50 colonies/100ml and not more than 10 percent of the most 30 recent samples may exceed 100 colonies/100 ml.

Fecal coliform bacteria in the water column near King County's treatment plant discharges were found at low levels if detected at all. The majority of subtidal stations had higher levels in December at all depths when almost three inches of rain fell during the three days prior to sampling. For the subtidal stations, the highest bacteria levels are usually seen at the surface samples.

Fecal coliform levels in water samples taken from intertidal beaches are influenced by freshwater runoff from the surrounding watersheds that drain into the Sound. As a result, the number of stations exceeding the Class AA marine standards increased in the high rainfall months and at stations closer to streams and other sources of freshwater runoff (Figure 3-2). Also, restricted bays and areas removed from the strong tidal mixing of the open Sound tend to retain

Figure 3-2. Fecal Coliform Results: Comparison With Standards

freshwater inputs for a longer period of time. Therefore, stations located near these geographic areas, such as station MSSM05 near the Tramp Harbor fishing pier and LSVW01 in Fauntleroy Cove, had higher bacteria levels.

The intertidal beaches with the lowest fecal coliform levels were those near Seacrest Park, Duwamish Head, and the station located between Duwamish Head and Alki Point. Bacteria levels at these three stations were below Class AA marine water standards. The exposed Bainbridge Island beach station at Fay Bainbridge State Park and the northern station at Richmond Beach also met Class AA marine water standards. The results in 1998 for these stations are similar to those obtained in past years.

Three beaches met the geometric mean standard but failed the peak standard; these included the southern West Point station, Lincoln Park, and Seahurst Park.

Beaches that exceeded both the geometric mean and peak standards were in the Carkeek Park area, southern Richmond Beach, south side of Alki Point, Shilshole Bay, Magnolia, inner Elliott Bay, Fauntleroy Cove, and Tramp Harbor (see Figure 3-2). These stations have consistently failed Class AA standards over the past several years. These stations are either located near a freshwater source or in areas with poor circulation where fecal coliform levels are elevated. Counts at these stations increased following periods of rainfall, particularly for the two stations located in inner Elliott Bay: LTAB01 and LTEH02. Most intertidal stations exceeding both standards had higher counts in the summer even though rainfall was low. Waterfowl and dogs tended to congregate at beaches such as Carkeek Park and Golden Gardens during the summer months in 1998, but this is no longer true for dogs as regulations prohibiting dogs on the beach are currently being enforced.

Figure 3-3 shows fecal coliform results throughout the year for all stations. The values, as depicted by the size of the marker, are not geometric mean values, but single point values for that particular month. This figures shows consistently low values detected at offshore stations. Table 3-3 shows which stations have regularly passed or failed standards over the last four years. Again, it is the offshore stations which consistently pass standards while stations near a freshwater source or embayment regularly failed standards over the last four years.

Figure 3-3. Fecal Coliform Concentrations

Table 3-3. Station Results for Fecal Coliform Bacteria Over Four Years

Passed both geometric mean and peak standards between 1995 and 1998	Exceeded both geometric mean and peak standards between 1995 and 1998	Variable from 1995-1998
Offshore		
KSBP01 LSNT01 LSKQ06 LSEP01 * KSSK02 * KSIW02 *	KSQU01	
Intertidal		
JSWX01 KRJY01 LSHV01	KSHZ03 KTHA01 KSLU03 KSYV02 LTAB01 LSKR01 LSKS01 LSVW01 MSSM05	JSVW04 KSSN04 KSSN05 LSTU01 MTEC01

* Indicates station only sampled in 1997 and 1998

Water Temperature

Depending upon the water depth at the station, temperatures were monitored at one to seven depths. Depths ranged from just below the surface down to 200 m (656 ft). Temperatures ranged from 8.2 to 16.2 (mean = 11.2) ^{o}C for all stations. Values for six stations, located off Point Jefferson, the West Point Treatment Plant (TP) outfall, the Renton TP outfall, inner Elliott Bay, the Alki TP outfall, and off Dolphin Point, are shown in Figure 3-4 and are representative of the patterns shown at other stations sampled. Temperature variations during the winter and early spring months were slight, particularly at greater depths. Surface water temperatures varied more than samples taken at deeper depths due to various weather influences, such as air temperature, cloud cover, and wind. The water column started to exhibit seasonal thermal stratification in May. The figures indicate a well-mixed water column throughout most of the year with no development of a thermocline (characterized by a rapid decrease in temperature with increased depth). There

Figure 3-4. Water Temperature at Six Stations (^{o}C)

is, however, a noted rise in surface water temperatures during the summer months which corresponds to a rise in air temperature and an increase in solar radiation. The warmest temperatures were measured between July and September for all stations.

Salinity

Salinity was measured at seven depths ranging from 1 to 200 meters, depending upon the water depth of the station. Salinities ranged from 21.43 to 30.78 (mean = 29.35) practical salinity units (psu) for all stations except KSRU02. Station KSRU02 is located in the Lake Washington Ship Canal and the salinity at this station is tidally influenced and ranged between 8.44 and 23.56 psu.

Salinities varied due to seasonal influences as depicted in the salinity profiles for six stations (Figure 3-5). Lower salinities were detected in surface waters during winter months when freshwater input is highest. The inner Elliott Bay stations (LTED04 and LTBC41) had lower salinities at the surface throughout the year which is attributed to the freshwater influence of the Duwamish River. The station located at the end of the West Point TP outfall also had lower surface salinities during months with high rainfall, but were not as low as the stations in inner Elliott Bay. Unlike surface waters, salinities measured at depths of 15, 25, 35, 55, 100, and 200 m showed little variation with depth. Values ranged from 28.39 to 30.78 (mean of 29.50) which indicates a well-mixed water column with no development of a strong halocline (characterized by a rapid increase in salinity with increased depth). Salinities were highest from August through November which may be attributed to an increased input of saltier deep oceanic water due to off-coast upwelling during late summer and a decrease in freshwater input from rivers and precipitation.

Density affects vertical mixing processes in the water column. Both temperature and salinity affect water density, which generally increases with colder water or higher salinity. Density is an important measurement as the water column may stratify and trap nutrients and/or contaminants in differing density layers. Figure 3-6 shows density profiles for six stations. Throughout the year for most stations, the figures indicate a non-stratified water column. Station LTED04, which is influenced by freshwater input, had lower density values at the surface throughout the year. For depths 15 m and greater, however, the water column is non-stratified. Station KSSK02 had slightly

Figure 3-5. Salinity at Six Stations (PSU)

Figure 3-6. Density at Six Stations (kg/m^3)

lower densities at the surface for the first part of the year but was non-stratified through the later months. This may be due to a slight freshwater influence from water moving around West Point from Elliott Bay and southward from the Ship Canal or from the freshwater surfacing of the effluent plume.

Dissolved Oxygen

Depending upon the depth of the station, dissolved oxygen was measured at three to seven depths. Depths ranged from just below the surface down to 200 m. Dissolved oxygen concentrations ranged from 4.5 to 14.1 (mean = 7.8) mg/L for all stations sampled in 1998. Concentrations decreased with depth as input from the atmosphere across the air-sea interface and photosynthetic activity yield most of the dissolved oxygen in estuaries (Kennish, 1994). Figure 3-7 shows dissolved oxygen profiles for six stations sampled in 1998. Dissolved oxygen values were below 7.0 mg/L from September to November at most depths and stations. Dissolved oxygen concentrations below 7.0 mg/L occur naturally during late summer and fall due to the input of deep oceanic water which contains low amounts of oxygen. During the summer months, surface water oxygen concentrations are greater than 7.0 mg/L, however, concentrations decrease with increasing depth. This is due to warmer water temperatures which contain less oxygen and no photosynthesis from phytoplankton at these depths.

Washington State marine surface water quality standards for dissolved oxygen vary depending upon the intended water use and classification of a specific body of water. Ecology uses a dissolved oxygen value of 5.0 mg/L as a guideline to indicate where potential problems could occur (DOE, 1998). Concentrations for all stations were above this guideline with one exception. Station KSSK02 had a value of 4.5 mg/L at 55 m, the deepest depth sampled at this station, in November. The other depths sampled for this station ranged between 6.5 and 6.8 mg/L. This station also had one value under 5.0 mg/L in 1997; however, the concentration (4.7 mg/L) was detected at 15 m and not at the deepest depth.

Figure 3-7. Dissolved Oxygen Concentrations (mg/L) at Six Stations

Transparency

Secchi disk depth (transparency) values ranged from 2.5 to 14.5 m for all stations. The lowest values were observed during months when freshwater runoff was high (January) and months when phytoplankton blooms occurred (April and July). For all stations, transparencies were higher in the fall and winter months, particularly for October.

Nutrients

Nitrogen Compounds. Several forms of inorganic nitrogen are commonly found in the marine environment. These compounds include ammonium (NH_4^+), nitrate (NO_3^-), and nitrite (NO_2^-), with nitrate being the primary form of inorganic nitrogen in seawater. The analytical method the King County Environmental Laboratory uses to measure nitrate concentrations does not distinguish between nitrate and nitrite, therefore, these two forms are reported as one value expressed as nitrate+nitrite. Nitrite amounts in the water column are naturally very low and the contribution of nitrite to the total value is usually minimal. Values for total ammonium and total nitrate+nitrite are reported below.

> *Ammonium*. Values ranged from less than the method detection limit (0.02 mg/L) up to 0.21 mg/L for all stations monitored. The mean concentration for all stations and months was 0.02 mg/L. Most ammonium concentrations monitored at all depths were at or below the method detection limit except from May through August--which is similar to the pattern observed in previous years. Higher concentrations during the summer months are expected as ammonium is generated from the decay of organic nitrogen (both natural and from zooplankton grazing of phytoplankton) and peaks about the time of senescence (decay) in the producer growth cycle (Valiela, 1984). Generally, the highest concentration occurred in May, the month following the April phytoplankton bloom. Figure 3-8 shows ammonium concentrations at six stations and a frequency plot of the values obtained for all stations is shown in Figure 3-9. Ammonium concentrations measured in 1998 were similar to those measured in previous years. The two stations which had the highest concentrations in 1997, LSEP01 and KSSK02, also had the

Figure 3-8. Ammonium Concentrations at Six Stations (mg/L)

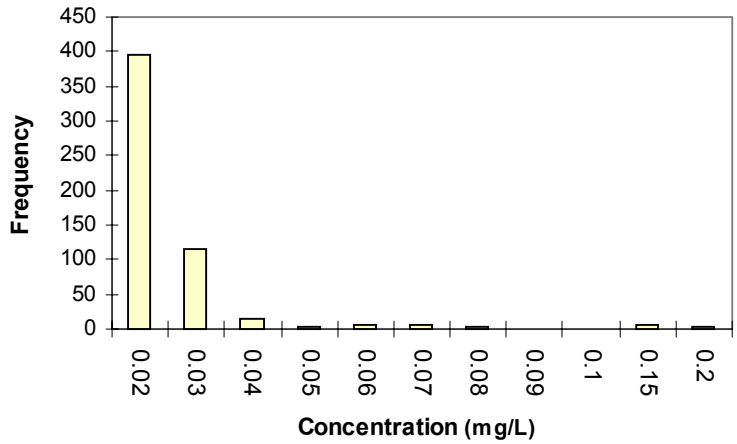

Figure 3-9. Ammonium Frequency Plot for All Stations Sampled in 1998

highest concentrations in 1998. Station LSEP01 which is located at the Renton outfall had a concentration of 0.11 mg/L at 150 m and KSSK02 located at the West Point outfall had a concentration of 0.21 mg/L at 55 m. These ammonium concentrations suggest that the effluent plume from the treatment plants were evident at these depths. At both of these sites, only the deepest depths monitored had higher concentrations than other depths.

Nitrate+Nitrite. As stated above, nitrate is usually the primary form of inorganic nitrogen in seawater and was most abundant in the winter when it was not taken up by phytoplankton and when freshwater runoff was highest. Phytoplankton uptake is restricted to the euphotic zone (the zone where enough light penetrates for photosynthesis to occur) which is why nitrate+nitrite concentrations tend to increase at depth during the summer months. Overall, nitrate+nitrite concentrations ranged from less than the detection limit (0.05) to 0.47 mg/L for all stations monitored. Nitrate+nitrite concentrations for six stations are shown in Figure 3-10. The highest concentration was detected near the surface at station LTBC41 (located in the vicinity of Denny Way in inner Elliott Bay) in January. The higher concentration at the surface is likely due to freshwater runoff. Values below the detection limit occurred only near the surface during the spring and summer months when phytoplankton

Figure 3-10. Nitrate+Nitrite Concentrations for Six Stations (mg/L)

blooms were evident. Concentrations were similar for all stations, including the inner Elliott Bay stations, and nitrate+nitrite values measured in 1998 were similar to values from previous years.

Phosphorus

Phosphorus in seawater is found as dissolved inorganic, dissolved organic, and particulate phosphorus. Generally, particulate phosphorus is the most abundant form. Several forms of inorganic phosphorus are found in the marine environment. The most abundant forms of phosphorus are the orthophosphate ions, with HPO_4^{2-} being the major ion in seawater (Valiela, 1984). Total phosphorus (which includes all forms of inorganic and organic phosphorus) was measured at ten stations. Values ranged from 0.02 to 0.13 mg/L with a mean of 0.07 mg/L. Concentrations did not show a clear trend with depth. However, phosphorus did show a clear seasonal trend with levels decreasing at the surface depths during the late spring and summer months which is due to phytoplankton and bacteria uptake. Concentrations were the highest in January and February at all stations. Results obtained in 1998 were similar to concentrations measured in previous years.

Silica

Silica was measured at all stations and depths. Concentrations ranged from 0.67 to 6.8 mg/L with a mean of 2.7 mg/L. Values at the surface were lower than other depths measured from April to July as diatoms (microscopic photosynthetic plants) use silica for skeletal growth and are usually concentrated near the surface. For all depths, concentrations were lower during the summer months than for the rest of the year. Further evidence that silica concentrations are biologically related was seen in winter. Winter months (November through February) had higher mean and maximum concentrations when phytoplankton abundance is low and silica uptake is at a minimum. Also, there was little variation between surface and deeper depths during the winter months. The two stations in inner Elliott Bay, LTBC41 and LTED04, had higher silica concentrations at the surface, which may be attributed to the input of particulates from the Duwamish River. Station LTBC41 had the highest concentration measured (6.8 mg/L) at the surface in 1998. Figure 3-11 shows

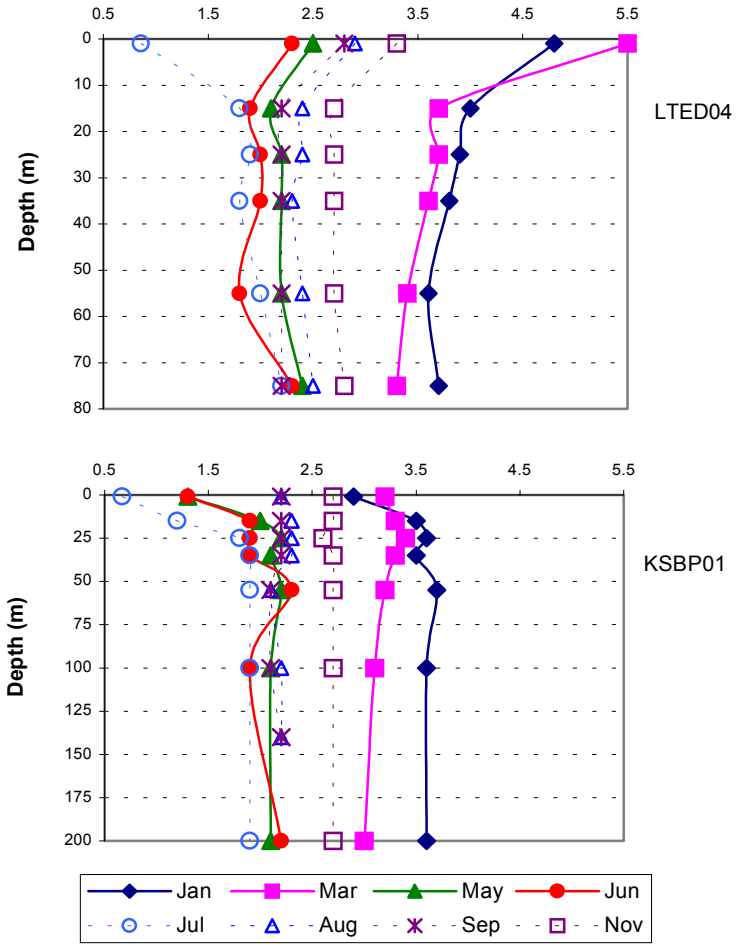

Figure 3-11. Silica Concentrations at Stations LTED04 and KSBP01 (mg/L)

the increase in surface silica at station LTED04 and the typical pattern seen at other stations. Silica concentrations in 1998 were similar to concentrations found in previous years.

Chlorophyll-*a* and Phaeophytin

Chlorophyll-*a* and phaeophytin were measured at ten stations at four depths (1, 15, 25, and 35 m). Chlorophyll-*a* values ranged from 0.11 to 31.5 µg/L (mean concentration was 2.4 µg/L) and phaeophytin levels ranged from <0.01 to 3.3

µg/L (mean concentration was 0.47 µg/L). Chlorophyll-*a* concentrations for six stations are shown in Figure 3-12. Chlorophyll-*a* and phaeophytin levels were low in the winter and decreased with depth for all months. This corresponds to the decreased light availability for plant growth at deeper depths. High chlorophyll-*a* levels at the surface in April and July indicated a bloom occurred. Station KSBP01 had the highest chlorophyll-*a* concentrations for both the April and the July bloom. This station also had high levels at the surface in May, whereas the other stations sampled had low concentrations in May. In 1997, chlorophyll-*a* levels indicated a bloom occurred in September but in both 1996 and 1998, elevated levels were not seen past July. Although maximum concentrations vary from year to year, phytoplankton blooms exhibit seasonal trends with blooms usually occurring in April or May and July. The El Nino event in 1997 likely caused the late bloom and it appears that in 1998, the typical pattern seen in the Central Basin returned.

Several factors influence chlorophyll concentrations, including availability of light and nutrients, air temperature, and zooplankton grazing. As stated in the previous chapter, phaeopigments such as phaeophytin are degradation products of chlorophyll produced when zooplankton graze on phytoplankton cells. Generally, phaeophytin values tended to be higher at 15 m than at the surface and also when chlorophyll concentrations were high. Overall, phaeophytin concentrations at the two inner Elliott Bay stations were not higher than other stations as this parameter is affected more by zooplankton abundance than by water column mixing.

Total Suspended Solids

Total suspended solids values ranged throughout the year from 0.7 to 17.3 (mean = 3.3) mg/L. Generally, values tended to be higher at the lowest depth measured for those stations deeper than 55 m due to resuspension of bottom sediments. This was not the case, however, for stations 55 m or less. Surface values at these stations tended to be higher than other depths. During the months when chlorophyll-*a* levels were elevated, suspended solids values were higher at the surface. This is due to the influence of phytoplankton particles. Suspended solids are measured by filtering a well-mixed water sample through a glass-fiber filter and trapping suspended particles on the filter. Large phytoplankton particles are also trapped on the filter and can cause higher total suspended solid values when phytoplankton are abundant.

Figure 3-12. Chlorophyll-*a* Concentrations at Six Stations (µg/L)

There was no difference in mean values observed from station to station, even for the two stations located in inner Elliott Bay, LTBC41 and LTED04. Also, there was no difference between mean values obtained for the two stations located at the outfalls for the Renton and West Point treatment facilities and other stations sampled. Although the mean for the Renton TP outfall station was similar to other stations, the highest TSS value was found at the 55 m depth for this station.

SEDIMENT CHEMISTRY DATA RESULTS

Offshore and intertidal sediments were sampled as a part of the ambient and point source monitoring programs (see Figures 2-2 and 2-3). Sediments were sampled for conventional parameters (total solids, total volatile solids, total sulfide, nitrogen, oil and grease, total organic carbon, grain size distribution), metals, and organic compounds. Metals and ionizable organics data are presented on a dry weight basis and non-ionizable organics data are presented on both a dry weight and organic carbon normalized basis where appropriate. All sediment data are provided in Appendix B. A total of 29 offshore sediment sites (19 point source and 10 ambient) were sampled for sediment conventionals, metals, and organic compounds. Six intertidal stations (three point source and three ambient) were sampled for conventionals, metals, and organic compounds.

Conventionals

Total sulfides were measured at all 29 offshore stations but were not analyzed for the intertidal stations. Total sulfides are monitored as they may be toxic to benthic organisms, create unaesthetic conditions, and affect the toxicity of certain metals. No sulfides were detected above the detection limit of 10 mg/kg in any of the samples. Total sulfides have been detected in previous years at the stations located in inner Elliott Bay as sulfides tend to be higher in areas with greater amounts of freshwater input. However, the analytical method changed in 1998 which may account for the difference compared to previous years results.

Total oil and grease includes compounds such as hydrocarbons, animal fats, vegetable oils, soaps, and greases. This analysis was conducted on both offshore sediments collected at West Point and for all intertidal sediments. Total oil and grease values ranged from less than the detection limit (100 mg/kg) to 180 mg/kg. Only four stations at West Point had detectable levels of oil and grease and these compounds were not detected for any of the intertidal samples.

Ammonium nitrogen was measured for all subtidal samples. Values ranged from 0.3 to 10.4 mg/kg, with the highest value occurring at station LSML01 in the Central Basin. Concentrations were not higher at the end of the West point and Carkeek outfalls compared to other stations and stations with the lowest nitrogen values also had the lowest total organic carbon values.

Total organic carbon (TOC) was measured for all sediment samples. Values ranged from 596 to 17,200 mg/kg wet weight for offshore sediments and 511 to 3,920 mg/kg wet weight for intertidal sediments. Intertidal sediments are composed mainly of sand and gravel and sandy sediments have lower TOC values than sediments containing a high proportion of silt and clay. For subtidal stations, samples containing a high percentage of sand and gravel had low TOC values as is the case for both the West Point and Carkeek samples. Inner Elliott Bay stations had the highest TOC values; although two inner Elliott Bay stations had higher TOC values than expected, which may be due to organic enrichment. TOC concentrations were not higher at the end of the Carkeek CSO outfall compared to other stations in the area but the station at the end of the West Point outfall had slightly higher values than other stations near the outfall. This may be due to settling of fine particles in the immediate vicinity of the outfall.

Figure 3-13 shows the relationship of TOC to percent sand and gravel. As stated above, the amount of organic carbon contained in sediments is directly related to the physical processes that regulate grain size. Higher concentrations of organic carbon and total solids occur with fine-grained sediments in depositional areas, whereas lower organic carbon content and solids occur where coarse-grained sediments are found and organic-rich fines do not accumulate.

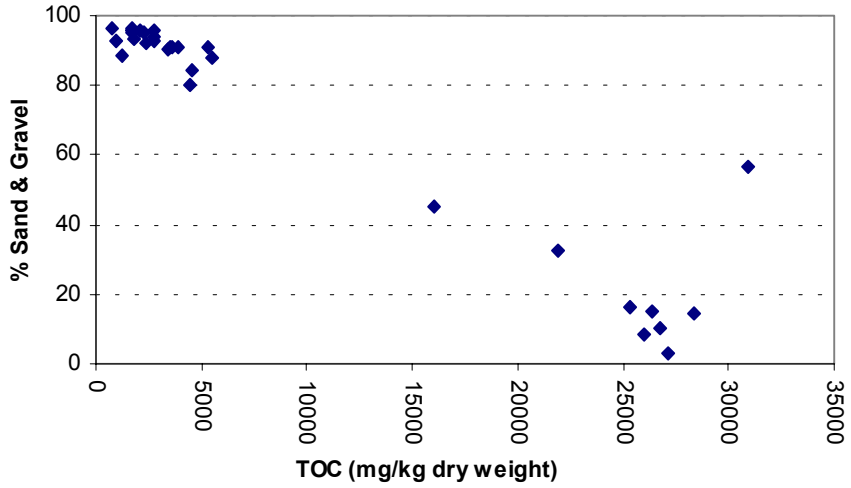

Figure 3-13. Organic Carbon Vs. Grain Size for All Stations

Metals

Sixteen metals were analyzed at 29 offshore stations (19 point source and 10 ambient) and thirteen metals were analyzed at 6 intertidal stations (3 point source and 3 ambient). A summary of the metals detected in offshore sediments is given in Table 3-4. All results are presented on a dry weight basis.

Two metals, selenium and thallium, were not detected in any samples. Antimony and silver were seldom detected and were at levels just slightly above the detection limits. Although a Washington State Sediment Quality Standard (SQS) does not exist for antimony, the silver values were well below the SQS for this metal. Cadmium and beryllium were detected in 10 and 27 of the 29 offshore samples, respectively, but at levels just above the detection limit. These two metals were not detected in the intertidal samples. Arsenic and mercury were detected in 20 of the 29 offshore samples. Mercury was not detected in any of the intertidal samples and arsenic was detected in two intertidal samples. Arsenic values ranged from less than the detection limit to 13.6 mg/kg, with the highest values found in inner Elliott Bay. Arsenic concentrations were well below the SQS of 57 mg/kg for this metal. All the Elliott Bay stations had higher mercury concentrations than samples collected near the wastewater treatment plants and other sites outside of Elliott Bay; concentrations in these areas were all 0.06 mg/kg or less. The highest mercury

Table 3-4. Metals Summary for Sediments

	Range (mg/kg dry weight)		Detection Frequency		Station with Highest Value	
	Offshore	Intertidal	Offshore	Intertidal	Offshore	Intertidal
Aluminum	5,603 - 23,371	na	29/29	na	LTED04	na
Antimony	<1.9 - 3.3	<1.6 - <2.0	5/29	0/6	LSCK01	---
Arsenic	<3.0 - 13.6	<3.0 - 3.5	20/29	2/6	LSEZ01	JSVW04
Beryllium	<0.1 - 0.4	<0.1	27/29	0/6	2 stations	---
Cadmium	<0.2 - 0.5	<0.2	10/29	0/6	LSEZ01	---
Chromium	14.9 - 45.1	15.4 - 23.3	29/29	6/6	LCSI01	JSVW04
Copper	4.4 - 54.9	4.7 - 23.3	29/29	6/6	LTED04	JSVW04
Iron	8,315 - 30,286	na	29/29	na	LTED04	na
Lead	2.1 - 61.4	2.4 - 14.9	29/29	6/6	LTDF01	JSVW04
Manganese	178 - 1020	na	29/29	na	WPD215N	na
Mercury	<0.02 - 0.44	<0.02 - <0.03	20/29	0/6	LTDF01	---
Nickel	13.0 - 37.1	15.0 - 29.5	29/29	6/6	LCSI01	JSVW04
Selenium	<2.7 - <5.2	<2.6 - <3.3	0/29	0/6	---	---
Silver	<0.2 - 0.9	<0.2 - <0.3	4/29	0/6	LTDF01	---
Thallium	<12.0 - <21.2	<10.6 - <13.1	0/29	0/6	---	---
Zinc	19.5 - 100.6	22.2 - 32.5	29/29	6/6	LSEZ01	JSVW04

na = not analyzed

concentration was 0.44 mg/kg detected at station LTDF01 located along the waterfront in inner Elliott Bay. This value exceeded the SQS of 0.41 mg/kg. This station also exceeded the SQS for mercury in 1996. Mercury can enter the marine environment from boat paints, plastics, smelting operations, and creosote and there is a known historical source of mercury along the waterfront.

Chromium, copper, lead, and zinc were detected in all samples; however, concentrations were well below the SQSs for these metals. Nickel was also detected in all samples ranging from 13.0 to 37.1 mg/kg but there is no SQS for this metal. Concentrations detected in 1998 were similar to those detected in previous years for all metals.

Organics

Twenty-nine offshore sediment stations (19 point source and 10 ambient) were monitored for organic compounds. In addition, 6 intertidal stations (3 point source and 3 ambient) were also monitored. Semivolatile organics (including PAHs), pesticides, and PCBs were measured in all samples. Organotins were analyzed only for the offshore samples. Dry weight and organic carbon normalized values are presented in Appendix B.

Results discussed below are compared to both SQSs and apparent effects thresholds (AETs) where appropriate. This is due to the low organic carbon content at most stations; thus it is not appropriate to use organic carbon normalized values to assess compliance with regulatory standards that are organic carbon based. For stations containing less than 0.5% organic carbon, dry weight values are more appropriate for comparison with the regulatory standards that are based upon AETs. For stations with organic carbon content greater than 0.5% (two West Point stations and all the Elliott Bay stations), results will be compared to the organic carbon based SQSs.

Of the 98 organic compounds analyzed, 24 were detected in offshore samples and 6 were detected in intertidal samples. Table 3-5 shows the organic compounds detected and the frequency detected. Most of these compounds were PAHs, particularly the high molecular weight PAHs. PAHs are present in petroleum products and coal-tar related manufacturing products and are byproducts of combustion. PAHs are also found in creosote, a compound used on pilings as a wood preservative. The composition of creosote is approximately 85% PAHs (Arvin and Flyvbjerg, 1992).

Stations with the highest PAH concentrations were located along the Seattle waterfront and at one station located near the West Point TP outfall. High PAH values have typically been detected at stations in inner Elliott Bay relative to other stations sampled over the past several years. This is particularly true for station LTDF01, which is located along the Seattle waterfront just south of the Bell Street Pier. Although concentrations are elevated, PAHs did not exceed SQSs for this station or any other station located in Elliott Bay. High PAH concentrations were also found at station WP430N, located 430 ft north of the West Point TP outfall, but concentrations did not exceed AETs.

Table 3-5. Organic Compounds Detected in Sediments

Compound	Range (µg/kg) dry weight	Detection Frequency	Station with Highest Value
Offshore			
1,4-Dichlorobenzene	<0.9 - 1.4	4/12	WP230P
Acenaphthene	<13.8 - 166.2	3/29	WP430N
Acenaphthylene	<20.1 - 64	4/29	LTDF01
Anthracene	<20.1 - 334	9/29	LTDF01
Benzo(*a*)anthracene	<20.8 - 542	26/29	LTDF01
Benzo(*a*)pyrene	<34.1 - 750	18/29	LTDF01
Benzo(*b*)fluoranthene	<54.0 - 1038	15/29	LTDF01
Benzo(*g,h,i*)perylene	<33.9 - 451.0	19/29	WP430N
Benzo(*k*)fluoranthene	<54.0 - 350	6/29	LTDF01
bis(2-Ethylhexyl)phthalate	<20.1 - 237.0	16/29	LTBC41
Chrysene	<20.2 - 869	21/29	LTDF01
di-*n* -Butyl phthalate	<33.9 - 44.9	1/29	WP230P
Dibenzo(*a,h*)anthracene	<54.0 - 110	2/29	LTDF01
Fluoranthene	<20.8 - 1133.5	27/29	WP430N
Fluorene	<20.1 - 94.7	2/29	WP430N
Indeno(1,2,3-*cd*)pyrene	<33.9 - 408.7	16/29	WP430N
Naphthalene	<54.0 - 99	1/29	LTDF01
Phenanthrene	<20.2 - 1010.9	20/29	WP430N
Pyrene	<20.8 - 1158.0	28/29	WP430N
4,4'-DDD	<1.6 - 5.2	1/29	LTDF01
Aroclor 1248	<16.3 - 48.7	1/29	LTDF01
Aroclor 1254	<16.3 - 59.2	2/29	LTDF01
Aroclor 1260	<16.3 - 188.5	2/29	LTDF01
Tributyltin	<0.3 - 228	16/29	LTBC41
Intertidal			
Benzo(*a*)anthracene	<16.9 - 36	2/6	KSSN04
Benzo(*a*)pyrene	<28.6 - 40	1/6	KSSN04
Chrysene	<16.9 - 32	1/6	KSSN04
Fluoranthene	<16.9 -71	2/6	KSSN04
Phenanthrene	<16.9 - 31	2/6	KSSN04
Pyrene	<16.9 - 89	2/6	KSSN04

Twelve stations were sampled for organic compounds in two transect lines around the West Point TP outfall in 1998--one transect along the end of the diffuser pipe and one at the mid-diffuser point. The stations placed along the mid-diffuser transect had few organic compounds detected, with the exception of station WPD430S. Although this station had less than 0.5 % organic carbon, it had the highest carbon content among the stations along this transect which is a contributing factor to the greater amount of PAHs detected. The stations along the end of the pipe transect had several PAHs detected, but did not follow a consistent gradient with respect to distance away from the pipe, although the stations north of the discharge tended to have higher concentrations. Station WP230P, located at the end of the pipe, had two PAHs that exceeded SQSs: benzo(*g,h,i*)perylene and indeno(1,2,3-*c,d*)pyrene. Concentrations did not exceed the Cleanup Screening Levels (CSLs). Based upon PAH results for stations WP230P and WP430N, three sediment toxicity tests were conducted on sediments from these two stations and will be discussed in a separate section below. As a result of time and weather constraints during the initial sample collection, enough sediment was not collected to run the bioassays; therefore, additional samples for these two stations were collected in March 1999 to run toxicity tests and additional chemical testing. The chemistry results for the samples collected in March are also provided in Appendix B. One sample, WP230P, had poor quality control results and was re-analyzed.

PAHs were the only organic compounds detected in intertidal sediments and were at concentrations all well below AETs. These stations are composed mainly of sand and have low carbon content, one of the reasons intertidal stations consistently have few organic compounds detected. One compound, 1,4-dichlorobenzene, was found at four of the West Point TP offshore stations with the highest concentration detected at the station at the end of the outfall. This compound is contained in some garbage and restroom deodorants as well moth control products. This compound was not detected in West Point sediments collected in 1996. Although not detected in 1998, 1,4-dichlorobenzene was detected at three of the inner Elliott Bay stations in 1996.

The only pesticide detected was 4,4'-DDD and was only detected at station LTDF01. This pesticide is a breakdown product of DDT but was also used as an insecticide for moths and other insects until the early 1970's. Both DDT and DDD were banned from general use in 1972 but these compounds adsorb strongly to sediments. There is no SQS for DDD, however, the concentration detected was just above the MDL. Three PCBs (Aroclor 1248, Aroclor 1254,

and Aroclor 1260) were detected at two stations in Elliott Bay. Aroclors 1254 and 1260 were found at stations LTDF01 and LTED04 and Aroclor 1248 was only found at LTDF01. PCBs were also detected at LTDF01 in 1996. Although PCBs are now banned, these compounds are persistent in sediments. All detected concentrations were below the SQS for total PCBs.

Although hexachlorobutadiene and N-nitrosodiphenylamine were not detected in any samples, the method detection limits exceeded the AETs for these compounds. Also not detected was 2,4-dimethylphenol, however, the detection limit exceeded the SQS. It is very difficult to obtain low detection limits for these compounds. Benzyl alcohol was not detected in any samples but the method detection limits exceeded the SQS for most the Elliott Bay stations. These stations had percent solids content less than 42% and when detection limits were dry weight converted, they exceed the SQS.

Organotins were analyzed in all 29 offshore samples--they were not measured in intertidal samples. Organotins, particularly tributyltin (TBT), have been used extensively as anti-fouling agents in boat paints. Organotins are highly effective against marine organisms attaching to boat bottoms, such as barnacles and algae, however, they are also toxic to nontarget marine organisms. Organotins are neurotoxins, disrupt ATP synthesis, impair DNA/RNA production, and have been found to be endocrine disrupters in fish. The use of organotins on leisure craft was banned in 1998, but they may still be used on commercial vessels. The International Maritime Organization is planning to ban the use of organotins in anti-fouling paints by 2003 and ban their presence on vessels by 2008.

The Carkeek and majority of West Point stations were all less than detection limits for organotins. In contrast, these compounds were detected in all the Elliott Bay stations, with the highest TBT value (228 µg/kg dry weight) detected at LTBC41, the station located just south of the Elliott Bay Marina and grain terminal. The next two highest values were found at the easternmost stations in inner Elliott Bay closest to the Seattle waterfront. Station LTBC41 also had the highest TBT value in 1997, which was 311.7 µg/kg dry weight. The values at this station are likely due to the proximity to the marina and ship traffic to the grain terminal.

Sediment Toxicity Results

As discussed above, only two stations had toxicity tests conducted due to the initial chemistry results, specifically PAHs. The two stations were WP230P and WP430N located near the West Point outfall. The KCEL conducted a 10-day acute toxicity test using the amphipod *Rhepoxynius abronius* and a 96-hour acute toxicity echinoderm embryo (*Strongylocentrotus purpuratus*) test. A 20-day chronic toxicity test using the juvenile polychaete, *Neanthes arenaceodentata*, was conducted by a subcontract laboratory. A summary of the test results are provided below and a more thorough discussion regarding toxicity results is presented in Section 4.

The results of the amphipod toxicity test for both stations passed both the Biological and Severe Biological Effects Criteria (i.e., showed no toxicity).

Results from the *Neanthes* test indicate a statistically significant reduction between station WP230P and the reference station with respect to individual and total dry weight and individual growth rate. There was no reduction with regard to percent mortality between the reference station and either of the West Point stations.

Echinoderm embryo test results show significant differences between the reference station and both the West Point stations with respect to mortality and abnormal echinoderm embryo development. Station WP430N exceeded the Biological Effect Criterion for mean effective mortality and station WP230P exceeded the Severe Biological Effect Criterion for mean effective mortality.

Benthic Community Results

Marine benthic communities are useful indicators of sediment quality because they spend most of their lives in direct contact with the sediment. Pollutants contained in sediments and interstitial water could be consumed or absorbed by benthos, resulting in unhealthy animals, stressed communities, and the potential for pollutants to pass through the food web to other marine organisms.

Benthic communities may be analyzed and characterized in several different ways. One of the most common methods is looking at community diversity. Diversity is a measure of the complexity of the community structure and is

increased or decreased by physical, chemical, and/or biological factors. High diversity is generally considered good as it indicates a balanced and stable community. Low diversity occurs in an area where the community is dominated by a few species, such as in a stressed environment. Diversity indices are commonly used due to their ease of calculation but are criticized due to their lack of detecting community changes due to a specific environmental factor, such as a particular pollutant or physical factor. This also leads to difficulty in interpreting diversity results as the reason why a particular community structure often cannot be determined.

Additional methods for characterizing benthic communities are used in conjunction with diversity indices to try and establish a clearer picture of why a particular community structure is seen. One of these methods is calculating abundances of pollution tolerant and pollution sensitive species. *Capitella capitata* is a polychaete commonly used as an indicator of polluted, anoxic, or organically enriched sediments (Pearson and Rosenberg, 1978). Ophiurids (brittle stars) have been used as indicators of clean undisturbed sediments (Comiskey et al., 1984).

In 1998, benthic community monitoring was conducted as part of the County's NPDES permit for the West Point treatment plant. The monitoring goals were to determine if discharges from the outfall are impacting (either positively or negatively) the surrounding benthic communities. Communities were examined by calculating several diversity indices, calculating abundances, and looking at species composition. Physical and chemical factors potentially affecting community structure were also explored.

Diversity indices. The Shannon-Wiener index is one of the most widely used diversity indices due to its ease of calculation and its relative independence of sample size. This index uses the total number of species in a sample as well as the abundance of single species to determine diversity. High diversity values are seen in areas with many different species and low environmental stress, while low values are seen in areas with few species and high environmental stress. Shannon-Wiener diversity values were calculated using the following equation:

$$H' = \sum_{i=1}^{S} P_i \log_2 P_i$$

Where H' = Shannon-Wiener index
P_i = Number of individuals in the ith species
S = Total number of species

Average Shannon-Wiener diversity values for the West Point samples ranged from 3.20 (station WP430N) to 5.79 (WPD215S). The two stations located south of the discharge and the reference station located 1500 feet north of the discharge had higher diversity values than the station at the discharge and the station located 430 feet north of the outfall.

Evenness is another measure of diversity that is commonly used in conjunction with the Shannon-Wiener index. Evenness was calculated with the following equation:

$$J = H' / \log_2 S$$

Where J = Evenness
H' = Shannon-Wiener index
S = Total number of species

Evenness values close to 1.0 represent a sample composed of several different species while low evenness values indicate a sample composed of only a few dominant species. Average evenness values ranged from 0.75 (WPD430S) to 0.88 (WP1500N). The values tend to be higher at the northernmost stations and decrease as the stations go further south. Evenness values did not follow the same pattern as the Shannon-Wiener values.

Swartz's index is another diversity index which measures the minimum number of species whose abundance makes up 75% of the total sample abundance. Low values indicate a sample with little diversity while high values indicate a sample composed of many species. Swartz's index values ranged from 7.00 (WPD430N) to 36.00 (WPD215S). The same pattern for the Shannon-Wiener index was also seen for Swartz's index, with the two stations located south of the discharge and the reference station having higher diversity values than the station at the discharge and the station located 430 feet north of the outfall.

As all the stations had similar grain size distributions, correlations between diversity index values and grain size were not seen. Generally, greater diversity

values are seen with coarser grain sizes, however, grain size was not a determining factor of diversity values for these samples.

Species Abundance. The average total abundance (the total number of organisms) varied from 32 (WPD430N) to 1,386 (WPD430S). The trend in total abundance was the same as seen with the Shannon-Wiener and Swartz's index, in that stations WPD430N and WP230D has the lowest values. Total abundances did not show a correlation with grain size as sediment type controls the type of inhabitant, but does not influence how many individuals are present. The average total number of species ranged from 14 (WPD430N) to 175 (WPD430S) and again followed the same pattern as total abundance.

The percent of total organisms in each major taxa group is shown in Figure 3-14. All the stations have fairly similar assemblages with only slight differences. Table 3-6 gives a summary of benthic community indices.

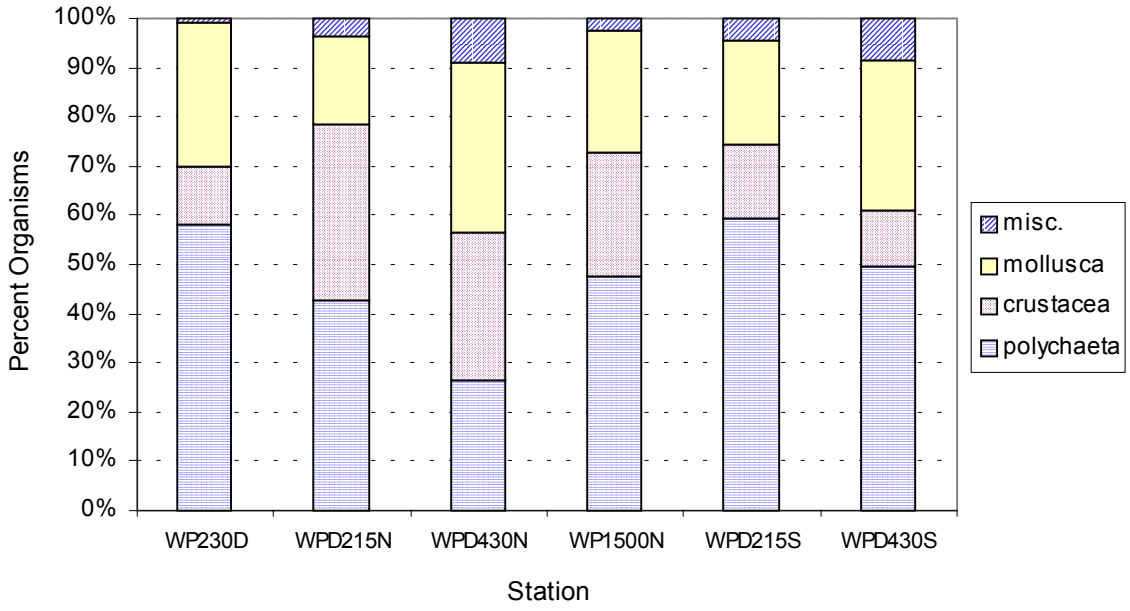

Figure 3-14. Major Taxa Groups

Table 3-6. Benthic Indices Summary

	Station					
Index	**WP230D**	**WPD215N**	**WPD430N**	**WP1500N**	**WPD215S**	**WPD430S**
Avg. # of Individuals	65.7	191.7	32.0	218.3	1020.7	1386.3
std. dev.	52.9	48.6	11.5	21.4	227.8	399.5
Avg. # of Species	24.3	61.3	14.0	74.3	157.3	175.3
std. dev.	12.9	23.8	5.3	11.8	11.7	3.2
Avg. Shannon-Wiener	3.6	5.1	3.2	5.5	5.8	5.6
std. dev.	0.3	0.6	0.7	0.4	0.2	0.3
Avg. Evenness	0.8	0.9	0.8	0.9	0.8	0.7
std. dev.	0.1	0.0	0.1	0.0	0.0	0.0
Avg. Swartz's Index	9.3	25.3	7.0	30.0	36.0	33.7
std. dev.	1.5	12.1	3.0	7.2	4.6	7.0
Avg. Mollusk Evenness	4.0	7.7	2.7	16.7	19.7	28.7
std. dev.	2.0	6.5	2.1	2.5	1.2	1.5
% clay	1.3	3.4	0.6	3.3	4.0	4.3
% silt	5.5	3.5	2.6	1.5	4.2	4.7
% sand	92.7	91.8	96.4	95.2	86.7	86.0
% gravel	0.0	1.6	0.1	0.4	5.2	5.2

Table 3-7 shows the dominant species found at each of the six stations. Many of the dominant species were found at several stations, with *Olivella baetica*, being the most dominant species at three stations. The benthic community results for 1996 sampling at station WP215N show the same dominant species assemblage as stations WPD215N and WPD215S in 1998. The abundance of certain species, such as the polychaete *Capitella capitata* which is known to be tolerant of polluted and organically enriched sediment, provides useful information. *Capitella capitata* was found in one of the three replicate samples for stations WPD215S and WP1500N but not at any of the other stations. *Eteone longo* and *Prionospio steenstrupi*, also considered pollution tolerant polychaetes, were found at all stations with the exception of station WPD430N. Other pollution tolerant species, such as *Paraprionspio pinnata, Leitoscoplos pugettensis*, and *Mya arenaria* were seldom, if at all, seen at any stations. Ophiurids are considered pollution sensitive organisms and were found at stations WPD215S, WPD430S, and WP1500N.

Table 3-7. Dominant Species at Each Station

Station	Dominant Species	Taxonomic Group	Average Number of Individuals	Percent of Total Abundance
WPD215N	*Olivella baetica*	Crustacea	14	7.3
	Neosabellaria cementarium	Polychaeta	12	6.2
	Byblis millsi	Crustacea	10	5.2
	Tritella pilimana	Crustacea	9	4.7
	Hiatella arctica	Mollusca	8	4.2
WPD215S	*Hiatella arctica*	Mollusca	120	11.8
	Dipolydora akaina	Polychaeta	86	8.4
	Neosabellaria cementarium	Polychaeta	80	7.8
	Pholoides asperus	Polychaeta	53	5.2
	Polycirrus sp.	Polychaeta	43	4.2
WPD430N	*Olivella baetica*	Crustacea	10	30.3
	Mandibulaphoxus mayi	Crustacea	5	15.6
	Polycirrus sp.	Polychaeta	3	10.3
	Polycirrus sp. II	Polychaeta	2	5.3
	Eogammarus confervicolus	Crustacea	1	3.1
WPD430S	*Hiatella arctica*	Mollusca	219	15.8
	Pholoides asperus	Polychaeta	148	10.6
	Nemocardium centifilosum	Mollusca	132	9.5
	Neosabellaria cementarium	Polychaeta	100	7.2
	Dipolydora akaina	Polychaeta	80	5.7
WP230D	*Olivella baetica*	Crustacea	16	24.8
	Cirratulus sp. juv.	Polychaeta	12	18.7
	Polycirrus sp.	Polychaeta	4	5.6
	Hippomedon sp.	Crustacea	3	4.1
	Dipolydora akaina	Polychaeta	3	4.1
WP1500N	*Rhepoxynius abronius*	Crustacea	22	10.1
	Nemocardium centifilosum	Mollusca	11	4.8
	Olivella baetica	Crustacea	10	4.7
	Prionospio steenstrupi	Polychaeta	10	4.4
	Macoma yoldiformis	Mollusca	9	4.0

SHELLFISH DATA RESULTS

Shellfish samples were collected from intertidal beaches as a part of the ambient and point source monitoring programs and consisted entirely of butter clam, *Saxidomus giganteus,* whole tissues. This is a change from previous years when samples consisted of several different species. The change to butter clams was initiated in order to facilitate comparisons between stations and to assist in temporal trends for future monitoring. Different feeding strategies can affect results, and mixing species that are surface deposit feeders (*Macoma* sp.) with clams which are filter feeders (butter, littleneck, manila, and horse clams) does not allow for direct comparisons between results. Also, the various species contain different amounts of lipids which may also affect

results. Therefore, only general comparisons between previous years results can be made but more specific comparisons between stations for 1998 is possible.

Two point source samples were analyzed for semivolatile organics, pesticides, PCBs, metals, fecal coliform and enterococcus bacteria. One additional point source sample was analyzed for bacteria only. Two ambient samples were analyzed for semivolatile organics, pesticides, PCBs, metals, fecal coliform and enterococcus bacteria. Four additional ambient samples were analyzed for bacteria only. All results are presented on a wet weight basis unless otherwise noted and are provided in Appendix C. Dry weight values for metals are also provided in Appendix C.

Metals

Thirteen metals were analyzed in shellfish tissues at station KSSN04 (West Point), LSKR01 (Alki Point), JSVW04 (Richmond Beach), and MTLD03 (Normandy Park). Antimony, beryllium, and thallium not detected in any samples. These metals were also not detected in previous years' monitoring. Cadmium, chromium, lead, mercury, nickel, selenium, and zinc concentrations varied only slightly between samples and were similar to values detected from previous studies (NOAA, 1981). Station JSVW04 had the highest concentration detected for most of the metals listed above. Arsenic was detected in all samples and concentrations ranged from 15.7 to 20.7 mg/kg dry weight, with the highest concentration found at the West Point station. Arsenic concentrations were similar to values detected previously. Copper was also detected at all stations ranging from 8.1 to 12.9 mg/kg dry weight, with the highest value detected at station JSVW04. Concentrations differed slightly between the same stations monitored in 1997, most likely due to differences in species composition. Silver values ranged from 5.05 to 7.23 mg/kg dry weight and the highest value was found at West Point. Silver concentrations for the other three stations varied only slightly and ranged between 5.05 and 5.86 mg/kg dry weight.

State and federal criteria do not exist for acceptable levels of metals in shellfish tissues. However, the U.S. Food and Drug Administration (FDA) has established guidance values termed Levels of Concern for mollusks for five metals: arsenic, cadmium, chromium, lead, and nickel. These guidance values

are risk-based and differ for children and adults. For comparative purposes, the lowest of the two values was chosen. Results from 1998 monitoring were below wet weight Levels of Concern for arsenic (55 mg/kg), cadmium (3 mg/kg), chromium (11 mg/kg), lead (0.8 mg/kg), and nickel (80 mg/kg) (FDA 1993a,b,c,d,e).

The FDA has established an Action Level in fish and shellfish tissues of 1.0 mg/kg for mercury (FDA, 1995). When this value is exceeded, the food product cannot be commercially traded which is how an Action Level differs from a Level of Concern. Mercury concentrations were well below this Action Level.

Organics

The same four stations that were monitored for metals were also monitored for organics, which included semivolatile organics, pesticides and PCBs. Of all the compounds analyzed, only one compound was detected: benzoic acid. Benzoic acid was detected in all samples at concentrations ranging from 661 to 1,670 mg/kg. Benzoic acid is used as a food preservative and an anti-fungal agent; however, it is also a degradation product produced by metabolic processes and has always been detected in shellfish samples in the past. No pesticides or PCBs were detected in any of the samples.

Fecal Coliform Bacteria in Shellfish

Fecal coliform and enterococcus bacteria were monitored at six ambient stations and three point source stations. All but three stations were sampled from May to September. Two stations were sampled in August only, MTLD03 and LSKR01. Station KSSN04 was sampled in August and October. The results can be found in Appendix C.

Fecal coliform concentrations varied from station to station and from month to month. Generally, stations near Seahurst Park (MTEC01) and Carkeek Park (KSHZ03) had the lowest values from May to September. During this five month period, values ranged from <20 to 3,500 MPN/100g with the highest concentration detected at Alki Point (LSKR01) in August. Fecal coliform counts were generally the lowest in September (Figure 3-15). Two samples at

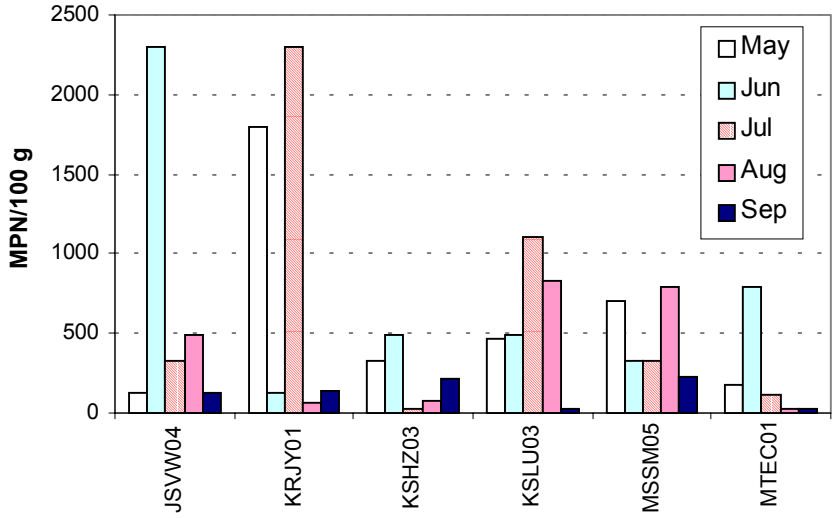

Figure 3-15. Fecal Coliform Concentrations in Shellfish

stations KRJY01 and KSSN04 were collected in October. Counts were 3,300 and 4,900 MPN/100g, respectively, for these two stations. Since samples were not collected in October at other stations, it is not possible to determine if concentrations were elevated at all stations; however, over an inch of rain fell a few days prior to sampling which likely contributed to the high counts. Station KSLU03, located just north of the Lake Washington Ship Canal at Golden Gardens, and MSSM05 located in Tramp Harbor did not have the highest fecal coliform values detected but had consistent concentrations from May to August. Stations such as MTEC01 and KRJY01 had concentrations that fluctuated throughout the year, unlike KSLU03 and MSSM05. Station KSLU03 is influenced by freshwater from a nearby creek and the Lake Washington Ship Canal and station MSSM05 is located in an area with poor mixing. The two stations located near West Point and Alki Point were only sampled in July, therefore, comparisons between stations and months cannot be made for these sites.

Enterococcus bacteria counts were not correlated with fecal coliform counts and the highest concentrations were not found in any particular month. Concentrations ranged from less than 20 to 7,900 MPN/100 ml.

There does not appear to be a consistent relationship between fecal coliform concentrations measured in shellfish and concentrations detected in water however, there was a correlation for some stations and months (Figure 3-16) that was not seen in previous years. For 1997, fecal coliform concentrations in shellfish and water did not show a relationship. Although several other studies have also found that a constant association between fecal coliform concentrations in shellfish and overlying water does not exist, shellfish from waters meeting water quality criteria are unlikely to be involved in the spread of Disease, which is the reason that shellfish beds are classified based upon bacteria concentrations in the water, not in the shellfish themselves (NSSP, 1995).

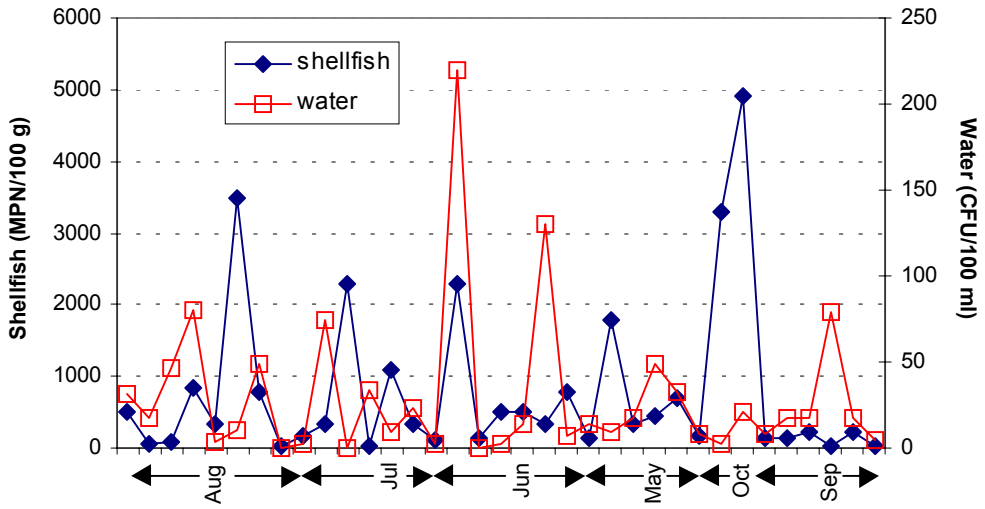

Figure 3-16. Fecal Coliform Concentrations in Shellfish & Water for All Stations

MACROALGAE DATA RESULTS

Macroalgae (algae) samples were collected from seven beaches and consisted entirely of the most prevalent edible algae, *Ulva fenestrata* (known as sea lettuce). Samples were analyzed for metals only. All macroalgae data are presented on a dry weight basis and can be found in Appendix D.

Algae from three point source and four ambient sites were sampled for 13 metals. The point source stations were KSSN04 and KSSN05 located on the north and south side of West Point, respectively, and LSKR01 at Alki Point. One ambient station was located near Richmond Beach and three were located between the southern end of West Point to just north of the Elliott Bay Marina (see Figure 2-1). All seven stations were sampled in August.

Macroalgae samples were monitored for thirteen metals. Five metals, antimony, beryllium, selenium, silver, and thallium were either below or at the MDLs for all samples. Mercury was detected in two samples; one right at the detection limit (0.02 mg/kg) and the other at a concentration of 0.024 mg/kg (station JSVW04). Lead was detected in three samples ranging from 2.05 to 2.74 mg/kg, with the highest concentration detected at KSSN04. Arsenic, cadmium, chromium, copper, nickel, and zinc were detected in all samples. A summary of metal concentrations detected in algae samples from four stations in 1997 and 1998 is given in Table 3-8. In the past few years, certain metals such as chromium, nickel, and zinc have been higher in algae from the stations at West Point than other stations sampled. In 1999, dissolved metals were also monitored in the water column from these beaches at the same time algae was collected. Those results will be discussed in the 1999 marine water quality report.

To determine if the pattern of higher metals near West Point is a continuing event, macroalgae will be sampled at additional stations in 1999. These stations will be located on both the west and east side of the central basin as well as north and south of West Point. In addition, total and dissolved metals will be measured in the water column at several stations, including the West Point stations.

Table 3-8. Metal Concentrations in Macroalgae (mg/kg dry weight)

	KSSN04		KSSN05		KSUR01		LSKR01	
	1998	**1997**	**1998**	**1997**	**1998**	**1997**	**1998**	**1997**
Arsenic	2.68	6.18	4.04	4.36	3.21	5.9	4.25	6.69
Cadmium	0.35	0.3	0.13	<0.15	<0.12	0.36	0.55	0.7
Chromium	8.39	5.9	8.57	10.2	2.51	0.42	1.16	0.96
Copper	7.00	13.65	6.07	16.23	5.69	13.07	2.49	5.6
Lead	2.74	<1.69	<1.1	1.72	<1.22	2.89	<1.66	<2.21
Nickel	30.22	7.42	10.66	12.16	4.55	4.52	2.38	2.65
Zinc	193.69	15.51	19.49	19.51	10.93	17.23	9.06	5.87

SECTION 4
INTEGRATION OF 1998 MONITORING DATA

This section provides a more detailed discussion for selected parameters than that provided in Section 3. A discussion of 1998 monitoring trends, West Point sediment data, and the relationship between sampling matrices will be discussed below.

MONITORING TRENDS

Generally, results in 1998 were consistent with those obtained for previous years. Water column parameters, such as nutrients and salinity, fluctuate depending upon time of year and depth sampled. However, despite these fluctuations, overall concentrations have been consistent over the last several years as evidenced by nitrate+nitrite values for station LSNT01 in the Central Basin (Table 4-1). A frequency plot for nitrate+nitrite concentrations over the last few years at station LSNT01 is shown in Figure 4-1.

Table 4-1. Nitrate+nitrite Concentrations (mg/L) at LSNT01

	Average	Maximum
1998	0.29	0.39
1997	0.32	0.42
1996	0.28	0.43
1995	0.28	0.48

It is interesting to note that chlorophyll-*a* values, which are used as an indicator to detect phytoplankton blooms, vary in terms of concentrations from year to year but the major blooms in the Central Basin usually occur at similar times every year--from April to May and in July. A bloom has also been detected in September for a few years, but not in others. Although chlorophyll is a good indicator for detecting phytoplankton blooms, with only one sample collected per month at each station it is easy to miss a minor bloom as they are episodic and can dissipate within a period of several days depending on environmental conditions.

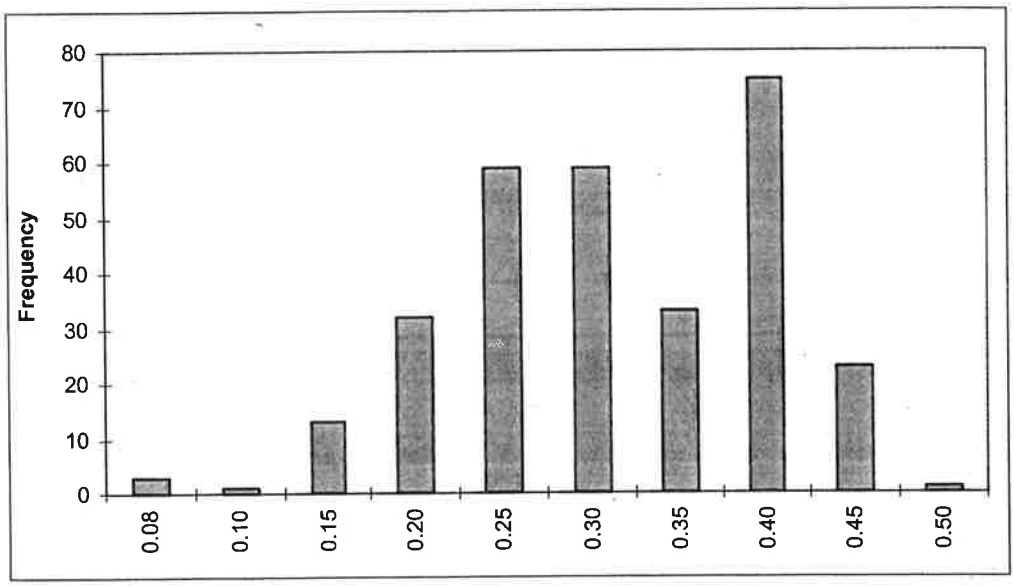

Figure 4-1. Nitrate+nitrite values (mg/L) from 1995-1998 for station LSNT01

Fecal coliform bacteria is another parameter where results from recent years have been consistent. Offshore stations consistently meet Washington State Class AA Marine Water Quality Standards with the exception of stations located in Elliott Bay. Stations which are located in Elliott Bay consistently fail standards likely due to the freshwater input from the Duwamish River and stormwater runoff (King County, 1999). There are several intertidal stations that have also consistently failed standards over the last several years and these stations are either in areas of poor mixing or near a freshwater source. Fecal coliform counts near these areas are elevated following high rainfall periods and it is likely that in the next few years, the same trends will continue for these stations.

WEST POINT SEDIMENTS

Results for 1998 West Point outfall sediment were provided in Section 3; however, a more detailed discussion is presented below. Twelve samples were collected along two transects--one at the end of the outfall diffuser and one at the mid-point of the diffuser (the two transects are approximately 100 meters

apart). Samples were initially analyzed for chemical parameters--including heavy metals, organic compounds such as polynuclear aromatic hydrocarbons (PAHs) and PCBs, and organotins. Results for metals indicated no exceedences of state sediment standards and that a gradient does not exist around the outfall (i.e., concentrations are not higher at the discharge point and do not show a gradient with respect to distance away from the outfall). Metals results from the five stations sampled along the outer transect in 1996 were similar to the 1998 results.

The majority of all organic compounds detected were PAHs; the PAHs detected in 1998 were the same as those detected in 1996. Samples collected along the mid-diffuser transect had fewer compounds detected with the exception of station WPD430S, located 430 ft south of the middle diffuser. This station had the highest organic carbon content of all the stations along this transect, therefore, it is not unexpected that some organic compounds would bind to sediments from this station. The stations placed along the end of the pipe transect had several PAHs detected, particularly the high molecular weight PAHs. Station WP230P, located at the end of the pipe, had two PAHs that exceeded SQSs: benzo(*g,h,i*)perylene and indeno(1,2,3-*c,d*)pyrene. In 1996, the station at the end of the pipe did not exceed standards but station WP430N exceeded the AET standard for indeno(1,2,3-*c,d*)pyrene. Station WP215S also exceeded the AET standard for indeno(1,2,3-*c,d*)pyrene and had high concentrations of chrysene and fluoranthene in 1996, but did not exceed standards in 1998. These data show the variability and evidence of some patchiness for organic compounds.

Toxicity tests for sediments from stations WP230P and WP430N sampled in 1998 exhibited no toxicity for one acute toxicity test, but showed a significant reduction with respect to individual growth rate and total dry weight for the chronic polychaete toxicity test for station WP230P. Another acute toxicity test (echinoderm embryo) showed exceedences of the Biological Effect Criterion and Severe Biological Effect Criterion for mean effective mortality for stations WP430N and WP230P.

Benthic infauna analysis was conducted on the mid-diffuser transect only and not at stations WP230P and WP430N. However, benthic communities at corresponding stations WP230D and WPD430N, show differences compared to other stations along the transect. Several commonly used indices were all significantly lower for these two stations than others sampled. When all three

types of analyses are considered together, it appears that the stations which are at the outfall itself and 430 ft north of the outfall are exhibiting an effect. However, it is not clear whether the effects are due to physical and/or chemical factors as the biological tests do not distinguish what the effect is from--just that one exists. An additional factor complicating interpretation is that 1998 was the first year that all three types of test were conducted on multiple stations. The results may not reflect changes at the West Point outfall, but an increase in our ability to detect changes due to additional sampling techniques. The West Point sediment stations are scheduled to be sampled again in September 2000.

RELATIONSHIP BETWEEN MATRICES

For three intertidal stations, West Point (KSSN04), Alki Point (LSKR01), and Richmond Beach (JSVW04), metals were monitored in three matrices: sediment, clam tissues, and macroalgae. A summary for selected metals in all three matrices is given in Table 4-2. Metals were highest at the Richmond Beach station for sediments, but clams and algae did not follow this pattern. The Richmond Beach station had a different sediment grain size profile than the other two stations and contained approximately 78% sand; the West Point and Alki Point stations contained approximately 93% and 94% sand, respectively. The slightly higher metal concentrations in sediments from the Richmond Beach station is likely not attributed to this difference in grain size as the percent silt and clay are similar for all three stations (see Table B-1 in Appendix B) and it is the finer sediments for which the metals have an affinity.

Metal concentrations in clam tissues tended to be slightly higher at the West Point station, but were not significantly different. Metals in algae were not consistently higher for any particular station with the exception of nickel and zinc, which were significantly higher in 1998 at the West Point station. Although nickel and zinc concentrations in algae were higher at the West Point station, clam and sediment concentrations were not higher than the other two stations.

Table 4-2. Metal Values for Sediment, Shellfish, and Algae

Station	Arsenic			Chromium			Copper			Lead			Nickel			Zinc		
	S	C	A	S	C	A	S	C	A	S	C	A	S	C	A	S	C	A
KSSN04	<MDL	20.7	2.7	15.7	1.9	8.4	6.3	12.7	7.0	3.3	0.8	2.7	19.8	5.9	30.2	23.8	94.2	193.7
LSKR01	<MDL	19	4.2	18.9	1.6	1.2	4.7	10.8	2.5	5.5	0.7	<MDL	15.0	5.0	2.4	22.2	90.3	9.1
JSVW04	3.5	15.7	4.0	23.3	2	9.4	11.4	12.9	6.9	14.9	1.6	2.7	29.5	5.7	10.6	32.5	89.4	16.4

All concentrations are mg/kg dry weight.
S = sediment
C = butter clam
A = algae

The table above shows that metal concentrations vary depending on the matrix sampled and that not any one matrix is a good predictor of metal concentration in another media, i.e., sediment cannot be used to predict the concentration of metals in shellfish. While grain size has a large effect on metal concentrations in sediments, environmental factors such as water temperature, tidal cycles, and seasonality have the largest effect on the bioavailabilty and bioaccumulation of metals in shellfish and algae.

SECTION 5
GLOSSARY

Algae: Plants that grow in surface waters in relative proportion to the amount of light, nutrients, and attachment sites available. Algae are food for fish and other aquatic organisms.

Alkalinity: A measure primarily of the carbonate or carbon dioxide related compounds in water. The lower the alkalinity, the less capacity the water has to absorb acids without becoming more acidic.

Ammonium: A nitrogen-containing substance commonly excreted by animals and used by macroalgae for growth.

Anthropogenic: Caused by humans.

Benthos: The communities of aquatic life that dwell in or on the bottom sediments of a waterbody. The benthos may comprise the following: burrowing organisms such as clams, creeping animals such as snails, and sessile animals such as sponges.

Bioaccumulation: The enrichment of a chemical in an organism caused by either passive adsorption from seawater, active uptake, or ingestion, followed by retention in tissues or hard parts.

Bioaccumulative substance: Substances that increase in concentration in living organisms as they inhale or filter contaminated air or water or ingest contaminated food or water.

Biochemical Oxygen Demand (BOD): Refers to the amount of dissolved oxygen required to meet the metabolic needs of microorganisms in water, wastewater, and effluents.

Biosolids: The organic solids separated from raw wastewater or produced by the wastewater treatment process. Contain large amounts of organic matter.

cfu: Colony forming unit. A unit of measure used for describing the amount of bacteria contained in a given water volume.

Chlorophyll: Green pigments in plants, including algae, that play an important part in the chemical reactions of photosynthesis. A measurement of chlorophyll-*a*, one type of pigment, is commonly used as an indicator of the algae content of water.

Clean Water Act: Formerly known as the Federal Water Pollution Control Act.

Cleanup Screening Levels (CSL): CLSs are the criteria in the State sediment quality standards used to determine whether an area should be designated as a cleanup site.

Combined sewers: A sewer system that carries both sanitary sewage and stormwater runoff.

Combined sewer overflow (CSO): An overflow of combined wastewater and stormwater. CSOs occur when stormwater from heavy rains exceed the capacity of the wastewater collection system.

Detection limit: The lowest concentration level in a sample that can be determined to be statistically different from a blank sample.

Dissolved oxygen (DO): The oxygen that is freely available in water. Certain amounts are necessary for life processes of aquatic animals. The oxygen is supplied by the photosynthesis of plants and by aeration. Oxygen is consumed by animals, plants, and bacteria that decompose dead organic matter and some chemicals.

Effluent: Treated/untreated water or wastewater flowing out of a treatment facility, sewer, or industrial outfall. Generally refers to discharges into surface waters.

Enterococcus: Any *Streptococcus* bacteria that inhabit the intestines of warm-blooded animals. In the intestines, *Enterococci* are normal and do not cause disease. They can be pathogenic if they enter tissues, the bloodstream, or the urinary tract.

Estuary: A coastal area where fresh water mixes with salt water. It is usually in a semi-enclosed body with a source of fresh water, such as a river or stream.

Estuaries provide shelter and food for marine organisms, birds, and other wildlife.

Euphotic zone: The layer of water that receives sufficient light to support photosynthesis.

Eutrophication: The progressive enrichment of confined bodies of water (such as an estuary) due to the addition of large amounts of inorganic nutrients. Excessive nutrient inputs allow large phytoplankton blooms, which use up oxygen in the underlying waters when they decompose. This deficit can kill nearby aquatic life.

Fecal coliform: Bacteria from the intestines of warm-blooded animals. Most fecal coliform bacteria are not harmful (pathogenic). They are measured or counted as an indicator of the possible presence of harmful bacteria.

Geometric mean: A calculated mean or average that is appropriate for data sets containing a few values that are very high relative to the other values. To reduce the bias introduced to an arithmetic mean (average) by these very high numbers, the natural logarithms of the data are averaged. The antilog of this average is the geometric mean.

Habitat: The physical and chemical environment that enables an aquatic organism to successfully complete its life cycle. The habitat includes food, shelter, and other factors, such as oxygen and physical characteristics.

Halocline: A layer of water which has a high rate of salinity change in the vertical dimension.

Influent: Water, wastewater, or other liquid flowing into a treatment facility.

Intertidal: The area of a beach that is exposed during low tide and covered during high tide.

Invertebrates: Animals lacking a backbone.

Macroalgae: Plants that float in the water or attach to larger plants, rocks, and other substrates. They are a normal component of aquatic ecosystems. Excessive numbers can make the water appear cloudy or colored.

Mean: Same as average. The sum of a list of values divided by the number of items on the list.

Median: The midpoint in a set of values that have been arranged in order.

Method detection limit (MDL): The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the concentration is greater than zero.

mgd: A unit of measure equal to million gallons per day.

mg/L: Milligrams per liter. Used in describing the amount of a substance in a given volume of liquid. Equal to parts per million (ppm).

µg/L: Micrograms per liter. Equal to parts per billion (ppb).

Monitor: The systematic and repeated measurement of conditions in order to track changes and assess the data gathered.

mpn: Most probable number. A unit of measure used for describing the amount of bacteria contained in a solid matrix, such as shellfish tissue.

National Pollutant Discharge Elimination System (NPDES): NPDES comes from Section 402 of the Clean Water Act. It prohibits the discharge of pollutants into navigable waters of the united States unless a special permit is issued by the EPA, a state, or tribal government.

Nearshore: Areas near the beach or shoreline influenced by light and wave action that may or may not be exposed at low tide.

Nitrate, nitrite: Two forms of nitrogen compounds that algae may use for growth. High concentrations may lead to algal blooms and undesirable effects.

Nonpoint source: An input of pollutants into a water body from unidentifiable sources, such as agriculture, the atmosphere, stormwater or groundwater runoff.

Nutrient: An inorganic or organic compound essential for growth of organisms.

Organic: Refers to living organisms and to the chemistry of compounds containing carbon.

Outfall: Discrete location where quantities of water and/or waste are discharged into lakes, streams, or oceans, generally through a pipe.

Pathogen: A microorganism that can cause disease in other microorganisms, humans, animals, or plants. Pathogens can be present in point and nonpoint source discharges.

Parameter: One of a set of properties whose values determine the characteristics of a waterbody. Examples include dissolved oxygen, temperature, and salinity.

Phytoplankton: Free-floating, single-celled, microscopic plants that live in water (also called unicellular algae).

Plankton: Organisms that drift passively or are weak swimmers, mostly phytoplankton, protozoa, larval animals, and small filter-feeding zooplankton. Are generally found in the surface layers of a waterbody.

Point source: An input of pollutants into a waterbody from discrete sources, such as municipal or industrial outfalls.

Polychaeta: A class of annelid worms that includes most of the marine segmented worms.

Primary treatment: The first stage of wastewater treatment involving removal of debris and solids by screening and settling.

Raw sewage: Untreated wastewater.

Reported detection limit (RDL): The level below which the laboratory does not report numerical values.

Salinity: A measure of the amount of dissolved solids in seawater. It is usually calculated from conductivity, refractive index, or chlorinity.

Secchi disk: A black and white painted disk that is used to measure the clarity of water. The disk is lowered into the water until it is not visible. The Secchi disk reading is half the distance between that depth and the depth at which the disk can be seen again.

Secondary treatment: The stage following primary treatment and which bacteria are used to consume organic wastes. Wastewater is then disinfected and discharged through an outfall.

Sediment Quality Standards (SQS): Standards established by the Washington State Department of Ecology for selected organic compounds and metals in sediments (Chapter 173-204 WAC). These standards are derived from the Puget Sound Apparent Effects Thresholds for selected chemicals.

Sill: A submarine ridge partially separating bodies of water, such as fjords, from one another or from the open ocean.

Standard: An established limit for a substance in water or sediment or a physical property of the water or sediment.

Subtidal sediments: Sediments below the lowest reach of the low tide.

Thermocline: A layer of water in which a rapid change in temperature can be measured in the vertical dimension.

Total suspended solids (TSS): Particles, both mineral (clay and sand) and organic (macroalgae and small pieces of decomposed plant and animal material), that are suspended in water.

Transparency: A measure of water clarity, often measured by using a Secchi disk.

Turbidity: Lack of water clarity caused by suspension of minute particles, usually algae, silt, clay, or dissolved materials.

Upwelling: The process by which deep, cold, nutrient-laden water is brought to the surface, usually by wind divergence of equatorial currents or coastal winds which push water away from the coast.

Washington Administrative Code (WAC): The regulations adopted by various Washington State agencies through the rule-making process.

Wastewater: Flow of liquids and solids within a sewerage system.

Water column: The area of water contained between the surface and the bottom of a waterbody.

Zooplankton: Small animals that drift passively or weakly swim in the water.

SECTION 6
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TABLE A-1. 1998 Ambient Offshore Water Column Monitoring
General Water Quality Parameters (page 1 of 5)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m³)	Phaeophytin (mg/m³)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
JSTU01	1/20/1998	1	9.0	28.32	5.0	8.5	0.37	0.02	<0.02	0.39	0.09	2.3	3.6
		15	9.1	28.69		8.2	0.36	<0.01	<0.02	0.39	0.09	2.7	3.7
		25	9.1	28.77		8.2	0.30	<0.01	<0.02	0.39	0.08	3.9	3.6
		35	9.2	28.83		8.0	0.34	<0.01	<0.02	0.39	0.09	2.9	3.6
	2/17/1998	1	8.7	28.44	6.0	8.5	0.72	<0.01	<0.02	0.37	0.08	2.3	3.1
		15	8.6	28.55		8.1	0.50	0.12	<0.02	0.38	0.07	2.3	3.1
		25	8.8	28.67		8.1	0.33	0.09	0.022	0.38	0.08	2.4	3.2
		35	8.8	28.71		5.8	0.30	0.11	<0.02	0.37	0.05	1.8	3.0
	3/16/1998	1	9.6	28.42	7.0	8.7	1.70	0.24	<0.02	0.35	0.07	1.3	3.0
		15	9.5	28.52		8.6	1.20	0.23	<0.02	0.36	0.07	2.1	3.3
		25	9.5	28.56		8.4	1.10	0.16	<0.02	0.37	0.07	1.8	3.0
		35	9.3	28.61		8.3	0.94	0.17	<0.02	0.36	0.08	1.4	3.2
	4/21/1998	1	11.7	28.31	3.0	14.0	21.60	1.80	<0.02	<0.05	0.04	5.6	1.0
		15	11.0	28.52		11.4	17.50	1.90	<0.02	0.12	0.05	6.5	2.0
		25	10.5	28.74		9.5	8.20	0.93	<0.02	0.25	0.06	3.7	2.6
		35	10.2	28.85		9.1	4.00	0.95	<0.02	0.29	0.06	3.7	2.8
	5/20/1998	1	11.8	28.20	7.5	9.7	5.10	1.10	<0.02	0.17	0.05	3.4	1.8
		15	11.3	28.67		9.0	2.20	0.70	0.025	0.20	0.05	4.1	2.0
		25	11.0	28.87		8.6	1.30	0.41	0.028	0.22	0.06	3.3	2.1
		35	10.9	29.02		8.5	0.51	0.39	0.033	0.23	0.06	2.3	1.8
	6/16/1998	1	12.5	28.76	5.8	10.4	10.10	2.60	<0.02	0.08	0.05	5.4	1.1
		15	12.4	28.87		9.8	7.50	3.20	<0.02	0.12	0.05	4.5	1.3
		25	11.9	29.08		8.7	3.00	2.40	0.021	0.17	0.05	5.8	1.6
		35	11.8	29.20		8.3	0.25	2.30	<0.02	0.19	0.06	3.2	1.9
	7/27/1998	1	14.6	29.35	5.0	10.2	7.80	1.20	0.011	0.08	0.05	6.6	1.2
		15	13.1	29.47		8.1	1.10	1.40	0.024	0.20	0.05	5.5	1.7
		25	12.9	29.52		7.5	0.82	2.00	0.021	0.21	0.06	4.7	1.8
		35	12.8	29.54		7.3	0.68	1.80	0.025	0.22	0.06	2.0	1.8
	8/31/1998	1	14.5	29.81	9.0	7.5	2.00	0.42	<0.02	0.21	0.06	4.2	2.2
		15	13.5	29.84		6.8	2.20	1.40	<0.02	0.25	0.07	5.8	2.3
		25	13.5	29.87		6.6	0.83	0.30	<0.02	0.25	0.07	4.6	2.3
		35	13.4	29.90		6.4	3.40	1.10	<0.02	0.27	0.07	4.5	2.3
	9/28/1998	1	13.5	30.14	10.0	6.7	2.30	0.58	<0.02	0.26	0.07	1.9	2.2
		15	13.3	30.18		6.4	2.00	0.46	<0.02	0.27	0.07	4.2	2.2
		25	13.2	30.22		6.2	1.40	0.39	<0.02	0.27	0.07	3.6	2.2
		35	13.0	30.34		5.7	0.64	0.26	<0.02	0.28	0.07	2.8	2.2
	10/20/1998	1	12.3	29.81	12.0	6.6	0.87	0.29	<0.02	0.29	0.07	3.6	2.4
		15	12.2	30.39		6.5	0.50	0.22	<0.02	0.30	0.07	4.8	2.4
		25	12.2	30.42		6.1	0.35	0.17	<0.02	0.30	0.07	5.4	2.4
		35	12.2	30.49		6.2	0.31	0.20	<0.02	0.30	0.07	5.0	2.4
	11/16/1998	1	11.6	30.30	10.0	7.0	0.49	0.19	<0.02	0.32	0.08	2.8	2.8
		15	11.6	30.45		6.7	0.33	0.19	<0.02	0.33	0.08	5.0	2.8
		25	11.5	30.49		6.6	0.28	0.18	<0.02	0.34	0.08	4.3	2.7
		35	11.6	30.56		6.6	0.23	0.18	<0.02	0.32	0.08	3.9	2.7
	12/14/1998	1	9.6	28.15	10.0		0.46	0.19	<0.02	0.37	0.07	3.7	3.0
		15	9.8	29.27			0.26	0.18	<0.02	0.35	0.08	5.8	2.9
		25	10.0	29.72			0.18	0.19	<0.02	0.33	0.07	5.5	2.8
		35	9.9	29.75		7.8	0.17	0.18	<0.02	0.36	0.07	4.0	2.8
KSBP01	1/20/1998	1	8.8	28.48	5.0	8.3	0.42	<0.01	<0.02	0.39	0.09	2.8	2.9
		15	9.1	28.80		8.2	0.33	<0.01	<0.02	0.39	0.09	1.9	3.5
		25	9.0	28.85		8.1	0.27	<0.01	<0.02	0.39	0.10	2.5	3.6
		35	9.0	28.89		8.3	0.28	<0.01	<0.02	0.39	0.10	3.1	3.5
		55	9.0	29.08		8.3			<0.02	0.39	0.08	2.0	3.7
		100	9.0	29.19		8.2			<0.02	0.37	0.08	2.7	3.6
		200	8.8	29.32		8.0			<0.02	0.37	0.09	2.3	3.6
	2/17/1998	1	8.7	28.57	6.0	6.9	0.45	0.06	<0.02	0.38	0.11	1.6	3.1
		15	8.7	28.61		6.7	0.51	0.06	<0.02	0.37	0.07	2.4	3.3
		25	8.7	28.63		6.6	0.42	0.05	<0.02	0.37	0.08	2.9	3.2
		35	8.8	28.71		6.6	0.34	<0.01	<0.02	0.38	0.08	2.0	3.1
		55	8.8	28.81		7.0			<0.02	0.36	0.13	4.9	3.0
		55	8.8	28.81		6.3			<0.02	0.36	0.07	3.1	3.9
		100	8.8	28.96		5.4			<0.02	0.34	0.10	3.5	3.6
		200	8.8	29.03		6.5			<0.02	0.33	0.11	3.7	3.5

TABLE A-1. 1998 Ambient Offshore Water Column Monitoring
General Water Quality Parameters (page 2 of 5)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m³)	Phaeophytin (mg/m³)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
KSBP01 (cont.)	3/16/1998	1	9.4	28.34	8.0	8.9	2.20	0.18	<0.02	0.37	0.06	1.8	3.2
		15	9.3	28.39		8.7	1.80	0.16	<0.02	0.35	0.06	2.3	3.3
		25	9.2	28.48		8.4	1.40	0.13	<0.02	0.36	0.07	1.8	3.4
		35	9.3	28.57		8.5	0.91	0.18	<0.02	0.35	0.08	2.3	3.3
		55	9.6	28.93		8.7			<0.02	0.35	0.08	2.7	3.2
		55	9.6	28.93		8.4			<0.02	0.33	0.07	1.2	3.6
		100	9.6	29.22		8.6			<0.02	0.33	0.06	2.7	3.1
		200	9.7	29.30		8.6			<0.02	0.32	0.06	4.6	3.0
	4/21/1998	1	12.0	26.73	2.3	14.1	20.40	2.30	<0.02	<0.05	0.03	7.0	0.8
		15	11.0	28.45		12.5	20.60	2.10	<0.02	0.07	0.06	5.8	1.4
		25	10.5	28.74		9.9	9.10	1.30	<0.02	0.24	0.05	5.9	2.6
		35	10.5	28.87		9.9	7.70	0.73	<0.02	0.25	0.06	3.8	2.6
		55	10.3	29.00		9.5			<0.02	0.27	0.06	3.0	2.6
		55	10.3	29.00		9.1			<0.02	0.27	0.06	4.7	2.7
		100	10.4	29.34		8.9			0.027	0.24	0.06	2.6	2.4
		200	10.5	29.56		8.8			0.025	0.23	0.06	2.9	2.3
	5/20/1998	1	12.3	26.48	6.0	11.4	15.70	2.00	<0.02	<0.05	0.05	4.3	1.3
		15	11.4	28.67		9.1	1.90	0.58	0.027	0.19	0.06	1.9	2.0
		25	10.9	28.99		9.4	0.70	0.34	0.028	0.21	0.06	2.0	2.2
		35	10.7	29.12		8.2	0.46	0.26	0.033	0.23	0.06	1.9	2.1
		55	10.7	29.32		8.3			0.030	0.25	0.06	1.7	2.2
		55	10.7	29.32		8.5			0.030	0.24	0.07	1.6	1.8
		100	10.7	29.47		8.8			0.038	0.24	0.06	4.0	2.1
		200	10.5	29.78		7.6			0.032	0.23	0.06	2.7	2.1
	6/16/1998	1	12.3	28.82	8.0	10.0	7.30	1.60	<0.02	0.10	0.05	5.9	1.3
		15	11.3	29.22		8.6	0.31	2.10	0.021	0.19	0.06	2.3	1.9
		25	11.3	29.21		8.2	0.14	3.30	<0.02	0.22	0.06	3.4	1.9
		35	11.3	29.25		8.5	0.33	1.00	<0.02	0.22	0.06	3.2	1.9
		55	11.1	29.21		7.9			0.022	0.21	0.06	3.2	2.3
		55	11.1	29.49		8.2			0.021	0.19	0.06	2.8	1.9
		100	11.0	29.60		7.9			0.022	0.17	0.06	3.1	1.9
		200	10.8	29.70		7.2			<0.02	0.18	0.06	4.5	2.2
	7/27/1998	1	15.5	29.24	2.5	13.8	31.50	2.70	<0.02	<0.05	0.05	7.9	0.7
		15	14.0	29.33		10.2	18.50	1.80	0.011	0.07	0.05	4.3	1.2
		25	13.0	29.48		8.2	2.70	0.44	0.020	0.20	0.06	1.5	1.8
		35	13.0	29.54		7.4	1.80	1.10	0.017	0.21	0.06	2.7	1.9
		55	12.6	29.64		7.0			0.012	0.25	0.06	2.6	1.9
		55	12.6	29.64		6.8			0.012	0.25	0.06	6.6	1.9
		100	12.5	29.77		7.1			0.025	0.24	0.06	2.9	1.9
		200	12.1	29.99		7.1			0.034	0.23	0.06	2.8	1.9
	8/31/1998	1	15.0	29.76	8.0	8.8	2.90	0.76	<0.02	0.17	0.07	5.7	2.2
		15	14.1	29.84		7.0	1.30	0.40	<0.02	0.24	0.07	3.3	2.3
		25	13.6	29.99		6.8	0.41	0.22	<0.02	0.26	0.07	4.8	2.3
		35	13.1	29.89		6.2	0.39	0.28	<0.02	0.27	0.07	4.1	2.3
		55	13.6	30.11		6.5			0.013	0.25	0.07	1.5	2.1
		55		30.11		6.6			0.014	0.26	0.07		2.3
		100	13.0	30.38		6.3			0.026	0.24	0.06	6.2	2.2
		140	13.4	30.43		6.4			0.023	0.24	0.07	4.7	2.2
	9/28/1998	1	13.7	30.07	11.0	7.2	2.60	0.41	<0.02	0.25	0.07	1.9	2.2
		15	13.3	30.19		6.3	1.20	0.37	<0.02	0.27	0.07	3.2	2.2
		25	13.1	30.29		5.9	0.67	0.28	<0.02	0.28	0.07	2.3	2.2
		35	13.1	30.35		5.7	0.38	0.26	<0.02	0.29	0.07	2.0	2.2
		55	13.0	30.39		5.9			<0.02	0.29	0.07	2.9	2.1
		55	13.1	30.39		5.9			<0.02	0.29	0.07	3.8	2.2
		100	12.7	30.59		6.1			<0.02	0.27	0.07	3.2	2.1
		140	12.6	30.67		6.0			<0.02	0.27	0.07	2.2	2.2
	10/20/1998	1	11.8	30.22	12.0	6.7	1.50	0.34	<0.02	0.29	0.07	2.9	2.3
		15	11.5	30.37		6.4	0.86	0.31	<0.02	0.29	0.07	1.9	2.4
		25	12.0	30.42		6.3	0.80	0.31	<0.02	0.29	0.07	3.3	2.7
		35	11.7	30.46		6.1	0.75	0.31	<0.02	0.29	0.07	3.5	2.7
		55	11.8	30.54		6.1			<0.02	0.30	0.07	2.9	2.4
		55	12.1	30.54		5.9			<0.02	0.30	0.07	4.2	2.7
		100	11.8	30.67		5.7			<0.02	0.31	0.07	2.9	2.7
		200	11.6	30.75		5.6			<0.02	0.31	0.07	4.2	2.8

TABLE A-1. 1998 Ambient Offshore Water Column Monitoring
General Water Quality Parameters (page 3 of 5)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
KSBP01 (cont.)	11/16/1998	1	11.5	30.46	11.0	6.5	0.27	0.17	<0.02	0.32	0.07	3.4	2.7
		15	11.5	30.56		6.4	0.30	0.21	<0.02	0.32	0.08	4.5	2.7
		25	11.5	30.57		6.4	0.24	0.21	<0.02	0.33	0.08	4.7	2.6
		35	11.4	30.57		6.5	0.26	0.21	<0.02	0.33	0.08	4.0	2.7
		55	11.5	30.59		6.5			<0.02	0.33	0.08	3.8	2.7
		55	11.4	30.59		6.6			<0.02	0.33	0.07	4.7	2.7
		100	11.2	30.71		6.5			<0.02	0.33	0.08	4.0	2.7
		200	11.2	30.78		6.5			<0.02	0.33	0.08	4.3	2.7
	12/14/1998	1	9.8	28.79		8.3	0.31	0.19	<0.02	0.32	0.08	3.3	3.0
		15	9.9	29.71		7.9	0.17	0.17	<0.02	0.36	0.08	6.5	2.8
		25	10.0	29.74		7.8	0.18	0.18	<0.02	0.33	0.07	3.5	2.8
		35	10.1	29.85		7.7	0.15	0.17	<0.02	0.36	0.07	3.3	2.7
		55	10.1	29.95		8.4			<0.02	0.35	0.07	3.2	2.8
		55	10.1	29.95		7.5			<0.02	0.35	0.07	2.8	2.8
		100	10.2	30.06		7.2			<0.02	0.33	0.08	2.3	2.7
		200	10.6	30.30		6.7			<0.02	0.36	0.08	5.3	2.9
KSRU02	1/20/1998	1	8.2	12.12									
	2/17/1998	1	8.5	18.64									
	3/16/1998	1	9.6	20.47									
	4/21/1998	1	11.3	20.26									
	5/20/1998	1	12.5	19.94									
	6/16/1998	1	13.5	na									
	7/27/1998	1	15.5	22.08									
	8/31/1998	1	16.2	20.81									
	9/28/1998	1	14.7	23.56									
	10/20/1998	1	13.6	19.30									
	11/16/1998	1	11.9	15.59									
	12/14/1998	1	9.6	8.44									
LSNT01	1/20/1998	1	9.2	28.81	5.5	8.2	0.41	<0.01	<0.02	0.38	0.08	3.5	4.0
		15	9.2	28.82		8.1	0.30	<0.01	<0.02	0.38	0.09	1.8	3.8
		25	9.2	28.83		8.1	0.23	0.05	<0.02	0.39	0.09	3.1	3.9
		35	9.2	28.87		8.0	0.19	0.04	<0.02	0.38	0.10	3.5	3.9
		55	9.2	28.95		7.9			<0.02	0.38	0.08	2.7	3.8
		100	9.3	29.22		8.3			<0.02	0.37	0.08	2.2	3.2
		200	9.2	29.28		7.8			<0.02	0.37	0.09	2.4	3.5
	2/17/1998	1	9.2	28.60	8.0	8.7	0.46	0.06	<0.02	0.39	0.12	3.9	4.5
		15	9.0	28.60		8.3	0.43	0.08	<0.02	0.39	0.09	2.3	4.3
		25	9.2	28.60		8.6	0.39	0.09	<0.02	0.39	0.09	1.6	4.3
		35	9.0	28.60		8.2	0.40	0.13	<0.02	0.39	0.08	2.6	4.3
		55	9.2	28.60		8.5			<0.02	0.39	0.08	1.9	4.4
		55	9.2	28.60		8.2			<0.02	0.38	0.11	2.8	4.4
		100	9.1	28.99		8.1			<0.02	0.37	0.09	3.2	4.0
		200	9.1	29.09		8.2			<0.02	0.38	0.12	3.9	3.9
	3/16/1998	1	9.7	28.58	6.0	8.5	0.92	0.12	<0.02	0.37	0.07	1.3	4.0
		15	9.4	28.59		8.3	1.10	0.18	<0.02	0.37	0.07	2.4	3.7
		25	9.6	28.61		8.3	0.92	0.26	<0.02	0.38	0.06	3.4	4.1
		35	9.6	28.71		8.3	0.68	0.20	<0.02	0.38	0.07	2.7	3.6
		55	9.6	28.72		8.3			<0.02	0.37	0.07	1.9	3.5
		100	9.6	28.82		8.4			<0.02	0.36	0.06	1.9	3.4
		200	9.7	29.09		8.1			<0.02	0.32	0.04	1.9	3.3
	4/21/1998	1	11.6	28.77	6.0	10.3	7.50	0.26	<0.02	0.22	0.05	3.9	2.5
		15	10.7	28.68		10.5	10.30	0.73	<0.02	0.23	0.06	4.6	2.6
		25	10.2	28.68		9.0	3.30	0.63	<0.02	0.28	0.06	3.0	2.8
		35	10.2	28.90		9.5	2.00	0.34	<0.02	0.29	0.06	4.4	2.7
		55	10.6	29.07		8.7			0.029	0.29	0.06	3.5	2.6
		55	10.6	29.07		8.7			<0.02	0.29	0.04	2.7	2.6
		100	10.5	29.27		8.8			0.020	0.28	0.05	2.5	2.6
		200	10.5	29.47		8.6			0.024	0.24	0.06	6.3	2.4
	5/20/1998	1	11.8	28.80	7.5	9.6	3.50	0.08	0.022	0.20	0.06	2.6	2.2
		15	11.3	28.89		9.3	3.00	0.17	0.022	0.20	0.05	3.6	2.1
		25	11.1	28.98		9.0	2.40	0.11	0.022	0.20	0.06	3.5	2.1
		35	11.1	28.99		8.7	2.10	0.01	0.024	0.20	0.05	2.6	2.2

TABLE A-1. 1998 Ambient Offshore Water Column Monitoring
General Water Quality Parameters (page 4 of 5)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
LSNT01 (cont.)	5/20/1998	55	10.8	29.06		8.4			0.027	0.21	0.06	3.0	2.3
		55	10.8	29.16		8.3			0.027	0.23	0.06	2.5	2.4
		100	10.7	29.52		7.7			0.034	0.24	0.06	2.1	2.3
		200	10.6	29.65		7.5			0.037	0.24	0.06	5.0	2.4
	6/16/1998	1		28.96	9.0	9.3	3.80	0.65	<0.02	0.15	0.05	3.8	1.9
		15		29.06		9.3	2.40	1.10	<0.02	0.18	0.05	2.7	1.8
		25		29.11		8.5	1.30	0.92	0.022	0.19	0.05	2.8	1.9
		35		29.18		8.3	0.94	0.62	0.028	0.19	0.06	1.2	2.0
		55		29.23		8.2			<0.02	0.23	0.05	1.8	2.0
		55		29.23		8.3			<0.02	0.22	0.05	1.8	2.0
		100		29.55		7.7			<0.02	0.28	0.06	3.7	2.2
		200		29.69		7.6			<0.02	0.26	0.06	2.1	2.3
	7/27/1998	1	13.8	29.41	7.0	8.6	13.40	0.53	0.011	0.12	0.05	5.0	1.7
		15	13.3	29.46		8.3	6.80	0.20	0.011	0.17	0.05	4.6	1.7
		25	13.0	29.48		8.5	3.50	0.28	0.017	0.20	0.06	2.7	1.8
		35	12.7	29.48		7.8	3.00	0.64	0.017	0.20	0.06	1.7	1.9
		55	12.3	29.65		7.2			0.013	0.23	0.06	3.9	1.9
		55	12.5	29.65		7.8			0.014	0.23	0.06	4.2	1.9
		100	12.2	29.88		6.5			0.014	0.27	0.06	2.1	2.0
		200	11.9	30.01		6.5			0.020	0.25	0.07	3.1	2.0
	8/31/1998	1	14.7	29.80	9.0	8.3	3.50	0.42	<0.02	0.18	0.06	4.0	2.1
		15	13.7	29.84		7.2	2.00	0.49	<0.02	0.23	0.06	3.6	2.2
		25	13.5	29.84		7.2	1.70	0.35	<0.02	0.22	0.07	4.3	2.2
		35	13.5	29.88		6.7	0.75	0.23	<0.02	0.24	0.07	2.0	2.2
		55	13.6	30.03		6.7			<0.02	0.26	0.07	4.2	2.3
		55	14.0	30.03		6.8			<0.02	0.26	0.07	2.5	2.2
		100	13.3	30.29		6.3			0.021	0.25	0.07	2.9	2.2
		140	13.3	30.37		6.3			0.029	0.24	0.07	3.4	2.3
	9/29/1998	1	13.7	30.17	10.0	7.0	2.70	0.48	<0.02	0.24	0.07	1.8	2.2
		15	13.5	30.18		6.5	2.40	0.20	<0.02	0.24	0.07	2.5	2.2
		25	13.2	30.22		6.3	1.70	0.24	<0.02	0.25	0.07	2.4	2.2
		35	13.1	30.31		6.0	0.70	0.20	<0.02	0.26	0.07	1.6	2.2
		55	12.9	30.48		5.8			<0.02	0.28	0.07	3.0	2.1
		55	12.8	30.48		5.9			<0.02	0.28	0.07	1.9	2.1
		100	12.7	30.58		5.9			<0.02	0.28	0.07	2.1	2.3
		140	12.7	30.64		5.9			<0.02	0.28	0.07	4.8	2.3
	10/21/1998	1	12.8	30.42	14.0	6.1	1.10	0.19	0.015	0.30	0.07	2.4	2.8
		15	12.9	30.43		6.0	1.10	0.28	0.012	0.29	0.07	3.1	2.8
		25	12.8	30.42		6.0	0.78	0.17	0.013	0.31	0.08	3.2	2.8
		35	12.8	30.43		6.0	1.10	0.20	0.015	0.30	0.07	2.6	2.9
		55	12.8	30.45		5.9			0.015	0.30	0.07	3.1	2.8
		55	12.7	30.45		6.0			0.012	0.29	0.07	3.7	2.8
		100	12.6	30.64		5.6			<0.02	0.32	0.08	1.7	2.8
	11/16/1998	1	11.5	30.17	12.5	7.4	0.86	0.32	<0.02	0.33	0.08	3.4	2.7
		15	11.5	30.42		6.8	0.42	0.17	<0.02	0.31	0.08	4.5	2.7
		25	11.3	30.48		6.6	0.29	0.16	<0.02	0.29	0.07	3.6	2.8
		35	11.5	30.49		6.6	0.26	0.16	<0.02	0.34	0.08	2.6	2.7
		55	11.5	30.52		6.4			<0.02	0.33	0.08	3.2	2.6
		55	11.5	30.48		6.4			<0.02	0.33	0.08	7.6	2.8
		100	11.2	30.67		6.1			<0.02	0.33	0.07	3.6	2.7
		200	11.1	30.75		6.1			<0.02	0.34	0.07	3.0	2.7
	12/14/1998	1	10.2	29.79	8.0	7.5	0.18	0.14	<0.02	0.38	0.08	6.3	2.9
		15	10.2	29.83		7.3	0.17	0.13	<0.02	0.38	0.08	2.6	3.1
		25	10.2	29.84		7.4	0.16	0.13	<0.02	0.36	0.08	3.5	3.1
		35	10.2	29.87		7.3	0.16	0.13	<0.02	0.37	0.08	5.0	3.0
		55	10.3	29.94		7.4			<0.02	0.38	0.08	2.8	3.0
		55	10.2	29.95		7.1			<0.02	0.36	0.08	2.8	3.0
		100	10.1	30.05		7.1			<0.02	0.37	0.08	4.2	2.9
		200	10.5	30.39		6.4			<0.02	0.36	0.08	8.8	2.9
LTED04	1/20/1998	1	9.0	26.19	4.0	8.8	0.62	0.08	<0.02	0.42	0.08	2.4	4.8
		15	9.1	28.77		8.5	0.25	0.04	<0.02	0.39	0.11	2.5	4.0
		25	9.2	28.82		8.1	0.19	0.06	<0.02	0.38	0.08	2.4	3.9
		35	9.2	28.90		7.9	0.11	0.05	<0.02	0.39	0.09	1.9	3.8

TABLE A-1. 1998 Ambient Offshore Water Column Monitoring
General Water Quality Parameters (page 5 of 5)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
LTED04	1/20/1998	55	9.2	29.12		7.6			<0.02	0.39	0.11	3.3	3.6
(cont.)		75	9.3	29.23		7.6			<0.02	0.38	0.10	3.6	3.7
	2/17/1998	1	8.7	25.33	6.0	6.5	0.56	0.08	<0.02	0.43	0.09	1.3	4.0
		15	8.7	28.61		5.7	0.39	0.15	<0.02	0.41	0.12	3.4	3.9
		25	8.9	28.65		5.1	0.33	0.14	<0.02	0.42	0.12	2.2	3.8
		35	8.9	28.69		6.3	0.28	0.10	<0.02	0.36	0.09	1.8	3.9
		55	8.9	28.75		5.1			<0.02	0.37	0.10	4.1	4.2
		75	9.0	28.92		5.6			<0.02	0.38	0.12	4.4	4.2
	3/16/1998	1	10.0	24.07	7.0	9.4	0.83	0.17	<0.02	0.39	0.07	2.1	5.5
		15	9.4	28.57		8.4	0.76	0.12	<0.02	0.38	0.07	1.8	3.7
		25	9.3	28.60		8.3	0.61	0.13	<0.02	0.38	0.07	3.6	3.7
		35	9.5	28.63		8.5	0.56	0.17	<0.02	0.38	0.07	2.9	3.6
		55	9.6	28.82		8.3			<0.02	0.37	0.07	3.4	3.4
		75	9.5	28.96		8.4			<0.02	0.35	0.07	1.1	3.3
	4/21/1998	1	11.3	26.33	4.5	11.3	10.70	<0.01	<0.02	0.17	0.06	5.2	3.0
		15	10.3	28.63		10.1	7.80	1.30	<0.02	0.24	0.06	2.3	2.6
		25	10.1	28.71		9.0	3.80	0.63	<0.02	0.30	0.06	2.0	3.1
		35	10.0	28.74		9.1	2.00	0.57	<0.02	0.31	0.06	3.1	3.1
		55	10.5	28.83		8.9			<0.02	0.33	0.06	2.5	3.0
		75	10.4	29.02		8.7			<0.02	0.33	0.07	4.2	3.0
	5/20/1998	1	12.0	27.81	9.5	9.3	1.80	0.07	0.024	0.19	0.07	1.5	2.5
		15	11.2	28.88		8.9	1.70	0.20	0.026	0.21	0.05	4.3	2.1
		25	11.0	28.94		8.6	0.64	0.32	0.028	0.23	0.07	2.2	2.2
		35	10.8	29.01		8.4	0.49	0.19	0.028	0.23	0.06	1.2	2.2
		55	10.7	29.05		8.2			0.025	0.23	0.06	2.4	2.2
		75	10.5	29.30		7.7			0.025	0.26	0.06	2.1	2.4
	6/16/1998	1	12.5	27.63	6.8	9.8	5.10	0.93	0.022	0.11	0.05	4.2	2.3
		15	11.5	29.06		9.0	3.00	1.50	0.026	0.17	0.06	1.3	1.9
		25	11.3	29.10		8.5	0.90	1.20	0.024	0.19	0.05	3.5	2.0
		35	11.3	29.12		8.6	0.57	1.00	0.023	0.19	0.05	1.2	2.0
		55	11.2	29.15		8.2			0.021	0.23	0.06	1.2	1.8
		75	11.0	29.26		7.9			<0.02	0.26	0.07	2.0	2.3
	7/27/1998	1	15.6	28.41	3.0	12.5	26.50	2.30	<0.02	<0.05	0.04	6.1	0.9
		15	13.2	29.40		8.1	2.60	0.46	0.016	0.19	0.05	2.5	1.8
		25	13.2	29.45		8.2	2.00	0.26	0.018	0.20	0.05	2.3	1.9
		35	13.1	29.47		7.5	1.20	0.43	0.017	0.21	0.05	4.5	1.8
		55	12.6	29.52		7.0			<0.02	0.24	0.06	4.7	2.0
		75	12.3	29.74		6.2			<0.02	0.28	0.07	3.9	2.2
	8/31/1998	1	15.6	28.67	4.8	8.1	1.70	0.71	<0.02	0.21	0.07	3.0	2.9
		15	13.6	29.84		6.5	0.81	0.27	<0.02	0.25	0.07	4.4	2.4
		25	13.5	29.88		6.6	0.26	0.14	<0.02	0.27	0.07	5.0	2.4
		35	13.4	29.90		6.8	0.17	0.17	<0.02	0.26	0.07	1.2	2.3
		55	13.5	29.88		6.9			<0.02	0.26	0.07	4.7	2.4
		75	13.0	30.19		6.2			<0.02	0.29	0.08	2.8	2.5
	9/29/1998	1	13.7	28.89	9.5	7.2	1.90	0.44	<0.02	0.26	0.07	4.0	2.8
		15	13.3	30.16		6.2	1.10	0.41	<0.02	0.26	0.07	1.4	2.2
		25	13.2	30.22		6.0	0.29	0.33	<0.02	0.27	0.07	1.8	2.2
		35	13.1	30.25		6.4	0.34	0.15	<0.02	0.28	0.07	3.2	2.2
		55	13.1	30.24		6.0			<0.02	0.28	0.07	2.3	2.2
		75	12.9	30.35		5.7			<0.02	0.28	0.07	1.3	2.2
	10/21/1998	1	12.9	30.09	14.5	6.4	0.93	0.20	<0.02	0.30	0.07	3.7	2.8
		15	12.7	30.43		5.9	0.49	0.19	<0.02	0.30	0.07	3.1	2.7
		25	12.6	30.46		5.7	0.42	0.16	<0.02	0.30	0.07	3.2	2.8
		35	12.4	30.51		5.7	0.21	0.13	<0.02	0.30	0.07	4.0	2.8
		55	12.5	30.56		5.5			<0.02	0.32	0.07	1.7	2.8
		75	12.2	30.71		5.7			0.010	0.33	0.08	2.5	2.9
	11/16/1998	1	11.5	28.09	6.0	7.0	0.43	0.24	<0.02	0.33	0.07	4.8	3.3
		15	11.7	30.49		6.6	0.23	0.11	<0.02	0.33	0.08	3.8	2.7
		25	11.7	30.51		6.5	0.22	0.11	<0.02	0.33	0.08	3.9	2.7
		35	11.7	30.52		6.5	0.14	0.09	<0.02	0.33	0.08	3.8	2.7
		55	11.7	30.54		6.2			<0.02	0.33	0.08	4.2	2.7
		75	11.5	30.71		5.8			<0.02	0.35	0.08	3.8	2.8
	12/14/1998	1	10.3	28.04	7.0		0.32	0.19	<0.02	0.39	0.08	3.4	3.3
		15	10.5	29.83			0.16	0.10	<0.02	0.38	0.08	2.4	2.8
		25	10.4	29.89			0.16	0.10	<0.02	0.37	0.08	4.6	3.0
		35	10.5	29.92			0.12	0.10	<0.02	0.36	0.08	3.5	2.9
		55	10.6	29.96					<0.02	0.36	0.08	3.4	2.9
		75	10.5	30.05					<0.02	0.34	0.08	4.3	3.0

TABLE A-2. 1998 Point Source Offshore Water Column Monitoring
General Water Quality Parameters (page 1 of 4)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
KSIW02	1/20/1998	1	8.6	27.38	5.0	8.7	0.56	<MDL	<0.02	0.39	0.09	2.6	4.1
		15	9.0	28.73		8.1	0.36	<MDL	<0.02	0.39	0.08	2.3	3.9
		25	9.1	28.90		7.9	0.23	0.02	<0.02	0.40	0.08	1.8	3.6
		35	9.1	28.92		7.9	0.21	0.04	<0.02	0.40	0.08	2.5	3.8
	2/17/1998	1	8.7	27.57	6.9	8.7	0.55	0.05	<0.02	0.37	0.11	3.0	4.2
		15	8.7	28.43		8.4	0.44	0.13	<0.02	0.38	0.12	3.0	4.0
		25	8.7	28.51		8.8	0.45	0.10	<0.02	0.37	0.08	3.7	3.9
		35	8.7	28.58		8.7	0.38	0.10	<0.02	0.38	0.11	3.2	4.0
	3/16/1998	1	9.7	28.37	7.5	8.8	2.10	0.21	<0.02	0.36	0.06	2.9	3.5
		15	9.5	28.51		8.6	1.20	0.21	<0.02	0.37	0.07	3.1	3.5
		25	9.5	28.60		8.5	0.88	0.10	<0.02	0.37	0.07	2.1	3.6
		35	9.4	28.67		8.3	0.57	0.19	<0.02	0.36	0.07	3.1	4.0
	4/21/1998	1	11.3	28.25	3.5	13.2	25.10	1.20	<0.02	<0.05	0.05	7.1	1.8
		15	10.3	28.67		9.1	10.00	1.50	<0.02	0.24	0.06	5.1	2.6
		25	10.2	28.77		9.5	5.00	1.00	<0.02	0.28	0.06	2.9	2.7
		35	10.2	28.88		8.9	3.20	0.47	<0.02	0.29	0.06	2.8	2.9
	5/20/1998	1	11.7	28.42	7.5	9.5	3.70	0.70	<0.02	0.18	0.05	1.5	1.9
		15	11.3	28.71		9.4	2.00	0.65	0.02	0.19	0.05	3.6	2.0
		25	11.0	28.94		8.7	0.73	0.34	0.03	0.22	0.06	1.2	2.0
		35	10.7	29.31		8.2	0.25	0.29	0.03	0.24	0.06	1.4	2.1
	6/16/1998	1	12.1	28.19	7.8	9.9	5.30	1.40	<0.02	0.09	0.05	4.6	1.5
		15	12.1	28.59		10.1	6.70	2.10	<0.02	0.09	0.05	4.9	1.4
		25	12.0	28.75		9.9	6.10	2.60	<0.02	0.10	0.05	3.8	1.5
		35	11.6	28.94		9.1	3.40	1.80	0.02	0.13	0.05	3.1	2.0
	7/27/1998	1	13.9	29.37	6.0	10.0	12.00	1.10	<0.02	0.10	0.05	5.3	1.3
		15	13.2	29.43		8.8	5.80	0.87	0.02	0.17	0.06	2.9	1.6
		25	13.2	29.47		7.8	2.40	0.87	0.02	0.20	0.06	2.9	1.8
		35	13.1	29.47		7.7	2.60	1.40	0.02	0.20	0.05	2.5	1.8
	8/31/1998	1	14.8	29.73	7.0	7.8	1.30	0.26	<0.02	0.20	0.06	3.2	2.2
		15	13.6	29.85		6.5	1.70	0.35	<0.02	0.25	0.07	5.5	2.3
		25	13.3	29.89		6.4	0.94	0.29	<0.02	0.26	0.07	4.9	2.3
		35	13.2	29.96		6.3	0.27	0.25	<0.02	0.26	0.07	3.1	2.3
	9/28/1998	1	13.7	30.12	9.0	7.0	2.30	0.62	<0.02	0.25	0.07	1.6	2.2
		15	13.4	30.16		6.7	2.20	0.77	<0.02	0.26	0.07	2.6	2.2
		25	13.2	30.19		6.4	1.30	0.33	<0.02	0.27	0.07	1.5	2.2
		35	13.2	30.25		6.2	0.78	0.31	<0.02	0.28	0.07	1.8	2.2
	10/20/1998	1	12.3	30.45	13.1	6.2	0.74	0.27	<0.02	0.29	0.07	2.8	2.4
		15	12.3	30.49		6.0	0.45	0.22	<0.02	0.30	0.07	1.6	2.7
		25	12.3	30.54		5.8	0.44	0.23	<0.02	0.31	0.07	3.1	2.7
		35	12.4	30.54		5.8	0.25	0.21	<0.02	0.30	0.07	4.6	2.4
	11/16/1998	1	11.6	29.99	12.0	7.3	0.38	0.19	0.01	0.33	0.07	4.2	2.8
		15	11.8	30.47		6.6	0.23	0.17	<0.02	0.32	0.08	4.0	2.7
		25	11.7	30.51		6.5	0.22	0.17	<0.02	0.32	0.08	3.6	2.7
		35	11.7	30.52		6.4	0.24	0.16	<0.02	0.33	0.08	4.2	2.7
	12/14/1998	1	9.6	26.49	9.2	--	0.29	0.21	<0.02	0.34	0.07	3.1	3.2
		15	10.1	29.71		--	0.15	0.16	<0.02	0.33	0.08	2.5	2.7
		25	10.0	29.83		--	0.12	0.16	<0.02	0.36	0.07	2.4	2.7
		35	10.1	29.86		--	0.11	0.17	<0.02	0.34	0.08	6.2	2.7
KSSK02	1/20/1998	1	8.8	27.13	4.0	8.7	0.78	<0.01	<0.02	0.41	0.08	2.4	4.8
		15	9.2	28.86		8.1	0.36	<0.01	<0.02	0.39	0.10	2.3	3.8
		25	9.3	28.87		8.0	0.33	<0.01	<0.02	0.38	0.09	2.2	4.0
		35	9.2	28.87		8.1	0.37	<0.01	<0.02	0.38	0.08	3.1	3.7
		55	9.2	28.90		8.0			0.02	0.38	0.10	2.9	4.0
	2/17/1998	1	8.8	28.46	6.5	5.6	0.58	0.06	<0.02	0.38	0.11	3.9	4.0
		15	8.8	28.64		6.0	0.37	0.06	<0.02	0.39	0.13	1.2	4.4
		25	8.8	28.67		6.4	0.38	0.05	<0.02	0.39	0.11	1.8	4.4
		35	8.8	28.77		6.9	0.34	<0.01	<0.02	0.39	0.09	3.2	4.4
		55	8.8	28.80		6.2			<0.02	0.40	0.08	3.6	3.9
	3/16/1998	1	9.8	27.65	7.0	8.8	1.10	0.11	<0.02	0.37	0.05	2.5	3.9
		15	9.3	28.58		8.5	0.95	0.13	<0.02	0.37	0.06	1.7	3.9
		25	9.5	28.58		8.4	0.97	<0.01	<0.02	0.38	0.06	4.6	3.7
		35	9.5	28.64		8.4	0.75	<0.01	<0.02	0.37	0.04	2.8	3.8
		55	9.6	28.70		8.4			<0.02	0.37	0.05	4.2	3.6

TABLE A-2. 1998 Point Source Offshore Water Column Monitoring
General Water Quality Parameters (page 2 of 4)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
KSSK02 (cont.)	3/16/1998	15	10.7	28.51		11.0	14.30	1.40	<0.02	0.17	0.05	3.2	2.3
		25	10.8	28.55		10.1	12.80	0.93	<0.02	0.19	0.05	4.6	2.5
		35	10.6	28.63		10.3	10.80	0.78	<0.02	0.21	0.05	3.8	2.5
		55	10.7	28.77		9.2			0.03	0.28	0.06	2.8	2.8
	5/20/1998	1	11.7	28.21	7.0	9.4	3.30	0.53	<0.02	0.19	0.06	4.0	1.9
		15	11.4	28.75		9.1	1.80	0.47	0.02	0.19	0.05	1.8	2.1
		25	11.1	28.92		8.7	1.10	0.19	0.03	0.22	0.06	1.8	2.1
		35	11.0	28.92		8.9	1.10	<0.01	0.04	0.21	0.06	2.4	2.2
		55	10.7	29.18		8.1			0.21	0.24	0.08	2.1	2.4
	6/16/1998	1	12.3	28.76	9.5	9.9	5.30	1.30	<0.02	0.13	0.05	4.7	1.8
		15	11.5	28.87		9.9	5.00	1.80	<0.02	0.11	0.05	3.8	1.8
		25	11.3	29.01		8.8	3.20	1.60	0.03	0.14	0.05	3.8	2.0
		35	11.3	29.03		8.8	1.90	1.10	0.07	0.16	0.06	3.6	2.2
		55	11.1	29.18		8.1			0.07	0.19	0.07	3.3	2.3
	7/27/1998	1	14.8	29.28	4.0	11.1	24.00	0.80	<0.02	<0.05	0.04	7.5	0.8
		15	13.6	29.39		8.5	17.50	1.40	<0.02	0.10	0.05	3.0	1.6
		25	13.2	29.45		8.1	4.10	0.68	0.02	0.19	0.05	3.4	1.8
		35	13.0	29.52		7.4	1.40	0.73	0.02	0.22	0.06	3.2	1.9
		55	12.9	29.61		7.4			0.02	0.25	0.06	3.5	1.9
	8/31/1998	1	14.5	29.64	9.0	7.6	2.70	0.55	<0.02	0.22	0.06	8.1	2.3
		15	13.5	29.86		6.6	1.50	0.31	<0.02	0.24	0.07	4.0	2.3
		25	13.6	29.87		6.5	0.97	0.26	<0.02	0.26	0.07	4.2	2.3
		35	13.3	29.88		6.3	0.53	0.30	0.07	0.27	0.08	6.9	2.4
		55		29.99		5.7			0.05	0.28	0.08	4.2	2.3
	9/28/1998	1	13.2	30.11	10.1	5.9	0.74	0.30	0.19	0.31	0.10	2.7	2.3
		15	13.1	30.18		6.0	0.63	0.31	0.13	0.30	0.09	2.0	2.2
		25	13.1	30.20		5.8	0.52	0.39	0.12	0.30	0.08	3.5	2.2
		35	13.1	30.21		5.8	0.54	0.34	0.12	0.31	0.09	2.5	2.3
		55	13.0	30.21		6.0			0.12	0.29	0.09	1.5	2.2
	10/20/1998	1	12.3	30.35	11.0	5.9	0.45	0.19	0.06	0.31	0.09	3.3	2.7
		15	12.2	30.40		6.1	0.51	0.20	0.02	0.30	0.08	3.0	2.7
		25	12.2	30.43		6.1	0.69	0.18	<0.02	0.29	0.08	4.4	2.7
		35	12.2	30.43		6.0	0.67	0.20	<0.02	0.30	0.08	2.5	2.7
		55	12.2	30.51		5.8			<0.02	0.31	0.08	2.1	2.8
	11/16/1998	1	11.8	30.24	9.0	6.8	0.37	0.24	<0.02	0.33	0.08	3.4	2.7
		15	11.7	30.27		6.7	0.30	0.21	<0.02	0.31	0.08	4.3	2.8
		25	11.7	30.32		6.5	0.30	0.21	<0.02	0.34	0.08	5.0	2.7
		35	11.6	30.38		6.5	0.26	0.19	<0.02	0.33	0.08	3.4	2.8
		55	11.6	30.44		4.5			<0.02	0.33	0.08	4.1	2.7
	12/14/1998	1	10.1	27.98	6.0	8.0	0.32	0.18	0.01	0.41	0.08	2.9	3.5
		15	10.1	29.65		--	0.14	0.15	0.01	0.38	0.08	1.7	3.0
		25	10.1	29.72		--	0.15	0.14	0.01	0.36	0.08	3.4	2.9
		35	10.2	29.84		--	0.13	0.12	<0.02	0.38	0.08	2.3	2.9
		55	10.0	29.53		--			0.06	0.39	0.09	3.7	3.0
LSEP01	1/20/1998	1	9.1	28.78	5.5	8.2	0.36	0.01	<0.02	0.39	0.08	2.8	3.8
		15	9.2	28.78		8.3	0.34	0.03	<0.02	0.39	0.08	3.8	3.9
		25	9.1	28.78		8.1	0.30	0.02	<0.02	0.38	0.08	1.7	3.9
		35	9.1	28.78		8.4	0.30	0.07	<0.02	0.39	0.11	1.9	3.9
		55	9.4	29.12		7.7			<0.02	0.38	0.08	17.3	3.6
		100	9.3	29.19		7.7			0.03	0.37	0.12	3.1	3.5
		150	9.2	29.24		8.1			<0.02	0.37	0.08	4.4	3.6
	2/17/1998	1	9.1	28.63	6.1	5.9	0.48	0.05	<0.02	0.37	0.10	2.6	4.2
		15	9.1	28.65		6.2	0.36	0.11	<0.02	0.38	0.09	2.7	4.2
		25	9.1	28.66		6.5	0.38	0.06	<0.02	0.38	0.09	2.3	4.0
		35	9.1	28.66		6.3	0.35	0.09	<0.02	0.38	0.08	2.6	4.0
		55	9.2	28.74		5.1			<0.02	0.38	0.02	2.2	4.0
		100	9.3	29.00		7.1			0.03	0.38	0.12	3.7	3.7
		150	9.1	29.04		6.1			0.03	0.39	0.08	3.4	4.0
	3/16/1998	1	10.1	28.54	9.2	8.9	0.91	0.09	<0.02	0.38	0.08	1.6	3.7
		15	9.6	28.55		8.5	1.10	0.06	<0.02	0.38	0.06	3.2	3.7
		25	9.7	28.56		8.5	1.00	0.12	<0.02	0.38	0.07	1.6	3.7
		35	9.7	28.60		8.5	0.58	0.23	<0.02	0.37	0.07	2.0	3.6
		55	9.7	28.67		8.7			<0.02	0.37	0.06	2.1	3.6
		100	9.7	28.93		8.3			0.02	0.35	0.07	1.4	3.5
		150	9.5	29.00		8.8			<0.02	0.37	0.06	3.2	3.4

TABLE A-2. 1998 Point Source Offshore Water Column Monitoring
General Water Quality Parameters (page 3 of 4)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
LSEP01 (cont.)	4/21/1998	1	11.5	28.58	5.0	12.2	17.60	0.76	<0.02	0.11	0.05	5.2	1.9
		15	10.4	28.71		9.7	7.80	0.25	<0.02	0.25	0.06	3.1	2.9
		25	10.3	28.72		9.9	7.20	0.95	<0.02	0.26	0.06	3.6	2.7
		35	10.3	28.73		10.0	6.40	0.66	<0.02	0.27	0.06	4.0	2.8
		55	10.2	28.98		9.5			<0.02	0.30	0.06	2.6	2.5
		100	10.2	29.20		8.6			0.02	0.29	0.06	3.1	2.6
		150	10.3	29.35		9.1			0.04	0.25	0.05	3.6	2.6
	5/20/1998	1	11.7	28.57	8.5	9.5	2.50	0.59	0.02	0.19	0.05	3.4	2.2
		15	11.5	28.74		9.2	3.90	0.15	0.02	0.19	0.05	3.2	2.1
		25	11.2	28.89		8.9	1.80	0.18	0.03	0.21	0.05	2.0	2.1
		35	10.7	28.97		8.6	1.70	0.04	0.02	0.21	0.05	2.5	2.1
		55	10.7	29.19		8.2			0.03	0.23	0.06	2.5	2.4
		100	10.5	29.51		7.7			0.04	0.24	0.06	1.8	2.3
		150	10.4	29.59		7.9			0.04	0.25	0.06	2.7	2.5
	6/16/1998	1	12.5	28.81	12.0	10.0	5.80	1.00	<0.02	0.10	0.04	3.3	1.2
		15	--	29.04		9.1	2.30	0.85	<0.02	0.16	0.06	1.0	2.0
		25	--	29.06		9.1	1.90	0.88	<0.02	0.18	0.05	2.5	1.7
		35	--	29.10		8.5	1.00	1.00	0.02	0.19	0.06	2.7	2.1
		55	--	29.31		8.1			<0.02	0.25	0.06	1.9	2.1
		100	--	29.59		7.6			0.06	0.28	0.06	2.1	2.3
		150	--	29.56		7.3			0.11	0.29	0.07	2.1	2.7
	7/27/1998	1	14.6	29.21	4.5	11.4	17.70	0.50	<0.02	0.05	0.04	6.8	1.4
		15	13.5	29.42		8.6	8.80	0.73	<0.02	0.16	0.06	4.2	1.7
		25	13.2	29.47		8.1	4.60	0.43	0.02	0.19	0.06	3.0	1.8
		35	13.2	29.47		8.0	4.20	0.61	0.02	0.19	0.05	4.3	1.8
		55	12.8	29.60		7.4			0.02	0.22	0.06	3.4	1.9
		100	12.2	29.88		7.6			0.02	0.26	0.06	3.7	2.0
		150	12.2	29.95		6.7			0.05	0.26	0.06	3.6	2.0
	8/31/1998	1	15.1	29.62	7.0	8.4	2.00	0.66	<0.02	0.19	0.06	6.2	2.4
		15	14.1	29.82		7.6	1.90	0.50	<0.02	0.21	0.07	4.3	2.1
		25	13.7	29.86		6.8	0.91	0.29	<0.02	0.24	0.06	1.3	2.3
		35	13.6	29.87		6.8	0.79	0.21	<0.02	0.24	0.07	5.2	2.3
		55	13.5	30.04		7.0			<0.02	0.26	0.07	3.8	2.3
		100	12.8	30.27		6.4			<0.02	0.27	0.07	1.2	2.3
		140	12.7	30.35		6.4			0.052	0.25	0.07	3.5	2.3
	9/29/1998	1	13.7	29.98	10.0	7.2	2.00	0.42	<0.02	0.25	0.06	3.6	2.2
		15	13.3	30.20		6.9	1.70	0.18	<0.02	0.24	0.07	1.7	2.1
		25	13.2	30.22		7.1	1.70	0.24	<0.02	0.25	0.07	1.5	2.1
		35	13.2	30.23		6.3	0.87	0.13	<0.02	0.26	0.07	3.1	2.3
		55	12.8	30.46		5.8			<0.02	0.28	0.07	2.0	2.2
		100	12.6	30.57		5.8			<0.02	0.28	0.07	1.6	2.2
		140	12.7	30.66		5.8			0.05	0.28	0.07	4.2	2.3
	10/21/1998	1	12.4	30.40	12.0	6.3	0.85	0.19	0.01	0.30	0.07	4.2	2.7
		15	12.2	30.43		6.3	0.33	0.29	0.01	0.30	0.07	3.0	2.8
		25	12.3	30.46		5.8	0.46	0.22	0.01	0.30	0.07	3.0	2.8
		35	12.4	30.47		6.1	0.45	0.21	0.01	0.30	0.07	3.5	2.8
		55	12.3	30.47		6.1			0.01	0.30	0.07	3.0	2.7
		100	12.1	30.69		5.6			0.02	0.33	0.08	2.9	2.8
		150	11.8	30.73		5.9			<0.02	0.33	0.08	4.0	2.9
	11/16/1998	1	11.6	30.41	13.0	6.7	0.42	0.19	<0.02	0.32	0.08	4.7	2.8
		15	11.6	30.51		6.4	0.24	0.16	<0.02	0.33	0.08	3.5	2.7
		25	11.6	30.51		6.3	0.25	0.17	<0.02	0.32	0.08	2.7	2.7
		35	11.6	30.51		6.4	0.26	0.17	<0.02	0.33	0.08	3.8	2.7
		55	11.5	30.54		6.4			<0.02	0.34	0.08	3.3	2.7
		150	11.2	30.72		6.1			0.021	0.34	0.08	4.5	2.7
	12/14/1998	1	10.2	29.51	10.2		0.34	0.15	<0.02	0.38	0.08	2.9	3.0
		15	10.3	29.83			0.23	0.13	<0.02	0.37	0.08	5.3	2.9
		25	10.3	29.85			0.18	0.11	<0.02	0.37	0.08	4.2	2.9
		35	10.3	29.90			0.14	0.12	<0.02	0.37	0.08	2.2	2.9
		55	10.4	30.02					<0.02	0.37	0.08	3.4	2.8
		145	10.6	30.28					<0.02	0.38	0.08	4.5	3.0
		150	10.5	30.30					<0.02	0.37	0.08	3.0	3.0

TABLE A-2. 1998 Point Source Offshore Water Column Monitoring
General Water Quality Parameters (page 4 of 4)

Station	Date	Depth (m)	Temperature (°C)	Salinity (psu)	Secchi Transparency (m)	Dissolved Oxygen (mg/L)	Chlorophyll-*a* (mg/m^3)	Phaeophytin (mg/m^3)	NH_4-N (mg/L)	$NO_2 + NO_3$ (mg/L)	Phosphorous (total) (mg/L)	TSS (mg/L)	Silica (mg/L)
LSKQ06	1/20/1998	1	9.0	28.64	6.5	8.3	0.65	0.01	<0.02	0.38	0.08	3.0	4.0
		15	9.1	28.78		8.1	0.27	0.06	<0.02	0.39	0.08	2.4	4.0
		25	9.2	28.81		8.4	0.36	<0.01	<0.02	0.38	0.08	2.2	3.8
		35	9.1	28.83		8.0	0.29	0.05	<0.02	0.38	0.12	1.9	3.9
	2/17/1998	1	9.1	28.60	8.0	7.5	0.46	0.06	<0.02	0.39	0.06	2.5	4.4
		15	9.1	28.65		7.5	0.38	0.05	<0.02	0.38	0.09	2.3	4.2
		25	9.1	28.68		7.4	0.39	0.09	<0.02	0.38	0.10	5.4	4.2
		35	9.1	28.70		7.3	0.33	0.08	<0.02	0.38	0.09	6.3	4.2
	3/16/1998	1	10.0	28.50	9.0	8.8	1.50	0.11	<0.02	0.37	0.07	2.7	4.2
		15	9.7	28.52		8.8	1.40	0.21	<0.02	0.37	0.07	4.0	3.8
		25	9.7	28.54		8.8	1.30	0.23	<0.02	0.37	0.06	1.6	3.7
		35	9.8	28.55		9.0	1.10	0.16	<0.02	0.37	0.07	3.8	4.1
	4/21/1998	1	11.7	28.60	5.0	12.5	12.90	1.00	<0.02	0.09	0.04	3.5	2.1
		15	11.0	28.67		10.5	10.60	2.20	<0.02	0.21	<0.005	2.3	2.7
		25	10.4	28.70		9.6	5.60	0.68	<0.02	0.26	0.05	1.4	2.8
		35	10.4	28.72		9.1	3.20	0.49	<0.02	0.28	0.06	2.3	2.8
	5/20/1998	1	11.6	28.76	7.0	9.2	2.30	0.27	0.03	0.21	0.06	2.2	2.3
		15	11.2	28.94		8.7	2.10	0.11	0.03	0.21	0.05	1.6	2.2
		25	11.1	28.98		8.8	1.60	0.25	0.03	0.22	0.05	1.6	2.2
		35	10.9	29.10		8.3	0.76	0.18	0.03	0.24	0.06	2.8	2.3
	6/16/1998	1	--	28.64	9.0	10.9	7.70	1.70	<MDL	0.06	0.04	2.8	1.1
		15	--	29.07		8.8	1.50	1.60	0.02	0.17	0.05	3.2	1.8
		25	--	29.19		8.1	0.83	0.90	<0.02	0.17	0.06	2.1	2.0
		35	--	29.21		8.2	0.88	0.77	<0.02	0.21	0.06	2.0	2.0
	7/27/1998	1	13.6	29.47	9.2	8.2	6.80	0.30	0.01	0.17	0.05	4.0	1.7
		15	13.1	29.49		7.9	4.40	0.57	0.02	0.20	0.06	2.6	1.8
		25	12.9	29.54		8.2	2.80	0.45	0.01	0.22	0.06	3.3	1.8
		35	12.8	29.64		7.2	1.90	0.58	0.01	0.23	0.06	3.8	2.0
	8/31/1998	1	14.5	29.81	11.0	8.1	2.50	0.49	<0.02	0.20	0.06	4.9	2.1
		15	13.6	29.86		7.0	1.70	0.39	<0.02	0.23	0.07	1.9	2.2
		25	13.7	29.88		7.1	0.59	0.19	<0.02	0.24	0.07	4.0	2.2
		35	13.3	29.93		6.5	0.66	0.26	<0.02	0.25	0.07	4.0	2.3
	9/29/1998	1	13.6	30.18	10.3	7.2	2.80	0.42	<0.02	0.24	0.06	2.9	2.1
		15	13.2	30.24		6.2	1.20	0.15	<0.02	0.27	0.07	1.6	2.3
		25	13.1	30.27		6.0	0.90	0.23	<0.02	0.26	0.07	2.9	2.3
		35	13.2	30.29		6.2	0.75	0.25	<0.02	0.27	0.07	1.8	2.3
	10/21/1998	1	12.2	30.44	12.5	6.2	0.77	0.19	0.01	0.29	0.07	3.1	2.8
		15	12.3	30.47		5.9	0.65	0.21	0.01	0.30	0.07	2.6	2.8
		25	12.2	30.48		6.0	0.55	0.29	0.01	0.30	0.07	3.3	2.8
		35	12.2	30.49		5.9	0.47	0.23	0.01	0.30	0.07	2.4	2.7
	11/16/1998	1	11.6	30.18	12.0	7.3	0.95	0.32	<0.02	0.32	0.08	3.9	2.8
		15	11.6	30.39		6.9	0.47	0.20	<0.02	0.33	0.08	3.6	2.7
		25	11.5	30.43		6.7	0.38	0.17	<0.02	0.32	0.08	3.7	2.7
		35	11.5	30.44		6.7	0.27	0.16	<0.02	0.33	0.07	4.5	2.7
	12/14/1998	1	10.2	29.68	11.0	7.7	0.55	0.22	<0.02	0.38	0.08	3.0	3.0
		15	10.5	29.77		7.5	0.24	0.14	<0.02	0.38	0.08	3.3	3.0
		25	10.2	29.78		7.5	0.19	0.13	<0.02	0.38	0.08	2.8	2.9
		35	10.2	29.78		7.4	0.19	0.12	<0.02	0.38	0.08	2.8	2.9
LTBC40	1/20/1998	1	8.3	21.43	3.5	9.3	0.51	0.02	0.03	0.47	0.07	2.6	6.8
		15	9.1	28.71		8.2	0.30	<0.01	<0.02	0.39	0.10	0.7	4.0
		23	9.1	28.78		8.3	0.22	0.03	<0.02	0.39	0.08	3.0	3.9
	2/17/1998	1	8.7	26.47	6.5	8.2	0.46	0.07	<0.02	0.42	0.08	2.6	4.7
		15	8.8	28.64		8.3	0.25	0.15	<0.02	0.41	0.08	2.1	4.2
		23	8.9	28.66		8.5	0.33	<0.01	<0.02	0.40	0.08	1.2	4.2
	3/16/1998	1	10.1	28.85	8.0	8.7	1.00	0.10	<0.02	0.39	0.06	2.1	4.8
		15	9.5	28.56		8.5	0.87	0.10	<0.02	0.37	0.05	2.6	3.7
		23	9.5	28.58		8.7	0.75	0.08	<0.02	0.38	0.05	2.0	3.7
	4/21/1998	1	11.5	25.99	5.0	10.9	7.70	0.21	<0.02	0.19	0.05	4.1	3.3
		15	10.2	28.62		9.4	8.40	0.62	<0.02	0.27	0.05	2.7	2.7
		23	10.1	28.71		8.6	3.70	0.61	<0.02	0.31	0.06	3.9	2.8
	5/20/1998	1	11.8	27.47	12.0	10.0	1.40	0.02	0.02	0.21	0.05	2.6	2.8
		15	10.9	28.91		8.7	0.98	<0.01	0.03	0.22	0.06	2.6	2.2
		23	10.9	28.94		8.6	0.69	0.06	0.03	0.21	0.06	2.2	2.2
	6/16/1998	1	12.7	27.23	7.5	9.8	3.90	0.65	0.02	0.12	0.04	3.6	2.5
		15	11.5	29.04		10.0	3.10	1.30	0.03	0.15	0.06	2.7	1.7
		23	11.3	29.08		8.6	2.00	1.20	0.03	0.17	0.05	3.2	2.1

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 1 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
JSTU01	20-Jan-98	1	1	6	
		15	4	1	
		25	5	1	
		35	2	2	
	17-Feb-98	1	1	0	
		15	0	1	
		25	0	0	
		35	1	0	
	16-Mar-98	1	1	0	
		15	0	0	
		25	0	0	
		35	0	0	
	21-Apr-98	1	0	0	
		15	3	1	
		25	0	0	
		35	0	0	
	20-May-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
	16-Jun-98	1	2	0	
		15	2	1	
		25	0	0	
		35	0	1	
	27-Jul-98	1	2	0	
		15	0	0	
		25	0	0	
		35	0	0	
	31-Aug-98	1	1	0	
		15	0	0	
		25	0	0	
		35	0	0	
	28-Sep-98	1	0	0	
		15	0	1	
		25	1	0	
		35	0	0	
	20-Oct-98	1	1	1	
		15	2	5	
		25	0	2	
		35	0	0	
	16-Nov-98	1	3	4	
		15	1	2	
		25	1	4	
		35	0	3	
	14-Dec-98	1	14	8	2
		15	13	8	
		25	5	2	
		35	5	2	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 2 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
KSBP01	20-Jan-98	1	2	1	1
		15	2	4	
		25	0	1	
		35	0	1	
		55	0	0	
		100	0	1	
		200	0	1	
	17-Feb-98	1	0	1	1
		15	0	0	
		25	0	0	
		35	0	3	
		55	0	0	
		100	0	0	
		200	0	0	
	16-Mar-98	1	1	0	1
		15	1	0	
		25	0	0	
		35	1	0	
		55	0	0	
		100	0	0	
		200	1	0	
	21-Apr-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
	20-May-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
	16-Jun-98	1	0	0	1
		15	0	0	
		25	2	0	
		35	0	0	
		55	1	0	
		100	0	0	
		200	0	0	
	27-Jul-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		200	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 3 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
KSBP01 (cont.)	31-Aug-98	1	0	0	1
		15	0	0	
		25	1	0	
		35	0	0	
		55	0	0	
		100	0	0	
		140	0	0	
	28-Sep-98	1	0	0	1
		15	0	0	
		25	0	1	
		35	0	0	
		55	0	0	
		100	0	0	
		140	0	1	
	20-Oct-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
	16-Nov-98	1	1	3	1
		15	1	0	
		25	0	1	
		35	0	3	
		55	1	0	
		55	1	1	
		100	0	0	
		200	0	0	
	14-Dec-98	1	16	15	1
		15	4	2	
		25	4	1	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
KSIW02	20-Jan-98	1	11	7	
		15	4	2	
		25	3	0	
		35	0	1	
	17-Feb-98	1	6	0	
		15	0	0	
		25	0	1	
		35	0	1	
	16-Mar-98	1	0	0	
		15	0	1	
		25	0	1	
		35	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 4 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
KSIW02 (cont.)	21-Apr-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
	20-May-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
	16-Jun-98	1	3	1	
		15	0	0	
		25	0	2	
		35	2	0	
	27-Jul-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
	31-Aug-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
	28-Sep-98	1	0	0	
		15	1	0	
		25	0	0	
		35	0	0	
	20-Oct-98	1	1	0	
		15	0	0	
		25	0	0	
		35	0	0	
	16-Nov-98	1	0	2	
		15	0	1	
		25	1	2	
		35	0	0	
	14-Dec-98	1	29	13	2
		15	2	4	
		25	0	2	
		35	2	1	
KSRU02	20-Jan-98	1	63	32	26
	17-Feb-98	1	26	4	26
	16-Mar-98	1	12	3	24
	21-Apr-98	1	5	2	22
	20-May-98	1	7	3	21
	16-Jun-98	1	51	18	22
	27-Jul-98	1	14	1	22
	31-Aug-98	1	21	5	22
	28-Sep-98	1	30	0	22
	20-Oct-98	1	30	9	23
	16-Nov-98	1	54	23	24
	14-Dec-98	1	130	41	28

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 5 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
KSSK02	20-Jan-98	1	35	4	
		15	0	0	
		25	2	2	
		35	0	0	
		55	1	0	
	17-Feb-98	1	6	0	
		15	0	2	
		25	1	1	
		35	2	0	
		55	0	0	
	16-Mar-98	1	1	0	
		15	0	0	
		25	0	0	
		35	1	0	
		55	0	0	
	21-Apr-98	1	2	1	
		15	2	0	
		25	2	0	
		35	0	0	
		55	0	0	
	20-May-98	1	0	1	
		15	0	0	
		25	0	1	
		35	0	0	
		55	0	0	
	16-Jun-98	1	0	0	
		15	1	0	
		25	0	0	
		35	0	0	
		55	1	1	
	27-Jul-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
	31-Aug-98	1	2	0	
		15	0	0	
		25	0	1	
		35	1	0	
		55	0	0	
	28-Sep-98	1	0	0	
		15	0	0	
		25	0	10	
		35	0	1	
		55	3	0	
	20-Oct-98	1	0	1	
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 6 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
KSSK02 (cont.)	16-Nov-98	1	1	10	
		15	4	5	
		25	4	5	
		35	0	4	
		55	2	4	
	14-Dec-98	1	60	60	2
		15	22	16	
		25	17	19	
		35	10	7	
		55	3	5	
LSEP01	20-Jan-98	1	2	6	
		15	0	5	
		25	1	4	
		35	2	3	
		55	1	0	
		100	0	0	
		150	0	0	
	17-Feb-98	1	0	0	
		15	0	0	
		25	1	0	
		35	0	0	
		55	0	0	
		100	0	0	
		150	0	1	
	16-Mar-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	1	
		55	0	0	
		100	1	0	
		150	0	0	
	21-Apr-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		150	0	1	
	20-May-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		150	0	0	
	16-Jun-98	1	0	0	
		15	4	0	
		25	5	1	
		35	7	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 7 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
LSEP01 (cont.)	16-Jun-98	55	0	4	
		100	0	0	
		150	0	0	
	27-Jul-98	1	0	0	
		15	0	0	
		25	0	0	
		35	1	2	
		55	0	0	
		100	0	0	
		150	0	0	
	31-Aug-98	1	0	0	
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		140	0	0	
	29-Sep-98	1	0	1	
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		140	0	0	
	21-Oct-98	1	0	0	
		15	1	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	1	
		150	0	0	
	16-Nov-98	1	1	0	
		15	0	1	
		25	0	2	
		35	1	0	
		55	1	2	
		100			
		150	0	0	
	14-Dec-98	1	26	12	1
		15	1	0	
		25	1	3	
		35	0	0	
		55	0	0	
		145	0	0	
		150	0	0	
LSKQ06	20-Jan-98	1	0	0	1
		15	0	1	
		25	0	0	
		35	1	1	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 8 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
LSKQ06 (cont.)	17-Feb-98	1	0	0	1
		15	0	1	
		25	0	0	
		35	2	0	
	16-Mar-98	1	0	0	1
		15	0	1	
		25	0	0	
		35	0	0	
	21-Apr-98	1	0	0	1
		15	0	0	
		25	1	1	
		35	0	0	
	20-May-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
	16-Jun-98	1	0	0	1
		15	13	2	
		25	1	1	
		35	1	0	
	27-Jul-98	1	0	1	1
		15	0	0	
		25	0	0	
		35	0	0	
	31-Aug-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
	29-Sep-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
	21-Oct-98	1	1	0	1
		15	0	0	
		25	0	0	
		35	0	0	
	16-Nov-98	1	0	2	1
		15	0	1	
		25	0	0	
		35	0	0	
	14-Dec-98	1	1	1	1
		15	0	1	
		25	0	0	
		35	0	2	
LSNT01	20-Jan-98	1	2	0	1
		15	2	0	
		25	0	1	
		35	1	1	
		55	1	0	
		100	0	0	
		200	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 9 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
LSNT01 (cont.)	17-Feb-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	1	
		55	0	0	
		100	0	0	
		200	0	0	
	16-Mar-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
	21-Apr-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
		200	0	1	
	20-May-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
	16-Jun-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	2	
		200	0	0	
	27-Jul-98	1	0	0	1
		15	0	0	
		25	0	1	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
	31-Aug-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 10 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
LSNT01 (cont.)	31-Aug-98	55	0	0	
		55	0	0	
		100	0	0	
		140	0	0	
	29-Sep-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
		140	0	0	
	21-Oct-98	1	0	0	1
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
	16-Nov-98	1	1	3	1
		15	0	1	
		25	0	2	
		35	1	2	
		55	0	0	
		55	1	0	
		100	0	0	
		200	0	1	
	14-Dec-98	1	2	0	1
		15	2	0	
		25	1	0	
		35	0	0	
		55	0	0	
		55	0	0	
		100	0	0	
		200	0	0	
LTBC41	20-Jan-98	1	67	28	
		15	4	3	
		23	0	3	
	17-Feb-98	1	5	2	
		15	0	3	
		23	5	2	
	16-Mar-98	1	2	0	
		15	0	1	
		23	0	1	
	21-Apr-98	1	0	1	
		15	4	10	
		23	2	1	
	20-May-98	1	3	0	
		15	0	0	
		23	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 11 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
LTBC41 (cont.)	16-Jun-98	1	7	0	
		15	4	1	
		23	1	0	
	27-Jul-98	1	4	1	
		15	0	1	
		19	1	0	
	31-Aug-98	1	1	1	
		15	0	0	
		23	0	0	
	29-Sep-98	1	3	3	
		15	1	1	
		23	0	0	
	21-Oct-98	1	27	2	
		15	2	4	
		23	2	9	
	16-Nov-98	1	52	60	
		15	2	2	
		23	0	2	
	14-Dec-98	1	>60	>60	9
		15	65	22	
		23	37	12	
LTED04	20-Jan-98	1	24	6	10
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		75	0	0	
	17-Feb-98	1	10	6	11
		15	0	0	
		25	0	0	
		35	0	2	
		55	1	1	
		75	1	2	
	16-Mar-98	1	6	7	10
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		75	2	0	
	21-Apr-98	1	2	0	9
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		75	0	0	
	20-May-98	1	0	0	8
		15	0	0	
		25	0	0	
		35	0	0	

Table A-3. 1998 Offshore Water Column Monitoring
Bacteria (page 12 of 12)

Station	Date	Depth (m)	Fecal Coliform (cfu/100 ml)	*Enterococcus* (cfu/100 ml)	Running Geometric Mean*
LTED04 (cont.)	20-May-98	55	0	0	
		75	0	0	
	16-Jun-98	1	7	0	9
		15	0	3	
		25	0	0	
		35	0	0	
		55	0	0	
		75	0	0	
	27-Jul-98	1	1	0	9
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		75	0	0	
	31-Aug-98	1	0	0	8
		15	0	0	
		25	0	0	
		35	0	0	
		55	0	0	
		75	1	0	
	29-Sep-98	1	5	1	7
		15	1	0	
		25	0	0	
		35	0	0	
		55	0	0	
		75	0	1	
	21-Oct-98	1	2	1	7
		15	0	0	
		25	0	0	
		35	0	0	
		55	1	0	
		75	0	0	
	16-Nov-98	1	45	38	6
		15	0	1	
		25	0	3	
		35	0	0	
		55	2	0	
		75	1	1	
	14-Dec-98	1	440	0	7
		15	28	13	
		25	17	9	
		35	6	5	
		55	1	1	
		75	1	1	

* The running geometric mean value is for fecal coliform bacteria.

** For stations with less than 10 data points, the geometric mean is given for the most recent samples only.
Point source stations are shaded.

Table B-1. 1998 Point Source Sediment Monitoring
Sediment Conventionals

Station	Sample Date	Total Oil & Grease (mg/kg)	Total Sulfide (mg/kg)	Ammonium-Nitrogen (mg/kg)	Total Solids (%)	Total Volatile Solids (%)	Total Organic Carbon (mg/kg)	Grain Size Distribution			
								% Gravel	% Sand	% Silt	% Clay
WP1500N	17-Nov-98	<100	<10	2.4	73.4	0.72	1260	0.4	95.2	1.5	3.3
WP1500S	23-Nov-98	<100	<10	6.6	76.6	1.15	4100	23.6	67.1	2.7	6.7
WP215N	30-Nov-98	110	<10	5.3	72.1	1.26	1980	5.5	87.3	5.4	2.9
WP215S	30-Nov-98	<100	<10	3.9	75.9	1.05	2080	4	91.5	3.4	1.3
WP430N	23-Nov-98	<100	<10	8.6	73.4	1.15	2640	1.2	89.7	4.2	4.7
WP430S	1-Dec-98	<100	<10	6.9	74.2	1.36	2060	4.7	89.4	4.1	2.1
WP230P	1-Dec-98	130	<10	6.0	71.3	1.60	3940	10.6	77.2	7.9	4.4
WPD215N	17-Nov-98	<100	<10	2.3	76.8	1.06	1370	1.6	91.8	3.5	3.4
WPD215S	18-Nov-98	180	<10	3.3	75.3	0.85	1780	5.2	86.7	4.2	4.0
WPD430N	17-Nov-98	<100	<10	0.3	79.1	0.59	596	0.1	96.4	2.6	0.6
WPD430S	18-Nov-98	110	<10	2.2	76.3	1.32	2960	5.2	86.0	4.7	4.3
WP230D	17-Nov-98	<100	<10	0.6	76.8	0.58	714	0	92.7	5.5	1.3
CP245/W310	9-Dec-98	--	<10	4.8	76.4	0.6	1600	0.7	94.8	3.2	1.2
CP246/W312	9-Dec-98	--	<10	3.4	76.2	0.6	1320	0.1	94.8	2	2.5
CP246/W315	9-Dec-98	--	<10	3.0	78.8	0.7	1800	0.5	94.9	2.3	2.5
CP246/W319	9-Dec-98	--	<10	3.9	71.5	0.8	2460	0.4	89.8	6.1	3.9
CP248/W308	9-Dec-98	--	<10	3.3	73.0	0.5	1230	0.4	96.1	1.6	1.9
KSIV01	9-Dec-98	--	<10	2.8	79.7	0.7	1350	0.2	95.4	2.2	2.4
LTBC41	9-Dec-98	--	<10	4.7	67.5	1.1	2990	2.5	77.9	14	5.5
WP230P	5-Mar-99	--	<10	2.7	71.3	1.5	3240	11.9	72.6	10	5.2
WP430N	5-Mar-99	--	<10	0.8	79.6	0.6	972	3.7	85.0	9.7	1.7
Intertidal											
KSHZ03	17-Aug-98	<100	--	--	94.5	--	2410	3.2	92.4	4.9	0
KSSN04	10-Aug-98	<100	--	--	74.7	--	3920	5.8	92.8	1.0	1.3
LSKR01	10-Aug-98	<100	--	--	78.8	--	987	3.3	93.6	1.6	2.3

Table B-2. 1998 Ambient Sediment Monitoring
Sediment Conventionals

Station	Sample Date	Total Oil & Grease (mg/kg)	Total Sulfide (mg/kg)	Ammonium-Nitrogen (mg/kg)	Total Solids (%)	Total Volatile Solids (%)	Total Organic Carbon (mg/kg)	Grain Size Distribution			
								% Gravel	% Sand	% Silt	% Clay
KSPS01	9-Dec-98	--	<10	7.3	70.4	1.6	2440	2.2	88.7	4.5	4.5
LSML01	9-Dec-98	--	<10	10.4	41.2	2.1	6590	0.8	44.1	31.1	23.7
LTDF01	9-Dec-98	--	<10	3.2	55.7	3.7	17200	4.7	52.2	27.0	16.5
LSCI01	9-Dec-98	--	<10	8.7	32.6	2.4	8480	0.6	7.9	57.7	34.0
LSCK01	9-Dec-98	--	<10	8.0	30.6	2.3	8290	0	3.1	57.0	39.4
LSCW02	9-Dec-98	--	<10	4.7	36.0	2.4	7880	0.7	31.7	39.1	27.8
LSDZ01	9-Dec-98	--	<10	7.1	32.7	2.4	8290	0.9	15.5	50.1	34.0
LSEZ01	9-Dec-98	--	<10	7.5	33.8	2.5	9600	0	14.4	51.0	36.3
LTCA02	9-Dec-98	--	<10	4.4	34.7	2.4	9150	0	14.8	49.1	36.7
LTED04	9-Dec-98	--	<10	4.7	35.0	2.5	9350	0.3	9.8	56.0	34.0
Intertidal											
JSVW04	10-Aug-98	<100	--	--	82.7	--	511	21	77.8	0.6	0.6
KSXS02	10-Aug-98	<100	--	--	81.0	--	3100	2	94.4	2.5	1.4
MTEC01	19-Aug-98	<100	--	--	83.3	--	782	11	87.0	1.6	0

Table B-3. 1998 Offshore Point Source Sediment Monitoring
Metals (dry weight) (page 1 of 4)

	Station and Date of Sample											
	WP1500N 17-Nov-98		WP1500S 23-Nov-98		WP215N 30-Nov-98		WP215S 30-Nov-98		WP430N 23-Nov-98		WP430S 1-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		73.4		76.6		72.1		75.9		73.4		74.2
Parameter (mg/kg):												
Aluminum *	6.7	7916	6.7	9021	6.9	8807	6.5	7931	6.5	8460	6.7	7709
Antimony **	2.0	<MDL	2.0	<MDL	2.1	<MDL	2.0	<MDL	1.9	<MDL	2.0	<MDL
Arsenic	3.3	<MDL	3.4	5.0	3.5	<MDL	3.3	4.2	3.3	4.1	3.4	4.6
Beryllium	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cadmium	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL
Chromium	0.3	19.9	0.3	26.6	0.3	18.9	0.3	31.8	0.3	21.0	0.3	19.1
Copper	0.3	7.1	0.3	12.8	0.3	10.0	0.3	8.4	0.3	9.3	0.3	7.7
Iron	3.3	11185	3.4	15274	3.5	12718	3.3	12082	3.3	12534	3.4	11496
Lead	2.0	3.8	2.0	8.6	2.1	9.6	2.0	11.0	1.9	11.9	2.0	10.1
Manganese *	0.1	261.6	0.1	539.2	0.1	618.6	0.1	590.3	0.1	589.9	0.1	965.0
Mercury	0.03	<MDL	0.03	0.06	0.03	0.06	0.03	0.03	0.03	0.04	0.03	0.04
Nickel	1.3	24.7	1.3	33.0	1.4	22.9	1.3	21.2	1.3	23.6	1.3	19.7
Selenium	3.3	<MDL	3.4	<MDL	3.5	<MDL	3.3	<MDL	3.3	<MDL	3.4	<MDL
Silver	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL
Thallium	13.2	<MDL	13.1	<MDL	13.9	<MDL	12.9	<MDL	13.2	<MDL	13.5	<MDL
Zinc	0.3	26.0	0.3	36.0	0.3	33.1	0.3	30.4	0.3	32.4	0.3	31.5

MDL = method detection limit

* Indicates recovery of matrix spike or SRM above acceptance range

** Indicates matrix spike or SRM recovery below acceptance range

Table B-3. 1998 Offshore Point Source Sediment Monitoring
Metals (dry weight) (page 2 of 4)

	Station and Date of Sample											
	WP230P 1-Dec-98		WPD215N 17-Nov-98		WPD215S 18-Nov-98		WPD430N 17-Nov-98		WPD430S 18-Nov-98		WP230D 17-Nov-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		71.3		76.8		75.3		79.1		76.3		76.8
Parameter (mg/kg):												
Aluminum *	7.0	8878	6.4	7018	6.5	7809	6.6	7295	6.6	8270	6.4	6901
Antimony **	2.1	2.2	2.0	<MDL	2.0	<MDL	2.0	<MDL	2.0	<MDL	2.0	<MDL
Arsenic	3.5	5.8	3.1	4.9	3.3	<MDL	3.3	3.4	3.3	4.7	3.1	<MDL
Beryllium	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cadmium	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL
Chromium	0.4	20.9	0.3	16.8	0.3	21.9	0.3	20.9	0.3	19.8	0.3	15.2
Copper	0.3	12.6	0.3	6.5	0.3	7.3	0.3	5.9	0.3	10.1	0.2	5.1
Iron	3.5	13843	3.1	10234	3.3	11527	3.3	10809	3.3	13106	3.1	9362
Lead	2.1	11.9	2.0	7.3	2.0	7.8	2.0	5.2	2.0	10.4	2.0	2.1
Manganese *	0.1	558.2	0.1	1019.5	0.1	722.4	0.1	504.4	0.1	731.3	0.1	179.7
Mercury	0.03	0.06	0.03	<MDL	0.03	<MDL	0.02	<MDL	0.03	0.03	0.02	<MDL
Nickel	1.4	25.1	1.3	18.6	1.3	21.0	1.3	22.5	1.3	23.9	1.3	17.3
Selenium	3.5	<MDL	3.1	<MDL	3.3	<MDL	3.3	<MDL	3.3	<MDL	3.1	<MDL
Silver	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.2	<MDL
Thallium	14.0	<MDL	12.8	<MDL	13.1	<MDL	12.6	<MDL	13.1	<MDL	12.6	<MDL
Zinc	0.4	40.0	0.3	26.0	0.3	46.3	0.3	25.4	0.3	37.7	0.3	21.1

MDL = method detection limit

* Indicates recovery of matrix spike or SRM above acceptance range

** Indicates matrix spike or SRM recovery below acceptance range

Table B-3. 1998 Offshore Point Source Sediment Monitoring
Metals (dry weight) (page 3 of 4)

	Station and Date of Sample											
	WP430N 5-Mar-99		WP230P 5-Mar-99		CP245/W310 9-Dec-98		CP246/W312 9-Dec-98		CP246/W315 9-Dec-98		CP246/W319 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		79.6		71.3		76.4		76.2		78.8		71.5
Parameter (mg/kg):												
Aluminum *	6.2	7399	6.7	9130	6.4	6688	6.4	6365	6.2	6371	6.7	7231
Antimony **	1.9	3.0	2.1	3.2	2.0	<MDL	2.0	<MDL	1.9	<MDL	2.0	<MDL
Arsenic	3.0	<MDL	3.4	<MDL	3.3	<MDL	3.3	<MDL	3.0	3.6	3.4	<MDL
Beryllium	0.1	0.1	0.1	0.1	0.1	<MDL	0.1	0.1	0.1	0.1	0.1	0.1
Cadmium **	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL
Chromium	0.3	17.8	0.3	19.6	0.3	15.1	0.3	15.6	0.3	17.0	0.3	21.0
Copper	0.2	7.6	0.3	15.7	0.3	4.8	0.3	4.4	0.3	5.0	0.3	6.8
Iron *	3.0	10704	3.4	12973	3.3	8691	3.3	9423	3.0	10381	3.4	12000
Lead	1.9	8.5	2.1	14.3	2.0	3.3	2.0	5.5	1.9	4.7	2.0	4.8
Manganese **	0.1	251.3	0.1	475.5	0.1	196.3	0.1	229.7	0.1	233.5	0.1	261.5
Mercury	0.03	0.03	0.03	0.08	0.03	<MDL	0.02	<MDL	0.03	0.03	0.03	0.03
Nickel	1.2	20.0	1.4	24.1	1.3	14.4	1.3	13.6	1.2	16.4	1.3	18.6
Selenium	3.0	<MDL	3.4	<MDL	3.3	<MDL	3.3	<MDL	3.0	<MDL	3.4	<MDL
Silver	0.2	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL
Thallium	12.2	<MDL	13.6	<MDL	12.8	<MDL	13.0	<MDL	12.4	<MDL	13.3	<MDL
Zinc	0.3	27.6	0.3	39.4	0.3	20.5	0.3	21.4	0.3	24.0	0.3	27.8

MDL = method detection limit

* Indicates recovery of matrix spike or SRM above acceptance range

** Indicates matrix spike or SRM recovery below acceptance range

Table B-3. 1998 Offshore Point Source Sediment Monitoring Metals (dry weight) (page 4 of 4)

	Station and Date of Sample					
	CP248/W308 9-Dec-98		KSIV01 9-Dec-98		LTBC41 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		73.0		79.7		67.5
Parameter (mg/kg):						
Aluminum *	6.6	5603	6.1	7867	5.2	9007
Antimony	1.9	<MDL	1.9	<MDL	1.6	1.8
Arsenic	3.3	<MDL	3.0	3.5	2.7	4.9
Beryllium	0.1	<MDL	0.1	0.1	0.1	0.1
Cadmium	0.2	<MDL	0.2	<MDL	0.2	0.2
Chromium	0.3	14.9	0.3	21.2	0.3	22.4
Copper	0.3	4.5	0.3	5.6	0.2	17.9
Iron *	3.3	8315	3.0	13049	2.7	11748
Lead	1.9	4.4	1.9	6.9	1.6	12.5
Manganese	0.1	250.7	0.1	509.4	0.1	177.8
Mercury	0.03	<MDL	0.02	<MDL	0.03	0.08
Nickel	1.3	13.0	1.2	16.9	1.0	20.7
Selenium	3.3	<MDL	3.0	<MDL	2.7	<MDL
Silver	0.3	<MDL	0.3	<MDL	0.2	0.3
Thallium	13.3	<MDL	12.3	<MDL	10.4	<MDL
Zinc	0.3	19.5	0.3	27.1	0.3	32.3

MDL = method detection limit

* Indicates recovery of matrix spike or SRM above acceptance range

Table B-4. 1998 Offshore Ambient Sediment Monitoring
Metals (dry weight)(page 1 of 2)

	Station and Date of Sample											
	KSPS01 9-Dec-98		LSML01 9-Dec-98		LTDF01 9-Dec-98		LSCI01 9-Dec-98		LSCK01 9-Dec-98		LSCW02 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		70.4		41.2		55.7		32.6		30.6		36.0
Parameter (mg/kg):												
Aluminum *	7.1	8366	7.8	15583	5.9	13627	10.1	22331	10.5	21993	8.9	20528
Antimony *	2.1	<MDL	2.3	<MDL	1.8	1.8	3.1	<MDL	3.2	3.3	2.6	<MDL
Arsenic	3.6	<MDL	3.9	8.5	3.1	10.8	5.2	8.6	5.2	10.8	4.4	10.0
Beryllium	0.1	0.2	0.1	0.3	0.1	0.2	0.1	0.4	0.1	0.4	0.1	0.3
Cadmium **	0.2	<MDL	0.2	0.3	0.2	0.4	0.3	0.4	0.3	0.4	0.3	0.3
Chromium	0.4	21.2	0.4	34.5	0.3	34.8	0.5	45.1	0.5	44.1	0.4	40.6
Copper	0.3	8.3	0.3	27.9	0.2	48.8	0.4	39.0	0.4	39.2	0.4	43.9
Iron *	3.6	11577	3.9	22379	5.9	20108	5.2	29325	5.2	28693	8.9	28611
Lead	2.1	8.7	2.3	16.8	1.8	61.4	3.1	22.9	3.2	21.6	2.6	29.2
Manganese	0.1	242.9	0.2	332.5	0.1	307.0	0.2	389.6	0.2	424.8	0.2	361.1
Mercury	0.03	0.03	0.05	0.11	0.04	0.44	0.06	0.13	0.07	0.15	0.05	0.23
Nickel	1.4	21.4	1.6	30.3	1.2	29.8	2.1	37.1	2.1	35.9	1.8	32.5
Selenium	3.6	<MDL	3.9	<MDL	3.1	<MDL	5.2	<MDL	5.2	<MDL	4.4	<MDL
Silver	0.3	<MDL	0.3	<MDL	0.2	0.9	0.4	<MDL	0.4	<MDL	0.4	<MDL
Thallium	14.2	<MDL	15.5	<MDL	12.0	<MDL	20.6	<MDL	21.2	<MDL	17.5	<MDL
Zinc	0.4	27.7	0.4	67.5	0.3	75.0	0.5	89.3	0.5	88.2	0.4	95.0

MDL = method detection limit

* Indicates recovery of matrix spike or SRM above acceptance range

** Indicates matrix spike or SRM recovery below acceptance range

Table B-4. 1998 Offshore Ambient Sediment Monitoring
Metals (dry weight)(page 2 of 2)

	Station and Date of Sample							
	LSDZ01 9-Dec-98		LSEZ01 9-Dec-98		LTCA02 9-Dec-98		LTED04 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		32.7		33.8		34.7		35.0
Parameter (mg/kg):								
Aluminum *	9.5	20795	10.1	21746	8.9	21153	9.7	23371
Antimony *	2.8	3.1	3.0	<MDL	2.7	<MDL	2.9	<MDL
Arsenic	4.6	11.9	5.0	13.6	4.3	11.8	4.9	12.3
Beryllium	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.3
Cadmium **	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3
Chromium	0.5	41.0	0.5	42.0	0.4	40.3	0.5	41.4
Copper	0.4	47.4	0.4	51.2	0.3	47.3	0.4	54.9
Iron *	4.6	27768	5.0	28905	8.9	28674	9.7	30286
Lead	2.8	38.2	3.0	41.4	2.7	37.8	2.9	46.6
Manganese	0.2	394.5	0.2	429.0	0.2	394.8	0.2	360.0
Mercury	0.06	0.30	0.06	0.30	0.06	0.27	0.05	0.37
Nickel	1.9	33.6	2.0	34.0	1.8	33.1	1.9	32.6
Selenium	4.6	<MDL	5.0	<MDL	4.3	<MDL	4.9	<MDL
Silver	0.4	<MDL	0.4	0.5	0.3	0.4	0.4	<MDL
Thallium	18.7	<MDL	19.8	<MDL	17.6	<MDL	19.1	<MDL
Zinc	0.5	92.4	0.5	100.6	0.4	90.2	0.5	98.9

MDL = method detection limit

* Indicates recovery of matrix spike or SRM above acceptance range

** Indicates matrix spike or SRM recovery below acceptance range

Table B-5. 1998 Intertidal Sediment Monitoring
Metals (dry weight)(page 1 of 1)

	Station and Date of Sample											
	KSHZ03 17-Aug-98		KSSN04 10-Aug-98		LSKR01 10-Aug-98		JSVW04 10-Aug-98		KSXS02 10-Aug-98		MTEC01 19-Aug-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		94.5		74.7		78.8		82.7		81.0		83.3
Parameter (mg/kg):												
Aluminum	na	na	na	na	na	na	na	na	na	na	na	na
Antimony *	1.6	<MDL	2.0	<MDL	1.9	<MDL	1.8	<MDL	1.9	<MDL	1.8	<MDL
Arsenic	2.6	3.0	3.3	<MDL	3.3	<MDL	3.0	3.5	3.1	<MDL	3.0	<MDL
Beryllium	0.1	<MDL	0.1	<MDL	0.1	<MDL	0.1	<MDL	0.1	<MDL	0.1	<MDL
Cadmium **	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL
Chromium	0.3	15.4	0.3	15.7	0.3	18.9	0.3	23.3	0.3	16.8	0.3	20.2
Copper	0.2	6.6	0.3	6.3	0.3	4.7	0.2	11.4	0.2	7.3	0.2	7.1
Iron	na	na	na	na	na	na	na	na	na	na	na	na
Lead	1.6	2.9	2.0	3.3	1.9	5.5	1.8	14.9	1.9	3.6	1.8	2.4
Manganese	na	na	na	na	na	na	na	na	na	na	na	na
Mercury	0.02	<MDL	0.03	<MDL	0.03	<MDL	0.02	<MDL	0.02	<MDL	0.02	<MDL
Nickel	1.1	21.6	1.3	19.8	1.3	15.0	1.2	29.5	1.2	21.2	1.2	23.0
Selenium	2.6	<MDL	3.3	<MDL	3.3	<MDL	3.0	<MDL	3.1	<MDL	3.0	<MDL
Silver	0.2	<MDL	0.3	<MDL	0.3	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL
Thallium	10.6	<MDL	13.1	<MDL	12.7	<MDL	12.0	<MDL	12.2	<MDL	11.8	<MDL
Zinc ***	0.3	22.3	0.3	23.8	0.3	22.2	0.3	32.5	0.3	25.2	0.3	25.5

MDL = method detection limit
* Indicates recovery of matrix spike or SRM above acceptance range
** Indicates matrix spike or SRM recovery below acceptance range
*** Indicates blank contamination
Point source stations are shaded.

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 1 of 8)

	Station and Sample Date											
	WP1500N 17-Nov-98		WP1500S 23-Nov-98		WP215N 30-Nov-98		WP215S 30-Nov-98		WP430N 23-Nov-98		WP430S 1-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		73.4		76.6		72.1		75.9		73.4		74.2
Compound (µg/kg):												
1,2,4-Trichlorobenzene *	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL
1,2-Dichlorobenzene *	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL
1,2-Diphenylhydrazine	72	<MDL	69	<MDL	74	<MDL	70	<MDL	72	<MDL	71	<MDL
1,3-Dichlorobenzene *	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL
1,4-Dichlorobenzene *	0.94	<MDL	0.90	<MDL	0.96	#REF!	0.91	<MDL	0.94	#REF!	0.93	#REF!
2,4,5-Trichlorophenol	149.9	<MDL	143.6	<MDL	152.6	<MDL	144.9	<MDL	149.9	<MDL	148.2	<MDL
2,4,6-Trichlorophenol	149.9	<MDL	143.6	<MDL	152.6	<MDL	144.9	<MDL	149.9	<MDL	148.2	<MDL
2,4-Dichlorophenol	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
2,4-Dimethylphenol *	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
2,4-Dinitrophenol	72.2	<MDL	69.2	<MDL	73.5	<MDL	69.8	<MDL	72.2	<MDL	71.4	<MDL
2,4-Dinitrotoluene	15.0	<MDL	14.4	<MDL	15.3	<MDL	14.5	<MDL	15.0	<MDL	14.8	<MDL
2,6-Dinitrotoluene	15.0	<MDL	14.4	<MDL	15.3	<MDL	14.5	<MDL	15.0	<MDL	14.8	<MDL
2-Chloronaphthalene	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL
2-Chlorophenol	72	<MDL	69	<MDL	74	<MDL	70	<MDL	72	<MDL	71	<MDL
2-Methylnaphthalene	59	<MDL	56	<MDL	60	<MDL	57	<MDL	59	<MDL	58	<MDL
2-Methylphenol	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
2-Nitroaniline	150	<MDL	144	<MDL	153	<MDL	145	<MDL	150	<MDL	148	<MDL
2-Nitrophenol	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
3,3'-Dichlorobenzidine *	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
3-Nitroaniline *	150	<MDL	144	<MDL	153	<MDL	145	<MDL	150	<MDL	148	<MDL
4,6-Dinitro-o-Cresol	72	<MDL	69	<MDL	74	<MDL	70	<MDL	72	<MDL	71	<MDL
4-Bromophenyl phenyl ether	15	<MDL	14	<MDL	15	<MDL	14	<MDL	15	<MDL	15	<MDL
4-Chloro-3-methylphenol	72	<MDL	69	<MDL	74	<MDL	70	<MDL	72	<MDL	71	<MDL
4-Chloroaniline *	72	<MDL	69	<MDL	74	<MDL	70	<MDL	72	<MDL	71	<MDL
4-Chlorophenyl phenyl ether	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL
4-Methylphenol	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
4-Nitroaniline	150	<MDL	144	<MDL	153	<MDL	145	<MDL	150	<MDL	148	<MDL
4-Nitrophenol	72	<MDL	69	<MDL	74	<MDL	70	<MDL	72	<MDL	71	<MDL
Acenaphthene	15.0	<MDL	14.4	<MDL	15.3	#REF!	14.5	<MDL	15.0	#REF!	14.8	<MDL
Acenaphthylene	21.8	<MDL	20.9	<MDL	22.2	#REF!	21.1	<MDL	21.8	#REF!	21.6	<MDL
Aniline *	72.2	<MDL	69.2	<MDL	73.5	<MDL	69.8	<MDL	72.2	<MDL	71.4	<MDL
Anthracene *	21.8	<MDL	20.9	<MDL	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	<MDL
Benzidine **	872	<MDL	836	<MDL	888	<MDL	843	<MDL	872	<MDL	863	<MDL
Benzo(*a*)anthracene *	21.8	#REF!	20.9	#REF!	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	#REF!
Benzo(*a*)pyrene *	36.8	<MDL	35.2	#REF!	37.4	#REF!	35.6	#REF!	36.8	#REF!	36.4	#REF!
Benzo(*b*)fluoranthene	58.6	<MDL	56.1	#REF!	59.6	#REF!	56.7	#REF!	58.6	#REF!	58.0	#REF!
Benzo(*g,h,i*)perylene *	36.8	<MDL	35.2	#REF!	37.4	#REF!	35.6	#REF!	36.8	#REF!	36.4	#REF!
Benzo(*k*)fluoranthene	58.6	<MDL	56.1	<MDL	59.6	#REF!	56.7	#REF!	58.6	#REF!	58.0	<MDL
Benzoic acid	150	<MDL	144	<MDL	153	<MDL	145	<MDL	150	<MDL	148	<MDL
Benzyl alcohol	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Benzyl butyl phthalate	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL
bis(2-Chloroethoxy)methane	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
bis(2-Chloroethyl)ether	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 2 of 8)

	Station and Sample Date											
	WP1500N 17-Nov-98		WP1500S 23-Nov-98		WP215N 30-Nov-98		WP215S 30-Nov-98		WP430N 23-Nov-98		WP430S 1-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):												
bis(2-Chloroisopropyl)ether	72.2	<MDL	69.2	<MDL	73.5	<MDL	69.8	<MDL	72.2	<MDL	71.4	<MDL
bis(2-Ethylhexyl)phthalate	21.8	<MDL	20.9	#REF!	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	<MDL
Carbazole	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Chrysene ***	21.8	<MDL	20.9	#REF!	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	#REF!
Coprostanol	367.8	<MDL	352.5	<MDL	374.5	<MDL	355.7	<MDL	367.8	<MDL	363.9	<MDL
di-*n* -Butyl phthalate	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
di-*n* -Octyl phthalate	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL
Dibenzo(*a,h*)anthracene *	58.6	<MDL	56.1	<MDL	59.6	<MDL	56.7	<MDL	58.6	#REF!	58.0	<MDL
Dibenzofuran	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Diethyl phthalate	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Dimethyl phthalate	15.0	<MDL	14.4	<MDL	15.3	<MDL	14.5	<MDL	15.0	<MDL	14.8	<MDL
Fluoranthene	21.8	#REF!	20.9	#REF!	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	#REF!
Fluorene *	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	#REF!	21.6	<MDL
Hexachlorobenzene *	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL
Hexachlorobutadiene	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Hexachlorocyclopentadiene *	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Hexachloroethane	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Indeno(1,2,3-*c,d*)Pyrene *	36.8	<MDL	35.2	#REF!	37.4	#REF!	35.6	#REF!	36.8	#REF!	36.4	#REF!
Isophorone *	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
N-Nitroso-di-*n* -propylamine	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
N-Nitrosodimethylamine	149.9	<MDL	143.6	<MDL	152.6	<MDL	144.9	<MDL	149.9	<MDL	148.2	<MDL
N-Nitrosodiphenylamine	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Naphthalene *	59	<MDL	56	<MDL	60	<MDL	57	<MDL	59	<MDL	58	<MDL
Nitrobenzene	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Pentachlorophenol	36.8	<MDL	35.2	<MDL	37.4	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL
Phenanthrene *	21.8	<MDL	20.9	#REF!	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	<MDL
Phenol	150	<MDL	144	<MDL	153	<MDL	145	<MDL	150	<MDL	148	<MDL
Pyrene	21.8	#REF!	20.9	#REF!	22.2	#REF!	21.1	#REF!	21.8	#REF!	21.6	#REF!

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
*** Matrix spike or surrogate recovery above acceptance range

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 3 of 8)

	Station and Sample Date											
	WP230P 1-Dec-98		WPD215N 17-Nov-98		WPD215S 18-Nov-98		WPD430N 17-Nov-98		WPD430S 18-Nov-98		WP230D 17-Nov-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		71.3		76.8		75.3		79.1		76.3		76.8
Compound (µg/kg):												
1,2,4-Trichlorobenzene *	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL
1,2-Dichlorobenzene *	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL
1,2-Diphenylhydrazine	74	<MDL	69	<MDL	70	<MDL	67	<MDL	69	<MDL	69	<MDL
1,3-Dichlorobenzene *	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL
1,4-Dichlorobenzene *	0.97	#REF!	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL
2,4,5-Trichlorophenol	154.3	<MDL	143.2	<MDL	146.1	<MDL	139.1	<MDL	144.2	<MDL	143.2	<MDL
2,4,6-Trichlorophenol	154.3	<MDL	143.2	<MDL	146.1	<MDL	139.1	<MDL	144.2	<MDL	143.2	<MDL
2,4-Dichlorophenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
2,4-Dimethylphenol *	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
2,4-Dinitrophenol	74.3	<MDL	69.0	<MDL	70.4	<MDL	67.0	<MDL	69.5	<MDL	69.0	<MDL
2,4-Dinitrotoluene	15.4	<MDL	14.3	<MDL	14.6	<MDL	13.9	<MDL	14.4	<MDL	14.3	<MDL
2,6-Dinitrotoluene	15.4	<MDL	14.3	<MDL	14.6	<MDL	13.9	<MDL	14.4	<MDL	14.3	<MDL
2-Chloronaphthalene	22.4	<MDL	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
2-Chlorophenol	74	<MDL	69	<MDL	70	<MDL	67	<MDL	69	<MDL	69	<MDL
2-Methylnaphthalene	60	<MDL	56	<MDL	57	<MDL	54	<MDL	56	<MDL	56	<MDL
2-Methylphenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
2-Nitroaniline	154	<MDL	143	<MDL	146	<MDL	139	<MDL	144	<MDL	143	<MDL
2-Nitrophenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
3,3'-Dichlorobenzidine *	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
3-Nitroaniline *	154	<MDL	143	<MDL	146	<MDL	139	<MDL	144	<MDL	143	<MDL
4,6-Dinitro-o-Cresol	74	<MDL	69	<MDL	70	<MDL	67	<MDL	69	<MDL	69	<MDL
4-Bromophenyl phenyl ether	15	<MDL	14	<MDL	15	<MDL	14	<MDL	14	<MDL	14	<MDL
4-Chloro-3-methylphenol	74	<MDL	69	<MDL	70	<MDL	67	<MDL	69	<MDL	69	<MDL
4-Chloroaniline *	74	<MDL	69	<MDL	70	<MDL	67	<MDL	69	<MDL	69	<MDL
4-Chlorophenyl phenyl ether	22.4	<MDL	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
4-Methylphenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
4-Nitroaniline	154	<MDL	143	<MDL	146	<MDL	139	<MDL	144	<MDL	143	<MDL
4-Nitrophenol	74	<MDL	69	<MDL	70	<MDL	67	<MDL	69	<MDL	69	<MDL
Acenaphthene	15.4	<MDL	14.3	<MDL	14.6	<MDL	13.9	<MDL	14.4	<MDL	14.3	<MDL
Acenaphthylene	22.4	#REF!	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
Aniline *	74.3	<MDL	69.0	<MDL	70.4	<MDL	67.0	<MDL	69.5	<MDL	69.0	<MDL
Anthracene *	22.4	#REF!	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
Benzidine **	898	<MDL	833	<MDL	850	<MDL	809	<MDL	839	<MDL	833	<MDL
Benzo(*a*)anthracene *	22.4	#REF!	20.8	<MDL	21.2	#REF!	20.2	#REF!	21.0	#REF!	20.8	<MDL
Benzo(*a*)pyrene *	37.9	#REF!	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	#REF!	35.2	<MDL
Benzo(*b*)fluoranthene	60.3	#REF!	56.0	<MDL	57.1	<MDL	54.4	<MDL	56.4	<MDL	56.0	<MDL
Benzo(*g,h,i*)perylene *	37.9	#REF!	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	#REF!	35.2	<MDL
Benzo(*k*)fluoranthene	60.3	#REF!	56.0	<MDL	57.1	<MDL	54.4	<MDL	56.4	<MDL	56.0	<MDL
Benzoic acid	154	<MDL	143	<MDL	146	<MDL	139	<MDL	144	<MDL	143	<MDL
Benzyl alcohol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Benzyl butyl phthalate	22.4	<MDL	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
bis(2-Chloroethoxy)methane	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
bis(2-Chloroethyl)ether	22.4	<MDL	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 4 of 8)

	Station and Sample Date											
	WP230P 1-Dec-98		WPD215N 17-Nov-98		WPD215S 18-Nov-98		WPD430N 17-Nov-98		WPD430S 18-Nov-98		WP230D 17-Nov-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):												
bis(2-Chloroisopropyl)ether	74.3	<MDL	69.0	<MDL	70.4	<MDL	67.0	<MDL	69.5	<MDL	69.0	<MDL
bis(2-Ethylhexyl)phthalate	22.4	#REF!	20.8	<MDL	21.2	#REF!	20.2	<MDL	21.0	#REF!	20.8	<MDL
Carbazole	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Chrysene ***	22.4	#REF!	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	#REF!	20.8	<MDL
Coprostanol	378.7	<MDL	351.6	<MDL	358.6	<MDL	341.3	<MDL	353.9	<MDL	351.6	<MDL
di-*n*-Butyl phthalate	37.9	#REF!	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
di-*n*-Octyl phthalate	22.4	<MDL	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
Dibenzo(*a,h*)anthracene *	60.3	<MDL	56.0	<MDL	57.1	<MDL	54.4	<MDL	56.4	<MDL	56.0	<MDL
Dibenzofuran	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Diethyl phthalate	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Dimethyl phthalate	15.4	<MDL	14.3	<MDL	14.6	<MDL	13.9	<MDL	14.4	<MDL	14.3	<MDL
Fluoranthene	22.4	#REF!	20.8	<MDL	21.2	#REF!	20.2	#REF!	21.0	#REF!	20.8	<MDL
Fluorene *	22.4	<MDL	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL
Hexachlorobenzene *	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL
Hexachlorobutadiene	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Hexachlorocyclopentadiene *	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Hexachloroethane	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Indeno(1,2,3-*c,d*)Pyrene *	37.9	#REF!	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	#REF!	35.2	<MDL
Isophorone *	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
N-Nitroso-di-*n*-propylamine	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
N-Nitrosodimethylamine	154.3	<MDL	143.2	<MDL	146.1	<MDL	139.1	<MDL	144.2	<MDL	143.2	<MDL
N-Nitrosodiphenylamine	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Naphthalene *	60	<MDL	56	<MDL	57	<MDL	54	<MDL	56	<MDL	56	<MDL
Nitrobenzene	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Pentachlorophenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL
Phenanthrene *	22.4	#REF!	20.8	<MDL	21.2	<MDL	20.2	<MDL	21.0	#REF!	20.8	<MDL
Phenol	154	<MDL	143	<MDL	146	<MDL	139	<MDL	144	<MDL	143	<MDL
Pyrene	22.4	#REF!	20.8	#REF!	21.2	#REF!	20.2	#REF!	21.0	#REF!	20.8	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
*** Matrix spike or surrogate recovery above acceptance range

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 5 of 8)

	Station and Date of Sample					
	WP430N 5-Mar-99		WP230P 5-Mar-99		WP230P 5-Mar-99 (re-analysis)	
	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		79.6		71.3		71.3
Compound (µg/kg):						
1,2,4-Trichlorobenzene	0.87	<MDL	0.97	<MDL	22.40	<MDL
1,2-Dichlorobenzene	0.87	<MDL	0.97	<MDL	22.40	<MDL
1,2-Diphenylhydrazine [a]	67	<MDL	74	<MDL	74	<MDL
1,3-Dichlorobenzene	0.87	<MDL	0.97	<MDL	22.40	<MDL
1,4-Dichlorobenzene	0.87	<MDL	0.97	<MDL	22.40	<MDL
2,4,5-Trichlorophenol*	138.2	<MDL	154.3	<MDL	154.3	<MDL
2,4,6-Trichlorophenol*	138.2	<MDL	154.3	<MDL	154.3	<MDL
2,4-Dichlorophenol*	33.9	<MDL	37.9	<MDL	37.9	<MDL
2,4-Dimethylphenol *	33.9	<MDL	37.9	<MDL	37.9	<MDL
2,4-Dinitrophenol *	66.6	<MDL	74.3	<MDL	74.3	<MDL
2,4-Dinitrotoluene [a]	13.8	<MDL	15.4	<MDL	15.4	<MDL
2,6-Dinitrotoluene [a]	13.8	<MDL	15.4	<MDL	15.4	<MDL
2-Chloronaphthalene*	20.1	<MDL	22.4	<MDL	22.4	<MDL
2-Chlorophenol*	67	<MDL	74	<MDL	74	<MDL
2-Methylnaphthalene*	54	<MDL	60	73	60	<MDL
2-Methylphenol*	33.9	<MDL	37.9	<MDL	37.9	<MDL
2-Nitroaniline [a]	138	<MDL	154	<MDL	154	<MDL
2-Nitrophenol*	33.9	<MDL	37.9	<MDL	37.9	<MDL
3,3'-Dichlorobenzidine *	33.9	<MDL	37.9	<MDL	37.9	<MDL
3-Nitroaniline *	138	<MDL	154	<MDL	154	<MDL
4,6-Dinitro-o-Cresol*	67	<MDL	74	<MDL	74	<MDL
4-Bromophenyl phenyl ether [a]	14	<MDL	15	<MDL	15	<MDL
4-Chloro-3-methylphenol*	67	<MDL	74	<MDL	74	<MDL
4-Chloroaniline **	67	<MDL	74	<MDL	74	<MDL
4-Chlorophenyl phenyl ether [a]	20.1	<MDL	22.4	<MDL	22.4	<MDL
4-Methylphenol*	33.9	<MDL	37.9	<MDL	37.9	<MDL
4-Nitroaniline [a]	138	<MDL	154	<MDL	154	<MDL
4-Nitrophenol*	67	<MDL	74	<MDL	74	<MDL
Acenaphthene [a]	13.8	<MDL	15.4	#REF!	15.4	<MDL
Acenaphthylene ^	20.1	<MDL	22.4	457.2	22.4	<MDL
Aniline **	66.6	<MDL	74.3	<MDL	74.3	<MDL
Anthracene ^	20.1	<MDL	22.4	734.9	22.4	51.3
Benzidine **	804	<MDL	898	<MDL	898	<MDL
Benzo(*a*)anthracene ^	20.1	<MDL	22.4	1072.9	22.4	209.0
Benzo(*a*)pyrene ^	33.9	<MDL	37.9	1626.9	37.9	297.3
Benzo(*b*)fluoranthene ^	54.0	<MDL	60.3	1357.6	60.3	253.8
Benzo(*g,h,i*)perylene ^	33.9	<MDL	37.9	1087.0	37.9	224.4
Benzo(*k*)fluoranthene ^	54.0	<MDL	60.3	446.0	60.3	110.8
Benzoic acid*	138	<MDL	154	<MDL	154	168.00
Benzyl alcohol*	33.9	<MDL	37.9	<MDL	37.9	<MDL
Benzyl butyl phthalate [a]	20.1	<MDL	22.4	<MDL	22.4	<MDL
bis(2-Chloroethoxy)methane*	33.9	<MDL	37.9	<MDL	37.9	<MDL
bis(2-Chloroethyl)ether*	20.1	<MDL	22.4	<MDL	22.4	<MDL

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 6 of 8)

	Station and Date of Sample					
	WP430N 5-Mar-99		WP230P 5-Mar-99		WP230P 5-Mar-99 (re-analysis)	
	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):						
bis(2-Chloroisopropyl)ether*	66.6	<MDL	74.3	<MDL	74.3	<MDL
bis(2-Ethylhexyl)phthalate [#]	20.1	71.0	22.4	118.2	22.4	49.9
Carbazole* **	33.9	<MDL	37.9	91.4	37.9	<MDL
Chrysene ^	20.1	<MDL	22.4	1234.2	22.4	235.6
Coprostanol [a]	339.2	<MDL	378.7	<MDL	378.7	<MDL
di-*n* -Butyl phthalate [a]	33.9	<MDL	37.9	<MDL	37.9	<MDL
di-*n* -Octyl phthalate [a]	20.1	<MDL	22.4	<MDL	22.4	<MDL
Dibenzo(*a,h*)anthracene ^	54.0	<MDL	60.3	168.3	60.3	<MDL
Dibenzofuran [a]	33.9	<MDL	37.9	<MDL	37.9	<MDL
Diethyl phthalate [a]	33.9	<MDL	37.9	<MDL	37.9	<MDL
Dimethyl phthalate [a]	13.8	<MDL	15.4	<MDL	15.4	<MDL
Fluoranthene ^	20.1	<MDL	22.4	2454.4	22.4	385.7
Fluorene *	20.1	<MDL	22.4	253.9	22.4	<MDL
Hexachlorobenzene	0.87	<MDL	0.97	<MDL	22.40	<MDL
Hexachlorobutadiene*	33.9	<MDL	37.9	<MDL	37.9	<MDL
Hexachlorocyclopentadiene *	33.9	<MDL	37.9	<MDL	37.9	<MDL
Hexachloroethane*	33.9	<MDL	37.9	<MDL	37.9	<MDL
Indeno(1,2,3-*c,d*)Pyrene ^	33.9	<MDL	37.9	1173.9	37.9	210.4
Isophorone *	33.9	<MDL	37.9	<MDL	37.9	<MDL
N-Nitroso-di-*n* -propylamine*	33.9	<MDL	37.9	<MDL	37.9	<MDL
N-Nitrosodimethylamine*	138.2	<MDL	154.3	<MDL	154.3	<MDL
N-Nitrosodiphenylamine [a]	33.9	<MDL	37.9	<MDL	37.9	<MDL
Naphthalene *	54	<MDL	60	<MDL	60	<MDL
Nitrobenzene*	33.9	<MDL	37.9	<MDL	37.9	<MDL
Pentachlorophenol*	33.9	<MDL	37.9	<MDL	37.9	<MDL
Phenanthrene ^	20.1	<MDL	22.4	2692.8	22.4	228.6
Phenol*	138	<MDL	154	<MDL	154	<MDL
Pyrene ^	20.1	23.9	22.4	3085.6	22.4	535.8

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
*** Matrix spike or surrogate recovery above acceptance range
^ Indicates estimated value for WP230P ((5-Mar-99) only
[#] Blank contamination
[a] Matrix spike or SRM recovery below acceptance range for sample WP430N only

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 7 of 8)

	Station and Sample Date													
	CP245/W310 9-Dec-98		CP246/W312 9-Dec-98		CP246/W315 9-Dec-98		CP246/W319 9-Dec-98		CP248/W308 9-Dec-98		KSIV01 9-Dec-98		LTBC41 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		76.4		76.2		78.8		71.5		73.0		79.7		67.5
Compound (µg/kg):														
1,2,4-Trichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1,2-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1,2-Diphenylhydrazine	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
1,3-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1,4-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2,4,5-Trichlorophenol	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
2,4,6-Trichlorophenol	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
2,4-Dichlorophenol *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
2,4-Dimethylphenol *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
2,4-Dinitrophenol *	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
2,4-Dinitrotoluene	14.40	<MDL	14.44	<MDL	13.96	<MDL	15.38	<MDL	15.07	<MDL	13.80	<MDL	16.30	<MDL
2,6-Dinitrotoluene	14.40	<MDL	14.44	<MDL	13.96	<MDL	15.38	<MDL	15.07	<MDL	13.80	<MDL	16.30	<MDL
2-Chloronaphthalene*	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL
2-Chlorophenol *	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
2-Methylnaphthalene *	56.28	<MDL	56.43	<MDL	54.57	<MDL	60.14	<MDL	58.90	<MDL	53.95	<MDL	63.70	<MDL
2-Methylphenol *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
2-Nitroaniline	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
2-Nitrophenol *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
3,3'-Dichlorobenzidine *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
3-Nitroaniline *	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
4,6-Dinitro-o-Cresol *	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
4-Bromophenyl phenyl ether	14.40	<MDL	14.44	<MDL	13.96	<MDL	15.38	<MDL	15.07	<MDL	13.80	<MDL	16.30	<MDL
4-Chloro-3-methylphenol	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
4-Chloroaniline *	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
4-Chlorophenyl phenyl ether	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL
4-Methylphenol *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
4-Nitroaniline *	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
4-Nitrophenol	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
Acenaphthene	14.40	<MDL	14.44	<MDL	13.96	<MDL	15.38	<MDL	15.07	<MDL	13.80	<MDL	16.30	<MDL
Acenaphthylene	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL
Aniline **	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
Anthracene *	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	31.51	20.08	<MDL	23.70	42.22
Benzidine **	837.7	<MDL	839.9	<MDL	812.2	<MDL	895.1	<MDL	876.7	<MDL	803.0	<MDL	948.1	<MDL
Benzo(*a*)anthracene *	20.94	30.10	21.00	<MDL	20.30	20.30	22.38	36.36	21.92	87.95	20.08	43.16	23.70	95.56
Benzo(*a*)pyrene *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	47.55	36.99	100.1	33.88	38.90	40.00	117.2
Benzo(*b*)fluoranthene	56.28	<MDL	56.43	<MDL	54.57	<MDL	60.14	<MDL	58.90	80.82	53.95	<MDL	63.70	160.0
Benzo(*g,h,i*)perylene *[e]	35.34	37.96	35.43	44.62	34.26	<MDL	37.76	<MDL	36.99	114.5	33.88	<MDL	40.00	80.30
Benzo(*k*)fluoranthene	56.28	<MDL	56.43	<MDL	54.57	<MDL	60.14	<MDL	58.90	<MDL	53.95	<MDL	63.70	72.59
Benzoic acid *	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
Benzyl alcohol *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Benzyl butyl phthalate	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL
bis(2-Chloroethoxy)methane *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
bis(2-Chloroethyl)ether *	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL

Table B-6. 1998 Point Source Sediment Monitoring
Semi-volatile Organics (dry weight) (page 8 of 8)

	Station and Sample Date													
	CP245/W310 9-Dec-98		CP246/W312 9-Dec-98		CP246/W315 9-Dec-98		CP246/W319 9-Dec-98		CP248/W308 9-Dec-98		KSIV01 9-Dec-98		LTBC41 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):														
bis(2-Chloroisopropyl)ether *	69.37	<MDL	69.55	<MDL	67.26	<MDL	74.13	<MDL	72.60	<MDL	66.50	<MDL	78.52	<MDL
bis(2-Ethylhexyl)phthalate [e]	20.94	<MDL	21.00	23.62	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	237.0
Carbazole	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Chrysene	20.94	28.80	21.00	<MDL	20.30	<MDL	22.38	38.18	21.92	87.81	20.08	38.52	23.70	128.6
Coprostanol	353.4	<MDL	354.3	<MDL	342.6	<MDL	377.6	<MDL	369.9	<MDL	338.8	<MDL	400.0	<MDL
di-*n* -Butyl phthalate	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
di-*n* -Octyl phthalate	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL
Dibenzo(*a,h*)anthracene *	56.28	<MDL	56.43	<MDL	54.57	<MDL	60.14	<MDL	58.90	<MDL	53.95	<MDL	63.70	<MDL
Dibenzofuran	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Diethyl phthalate	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Dimethyl phthalate	14.40	<MDL	14.44	<MDL	13.96	<MDL	15.38	<MDL	15.07	<MDL	13.80	<MDL	16.30	<MDL
Fluoranthene	20.94	50.13	21.00	26.25	20.30	24.11	22.38	60.14	21.92	227.4	20.08	80.55	23.70	225.2
Fluorene *	20.94	<MDL	21.00	<MDL	20.30	<MDL	22.38	<MDL	21.92	<MDL	20.08	<MDL	23.70	<MDL
Hexachlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Hexachlorobutadiene	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Hexachlorocyclopentadiene *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Hexachloroethane *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Indeno(1,2,3-*c,d*)Pyrene *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	65.75	33.88	<MDL	40.00	71.11
Isophorone *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
N-Nitroso-di-*n* -propylamine *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
N-Nitrosodimethylamine *	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
N-Nitrosodiphenylamine	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Naphthalene *	56.28	<MDL	56.43	<MDL	54.57	<MDL	60.14	<MDL	58.90	<MDL	53.95	<MDL	63.70	<MDL
Nitrobenzene *	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Pentachlorophenol	35.34	<MDL	35.43	<MDL	34.26	<MDL	37.76	<MDL	36.99	<MDL	33.88	<MDL	40.00	<MDL
Phenanthrene	20.94	35.08	21.00	<MDL	20.30	<MDL	22.38	27.97	21.92	197.3	20.08	49.94	23.70	128.1
Phenol *	144.0	<MDL	144.4	<MDL	139.6	<MDL	153.8	<MDL	150.7	<MDL	138.0	<MDL	163.0	<MDL
Pyrene	20.94	55.10	21.00	31.50	20.30	27.92	22.38	77.20	21.92	238.4	20.08	79.17	23.70	165.9

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
*** Matrix spike or surrogate recovery above acceptance range
[e] Indicates estimated value
na = not analyzed

Table B-7. 1998 Ambient Sediment Monitoring
Semi-volatile Organics (dry weight) (page 1 of 4)

	Station and Sample Date											
	KSPS01 9-Dec-98		LSML01 9-Dec-98		LTDF01 9-Dec-98		LSCI01 9-Dec-98		LSCK01 9-Dec-98		LSCW02 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		70.4		41.2		55.7		32.6		30.6		36.0
Compound (µg/kg):												
1,2,4-Trichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na
1,2-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na
1,2-Diphenylhydrazine	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
1,3-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na
1,4-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na
2,4,5-Trichlorophenol	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
2,4,6-Trichlorophenol	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
2,4-Dichlorophenol *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
2,4-Dimethylphenol *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
2,4-Dinitrophenol *	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
2,4-Dinitrotoluene	15.6	<MDL	26.7	<MDL	19.7	<MDL	33.7	<MDL	35.9	<MDL	30.6	<MDL
2,6-Dinitrotoluene	15.6	<MDL	26.7	<MDL	19.7	<MDL	33.7	<MDL	35.9	<MDL	30.6	<MDL
2-Chloronaphthalene*	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL
2-Chlorophenol *	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
2-Methylnaphthalene *	61.1	<MDL	104.4	<MDL	77.2	<MDL	131.9	<MDL	140.5	<MDL	119.4	<MDL
2-Methylphenol *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
2-Nitroaniline	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
2-Nitrophenol *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
3,3'-Dichlorobenzidine *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
3-Nitroaniline *	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
4,6-Dinitro-o-Cresol *	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
4-Bromophenyl phenyl ether	15.6	<MDL	26.7	<MDL	19.7	<MDL	33.7	<MDL	35.9	<MDL	30.6	<MDL
4-Chloro-3-methylphenol	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
4-Chloroaniline *	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
4-Chlorophenyl phenyl ether	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL
4-Methylphenol *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
4-Nitroaniline *	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
4-Nitrophenol	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
Acenaphthene	15.6	<MDL	26.7	<MDL	19.7	61	33.7	<MDL	35.9	<MDL	30.6	<MDL
Acenaphthylene	22.7	<MDL	38.8	<MDL	28.7	64	49.1	<MDL	52.3	<MDL	44.4	<MDL
Aniline **	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
Anthracene *	22.7	38	38.8	<MDL	28.7	334	49.1	<MDL	52.3	<MDL	44.4	<MDL
Benzidine **	909.1	<MDL	1553.4	<MDL	1149.0	<MDL	1963.2	<MDL	2091.5	<MDL	1777.8	<MDL
Benzo(*a*)anthracene *	22.7	123	38.8	51	28.7	542	49.1	61	52.3	52	44.4	77
Benzo(*a*)pyrene *	38.4	155	65.5	<MDL	48.5	750	82.8	<MDL	88.2	<MDL	75.0	100
Benzo(*b*)fluoranthene	61.1	143	104.4	<MDL	77.2	1038	131.9	<MDL	140.5	<MDL	119.4	131
Benzo(*g,h,i*)perylene *[e]	38.4	97	65.5	148	48.5	363	82.8	209	88.2	<MDL	75.0	75
Benzo(*k*)fluoranthene	61.1	<MDL	104.4	<MDL	77.2	350	131.9	<MDL	140.5	<MDL	119.4	<MDL
Benzoic acid *	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
Benzyl alcohol *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Benzyl butyl phthalate	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL
bis(2-Chloroethoxy)methane *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
bis(2-Chloroethyl)ether *	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL

Table B-7. 1998 Ambient Sediment Monitoring
Semi-volatile Organics (dry weight) (page 2 of 4)

	Station and Sample Date											
	KSPS01 9-Dec-98		LSML01 9-Dec-98		LTDF01 9-Dec-98		LSCI01 9-Dec-98		LSCK01 9-Dec-98		LSCW02 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):												
bis(2-Chloroisopropyl)ether *	75.3	<MDL	128.6	<MDL	95.2	<MDL	162.6	<MDL	173.2	<MDL	147.2	<MDL
bis(2-Ethylhexyl)phthalate [e]	22.7	<MDL	38.8	44	28.7	189	49.1	<MDL	52.3	<MDL	44.4	76
Carbazole	38.4	<MDL	65.5	<MDL	48.5	77	82.8	<MDL	88.2	<MDL	75.0	<MDL
Chrysene	22.7	137	38.8	49	28.7	869	49.1	55	52.3	<MDL	44.4	107
Coprostanol	383.5	<MDL	655.3	<MDL	484.7	<MDL	828.2	<MDL	882.4	<MDL	750.0	<MDL
di-*n* -Butyl phthalate	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
di-*n* -Octyl phthalate	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL
Dibenzo(*a,h*)anthracene *	61.1	<MDL	104.4	<MDL	77.2	110	131.9	<MDL	140.5	<MDL	119.4	<MDL
Dibenzofuran	38.4	<MDL	65.5	<MDL	48.5	56	82.8	<MDL	88.2	<MDL	75.0	<MDL
Diethyl phthalate	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Dimethyl phthalate	15.6	<MDL	26.7	<MDL	19.7	<MDL	33.7	<MDL	35.9	<MDL	30.6	<MDL
Fluoranthene	22.7	281	38.8	78	28.7	901	49.1	100	52.3	69	44.4	147
Fluorene *	22.7	<MDL	38.8	<MDL	28.7	94	49.1	<MDL	52.3	<MDL	44.4	<MDL
Hexachlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na
Hexachlorobutadiene	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Hexachlorocyclopentadiene *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Hexachloroethane *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Indeno(1,2,3-*c,d*)Pyrene *	38.4	95	65.5	<MDL	48.5	406	82.8	<MDL	88.2	<MDL	75.0	75
Isophorone *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
N-Nitroso-di-*n* -propylamine *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
N-Nitrosodimethylamine *	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
N-Nitrosodiphenylamine	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Naphthalene *	61.1	<MDL	104.4	<MDL	77.2	99	131.9	<MDL	140.5	<MDL	119.4	<MDL
Nitrobenzene *	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Pentachlorophenol	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Phenanthrene	22.7	138	38.8	41	28.7	513	49.1	52	52.3	<MDL	44.4	80
Phenol *	156.3	<MDL	267.0	<MDL	197.5	<MDL	337.4	<MDL	359.5	<MDL	305.6	<MDL
Pyrene	22.7	320	38.8	87	28.7	1133	49.1	106	52.3	78	44.4	176

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
*** Matrix spike or surrogate recovery above acceptance range
[e] Indicates estimated value
na = not analyzed

Table B-7. 1998 Ambient Sediment Monitoring
Semi-volatile Organics (dry weight) (page 3 of 4)

	Station and Sample Date							
	LSDZ01 9-Dec-98		LSEZ01 9-Dec-98		LTCA02 9-Dec-98		LTED04 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		32.7		33.8		34.7		35.0
Compound (µg/kg):								
1,2,4-Trichlorobenzene	na	na	na	na	na	na	na	na
1,2-Dichlorobenzene	na	na	na	na	na	na	na	na
1,2-Diphenylhydrazine	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
1,3-Dichlorobenzene	na	na	na	na	na	na	na	na
1,4-Dichlorobenzene	na	na	na	na	na	na	na	na
2,4,5-Trichlorophenol	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
2,4,6-Trichlorophenol	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
2,4-Dichlorophenol *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
2,4-Dimethylphenol *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
2,4-Dinitrophenol *	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
2,4-Dinitrotoluene	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL
2,6-Dinitrotoluene	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL
2-Chloronaphthalene*	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL
2-Chlorophenol *	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
2-Methylnaphthalene *	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL
2-Methylphenol *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
2-Nitroaniline	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
2-Nitrophenol *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
3,3'-Dichlorobenzidine *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
3-Nitroaniline *	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
4,6-Dinitro-o-Cresol *	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
4-Bromophenyl phenyl ether	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL
4-Chloro-3-methylphenol	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
4-Chloroaniline *	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
4-Chlorophenyl phenyl ether	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL
4-Methylphenol *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
4-Nitroaniline *	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
4-Nitrophenol	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
Acenaphthene	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL
Acenaphthylene	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL
Aniline **	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
Anthracene *	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	54
Benzidine **	1957.2	<MDL	1893.5	<MDL	1844.4	<MDL	1828.6	<MDL
Benzo(*a*)anthracene *	48.9	98	47.3	106	46.1	107	45.7	140
Benzo(*a*)pyrene *	82.6	122	79.9	127	77.8	138	77.1	184
Benzo(*b*)fluoranthene	131.5	168	127.2	178	123.9	190	122.9	272
Benzo(*g,h,i*)perylene *[e]	82.6	<MDL	79.9	104	77.8	92	77.1	224
Benzo(*k*)fluoranthene	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL
Benzoic acid *	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
Benzyl alcohol *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Benzyl butyl phthalate	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL
bis(2-Chloroethoxy)methane *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
bis(2-Chloroethyl)ether *	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL

Table B-7. 1998 Ambient Sediment Monitoring
Semi-volatile Organics (dry weight) (page 4 of 4)

	Station and Sample Date							
	LSDZ01 9-Dec-98		LSEZ01 9-Dec-98		LTCA02 9-Dec-98		LTED04 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):								
bis(2-Chloroisopropyl)ether *	162.1	<MDL	156.8	<MDL	152.7	<MDL	151.4	<MDL
bis(2-Ethylhexyl)phthalate [e]	48.9	61	47.3	77	46.1	80	45.7	127
Carbazole	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Chrysene	48.9	136	47.3	130	46.1	135	45.7	175
Coprostanol	825.7	<MDL	798.8	<MDL	778.1	<MDL	771.4	<MDL
di-*n* -Butyl phthalate	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
di-*n* -Octyl phthalate	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL
Dibenzo(*a,h*)anthracene *	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL
Dibenzofuran	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Diethyl phthalate	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Dimethyl phthalate	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL
Fluoranthene	48.9	160	47.3	177	46.1	193	45.7	277
Fluorene *	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL
Hexachlorobenzene	na	na	na	na	na	na	na	na
Hexachlorobutadiene	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Hexachlorocyclopentadiene *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Hexachloroethane *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Indeno(1,2,3-*c,d*)Pyrene *	82.6	83	79.9	83	77.8	95	77.1	143
Isophorone *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
N-Nitroso-di-*n* -propylamine *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
N-Nitrosodimethylamine *	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
N-Nitrosodiphenylamine	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Naphthalene *	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL
Nitrobenzene *	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Pentachlorophenol	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL
Phenanthrene	48.9	82	47.3	88	46.1	93	45.7	128
Phenol *	336.4	<MDL	325.4	<MDL	317.0	<MDL	314.3	<MDL
Pyrene	48.9	168	47.3	217	46.1	197	45.7	275

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
*** Matrix spike or surrogate recovery above acceptance range
[e] Indicates estimated value
na = not analyzed

Table B-8. 1998 Intertidal Sediment Monitoring
Semi-volatile Organics (dry weight) (page 1 of 2)

	Station and Sample Date											
	KSHZ03 17-Aug-98		KSSN04 10-Aug-98		LSKR01 10-Aug-98		JSVW04 10-Aug-98		KSXS02 10-Aug-98		MTEC01 19-Aug-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		94.5		74.7		78.8		82.7		81.0		83.3
Compound (µg/kg):												
1,2,4-Trichlorobenzene	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
1,2-Dichlorobenzene *	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
1,2-Diphenylhydrazine	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
1,3-Dichlorobenzene *	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
1,4-Dichlorobenzene *	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
2,4,5-Trichlorophenol *	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
2,4,6-Trichlorophenol *	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
2,4-Dichlorophenol *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
2,4-Dimethylphenol **	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
2,4-Dinitrophenol *	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
2,4-Dinitrotoluene	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL
2,6-Dinitrotoluene	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL
2-Chloronaphthalene*	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
2-Chlorophenol *	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
2-Methylnaphthalene *	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL
2-Methylphenol *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
2-Nitroaniline	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
2-Nitrophenol *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
3,3'-Dichlorobenzidine	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
3-Nitroaniline *	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
4,6-Dinitro-o-Cresol *	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
4-Bromophenyl phenyl	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL
4-Chloro-3-methylpher	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
4-Chloroaniline **	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
4-Chlorophenyl phenyl	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
4-Methylphenol *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
4-Nitroaniline	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
4-Nitrophenol *	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
Acenaphthene	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL
Acenaphthylene	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Aniline **	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
Anthracene *	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Benzidine **	677.2	<MDL	856.8	<MDL	812.2	<MDL	773.9	<MDL	790.1	<MDL	768.3	<MDL
Benzo(*a*)anthracene *	16.9	<MDL	21.4	36	20.3	24	19.3	<MDL	19.8	<MDL	19.2	<MDL
Benzo(*a*)pyrene *	28.6	<MDL	36.1	40	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Benzo(*b*)fluoranthene	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL
Benzo(*g,h,i*)perylene *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Benzo(*k*)fluoranthene	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL
Benzoic acid *	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
Benzyl alcohol *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Benzyl butyl phthalate	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
bis(2-Chloroethoxy)me	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
bis(2-Chloroethyl)ether	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL

Table B-8. 1998 Intertidal Sediment Monitoring
Semi-volatile Organics (dry weight) (page 2 of 2)

	Station and Sample Date											
	KSHZ03 17-Aug-98		KSSN04 10-Aug-98		LSKR01 10-Aug-98		JSVW04 10-Aug-98		KSXS02 10-Aug-98		MTEC01 19-Aug-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Compound (µg/kg):												
bis(2-Chloroisopropyl)	56.1	<MDL	71.0	<MDL	67.3	<MDL	64.1	<MDL	65.4	<MDL	63.6	<MDL
bis(2-Ethylhexyl)phtha	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Carbazole	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Chrysene	16.9	<MDL	21.4	32	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Coprostanol *	285.7	<MDL	361.4	<MDL	342.6	<MDL	326.5	<MDL	333.3	<MDL	324.1	<MDL
di-*n* -Butyl phthalate	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
di-*n* -Octyl phthalate	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Dibenzo(*a,h*)anthracen	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL
Dibenzofuran	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Diethyl phthalate	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Dimethyl phthalate	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL
Fluoranthene *	16.9	<MDL	21.4	71	20.3	34	19.3	<MDL	19.8	<MDL	19.2	<MDL
Fluorene *	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Hexachlorobenzene	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL
Hexachlorobutadiene *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Hexachlorocyclopentad	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Hexachloroethane *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Indeno(1,2,3-*c,d*)Pyren	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Isophorone *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
N-Nitroso-di-*n* -propyla	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
N-Nitrosodimethylamin	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
N-Nitrosodiphenylamin	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Naphthalene *	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL
Nitrobenzene *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Pentachlorophenol *	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL
Phenanthrene *	16.9	<MDL	21.4	31	20.3	25	19.3	<MDL	19.8	<MDL	19.2	<MDL
Phenol *	116.4	<MDL	147.3	<MDL	139.6	<MDL	133.0	<MDL	135.8	<MDL	132.1	<MDL
Pyrene *	16.9	<MDL	21.4	89	20.3	32	19.3	<MDL	19.8	<MDL	19.2	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
Point source stations are shaded.

Table B-9. 1998 Point Source Sediment Monitoring
Pesticides and PCBs (dry weight) (page 1 of 4)

	Station and Sample Date											
	WP1500N 17-Nov-98		WP1500S 23-Nov-98		WP215N 30-Nov-98		WP215S 30-Nov-98		WP430N 23-Nov-98		WP430S 1-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		73.4		76.6		72.1		75.9		73.4		74.2
Compound (µg/kg):												
4,4'-DDD	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
4,4'-DDE	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
4,4'-DDT	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Aldrin	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
alpha-BHC *	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Aroclor 1016	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
Aroclor 1221	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
Aroclor 1232	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
Aroclor 1242	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
Aroclor 1248	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
Aroclor 1254 *	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
Aroclor 1260	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL
beta-BHC	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Chlordane	9.1	<MDL	8.7	<MDL	9.3	<MDL	8.8	<MDL	9.1	<MDL	9.0	<MDL
delta-BHC	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Dieldrin	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Endosulfan I	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Endosulfan II	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Endosulfan Sulfate	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Endrin	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Endrin Aldehyde **	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
gamma-BHC (Lindane)	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Heptachlor	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Heptachlor Epoxide	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.7	<MDL	1.8	<MDL	1.8	<MDL
Methoxychlor	9.1	<MDL	8.7	<MDL	9.3	<MDL	8.8	<MDL	9.1	<MDL	9.0	<MDL
Toxaphene	17.7	<MDL	17.0	<MDL	18.0	<MDL	17.1	<MDL	17.7	<MDL	17.5	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%

Table B-9. 1998 Point Source Sediment Monitoring
Pesticides and PCBs (dry weight) (page 2 of 4)

	Station and Sample Date											
	WP230P 1-Dec-98		WPD215N 17-Nov-98		WPD215S 18-Nov-98		WPD430N 17-Nov-98		WPD430S 18-Nov-98		WP230D 17-Nov-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		71.3		76.8		75.3		79.1		76.3		76.8
Compound (µg/kg):												
4,4'-DDD	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
4,4'-DDE	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
4,4'-DDT	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Aldrin	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
alpha-BHC	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Aroclor 1016	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
Aroclor 1221	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
Aroclor 1232	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
Aroclor 1242	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
Aroclor 1248	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
Aroclor 1254 *	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
Aroclor 1260	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL
beta-BHC	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Chlordane	9.4	<MDL	8.7	<MDL	8.9	<MDL	8.5	<MDL	8.8	<MDL	8.7	<MDL
delta-BHC	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Dieldrin	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Endosulfan I	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Endosulfan II	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Endosulfan Sulfate	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Endrin	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Endrin Aldehyde **	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
gamma-BHC (Lindane)	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Heptachlor	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Heptachlor Epoxide	1.8	<MDL	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.7	<MDL	1.7	<MDL
Methoxychlor	9.4	<MDL	8.7	<MDL	8.9	<MDL	8.5	<MDL	8.8	<MDL	8.7	<MDL
Toxaphene	18.2	<MDL	16.9	<MDL	17.3	<MDL	16.4	<MDL	17.0	<MDL	16.9	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%

Table B-9. 1998 Point Source Sediment Monitoring Pesticides and PCBs (dry weight) (page 3 of 4)

	Station and Sample Date			
	WP430N 5-Mar-99		WP230P 5-Mar-99	
	MDL	Value	MDL	Value
Total Solids (%)		79.6		71.3
Compound (µg/kg):				
4,4'-DDD	1.6	<MDL	1.8	<MDL
4,4'-DDE	1.6	<MDL	1.8	<MDL
4,4'-DDT	1.6	<MDL	1.8	<MDL
Aldrin	1.6	<MDL	1.8	<MDL
alpha-BHC	1.6	<MDL	1.8	<MDL
Aroclor 1016	16.3	<MDL	18.2	<MDL
Aroclor 1221	16.3	<MDL	18.2	<MDL
Aroclor 1232	16.3	<MDL	18.2	<MDL
Aroclor 1242	16.3	<MDL	18.2	<MDL
Aroclor 1248	16.3	<MDL	18.2	19.6
Aroclor 1254	16.3	<MDL	18.2	23.8
Aroclor 1260	16.3	<MDL	18.2	<MDL
beta-BHC	1.6	<MDL	1.8	<MDL
Chlordane	8.4	<MDL	9.4	<MDL
delta-BHC	1.6	<MDL	1.8	<MDL
Dieldrin	1.6	<MDL	1.8	<MDL
Endosulfan I	1.6	<MDL	1.8	<MDL
Endosulfan II	1.6	<MDL	1.8	<MDL
Endosulfan Sulfate	1.6	<MDL	1.8	<MDL
Endrin	1.6	<MDL	1.8	<MDL
Endrin Aldehyde	1.6	<MDL	1.8	<MDL
gamma-BHC (Lindane)	1.6	<MDL	1.8	<MDL
Heptachlor	1.6	<MDL	1.8	<MDL
Heptachlor Epoxide	1.6	<MDL	1.8	<MDL
Methoxychlor	8.4	<MDL	9.4	<MDL
Toxaphene	16.3	<MDL	18.2	<MDL

MDL= method detection limit

Table B-9. 1998 Point Source Sediment Monitoring
Pesticides and PCBs (dry weight) (page 4 of 4)

	Station and Sample Date													
	CP245/W310 9-Dec-98		CP246/W312 9-Dec-98		CP246/W315 9-Dec-98		CP246/W319 9-Dec-98		CP248/W308 9-Dec-98		KSIV01 9-Dec-98		LTBC41 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		76.4		76.2		78.8		71.5		73.0		79.7		67.5
Compound (µg/kg):														
4,4'-DDD	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
4,4'-DDE *	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
4,4'-DDT	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Aldrin	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
alpha-BHC	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Aroclor 1016	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL
Aroclor 1221	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL
Aroclor 1232	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL
Aroclor 1242	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL
Aroclor 1248	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL
Aroclor 1254 *	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL
Aroclor 1260	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	101.4	17.8	<MDL	16.3	<MDL	19.3	<MDL
beta-BHC	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Chlordane	8.8	<MDL	8.8	<MDL	8.5	<MDL	9.4	<MDL	9.2	<MDL	8.4	<MDL	9.9	<MDL
delta-BHC	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Dieldrin	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Endosulfan I	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Endosulfan II	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Endosulfan Sulfate	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Endrin	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Endrin Aldehyde **	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
gamma-BHC (Lindane)	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Heptachlor	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Heptachlor Epoxide	1.7	<MDL	1.7	<MDL	1.6	<MDL	1.8	<MDL	1.8	<MDL	1.6	<MDL	1.9	<MDL
Methoxychlor	8.8	<MDL	8.8	<MDL	8.5	<MDL	9.4	<MDL	9.2	<MDL	8.4	<MDL	9.9	<MDL
Toxaphene	17.0	<MDL	17.1	<MDL	16.5	<MDL	18.2	<MDL	17.8	<MDL	16.3	<MDL	19.3	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%

Table B-10. 1998 Ambient Sediment Monitoring
Pesticides and PCBs (dry weight) (page 1 of 2)

	Station and Sample Date											
	KSPS01 9-Dec-98		LSML01 9-Dec-98		LTDF01 9-Dec-98		LSCI01 9-Dec-98		LSCK01 9-Dec-98		LSCW02 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		70.4		41.2		55.7		32.6		30.6		36.0
Compound (µg/kg):												
4,4'-DDD	1.8	<MDL	3.2	<MDL	2.3	5.2	4.0	<MDL	4.2	<MDL	3.6	<MDL
4,4'-DDE *	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
4,4'-DDT	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Aldrin	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
alpha-BHC	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Aroclor 1016	18.5	<MDL	31.6	<MDL	23.3	<MDL	39.9	<MDL	42.5	<MDL	36.1	<MDL
Aroclor 1221	18.5	<MDL	31.6	<MDL	23.3	<MDL	39.9	<MDL	42.5	<MDL	36.1	<MDL
Aroclor 1232	18.5	<MDL	31.6	<MDL	23.3	<MDL	39.9	<MDL	42.5	<MDL	36.1	<MDL
Aroclor 1242	18.5	<MDL	31.6	<MDL	23.3	<MDL	39.9	<MDL	42.5	<MDL	36.1	<MDL
Aroclor 1248	18.5	<MDL	31.6	<MDL	23.3	48.7	39.9	<MDL	42.5	<MDL	36.1	<MDL
Aroclor 1254 *	18.5	<MDL	31.6	<MDL	23.3	59.2	39.9	<MDL	42.5	<MDL	36.1	<MDL
Aroclor 1260	18.5	<MDL	31.6	<MDL	23.3	188.5	39.9	<MDL	42.5	<MDL	36.1	<MDL
beta-BHC	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Chlordane	9.5	<MDL	16.3	<MDL	12.0	<MDL	20.6	<MDL	21.9	<MDL	18.6	<MDL
delta-BHC	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Dieldrin	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Endosulfan I	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Endosulfan II	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Endosulfan Sulfate	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Endrin	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Endrin Aldehyde **	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
gamma-BHC (Lindane)	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Heptachlor	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Heptachlor Epoxide	1.8	<MDL	3.2	<MDL	2.3	<MDL	4.0	<MDL	4.2	<MDL	3.6	<MDL
Methoxychlor	9.5	<MDL	16.3	<MDL	12.0	<MDL	20.6	<MDL	21.9	<MDL	18.6	<MDL
Toxaphene	18.5	<MDL	31.6	<MDL	23.3	<MDL	39.9	<MDL	42.5	<MDL	36.1	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%

Table B-10. 1998 Ambient Sediment Monitoring Pesticides and PCBs (dry weight) (page 2 of 2)

	Station and Sample Date							
	LSDZ01 9-Dec-98		LSEZ01 9-Dec-98		LTCA02 9-Dec-98		LTED04 9-Dec-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		32.7		33.8		34.7		35.0
Compound (µg/kg):								
4,4'-DDD	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
4,4'-DDE *	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
4,4'-DDT	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Aldrin	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
alpha-BHC	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Aroclor 1016	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	<MDL
Aroclor 1221	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	<MDL
Aroclor 1232	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	<MDL
Aroclor 1242	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	<MDL
Aroclor 1248	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	<MDL
Aroclor 1254 *	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	48.6
Aroclor 1260	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	139.4
beta-BHC	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Chlordane	20.5	<MDL	19.8	<MDL	19.3	<MDL	19.1	<MDL
delta-BHC	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Dieldrin	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Endosulfan I	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Endosulfan II	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Endosulfan Sulfate	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Endrin	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Endrin Aldehyde **	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
gamma-BHC (Lindane)	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Heptachlor	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Heptachlor Epoxide	4.0	<MDL	3.8	<MDL	3.7	<MDL	3.7	<MDL
Methoxychlor	20.5	<MDL	19.8	<MDL	19.3	<MDL	19.1	<MDL
Toxaphene	39.8	<MDL	38.5	<MDL	37.5	<MDL	37.1	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%

Table B-11. 1998 Intertidal Sediment Monitoring
Pesticides and PCBs (dry weight) (page 1 of 1)

	Station and Sample Date											
	KSHZ03 17-Aug-98		KSSN04 10-Aug-98		LSKR01 10-Aug-98		JSVW04 10-Aug-98		KSXS02 10-Aug-98		MTEC01 19-Aug-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		94.5		74.7		78.8		82.7		81.0		83.3
Compound (µg/kg):												
4,4'-DDD *	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
4,4'-DDE *	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
4,4'-DDT	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Aldrin	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
alpha-BHC *	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Aroclor 1016	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
Aroclor 1221	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
Aroclor 1232	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
Aroclor 1242	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
Aroclor 1248	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
Aroclor 1254 *	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
Aroclor 1260	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL
beta-BHC	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Chlordane	7.1	<MDL	9.0	<MDL	8.5	<MDL	8.1	<MDL	8.3	<MDL	8.0	<MDL
delta-BHC	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Dieldrin	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Endosulfan I	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Endosulfan II	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Endosulfan Sulfate	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Endrin	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Endrin Aldehyde **	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
gamma-BHC (Lindane)	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Heptachlor	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Heptachlor Epoxide	1.4	<MDL	1.7	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL	1.6	<MDL
Methoxychlor	7.1	<MDL	9.0	<MDL	8.5	<MDL	8.1	<MDL	8.3	<MDL	8.0	<MDL
Toxaphene	13.8	<MDL	17.4	<MDL	16.5	<MDL	15.7	<MDL	16.0	<MDL	15.6	<MDL

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range
** Matrix spike or surrogate recovery <10%
Point source stations are shaded.

Table B-12. 1998 Offshore Sediment Monitoring
Organotins (dry weight) (page 1 of 1)

Station	Sample Date	Total Solids (%)	Mono-n-butyltin (µg/kg)		Di-n-butyltin (µg/kg)		Tri-n-butyltin (µg/kg)		Tetra-n-butyltin (µg/kg)		Total butyltin (µg/kg)	
			MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
WP1500N	17-Nov-98	73.4	2.3	<MDL [a]	0.5	0.5 [b]	0.3	0.6 [d]	0.5	<MDL [a]		1.1 [a,b,d]
WP1500S	23-Nov-98	76.6	2.2	3.4	0.5	2.7 [c]	0.3	0.9 [e]	0.5	<MDL		7.0 [c,e]
WP215N	30-Nov-98	72.1	2.4	5.4	0.5	<MDL [c]	0.3	<MDL [e]	0.6	<MDL		5.4 [c,e]
WP215S	30-Nov-98	75.9	2.2	2.8	0.5	<MDL [c]	0.3	<MDL [e]	0.5	<MDL		2.8 [c,e]
WP430N	23-Nov-98	73.4	2.3	2.6	0.5	3.5 [c]	0.3	2.4 [e]	0.5	<MDL		8.5 [c,e]
WP430S	1-Dec-98	74.2	2.3	6.1	0.5	<MDL [c]	0.3	<MDL [e]	0.5	<MDL		6.1 [c,e]
WP230P	1-Dec-98	71.3	2.4	5.5	0.5	1.9 [c]	0.3	1.0 [e]	0.6	<MDL		8.4 [c,e]
WPD215N	17-Nov-98	76.8	2.2	<MDL	0.5	1.2 [c]	0.3	<MDL [e]	0.5	<MDL		1.2 [c,e]
WPD215S	18-Nov-98	75.3	2.3	<MDL	0.5	<MDL [c]	0.3	<MDL [e]	0.5	<MDL	2.3	<MDL [c,e]
WPD430N	17-Nov-98	79.1	2.1	<MDL	0.4	<MDL [c]	0.3	<MDL [e]	0.5	<MDL	2.1	<MDL [c,e]
WPD430S	18-Nov-98	76.3	2.2	<MDL	0.5	1.2 [c]	0.3	<MDL [e]	0.5	<MDL	2.2	<MDL [c,e]
WP230D	17-Nov-98	76.8	2.2	<MDL	0.5	<MDL [c]	0.3	<MDL [e]	0.5	<MDL	2.2	<MDL [c,e]
CP245/W310	9-Dec-98	76.4	2.2	<MDL	0.5	<MDL [a]	0.3	<MDL	0.5	<MDL	2.2	<MDL [a]
CP246/W312	9-Dec-98	76.2	2.2	<MDL	0.5	<MDL [a]	0.3	<MDL	0.5	<MDL	2.2	<MDL [a]
CP246/W315	9-Dec-98	78.8	2.2	<MDL	0.4	<MDL [a]	0.3	<MDL	0.5	<MDL	2.2	<MDL [a]
CP246/W319	9-Dec-98	71.5	2.4	<MDL	0.5	<MDL [a]	0.3	0.6	0.6	<MDL		0.6 [a]
CP248/W308	9-Dec-98	73.0	2.3	<MDL	0.5	<MDL [a]	0.3	<MDL	0.5	<MDL	2.3	<MDL [a]
KSIV01	9-Dec-98	79.7	2.1	<MDL	0.4	<MDL [a]	0.3	<MDL	0.5	<MDL	2.1	<MDL [a]
LTBC41	9-Dec-98	67.5	2.5	16	0.5	37 [a]	0.3	228	0.6	<MDL		281.9 [a]
KSPS01	9-Dec-98	70.4	2.4	<MDL	0.5	<MDL [a]	0.3	1.6	0.6	<MDL		1.6 [a]
LSML01	9-Dec-98	41.2	4.1	6.3	0.8	2.2 [a]	0.5	1.2	1.0	<MDL		9.7 [a]
LTDF01	9-Dec-98	55.7	3.1	26.8	0.6	36.8 [a]	0.4	72.2	0.7	2.5		138.3 [a]
LSCI01	9-Dec-98	32.6	5.2	8.9	1.1	2.7 [a]	0.6	1.9	1.2	<MDL		13.5 [a]
LSCK01	9-Dec-98	30.6	5.6	9.2	1.1	2.9 [a]	0.7	2.6	1.3	<MDL		14.7 [a]
LSCW02	9-Dec-98	36.0	4.7	8.6	1.0	7.6 [a]	0.6	8.0	1.1	<MDL		24.2 [a]
LSDZ01	9-Dec-98	32.7	5.2	20.9	1.1	31.5 [a]	0.6	25.0	1.2	<MDL		77.3 [a]
LSEZ01	9-Dec-98	33.8	5.0	13.5	1.0	13.0 [a]	0.6	16.9	1.2	<MDL		43.4 [a]
LTCA02	9-Dec-98	34.7	4.9	13.5	1.0	12.8 [a]	0.6	18.3	1.2	<MDL		44.6 [a]
LTED04	9-Dec-98	35.0	4.9	20.0	1.0	23.9 [a]	0.6	57.7	1.1	<MDL		101.7 [a]

MDL = method detection limit

[a] Matrix spike or SRM recovery below acceptance range.

[b] Blank contamination and estimated value.

[c] Blank contamination, estimated value, and matrix spike or SRM above acceptance range.

[d] Matrix spike or SRM recovery below and above acceptance range.

[e] Matrix spike or SRM recovery above acceptance range.

Table B-13. 1998 Offshore Point Source Sediment Monitoring Comparison With Standards--Dry Weights (page 1 of 4)

Station:	WP1500N		WP1500S		WP215N		WP215S		WP430N		WP430S			
Date:	17-Nov-98		23-Nov-98		30-Nov-98		30-Nov-98		23-Nov-98		1-Dec-98		Sediment	Lowest
% Solids:	73.4		76.6		72.1		75.9		73.4		74.2		Quality	Apparent Effects
TOC (mg/kg dry wt.)	1717		5353		2746		2740		3597		2776		Standards	Threshold
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value		
Metals (mg/kg dry wt.)														
Arsenic	3.3	<MDL		5.0	3.5	<MDL		4.2		4.1		4.6	57	--
Cadmium	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	5.1	--
Chromium		19.9		26.6		18.9		31.8		21.0		19.1	260	--
Copper		7.1		12.8		10.0		8.4		9.3		7.7	390	--
Lead		3.8		8.6		9.6		11.0		11.9		10.1	450	--
Mercury	0.03	<MDL		0.06		0.06		0.03		0.04		0.04	0.41	--
Silver	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	6.1	--
Zinc		26.0		36.0		33.1		30.4		32.4		31.5	410	--
Nonionizable Organic Compounds (µg/kg dry wt.)														
2–Methylnaphthalene	58.6	<MDL	56.1	<MDL	59.6	<MDL	56.7	<MDL	58.6	<MDL	58.0	<MDL	--	670
Acenaphthylene	21.8	<MDL	20.9	<MDL		26.4	21.1	<MDL		54.4	21.6	<MDL	--	1300
Acenapthene	15.0	<MDL	14.4	<MDL		18.0	14.5	<MDL		166.2	14.8	<MDL	--	500
Anthracene [a]	21.8	<MDL	20.9	<MDL		91.4		35.3		248.0	21.6	<MDL	--	960
Fluorene [a]	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL		94.7	21.6	<MDL	--	540
Naphthalene [a]	58.6	<MDL	56.1	<MDL	59.6	<MDL	56.7	<MDL	58.6	<MDL	58.0	<MDL	--	2100
Phenanthrene [a]	21.8	<MDL		41.3		298.2		77.6		1010.9	21.6	<MDL	--	1500
Total LPAHs	58.6	<MDL		41.3		434.0		112.9		1574.1	58.0	<MDL	--	5200
Benzo (*a*) anthracene [a]		30.0		56.3		221.9		126.4		400.5		63.1	--	1300
Benzo (*a*) pyrene [a]	36.8	<MDL		81.5		338.4		150.2		637.6		72.0	--	1600
Benzo (*g,h,i*) perylene [a]	36.8	<MDL		66.6		262.1		103.6		451.0		39.1	--	670
Chrysene [b]	21.8	<MDL		69.8		264.9		131.0		491.8		57.3	--	1400
Dibenzo (*a,h*) anthracene [a]	58.6	<MDL	56.1	<MDL	59.6	<MDL	56.7	<MDL		64.0	58.0	<MDL	--	230
Fluoranthene		30.0		97.0		479.9		220.0		1133.5		44.9	--	1700
Indeno (1,2,3-*c,d*) pyrene [a]	36.8	<MDL		64.0		208.0		92.4		408.7		43.1	--	600
Pyrene		43.2		119.5		531.2		226.6		1158.0		55.4	--	2600
Total benzofluoranthenes	58.6	<MDL		67.9		385.6		200.3		718.0		82.2	--	3200
Total HPAHs		103.1		622.5		2692.1		1250.3		5463.2		457.0	--	12000
1,2,4–Trichlorobenzene [a]	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL	--	31
1,2–Dichlorobenzene [a]	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL	--	35
1,4–Dichlorobenzene [a]	0.94	<MDL	0.90	<MDL		1.3	0.91	<MDL		0.9		1.0	--	110
Bis (2-ethylhexyl) phthalate	21.8	<MDL		23.5		26.4		26.4		215.3	21.6	<MDL	--	1300
Butyl benzyl phthalate	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL	--	63
Di–*n*–butyl phthalate	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL	--	1400
Di–*n*–octyl phthalate	21.8	<MDL	20.9	<MDL	22.2	<MDL	21.1	<MDL	21.8	<MDL	21.6	<MDL	--	6200
Dibenzofuran	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL	--	540
Diethyl phthalate	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	<MDL	--	200
Dimethyl phthalate	15.0	<MDL	14.4	<MDL	15.3	<MDL	14.5	<MDL	15.0	<MDL	14.8	<MDL	--	71
Hexachlorobenzene [a]	0.94	<MDL	0.90	<MDL	0.96	<MDL	0.91	<MDL	0.94	<MDL	0.93	<MDL	--	22
Hexachlorobutadiene	* 36.8	<MDL	* 35.3	<MDL	* 37.5	<MDL	* 35.6	<MDL	* 36.8	<MDL	* 36.4	<MDL	--	11
N–nitrosodiphenylamine	* 36.8	<MDL	* 35.3	<MDL	* 37.5	<MDL	* 35.6	<MDL	* 36.8	<MDL	* 36.4	<MDL	--	28
Total PCBs	18	<MDL	17	<MDL	18	<MDL	17	<MDL	18	<MDL	18	<MDL	--	130
Ionizable Organic Compounds (µg/kg dry wt.)														
2,4–dimethylphenol [a]	** 36.8	< MDL	** 35.3	< MDL	** 37.5	< MDL	** 35.6	< MDL	** 36.8	< MDL	** 36.4	< MDL	29	--
2–methylphenol	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	< MDL	63	--
4–methylphenol	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	< MDL	670	--
Benzoic acid	149.9	< MDL	143.6	< MDL	152.6	< MDL	144.9	< MDL	149.9	< MDL	148.3	< MDL	650	--
Benzyl alcohol	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	< MDL	57	--
Pentachlorophenol	36.8	<MDL	35.3	<MDL	37.5	<MDL	35.6	<MDL	36.8	<MDL	36.4	< MDL	360	--
Phenol	149.9	< MDL	143.6	< MDL	152.6	< MDL	144.9	< MDL	149.9	< MDL	148.3	< MDL	420	--

* = Parameter exceeds LAET

** = Parameter exceeds SQS

[a] Matrix spike or SRM recovery below acceptance range

[b] Matrix spike or SRM recovery above acceptance range

Table B-13. 1998 Offshore Point Source Sediment Monitoring
Comparison With Standards--Dry Weights (page 2 of 4)

Station:	WP230P		WPD215N		WPD215S		WPD430N		WPD430S		WP230D			
Date:	1-Dec-98		17-Nov-98		18-Nov-98		17-Nov-98		18-Nov-98		17-Nov-98		Sediment	Lowest
% Solids:	71.3		76.8		75.3		79.1		76.3		76.8		Quality	Apparent Effects
TOC (mg/kg dry wt.)	5526		1784		2364		754		3879		930		Standards	Threshold
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value		
Metals (mg/kg dry wt.)														
Arsenic		5.8		4.9	3.3	<MDL		3.4		4.7	3.1	<MDL	57	--
Cadmium	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	5.1	--
Chromium		20.9		16.8		21.9		20.9		19.8		15.2	260	--
Copper		12.6		6.5		7.3		5.9		10.1		5.1	390	--
Lead		11.9		7.3		7.8		5.2		10.4		2.1	450	--
Mercury		0.1	0.03	<MDL	0.03	<MDL	0.02	<MDL		0.03	0.02	<MDL	0.41	--
Silver	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.2	<MDL	6.1	--
Zinc		40.0		26.0		46.3		25.4		37.7		21.1	410	--
Nonionizable Organic Compounds (µg/kg dry wt.)														
2–Methylnaphthalene	60.3	<MDL	56.0	<MDL	57.1	<MDL	54.4	<MDL	56.4	<MDL	56.0	<MDL	--	670
Acenaphthylene		45.2	20.8	<MDL	21.3	26.4	20.2	<MDL	21.0	<MDL	20.8	<MDL	--	1300
Acenapthene	15.4	<MDL	14.4	<MDL	14.6	<MDL	13.9	<MDL	14.4	<MDL	14.3	<MDL	--	500
Anthracene [a]		66.8	20.8	<MDL	21.3	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL	--	960
Fluorene [a]	22.4	<MDL	20.8	<MDL	21.3	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL	--	540
Naphthalene [a]	60.3	<MDL	56.0	<MDL	57.1	<MDL	54.4	<MDL	56.4	<MDL	56.0	<MDL	--	2100
Phenanthrene [a]		246.8	20.8	<MDL	21.3	<MDL	20.2	<MDL		40.6	20.8	<MDL	--	1500
Total LPAHs		358.8	56.0	<MDL		26.4	54.4	<MDL		40.6	56.0	<MDL	--	5200
Benzo (*a*) anthracene [a]		329.6	20.8	<MDL		30.5		22.8		50.1	20.8	<MDL	--	1300
Benzo (*a*) pyrene [a]		531.6	35.2	<MDL	35.9	<MDL	34.1	<MDL		51.1	35.2	<MDL	--	1600
Benzo (*g,h,i*) perylene [a]		336.6	35.2	<MDL	35.9	<MDL	34.1	<MDL		40.6	35.2	<MDL	--	670
Chrysene [b]		384.3	20.8	<MDL	21.3	<MDL	20.2	<MDL		59.1	20.8	<MDL	--	1400
Dibenzo (*a,h*) anthracene [a]	60.3	<MDL	56.0	<MDL	57.1	<MDL	54.4	<MDL	56.4	<MDL	56.0	<MDL	--	230
Fluoranthene		629.7	20.8	<MDL		39.8		25.3		59.1	20.8	<MDL	--	1700
Indeno (1,2,3-*c,d*) pyrene [a]		374.5	35.2	<MDL	35.9	<MDL	34.1	<MDL		38.0	35.2	<MDL	--	600
Pyrene		716.7		30.0		54.5		33.9		89.0	20.8	<MDL	--	2600
Total benzofluoranthenes		635.3	56.0	<MDL	57.1	<MDL	54.4	<MDL	54.4	<MDL	56.0	<MDL	--	3200
Total HPAHs		3938.3		30.0		124.8		81.9		387.0	56.0	<MDL	--	12000
1,2,4–Trichlorobenzene [a]	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL	--	31
1,2–Dichlorobenzene [a]	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL	--	35
1,4–Dichlorobenzene [a]		1.4	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL	--	110
Bis (2-ethylhexyl) phthalate		33.7	20.8	<MDL		34.5	20.2	<MDL		40.0	20.8	<MDL	--	1300
Butyl benzyl phthalate	22.4	<MDL	20.8	<MDL	21.3	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL	--	63
Di–*n*–butyl phthalate		44.9	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL	--	1400
Di–*n*–octyl phthalate	22.4	<MDL	20.8	<MDL	21.3	<MDL	20.2	<MDL	21.0	<MDL	20.8	<MDL	--	6200
Dibenzofuran	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL	--	540
Diethyl phthalate	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	<MDL	--	200
Dimethyl phthalate	15.4	<MDL	14.3	<MDL	14.6	<MDL	13.9	<MDL	14.4	<MDL	14.3	<MDL	--	71
Hexachlorobenzene [a]	0.97	<MDL	0.90	<MDL	0.92	<MDL	0.87	<MDL	0.90	<MDL	0.90	<MDL	--	22
Hexachlorobutadiene	* 37.9	<MDL	* 35.2	<MDL	* 35.9	<MDL	* 34.1	<MDL	* 35.4	<MDL	* 35.2	<MDL	--	11
N–nitrosodiphenylamine	* 37.9	<MDL	* 35.2	<MDL	* 35.9	<MDL	* 34.1	<MDL	* 35.4	<MDL	* 35.2	<MDL	--	28
Total PCBs	18	<MDL	17	<MDL	17	<MDL	16	<MDL	17	<MDL	17	<MDL	--	130
Ionizable Organic Compounds (µg/kg dry wt.)														
2,4–dimethylphenol [a]	** 37.9	< MDL	** 35.2	< MDL	** 35.9	< MDL	** 34.1	< MDL	** 35.4	< MDL	** 35.2	< MDL	29	--
2–methylphenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	< MDL	63	--
4–methylphenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	< MDL	670	--
Benzoic acid	154.3	< MDL	143.2	< MDL	146.1	< MDL	139.1	< MDL	144.2	< MDL	143.2	< MDL	650	--
Benzyl alcohol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	< MDL	57	--
Pentachlorophenol	37.9	<MDL	35.2	<MDL	35.9	<MDL	34.1	<MDL	35.4	<MDL	35.2	< MDL	360	--
Phenol	154.3	< MDL	143.2	< MDL	146.1	< MDL	139.1	< MDL	144.2	< MDL	143.2	< MDL	420	--

* = Parameter exceeds LAET

** = Parameter exceeds SQS

[a] Matrix spike or SRM recovery below acceptance range

[b] Matrix spike or SRM recovery above acceptance range

Table B-13. 1998 Offshore Point Source Sediment Monitoring Comparison With Standards--Dry Weights (page 3 of 4)

Station:	WP430N			WP230P			WP230P				
Date:	5-Mar-99			5-Mar-99			5-Mar-99 (re-analysis)			Sediment Quality Standards	Lowest Apparent Effects Threshold
% Solids:	79.6			71.3			71.3				
TOC (mg/kg dry wt.)	1221			4544			4544				
	MDL		Value	MDL		Value	MDL		Value		
Metals (mg/kg dry wt.)											
Arsenic		3.0	<MDL		3.4	<MDL			--	57	--
Cadmium		0.2	<MDL		0.2	<MDL			--	5.1	--
Chromium			17.8			19.6			--	260	--
Copper			7.6			15.7			--	390	--
Lead			8.5			14.3			--	450	--
Mercury			0.03			0.10			--	0.41	--
Silver		0.2	<MDL		0.3	<MDL			--	6.1	--
Zinc			27.6			39.4			--	410	--
Nonionizable Organic Compounds (µg/kg dry wt.)											
2–Methylnaphthalene [a]		54.0	<MDL			73.0		60.0	<MDL	--	670
Acenaphthylene [c]		20.1	<MDL			457.2		22.4	<MDL	--	1300
Acenapthene [a]		13.8	<MDL			55.4		15.4	<MDL	--	500
Anthracene [c]		20.1	<MDL			734.9			51.3	--	960
Fluorene [a]		20.1	<MDL			253.9		22.4	<MDL	--	540
Naphthalene [a]		54.0	<MDL		60.0	<MDL		60.0	<MDL	--	2100
Phenanthrene [c]		20.1	<MDL	*		2692.8			228.6	--	1500
Total LPAHs [c]		54.0	<MDL			4194.2			279.9	--	5200
Benzo (*a*) anthracene [c]		20.1	<MDL			1072.9			209.0	--	1300
Benzo (*a*) pyrene [c]		33.9	<MDL	*		1626.9			297.3	--	1600
Benzo (*g,h,i*) perylene [c]		33.9	<MDL	*		1087.0			224.4	--	670
Chrysene [c]		20.1	<MDL			1234.2			235.6	--	1400
Dibenzo (*a,h*) anthracene [c]		54.0	<MDL			168.3		60.3	<MDL	--	230
Fluoranthene [c]		20.1	<MDL	*		2454.4			385.7	--	1700
Indeno (1,2,3-*c,d*) pyrene [c]		33.9	<MDL	*		1173.9			210.4	--	600
Pyrene [c]			23.9	*		3085.6			535.8	--	2600
Total benzofluoranthenes [c]		54.0	<MDL			1803.6			364.6	--	3200
Total HPAHs [c]			23.9	*		13706.8			2462.8	--	12000
1,2,4–Trichlorobenzene		0.87	<MDL		0.97	<MDL		22.4	<MDL	--	31
1,2–Dichlorobenzene		0.87	<MDL		0.97	<MDL		22.4	<MDL	--	35
1,4–Dichlorobenzene		0.87	<MDL		0.97	<MDL		22.4	<MDL	--	110
Bis (2-ethylhexyl) phthalate [d]			71.0			118.2			49.9	--	1300
Butyl benzyl phthalate [a]		20.1	<MDL		22.4	<MDL		22.4	<MDL	--	63
Di–*n*–butyl phthalate [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	--	1400
Di–*n*–octyl phthalate [a]		20.1	<MDL		22.4	<MDL		22.4	<MDL	--	6200
Dibenzofuran [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	--	540
Diethyl phthalate [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	--	200
Dimethyl phthalate [a]		13.8	<MDL		15.4	<MDL		15.4	<MDL	--	71
Hexachlorobenzene		0.87	<MDL		0.97	<MDL	*	22.4	<MDL	--	22
Hexachlorobutadiene [a]	*	33.9	<MDL	*	37.9	<MDL	*	37.9	<MDL	--	11
N–nitrosodiphenylamine [a]	*	33.9	<MDL	*	37.9	<MDL	*	37.9	<MDL	--	28
Total PCBs		16	<MDL			43.4			--	--	130
Ionizable Organic Compounds (µg/kg dry wt.)											
2,4–dimethylphenol [a]	**	33.9	< MDL	**	37.9	< MDL	**	37.9	< MDL	29	--
2–methylphenol [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	63	--
4–methylphenol [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	670	--
Benzoic acid [a]		138.0	< MDL		154.0	< MDL			168	650	--
Benzyl alcohol [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	57	--
Pentachlorophenol [a]		33.9	<MDL		37.9	<MDL		37.9	<MDL	360	--
Phenol [a]		138.0	< MDL		154.0	< MDL		154.0	< MDL	420	--

* = Parameter exceeds LAET

** = Parameter exceeds SQS

[a] Matrix spike or SRM recovery below acceptance range

[b] Matrix spike or SRM recovery above acceptance range

[c] Estimated value for WP230P, 5-Mar-99 only

[d] Blank contamination

Table B-13. 1998 Offshore Point Source Sediment Monitoring Comparison With Standards--Dry Weights (page 4 of 4)

Station:	CP245/W310		CP246/W312		CP246/W315		CP246/W319		CP248/W308		KSIV01		LTBC41		
Date:	9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		Sediment
% Solids:	76.4		76.2		78.8		71.5		73.0		79.7		67.5		Quality
TOC (mg/kg dry wt.)	2094		1732		2284		3440		1685		1694		4430		Standards
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	
Metals (mg/kg dry wt.)															
Arsenic	3.3	<MDL	3.3	<MDL		3.6	3.4	<MDL	3.3	<MDL		3.5		4.9	57
Cadmium	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL		0.2	5.1
Chromium		15.1		15.6		17.0		21.0		14.9		21.2		22.4	260
Copper		4.8		4.4		5.0		6.8		4.5		5.6		17.9	390
Lead		3.3		5.5		4.7		4.8		4.4		6.9		12.5	450
Mercury	0.03	<MDL	0.02	<MDL		0.03		0.03	0.03	<MDL	0.02	<MDL		0.08	0.41
Silver	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL	0.3	<MDL		0.3	6.1
Zinc		20.5		21.4		24.0		27.8		19.5		27.1		32.3	410
Nonionizable Organic Compounds (µg/kg dry wt.)															
2–Methylnaphthalene ^	56.3	<MDL	56.4	<MDL	54.6	<MDL	60.1	<MDL	58.9	<MDL	54.0	<MDL	63.7	<MDL	--
Acenaphthylene	20.9	<MDL	21.0	<MDL	20.3	<MDL	22.4	<MDL	21.9	<MDL	20.1	<MDL	23.7	<MDL	--
Acenapthene	14.4	<MDL	14.4	<MDL	14.0	<MDL	15.4	<MDL	15.1	<MDL	13.8	<MDL	16.3	<MDL	--
Anthracene ^	20.9	<MDL	21.0	<MDL	20.3	<MDL	22.4	<MDL		31.5	20.1	<MDL		42.2	--
Fluorene ^	20.9	<MDL	21.0	<MDL	20.3	<MDL	22.4	<MDL	21.9	<MDL	20.1	<MDL	23.7	<MDL	--
Naphthalene ^	56.3	<MDL	56.4	<MDL	54.6	<MDL	60.1	<MDL	58.9	<MDL	54.0	<MDL	63.7	<MDL	--
Phenanthrene		35.1	21.0	<MDL	20.3	<MDL		28.0		197.3		49.9		128.1	--
Total LPAHs ^		35.1	56.4	<MDL		0.0		28.0		228.8		49.9		128.1	--
Benzo (*a*) anthracene ^		30.1	21.0	<MDL		20.3		36.4		88.0		43.2		95.6	--
Benzo (*a*) pyrene ^	35.3	<MDL	35.4	<MDL	34.3	<MDL		47.6		100.1		38.9		117.2	--
Benzo (*g,h,i*) perylene ^		38.0		44.6	34.3	<MDL	37.8	<MDL		114.5	33.9	<MDL		80.3	--
Chrysene		28.8	21.0	<MDL	20.3	<MDL		38.2		87.8		38.5		128.6	--
Dibenzo (*a,h*) anthracene ^	56.3	<MDL	56.4	<MDL	54.6	<MDL	60.1	<MDL	58.9	64.0	54.0	<MDL	63.7	<MDL	--
Fluoranthene		50.1		26.3		24.1		60.1		227.4		80.6		225.2	--
Indeno (1,2,3-*c,d*) pyrene ^	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL		71.1	--
Pyrene		55.1		31.5		27.9		77.2		238.4		79.2		165.9	--
Total benzofluoranthenes	56.3	<MDL	56.4	<MDL	54.6	<MDL	60.1	<MDL		80.8	54.0	<MDL		232.6	--
Total HPAHs ^		202.1		102.4		72.3		259.4		1001.0		280.3		1116.5	--
1,2,4–Trichlorobenzene		na		na		na		na		na		na		na	--
1,2–Dichlorobenzene		na		na		na		na		na		na		na	--
1,4–Dichlorobenzene		na		na		na		na		na		na		na	--
Bis (2-ethylhexyl) phthalate	20.9	<MDL		23.6	20.3	<MDL	22.4	<MDL	21.9	<MDL	20.1	<MDL		237.0	--
Butyl benzyl phthalate	20.9	<MDL	21.0	<MDL	20.3	<MDL	22.4	<MDL	21.9	<MDL	20.1	<MDL	23.7	<MDL	--
Di–*n*–butyl phthalate	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	<MDL	--
Di–*n*–octyl phthalate	20.9	<MDL	21.0	<MDL	20.3	<MDL	22.4	<MDL	21.9	<MDL	20.1	<MDL	23.7	<MDL	--
Dibenzofuran	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	<MDL	--
Diethyl phthalate	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	<MDL	--
Dimethyl phthalate	14.4	<MDL	14.4	<MDL	14.0	<MDL	15.4	<MDL	15.1	<MDL	13.8	<MDL	16.3	<MDL	--
Hexachlorobenzene		na		na		na		na		na		na		na	--
Hexachlorobutadiene	* 35.3	<MDL	* 35.4	<MDL	* 34.3	<MDL	* 37.8	<MDL	* 37.0	<MDL	* 33.9	<MDL	* 40.0	<MDL	--
N–nitrosodiphenylamine	* 35.3	<MDL	* 35.4	<MDL	* 34.3	<MDL	* 37.8	<MDL	* 37.0	<MDL	* 33.9	<MDL	* 40.0	<MDL	--
Total PCBs	17	<MDL	17	<MDL	17	<MDL	18	<MDL	18	<MDL	16	<MDL	19.3	<MDL	--
Ionizable Organic Compounds (µg/kg dry wt.)															
2,4–dimethylphenol ^	** 35.3	< MDL	** 35.4	< MDL	** 34.3	< MDL	** 37.8	< MDL	** 37.0	< MDL	** 33.9	< MDL	** 40.0	< MDL	29
2–methylphenol ^	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	< MDL	63
4–methylphenol ^	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	< MDL	670
Benzoic acid ^	144.0	< MDL	144.4	< MDL	139.6	< MDL	153.8	< MDL	150.7	< MDL	138.0	< MDL	163	< MDL	650
Benzyl alcohol ^	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	< MDL	57
Pentachlorophenol	35.3	<MDL	35.4	<MDL	34.3	<MDL	37.8	<MDL	37.0	<MDL	33.9	<MDL	40.0	< MDL	360
Phenol ^	144.0	< MDL	144.4	< MDL	139.6	< MDL	153.8	< MDL	150.7	< MDL	138.0	< MDL	163	< MDL	420

* = Parameter exceeds LAET
** = Parameter exceeds SQS
^ Matrix spike or SRM recovery below acceptance range
na indicates not analyzed

Table B-14. 1998 Offshore Ambient Sediment Monitoring
Comparison With Standards--Dry Weights (page 1 of 2)

Station:	KSPS01		LSML01		LTDF01		LSCI01		LSCK01		LSCW02	
Date:	9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98	
% Solids:	70.4		41.2		55.7		32.6		30.6		36.0	
TOC (mg/kg dry wt.)	3466		15995		30880		26012		27092		21889	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Metals (mg/kg dry wt.)												
Arsenic	3.6	<MDL		8.5		10.8		8.6		10.8		10.0
Cadmium	0.2	<MDL		0.3		0.4		0.4		0.4		0.3
Chromium		21.2		34.5		34.8		45.1		44.1		40.6
Copper		8.3		27.9		48.8		39.0		39.2		43.9
Lead		8.7		16.8		61.4		22.9		21.6		29.2
Mercury		0.0		0.11	**	0.44		0.13		0.15		0.23
Silver	0.3	<MDL	0.3	<MDL		0.9	0.4	<MDL	0.4	<MDL	0.4	<MDL
Zinc		27.7		67.5		75.0		89.3		88.2		95.0
Nonionizable Organic Compounds (µg/kg dry wt.)												
2–Methylnaphthalene ^	61.1	<MDL	104.4	<MDL	77.2	<MDL	131.9	<MDL	140.5	<MDL	119.4	<MDL
Acenaphthylene	22.7	<MDL	38.8	<MDL		64.0	49.1	<MDL	52.3	<MDL	44.4	<MDL
Acenapthene	15.6	<MDL	26.7	<MDL		61.0	33.7	<MDL	35.9	<MDL	30.6	<MDL
Anthracene ^		38.0	38.8	<MDL		334.0	49.1	<MDL	52.3	<MDL	44.4	<MDL
Fluorene ^	22.7	<MDL	38.8	<MDL		94.0	49.1	<MDL	52.3	<MDL	44.4	<MDL
Naphthalene ^	61.1	<MDL	104.4	<MDL		99.0	131.9	<MDL	140.5	<MDL	119.4	<MDL
Phenanthrene		138.0		41.0		513.0		52.0	52.3	<MDL		80.0
Total LPAHs ^		176.0		41.0		1165.0		52.0	140.5	<MDL		80.0
Benzo (*a*) anthracene ^		123.0		51.0		542.0		61.0		52.0		77.0
Benzo (*a*) pyrene ^		155.0	665.5	<MDL		750.0	82.8	<MDL	88.2	<MDL		100.0
Benzo (*g,h,i*) perylene ^		97.0		148.0		363.0		209.0	88.2	<MDL		75.0
Chrysene		137.0		49.0		869.0		55.0	52.3	<MDL		107.0
Dibenzo (*a,h*) anthracene ^	61.1	<MDL	104.4	<MDL		110.0	131.9	<MDL	140.5	<MDL	119.4	<MDL
Fluoranthene		281.0		78.0		901.0		100.0		69.0		147.0
Indeno (1,2,3-*c,d*) pyrene ^		95.0	65.5	<MDL		406.0	82.8	<MDL	88.2	<MDL		75.0
Pyrene		320.0		87.0		1133.0		106.0		78.0		176.0
Total benzofluoranthenes		143.0	104.4	<MDL		1388.0	131.9	<MDL	140.5	<MDL		131.0
Total HPAHs ^		1351.0		413.0		6462.0		531.0		199.0		888.0
1,2,4–Trichlorobenzene		na		na		na		na		na		na
1,2–Dichlorobenzene		na		na		na		na		na		na
1,4–Dichlorobenzene		na		na		na		na		na		na
Bis (2-ethylhexyl) phthalate	22.7	<MDL		44.0		189.0	49.1	<MDL	52.3	<MDL		76.0
Butyl benzyl phthalate	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL
Di–*n*–butyl phthalate	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Di–*n*–octyl phthalate	22.7	<MDL	38.8	<MDL	28.7	<MDL	49.1	<MDL	52.3	<MDL	44.4	<MDL
Dibenzofuran	38.4	<MDL	65.5	<MDL		56.0	82.8	<MDL	88.2	<MDL	75.0	<MDL
Diethyl phthalate	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	<MDL
Dimethyl phthalate	15.6	<MDL	26.7	<MDL	19.7	<MDL	33.7	<MDL	35.9	<MDL	30.6	<MDL
Hexachlorobenzene		na		na		na		na		na		na
Hexachlorobutadiene	* 38.4	<MDL	* 65.5	<MDL	* 48.5	<MDL	* 82.8	<MDL	* 88.2	<MDL	* 75.0	<MDL
N–nitrosodiphenylamine	* 38.4	<MDL	* 65.5	<MDL	* 48.5	<MDL	* 82.8	<MDL	* 88.2	<MDL	* 75.0	<MDL
Total PCBs	19	<MDL	32	<MDL		296.4	40	<MDL	43	<MDL	36	<MDL
Ionizable Organic Compounds (µg/kg dry wt.)												
2,4–dimethylphenol ^	** 38.4	< MDL	** 65.5	< MDL	** 48.5	< MDL	** 82.8	< MDL	** 88.2	< MDL	** 75.0	< MDL
2–methylphenol ^	38.4	<MDL	65.5	<MDL	48.5	<MDL	** 82.8	<MDL	** 88.2	<MDL	** 75.0	< MDL
4–methylphenol ^	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	< MDL
Benzoic acid ^	156.3	< MDL	267.0	< MDL	197.5	< MDL	337.4	< MDL	359.5	< MDL	305.6	< MDL
Benzyl alcohol ^	38.4	<MDL	** 65.5	<MDL	48.5	<MDL	** 82.8	<MDL	** 88.2	<MDL	** 75.0	< MDL
Pentachlorophenol	38.4	<MDL	65.5	<MDL	48.5	<MDL	82.8	<MDL	88.2	<MDL	75.0	< MDL
Phenol ^	156.3	< MDL	267.0	< MDL	197.5	< MDL	337.4	< MDL	359.5	< MDL	305.6	< MDL

* = Parameter exceeds LAET
** = Parameter exceeds SQS
^ Matrix spike or SRM recovery below acceptance range
na indicates not analyzed

Table B-14. 1998 Offshore Ambient Sediment Monitoring Comparison With Standards--Dry Weights (page 2 of 2)

Station:	LSDZ01		LSEZ01		LTCA02		LTED04			
Date:	9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		Sediment	Lowest
% Solids:	32.7		33.8		34.7		35.0		Quality	Apparent Effects
TOC (mg/kg dry wt.)	25352		28402		26369		26714		Standards	Threshold
	MDL	Value	MDL	Value	MDL	Value	MDL	Value		
Metals (mg/kg dry wt.)										
Arsenic		11.9		13.6		11.8		12.3	57	--
Cadmium		0.3		0.5		0.3		0.3	5.1	--
Chromium		41.0		42.0		40.3		41.4	260	--
Copper		47.4		51.2		47.3		54.9	390	--
Lead		38.2		41.4		37.8		46.6	450	--
Mercury		0.30		0.30		0.27		0.37	0.41	--
Silver	0.4	<MDL		0.5		0.4	0.4	<MDL	6.1	--
Zinc		92.4		100.6		90.2		98.9	410	--
Nonionizable Organic Compounds (µg/kg dry wt.)										
2–Methylnaphthalene ^	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL	--	670
Acenaphthylene	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL	--	1300
Acenapthene	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL	--	500
Anthracene ^	48.9	<MDL	47.3	<MDL	46.1	<MDL		54.0	--	960
Fluorene ^	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL	--	540
Naphthalene ^	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL	--	2100
Phenanthrene		82.0		88.0		93.0		128.0	--	1500
Total LPAHs ^		82.0		88.0		93.0		182.0	--	5200
Benzo (*a*) anthracene ^		98.0		106.0		107.0		140.0	--	1300
Benzo (*a*) pyrene ^		122.0		127.0		138.0		184.0	--	1600
Benzo (*g,h,i*) perylene ^	82.6	<MDL		104.0		92.0		224.0	--	670
Chrysene		136.0		130.0		135.0		175.0	--	1400
Dibenzo (*a,h*) anthracene ^	131.5	<MDL	127.2	<MDL	123.9	<MDL	122.9	<MDL	--	230
Fluoranthene		160.0		177.0		193.0		277.0	--	1700
Indeno (1,2,3-*c,d*) pyrene ^		83.0		83.0		95.0		143.0	--	600
Pyrene		168.0		217.0		197.0		275.0	--	2600
Total benzofluoranthenes		168.0		178.0		190.0		272.0	--	3200
Total HPAHs ^		935.0		1122.0		1147.0		1690.0	--	12000
1,2,4–Trichlorobenzene	na	na	na	na	na	na	na	na	--	31
1,2–Dichlorobenzene	na	na	na	na	na	na	na	na	--	35
1,4–Dichlorobenzene	na	na	na	na	na	na	na	na	--	110
Bis (2-ethylhexyl) phthalate		61.0		77.0		80.0		127.0	--	1300
Butyl benzyl phthalate	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL	--	63
Di–*n*–butyl phthalate	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL	--	1400
Di–*n*–octyl phthalate	48.9	<MDL	47.3	<MDL	46.1	<MDL	45.7	<MDL	--	6200
Dibenzofuran	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL	--	540
Diethyl phthalate	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL	--	200
Dimethyl phthalate	33.6	<MDL	32.5	<MDL	31.7	<MDL	31.4	<MDL	--	71
Hexachlorobenzene	na	na	na	na	na	na	na	na	--	22
Hexachlorobutadiene	* 82.6	<MDL	* 79.9	<MDL	* 77.8	<MDL	* 77.1	<MDL	--	11
N–nitrosodiphenylamine	* 82.6	<MDL	* 79.9	<MDL	* 77.8	<MDL	* 77.1	<MDL	--	28
Total PCBs	40	<MDL	39	<MDL	37.5	<MDL	*	188.0	--	130
Ionizable Organic Compounds (µg/kg dry wt.)										
2,4–dimethylphenol ^	** 82.6	< MDL	** 79.9	< MDL	** 77.8	< MDL	** 77.1	< MDL	29	--
2–methylphenol ^	** 82.6	<MDL	** 79.9	<MDL	** 77.8	<MDL	** 77.1	<MDL	63	--
4–methylphenol ^	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL	670	--
Benzoic acid ^	336.4	< MDL	325.4	< MDL	317.0	<MDL	314.3	<MDL	650	--
Benzyl alcohol ^	** 82.6	<MDL	** 79.9	<MDL	** 77.8	<MDL	** 77.1	<MDL	57	--
Pentachlorophenol	82.6	<MDL	79.9	<MDL	77.8	<MDL	77.1	<MDL	360	--
Phenol ^	336.4	< MDL	325.4	< MDL	317.0	< MDL	314.3	< MDL	420	--

* = Parameter exceeds LAET
** = Parameter exceeds SQS
^ Matrix spike or SRM recovery below acceptance range
na indicates not analyzed

Table B-15. 1998 Intertidal Sediment Monitoring
Comparison With Standards--Dry Weights (page 1 of 1)

Station:	KSHZ03		KSSN04		LSKR01		JSVW04		KSXS02		MTEC01			
Date:	17-Aug-98		10-Aug-98		10-Aug-98		10-Aug-98		10-Aug-98		19-Aug-98		Sediment	Lowest
% Solids:	94.5		74.7		78.8		82.7		81.0		83.3		Quality	Apparent Effects
TOC (mg/kg dry wt.)	2550		5248		1252		618		3827		939		Standards	Threshold
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value		
Metals (mg/kg dry wt.)														
Arsenic		3.0	3.3	<MDL	3.3	<MDL	3.0	<MDL	3.1	<MDL	3.0	<MDL	57	--
Cadmium	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	5.1	--
Chromium		15.4		15.7		18.9		23.3		16.8		20.2	260	--
Copper		6.6		6.3		4.7		11.4		7.3		7.1	390	--
Lead		2.9		3.3		5.5		14.9		3.6		2.4	450	--
Mercury	0.02	<MDL	0.03	<MDL	0.03	<MDL	0.02	<MDL	0.02	<MDL	0.02	<MDL	0.41	--
Silver	0.2	<MDL	0.3	<MDL	0.3	<MDL	0.2	<MDL	0.2	<MDL	0.2	<MDL	6.1	--
Zinc		22.3		23.8		22.2		32.5		25.2		25.5	410	--
Nonionizable Organic Compounds (µg/kg dry wt.)														
2–Methylnaphthalene ^	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL	--	670
Acenaphthylene	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	1300
Acenapthene	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL	--	500
Anthracene ^	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	960
Fluorene ^	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	540
Naphthalene ^	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL	--	2100
Phenanthrene ^	16.9	<MDL		31.0		25.0	19.3	<MDL	19.8	<MDL	19.2	80.0	--	1500
Total LPAHs ^	45.5	<MDL		31.0		25.0	52.0	<MDL	53.1	<MDL		80.0	--	5200
Benzo (*a*) anthracene ^	16.9	<MDL		36.0		24.0	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	1300
Benzo (*a*) pyrene ^	28.6	<MDL		40.0	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL	--	1600
Benzo (*g,h,i*) perylene ^	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL	--	670
Chrysene	16.9	<MDL		32.0	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	1400
Dibenzo (*a,h*) anthracene	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL	--	230
Fluoranthene ^	16.9	<MDL		71.0		34.0	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	1700
Indeno (1,2,3-*c,d*) pyrene ^	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL	--	600
Pyrene ^	16.9	<MDL		89.0		32.0	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	2600
Total benzofluoranthenes	45.5	<MDL	57.6	<MDL	54.6	<MDL	52.0	<MDL	53.1	<MDL	51.6	<MDL	--	3200
Total HPAHs ^	45.5	<MDL		268.0		90.0	52.0	<MDL	53.1	<MDL	51.6	<MDL	--	12000
1,2,4–Trichlorobenzene ^	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	31
1,2–Dichlorobenzene ^	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	35
1,4–Dichlorobenzene ^	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	110
Bis (2-ethylhexyl) phthalate	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	1300
Butyl benzyl phthalate	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	63
Di–*n*–butyl phthalate	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL	--	1400
Di–*n*–octyl phthalate	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	6200
Dibenzofuran	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL	--	540
Diethyl phthalate	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	<MDL	--	200
Dimethyl phthalate	11.6	<MDL	14.7	<MDL	14.0	<MDL	13.3	<MDL	13.6	<MDL	13.2	<MDL	--	71
Hexachlorobenzene	16.9	<MDL	21.4	<MDL	20.3	<MDL	19.3	<MDL	19.8	<MDL	19.2	<MDL	--	22
Hexachlorobutadiene	* 28.6	<MDL	* 36.1	<MDL	* 34.3	<MDL	* 32.6	<MDL	* 33.3	<MDL	* 32.4	<MDL	--	11
N–nitrosodiphenylamine	* 28.6	<MDL	* 36.1	<MDL	* 34.3	<MDL	* 32.6	<MDL	* 33.3	<MDL	* 32.4	<MDL	--	28
Total PCBs	14	<MDL	17	<MDL	17	296.4	16	<MDL	16	<MDL	16	<MDL	--	130
Ionizable Organic Compounds (µg/kg dry wt.)														
2,4–dimethylphenol ^^	28.6	< MDL	** 36.1	< MDL	** 34.3	< MDL	** 32.6	< MDL	** 33.3	< MDL	** 32.4	< MDL	29	--
2–methylphenol ^	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	< MDL	63	--
4–methylphenol ^	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	< MDL	670	--
Benzoic acid ^	116.4	< MDL	147.3	< MDL	139.6	< MDL	133.0	< MDL	135.8	< MDL	132.1	< MDL	650	--
Benzyl alcohol ^	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	< MDL	57	--
Pentachlorophenol ^	28.6	<MDL	36.1	<MDL	34.3	<MDL	32.6	<MDL	33.3	<MDL	32.4	< MDL	360	--
Phenol ^	116.4	< MDL	147.3	< MDL	139.6	< MDL	133.0	< MDL	135.8	< MDL	132.1	< MDL	420	--

* = Parameter exceeds LAET

** = Parameter exceeds SQS

^ Matrix spike or SRM recovery below acceptance range

^^ Matrix spike or surrogate recovery <10%

Point source stations are shaded

Table B-16. 1998 Offshore Sediment Monitoring
Comparison With Organic Carbon Normalized Standards (page 1 of 2)

Station:	WP230P		LSML01		LTDF01		LSCI01		LSCK01		LSCW02			
Date:	1-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		Sediment	Cleanup
% Solids:	71.3		41.2		55.7		32.6		30.6		36		Quality	Screening
TOC (mg/kg dry wt.)	5526		15995		30880		26012		27092		21889		Standards	Levels
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL	Value		
Nonionizable Organic Compounds (mg/kg TOC)														
2–Methylnaphthalene ^	10.9	<MDL	6.5	<MDL	2.5	<MDL	5.1	<MDL	5.2	<MDL	5.5	<MDL	38	64
Acenaphthylene		8.2	2.4	<MDL		2.1	1.9	<MDL	1.9	<MDL	2.0	<MDL	66	66
Acenapthene	2.8	<MDL	1.7	<MDL		2.0	1.3	<MDL	1.3	<MDL	1.4	<MDL	16	57
Anthracene ^		12.1	2.4	<MDL		10.8	1.9	<MDL	1.9	<MDL	2.0	<MDL	220	1200
Fluorene ^	4.1	<MDL	2.4	<MDL		3.0	1.9	<MDL	1.9	<MDL	2.0	<MDL	23	79
Naphthalene ^	10.9	<MDL	6.5	<MDL		3.2	5.1	<MDL	5.2	<MDL	5.5	<MDL	99	170
Phenanthrene		44.7		2.6		16.6		2.0	1.9	<MDL		3.7	100	480
Total LPAHs ^		64.9		2.6		37.7		2.0	5.2	<MDL		3.7	370	780
Benzo (*a*) anthracene ^		59.6		3.2		17.6		2.3		1.9		3.5	110	270
Benzo (*a*) pyrene ^		96.2	41.6	<MDL		24.3	3.2	<MDL	3.3	<MDL		4.6	99	210
Benzo (*g,h,i*) perylene ^	*	60.9		9.3		11.8		8.0	3.3	<MDL		3.4	31	78
Chrysene		69.5		3.1		28.1		2.1	1.9	<MDL		4.9	110	460
Dibenzo (*a,h*) anthracene ^	10.9	<MDL	6.5	<MDL		3.6	5.1	<MDL	5.2	<MDL	5.5	<MDL	12	33
Fluoranthene		114.0		4.9		29.2		3.8		2.5		6.7	160	1200
Indeno (1,2,3-*c,d*) pyrene ^	*	67.8	4.1	<MDL		13.1	3.2	<MDL	3.3	<MDL		3.4	34	88
Pyrene		129.7		5.4		36.7		4.1		2.9		8.0	1000	1400
Total benzofluoranthenes		115.0	6.5	<MDL		44.9	5.1	<MDL	5.2	<MDL		6.0	230	450
Total HPAHs ^		712.7		25.8		209.3		20.4		7.3		40.6	960	5300
1,2,4–Trichlorobenzene	0.2	<MDL		na		na		na		na		na	0.81	1.8
1,2–Dichlorobenzene	0.2	<MDL		na		na		na		na		na	2.3	2.3
1,4–Dichlorobenzene		0.3		na		na		na		na		na	3.1	9
Bis (2-ethylhexyl) phthalate		6.1		2.8		6.1	1.9	<MDL	1.9	<MDL		3.5	47	78
Butyl benzyl phthalate	4.1	<MDL	2.4	<MDL	0.9	<MDL	1.9	<MDL	1.9	<MDL	2.0	<MDL	4.9	64
Di–*n*–butyl phthalate		8.1	4.1	<MDL	1.6	<MDL	3.2	<MDL	3.3	<MDL	3.4	<MDL	220	1700
Di–*n*–octyl phthalate	4.1	<MDL	2.4	<MDL	0.9	<MDL	1.9	<MDL	1.9	<MDL	2.0	<MDL	58	4500
Dibenzofuran	6.9	<MDL	4.1	<MDL		1.8	3.2	<MDL	3.3	<MDL	3.4	<MDL	15	58
Diethyl phthalate	6.9	<MDL	4.1	<MDL	1.6	<MDL	3.2	<MDL	3.3	<MDL	3.4	<MDL	61	110
Dimethyl phthalate	2.8	<MDL	1.7	<MDL	0.6	<MDL	1.3	<MDL	1.3	<MDL	1.4	<MDL	53	53
Hexachlorobenzene	0.2	<MDL		na		na		na		na		na	0.38	2.3
Hexachlorobutadiene	** 6.9	<MDL	* 4.1	<MDL	1.6	<MDL	3.2	<MDL	3.3	<MDL	3.4	<MDL	3.9	6.2
N–nitrosodiphenylamine	6.9	<MDL	4.1	<MDL	1.6	<MDL	3.2	<MDL	3.3	<MDL	3.4	<MDL	11	11
Total PCBs	3.3	<MDL	2.0	<MDL		9.6	1.5	<MDL	1.6	<MDL	1.6	<MDL	12	65

* = Parameter exceeds SQS

** = Parameter exceeds CSL

^ Matrix spike or SRM recovery below acceptance range

na indicates not analyzed

Table B-16. 1998 Offshore Sediment Monitoring
Comparison With Organic Carbon Normalized Standards (page 2 of 2)

Station:	LSDZ01		LSEZ01		LTCA02		LTED04		WP230P			WP230P				
Date:	9-Dec-98		9-Dec-98		9-Dec-98		9-Dec-98		5-Mar-99			5-Mar-99 (re-analysis)			Sediment	Cleanup
% Solids:	32.7		33.8		34.7		35.0		71.3			71.3			Quality	Screening
TOC (mg/kg dry wt.)	25352		28402		26369		26714		4544			4544			Standards	Levels
	MDL	Value	MDL	Value	MDL	Value	MDL	Value	MDL		Value	MDL		Value		
Nonionizable Organic Compounds (mg/kg TOC)																
2–Methylnaphthalene [a]	5.2	<MDL	4.5	<MDL	4.7	<MDL	4.6	<MDL			16.1		13.2	<MDL	38	64
Acenaphthylene [b]	1.9	<MDL	1.7	<MDL	1.7	<MDL	1.7	<MDL	**		100.6		4.9	<MDL	66	66
Acenapthene [c]	1.3	<MDL	1.1	<MDL	1.2	<MDL	1.2	<MDL			12.2		3.4	<MDL	16	57
Anthracene [a d]	1.9	<MDL	1.7	<MDL	1.7	<MDL		2.0			161.7			11.3	220	1200
Fluorene [a]	1.9	<MDL	1.7	<MDL	1.7	<MDL	1.7	<MDL	*		55.9		4.9	<MDL	23	79
Naphthalene [a]	5.2	<MDL	4.5	<MDL	4.7	<MDL	4.6	<MDL		13.2	<MDL		13.2	<MDL	99	170
Phenanthrene [b]		3.2		3.1		3.5		4.8	**		592.6			50.3	100	480
Total LPAHs [a-d]		3.2		3.1		3.5		6.8	**		923.0			61.6	370	780
Benzo (*a*) anthracene [b d]		3.9		3.7		4.1		5.2	*		236.1			46.0	110	270
Benzo (*a*) pyrene [b d]		4.8		4.5		5.2		6.9	**		358.0			65.4	99	210
Benzo (*g,h,i*) perylene [b d]	3.3	<MDL		3.7		3.5		8.4	**		239.2	*		49.4	31	78
Chrysene [b]		5.4		4.6		5.1		6.6	*		271.6			51.8	110	460
Dibenzo (*a,h*) anthracene [b d]	5.2	<MDL	4.5	<MDL	4.7	<MDL	4.6	<MDL	**		37.0	*	13.3	<MDL	12	33
Fluoranthene [b]		6.3		6.2		7.3		10.4	*		540.1			84.9	160	1200
Indeno (1,2,3-*c,d*) pyrene [b d]		3.3		2.9		3.6		5.4	**		258.3	*		46.3	34	88
Pyrene [b]		6.6		7.6		7.5		10.3			679.0			117.9	1000	1400
Total benzofluoranthenes [b]		6.6		6.3		7.2		10.2	*		396.9			80.2	230	450
Total HPAHs [b d]		36.9		39.5		43.5		63.3	*		3016.3			542.0	960	5300
1,2,4–Trichlorobenzene		na		na		na		na		0.2	<MDL	**	4.9	<MDL	0.81	1.8
1,2–Dichlorobenzene		na		na		na		na		0.2	<MDL	**	4.9	<MDL	2.3	2.3
1,4–Dichlorobenzene		na		na		na		na		0.2	<MDL	*	4.9	<MDL	3.1	9
Bis (2-ethylhexyl) phthalate [b]		2.4		2.7		3.0		4.8			26.0			11.0	47	78
Butyl benzyl phthalate [c]	1.9	<MDL	1.7	<MDL	1.7	<MDL	1.7	<MDL	*	4.9	<MDL	*	4.9	<MDL	4.9	64
Di–*n* –butyl phthalate [c]	3.3	<MDL	2.8	<MDL	3.0	<MDL	2.9	<MDL		8.3	<MDL		8.3	<MDL	220	1700
Di–*n* –octyl phthalate [c]	1.9	<MDL	1.7	<MDL	1.7	<MDL	1.7	<MDL		4.9	<MDL		4.9	<MDL	58	4500
Dibenzofuran [c]	3.3	<MDL	2.8	<MDL	3.0	<MDL	2.9	<MDL		8.3	<MDL		8.3	<MDL	15	58
Diethyl phthalate [c]	3.3	<MDL	2.8	<MDL	3.0	<MDL	2.9	<MDL		8.3	<MDL		8.3	<MDL	61	110
Dimethyl phthalate [c]	1.3	<MDL	1.1	<MDL	1.2	<MDL	1.2	<MDL		3.4	<MDL		3.4	<MDL	53	53
Hexachlorobenzene		na		na		na		na		0.2	<MDL	**	4.9	<MDL	0.38	2.3
Hexachlorobutadiene [c]	3.3	<MDL	2.8	<MDL	3.0	<MDL	2.9	<MDL	**	8.3	<MDL	**	8.3	<MDL	3.9	6.2
N–nitrosodiphenylamine [c]	3.3	<MDL	2.8	<MDL	3.0	<MDL	2.9	<MDL		8.3	<MDL		8.3	<MDL	11	11
Total PCBs	1.6	<MDL	1.4	<MDL	1.4	<MDL		7.0			9.6			--	12	65

* = Parameter exceeds SQS

** = Parameter exceeds CSL

[a] Matrix spike or SRM recovery below acceptance range

[b] Estimated value

[c] Matrix spike or SRM recovery below acceptance range for 5-Mar-99 samples only

[d] Matrix spike or SRM recovery below acceptance range for 9-Dec-98 samples only

na indicates not analyzed

Table C-1. 1998 Intertidal Shellfish Monitoring
Metals

	Station and Date of Sample											
	KSSN04 18-Aug-98			LSKR01 18-Aug-98			JSVW04 17-Aug-98			MTLD03 19-Aug-98		
	MDL	Wet Wt. Value	Dry Wt. Value	MDL	Wet Wt. Value	Dry Wt. Value	MDL	Wet Wt. Value	Dry Wt. Value	MDL	Wet Wt. Value	Dry Wt. Value
Total Solids (%)		17.3			18.6			17.0			18.7	
Parameter (mg/kg):												
Antimony	0.02	<MDL		0.02	<MDL		0.02	<MDL		0.02	<MDL	
Arsenic	0.02	3.58	20.69	0.02	3.53	18.98	0.02	2.67	15.71	0.02	3.31	17.70
Beryllium	0.02	<MDL		0.02	<MDL		0.02	<MDL		0.02	<MDL	
Cadmium	0.01	0.07	0.38	0.01	0.06	0.31	0.01	0.07	0.38	0.01	0.07	0.37
Chromium	0.05	0.34	1.94	0.05	0.30	1.62	0.05	0.35	2.05	0.05	0.31	1.67
Copper	0.04	2.20	12.72	0.04	2.01	10.81	0.04	2.20	12.94	0.04	1.51	8.07
Lead	0.02	0.13	0.75	0.02	0.13	0.70	0.02	0.27	1.56	0.02	0.12	0.63
Mercury	0.004	0.014	0.081	0.004	0.008	0.042	0.004	0.014	0.082	0.004	0.007	0.040
Nickel	0.02	1.02	5.90	0.02	0.92	4.96	0.02	0.96	5.67	0.02	0.79	4.23
Selenium	0.04	0.44	2.54	0.04	0.37	1.98	0.04	0.30	1.76	0.04	0.35	1.87
Silver	0.01	1.25	7.23	0.01	1.09	5.86	0.01	0.86	5.05	0.01	1.09	5.83
Thallium	0.02	<MDL		0.02	<MDL		0.02	<MDL		0.02	<MDL	
Zinc	0.05	16.30	94.22	0.05	16.80	90.32	0.05	15.20	89.41	0.05	15.00	80.21

MDL= method detection limit
Point source stations are shaded.

Table C-2. 1998 Intertidal Shellfish Monitoring
Semivolatile Organics (wet weight) (page 1 of 2)

	JSVW04 17-Aug-98		**MTLD03** 19-Aug-98		**KSSN04** 18-Aug-98		**LSKR01** 18-Aug-98	
Total Solids (%):	17.0		18.7		17.3		18.6	
Compound (mg/kg):	Value	MDL	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
1,2-Dichlorobenzene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
1,2-Diphenylhydrazine	<MDL	53	<MDL	53	<MDL	53	<MDL	53
1,3-Dichlorobenzene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
1,4-Dichlorobenzene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
2,4,5-Trichlorophenol	<MDL	110	<MDL	110	<MDL	110	<MDL	110
2,4,6-Trichlorophenol	<MDL	110	<MDL	110	<MDL	110	<MDL	110
2,4-Dichlorophenol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
2,4-Dimethylphenol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
2,4-Dinitrophenol	<MDL	53	<MDL	53	<MDL	53	<MDL	53
2,4-Dinitrotoluene	<MDL	11	<MDL	11	<MDL	11	<MDL	11
2,6-Dinitrotoluene	<MDL	11	<MDL	11	<MDL	11	<MDL	11
2-Chloronaphthalene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
2-Chlorophenol	<MDL	53	<MDL	53	<MDL	53	<MDL	53
2-Methylnaphthalene	<MDL	43	<MDL	43	<MDL	43	<MDL	43
2-Methylphenol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
2-Nitroaniline	<MDL	110	<MDL	110	<MDL	110	<MDL	110
2-Nitrophenol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
3,3'-Dichlorobenzidine	<MDL	27	<MDL	27	<MDL	27	<MDL	27
3-Nitroaniline	<MDL	110	<MDL	110	<MDL	110	<MDL	110
4,6-Dinitro-O-Cresol	<MDL	53	<MDL	53	<MDL	53	<MDL	53
4-Bromophenyl Phenyl Ether	<MDL	11	<MDL	11	<MDL	11	<MDL	11
4-Chloro-3-Methylphenol	<MDL	53	<MDL	53	<MDL	53	<MDL	53
4-Chloroaniline	<MDL	53	<MDL	53	<MDL	53	<MDL	53
4-Chlorophenyl Phenyl Ether	<MDL	16	<MDL	16	<MDL	16	<MDL	16
4-Methylphenol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
4-Nitroaniline	<MDL	110	<MDL	110	<MDL	110	<MDL	110
4-Nitrophenol	<MDL	53	<MDL	53	<MDL	53	<MDL	53
Acenaphthene	<MDL	11	<MDL	11	<MDL	11	<MDL	11
Acenaphthylene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Aniline	<MDL	53	<MDL	53	<MDL	53	<MDL	53
Anthracene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Benzidine	<MDL	640	<MDL	640	<MDL	640	<MDL	640
Benzo(A)Anthracene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Benzo(A)Pyrene	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Benzo(B)Fluoranthene	<MDL	43	<MDL	43	<MDL	43	<MDL	43
Benzo(G,H,I)Perylene	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Benzo(K)Fluoranthene	<MDL	43	<MDL	43	<MDL	43	<MDL	43
Benzoic Acid	1670	110	710	110	1190	110	661	110
Benzyl Alcohol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Benzyl Butyl Phthalate	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Bis(2-Chloroethoxy)Methane	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Bis(2-Chloroethyl)Ether	<MDL	16	<MDL	16	<MDL	16	<MDL	16

Table C-2. 1998 Intertidal Shellfish Monitoring
Semivolatile Organics (wet weight) (page 2 of 2)

	JSVW04 17-Aug-98		**MTLD03** 19-Aug-98		**KSSN04** 18-Aug-98		**LSKR01** 18-Aug-98	
Total Solids (%):	17.0		18.7		17.3		18.6	
Compound (mg/kg):	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Bis(2-Chloroisopropyl)Ether	<MDL	53	<MDL	53	<MDL	53	<MDL	53
Bis(2-Ethylhexyl)Phthalate	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Carbazole	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Chrysene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Coprostanol	<MDL	270	<MDL	270	<MDL	270	<MDL	270
Di-N-Butyl Phthalate	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Di-N-Octyl Phthalate	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Dibenzo(A,H)Anthracene	<MDL	43	<MDL	43	<MDL	43	<MDL	43
Dibenzofuran	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Diethyl Phthalate	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Dimethyl Phthalate	<MDL	11	<MDL	11	<MDL	11	<MDL	11
Fluoranthene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Fluorene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Hexachlorobenzene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Hexachlorobutadiene	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Hexachlorocyclopentadiene	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Hexachloroethane	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Indeno(1,2,3-Cd)Pyrene	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Isophorone	<MDL	27	<MDL	27	<MDL	27	<MDL	27
N-Nitrosodi-N-Propylamine	<MDL	27	<MDL	27	<MDL	27	<MDL	27
N-Nitrosodimethylamine	<MDL	110	<MDL	110	<MDL	110	<MDL	110
N-Nitrosodiphenylamine	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Naphthalene	<MDL	43	<MDL	43	<MDL	43	<MDL	43
Nitrobenzene	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Pentachlorophenol	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Phenanthrene	<MDL	16	<MDL	16	<MDL	16	<MDL	16
Phenol	<MDL	110	<MDL	110	<MDL	110	<MDL	110
Pyrene	<MDL	16	<MDL	16	<MDL	16	<MDL	16

MDL = method detection limit
Point source stations are shaded.

Table C-3. 1998 Intertidal Shellfish Monitoring
Pesticides and PCBs (wet weight) (page 1 of 1)

	JSVW04 17-Aug-98		MTLD03 19-Aug-98		KSSN04 18-Aug-98		LSKR01 18-Aug-98	
Total Solids (%):	17.0		18.7		17.3		18.6	
Compound (mg/kg):	Value	MDL	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
4,4'-DDE	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
4,4'-DDT	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aldrin	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Alpha-BHC	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1016	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Aroclor 1221	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Aroclor 1232	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Aroclor 1242	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Aroclor 1248	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Aroclor 1254	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Aroclor 1260	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Beta-BHC	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Chlordane	<MDL	6.7	<MDL	6.7	<MDL	6.7	<MDL	6.7
Delta-BHC	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Dieldrin	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Endosulfan I	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Endosulfan II	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Endosulfan Sulfate	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Endrin	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Endrin Aldehyde	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Gamma-BHC (Lindane)	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Heptachlor	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Heptachlor Epoxide	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Methoxychlor	<MDL	6.7	<MDL	6.7	<MDL	6.7	<MDL	6.7
Toxaphene	<MDL	13	<MDL	13	<MDL	13	<MDL	13

MDL = method detection limit
Point source stations are shaded.

Table C-4. 1998 Intertidal Shellfish Monitoring
Bacteria (page 1 of 1)

Station	Date	Fecal Coliform (MPN/100g)	*Enterococcus* (MPN/100g)
JSVW04	13-May-98	130	1700
	23-Jun-98	2300	170
	20-Jul-98	330	330
	17-Aug-98	490	20
	15-Sep-98	130	230
KRJY01	12-May-98	1800	430
	22-Jun-98	130	480
	21-Jul-98	2300	1895
	18-Aug-98	60	1500
	15-Sep-98	135	815
	15-Oct-98	3300	220
KSHZ03	12-May-98	330	330
	22-Jun-98	490	140
	20-Jul-98	<20	310
	18-Aug-98	70	490
	14-Sep-98	210	<20
KSLU03	12-May-98	460	120
	22-Jun-98	490	790
	20-Jul-98	1100	20
	17-Aug-98	830	20
	14-Sep-98	20	130
MSSM05	11-May-98	700	2300
	23-Jun-98	330	130
	22-Jul-98	330	3300
	20-Aug-98	790	270
	15-Sep-98	230	2300
MTEC01	11-May-98	170	230
	23-Jun-98	790	330
	21-Jul-98	110	330
	19-Aug-98	20	490
	15-Sep-98	20	50
MTLD03	19-Aug-98	170	80
KSSN04	18-Aug-98	340	130
	15-Oct-98	4900	7900
LSKR01	18-Aug-98	3500	3300

Point source stations are shaded.

Table D-1. 1998 Ambient Intertidal Macroalgae Monitoring
Metals (dry weight)

	Station and Date of Sample							
	JSVW04 10-Aug-98		KSUR01 10-Aug-98		KSXS02 10-Aug-98		KSYV02 10-Aug-98	
	MDL	Value	MDL	Value	MDL	Value	MDL	Value
Total Solids (%)		32.2		24.6		22.3		17.6
Parameter (mg/kg):								
Antimony	0.93	<MDL	1.22	<MDL	1.35	<MDL	1.65	<MDL
Arsenic	1.55	4.04	2.03	3.21	2.20	6.28	2.78	7.95
Beryllium	0.03	<MDL	0.04	<MDL	0.04	<MDL	0.06	<MDL
Cadmium	0.09	0.27	0.12	<MDL	0.13	0.18	0.16	<MDL
Chromium	0.16	9.35	0.20	2.51	0.22	4.34	0.28	2.68
Copper	0.12	6.93	0.16	5.69	0.17	6.64	0.22	10.74
Lead	0.93	2.67	1.22	<MDL	1.35	<MDL	1.65	2.05
Mercury	0.014	0.024	0.018	<MDL	0.018	<MDL	0.023	<MDL
Nickel	0.62	10.59	0.81	4.55	0.90	5.61	1.14	10.85
Selenium	1.55	<MDL	2.03	<MDL	2.20	<MDL	2.78	<MDL
Silver *	0.12	<MDL	0.16	<MDL	0.17	<MDL	0.22	<MDL
Thallium	6.21	<MDL	8.13	<MDL	8.97	<MDL	11.36	<MDL
Zinc	0.16	16.37	0.20	10.93	0.22	17.85	0.28	76.70

MDL= method detection limit
* Matrix spike or SRM recovery below acceptance range

Table D-2. 1998 Point Source Intertidal Macroalgae Monitoring Metals (dry weight)

	Station and Date of Sample					
	LSKR01 10-Aug-98		**KSSN04 10-Aug-98**		**KSSN05 10-Aug-98**	
	MDL	**Value**	**MDL**	**Value**	**MDL**	**Value**
Total Solids (%)		18.1		31.7		27.2
Parameter (mg/kg):						
Antimony	1.66	<MDL	0.88	<MDL	1.10	<MDL
Arsenic	2.76	4.25	1.48	2.68	1.84	4.04
Beryllium	0.06	<MDL	0.03	0.03	0.04	<MDL
Cadmium	0.17	0.55	0.09	0.35	0.11	0.13
Chromium	0.28	1.16	0.15	8.39	0.18	8.57
Copper	0.22	2.49	0.12	7.00	0.15	6.07
Lead	1.66	<MDL	0.88	2.74	1.10	<MDL
Mercury	0.02	0.02	0.01	<MDL	0.01	<MDL
Nickel	1.10	2.38	0.60	30.22	0.74	10.66
Selenium	2.76	<MDL	1.48	<MDL	1.84	<MDL
Silver *	0.22	<MDL	0.12	<MDL	0.15	<MDL
Thallium	11.05	<MDL	5.99	<MDL	7.35	<MDL
Zinc	0.28	9.06	0.15	193.69	0.18	19.49

MDL= method detection limit

* Matrix spike or SRM recovery below acceptance range

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 1 of 18)

Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta									
Amage anops									
Ampharete cf. crassiseta	1	2		1	1	5		3	5
Amphicteis mucronata						1			
Amphitrite robusta				3		1			
Anobothrus gracilis		1		4		3	1	4	
Aphelochaeta sp.	8		1	12	4	2	2	1	1
Aphelochaeta sp. N2								2	
Apistobranchus ornatus									1
Aricidea catherinae	8								2
Aricidea hartleyi				1					
Aricidea lopezi				1	8	2			
Aricidea sp.				2				1	
Artacamella hancocki									
Asabellides lineata	1			6	3	6			
Asclerocheilus beringianus		3		7	1	4			
Autolytinae (epitokous)		1		4	1	2			
Autolytus magnus				25	2	4			
Autolytus verrilli				2					
Barantolla nr. americana									
Betapista dekkerae				6	7	5			
Bispira elegans				1	1		1		
Boccardiella hamata							1		
Capitella capitata hyperspecies						1			1
Caulleriella pacifica		2			4	2	2		
Chaetopteridae spp. Indet.					1				
Chaetopterus variopedatus									
Chaetozone acuta				15	2	3			
Chaetozone nr. setosa	1				1	1			1
Chaetozone sp. N2								1	
Chaetozone sp.				4					
Chone aurantiaca	1	1		2	2				
Chone sp.									
Cirratulus sp. juv		6		36	2	6	8		1
Cirratulus spectabilis			2					1	2
Cirratulidae, unident.									
Clymenura columbiana									
"Clymenura" gracilis								1	
Cossura pygodactylata									
Demonax medius				2	1				
Demonax sp.	1	2		1					
Diopatra ornata	1	4		6	4	3	11	3	6
Dipolydora akaina		3		109	41	108			
Dipolydora socialis		2		8	4	1			
Dipolydora sp.						1			
Dorvillea annulata	1	1		1	2	2			
Drilonereis falcata									
Drilonereis longa					1				
Ehlersia heterochaeta		2		12	5	15	2	1	
Ehlersia hyperioni	5	1		7	12	12		6	
Enipo nr. chuckchi							1		

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 2 of 18)

Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta cont.									
Eteone sp.	4	1		2	1	4	5	2	2
Euclymene cf. zonalis							11	2	
Euchone incolor									
Euclymeninae sp.						2			3
Eudistylia catherinae				1			1		
Eudistylia polymorpha				1	1	2			
Eudistylia vancouveri					2	3			
Eudistylia sp.						2			
Eulalia californiensis		3		1	2	4			
Eulalia quadrioculata		1							
Eumida longicornuta	2	3		8	2	13	2	2	1
Eumida sp.									
Eunoe oerstedi (?)				1					
Eusyllis blomstrandi									
Eusyllis habei				5	5	14	1		
Exogone dwisula					1	1			
Exogone lourei	3	3		9	3	5	2	5	3
Galathowenia oculata		1					1	2	
Gattyana ciliata									
Gattyana cirrosa		1			2		1		
Glycera americana				3					
Glycera nana							2		1
Glycinde armigera	2	3		1				1	
Glycinde polygnatha					1				
Goniada maculata					2			1	4
Harmothoe extenuata		1		5	2	1			
Harmothoe imbricata				2					
Harmothoe multisetosa					3	4			
Harmothoinae spp. indet.						2			
Idanthyrsus saxicavus				9	1	1			
Isocirrus longiceps									
Lanassa nordenskioeldi				12	1	1			
Lanassa venusta					3				
Laonice pugettensis							1		
Laonice spp. juv.					1				
Leitoscoloplos pugettensis				1	1				1
Lepidasthenia berkeleyae					2				
Lepidasthenia longicirrata		2		3	3	3			
Lepidonotus spiculus				17		6			
Lepidonotus squamatus					1	1			
Levinsenia gracilis								1	
Lumbrineris californiensis	4	3		11	11	7	7	1	
Lumbrineris cruzensis		1							
Lumbrineris sp. juv.				2					
Lumbrineris latreilli								1	
Lysilla loveni							1		
Lysilla pacifica					1				
Magelona longicornis	5			8	3	2	1		4
Magelona sacculata								5	
Maldane sarsi									

Table E-1. 1998 West Point Outfall Sediment Monitoring
Benthic Community Data (page 3 of 18)

Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta cont.									
Malmgreniella bansei					1				
Malmgreniella berkeleyorum					1				
Malmgreniella liei				1					
Malmgreniella nigralba				1	1				
Malmgreniella scriptoria									
Malmgreniella sp.			1						
Mediomastus californiensis									
Mediomastus sp.	1	1			4	4	2		
Megalomma splendida		2		12	16	4	4		
Melinna oculata									
Micropodarke dubia	1	2		1	1	5		2	
Monticellina tesselata					2	1			
Myxicola infundibulum		2		17	7	5			
Naineris quadricuspida				5			1		
Naineris uncinata									
Neosabellaria cementarium		36		139	25	76		1	
Nephtys caeca									
Nephtys cornuta									
Nephtys ferruginea (signifera)	4	3	4	6	3	2	10	4	7
Nereis procera	1			1		1			2
Nicomache lumbricalis									
Nicomache personata				2					
Nicolea zostericola	1	1		1	2				
Notomastus latericeus	2			5					
Notomastus tenuis		3		4	3	5			4
Odontosyllis phosphorea	1			2	2	2	3	3	
Oligochaeta					1	1			
Onuphis elegans									
Onuphis iridescens	1				1				
Onuphis sp. juv					1	1		1	
Ophelia limacina									
Ophelina acuminata									
Ophelina groenlandica		1							2
Owenia fusiformis									
Paleanotus bellis						1		1	
Paranaitis polyniodes				1					
Paraprionospio pinnata						1			2
Pectinaria californiensis							5	1	3
Pectinaria granulata	1								1
Pherusa plumosa									
Pholoe sp. N1				1					
Pholoides asperus		3		73	25	60	1		
Phyllochaetopterus prolifica		13		3	10	2	1		
Phyllodoce cuspidata									1
Phyllodoce groenlandica				1					
Phyllodoce longipes					1	2			
Phyllodoce sp. juv.									
Phylo felix									1
Pionosyllis uraga				4	4				
Pista bansei	1	1		1			2		1

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Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta cont.									
Pista brevibranchiata				2	3	2	2		1
Pista elongata		2		10	7	12	1		
Pista moorei						1			
Pista sp.		1						4	
Pista wui				1					
Platynereis bicanaliculata							4		
Podarke pugettensis				2		1			
Podarkeopsis glabrus						2			
Polycirrus californicus	4	4	3	70	25	28	5	7	4
Polycirrus sp.	10	2	1	11	55	63			
Polycirrus sp. A (sensu Phillips)	4			8			7	6	7
Polycirrus sp. I (sensu Banse)				1	2				
Polycirrus sp. II (sensu Banse)				2	1	2			
Polycirrus sp. V (sensu Banse)	1						3	5	3
Polydora limicola		2			1	2	2		
Polynoidae unident (dried)				1					
Praxillella sp.									
Prionospio (Minuspio) lighti					2				
Prionospio steenstrupi (jubata)	6	3	1	4	4	5	12	8	9
Prionospio multibranchiata				11	6	8	1		
Proceraea cornuta		1		1					
Proceraea sp. N1				1	1				
Proclea graffi				6		1	2		
Protodorvillea gracilis	1			7	2	4			
Pseudopotamilla myriops					1				
Pterocirrus macrocirros						1			
Pygospio elegans				2	1				
Rhodine bitorquata									2
Sabellinae, unident.				2	4	3			
Scalibregma inflatum					1	1			
Schistocomus hiltoni									
Schizobranchia insignis		4		5		1			
Scionella japonica						1			
Scoletoma luti									1
Sigalion spinosus									1
Sphaerodoropsis sphaerulifer									1
Sphaerosyllis ranunculus				1					
Spio filicornis					1				
Spio sp, unident.									
Spiochaetopterus costarum				1		1			
Spiophanes berkeleyorum	1	1		1		1	2	1	
Spiophanes bombyx	1		1	4	2				
Sternaspis scutata									
Streblosoma bairdi						3			
Syllis gracillis					1				
Tenonia priops									
Terebellides californica									
Terebellides cf kobei				1					
Tharyx sp.				2		1			
Thelepus setosus		4		11	11	10			
Typosyllis harti									
Polychaeta Biomass (g)	**0.90**	**4.32**	**3.25**	**11.78**	**9.55**	**6.40**	**2.98**	**0.78**	**1.73**

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 5 of 18)

Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Crustacea									
Aetidius divergens									
Americhelidium variabilum							4	1	
Americhelidium shoemakeri									
Americhelidium rectipalmum	1				1				
Ampelisca agassizi				3	1				
Ampelisca careyi	2		4		3	4			
Ampelisca hancocki									
Ampelisca lobata			3	6	2	3			
Ampelisca unsocalae							2		2
Ampelisca sp.				2					
Anoplodactylus sp.	1	1			2				
Anoplodactylus erectus			2	9		2			
Anoplodactylus viridintestinale			3			3			
Aoroides intermedius							1		
Aoroides spinosus							1		
Aoroides sp. Juv.			2			2			
Araphura breviaria									
Aruga holmesi	3		2			2			
Bathyleberis sp.									
Bathymedon pumilus				1					
Byblis millsi	3		28	35	30	28			
Byblis sp. Juv.							1	1	2
Calanus pacificus	3	2	4	2	2	4	6		6
Calliopius sp.			1	6	2	1			
Callipallene pacifica		1	3	3	2	3		1	
Campulaspis canaliculata					1				
Campulaspis rubromaculata			1			1			
Campylaspis hartae	2	2	1	2	2	1	1	1	
Cancer oregonensis				5					
Caprella irregularis			1		19	1			
Caprella mendax			8	11	5	8			
Caprella sp. juv.			3			3	1		
Caprellidea juv.			4		1	4			
Collembola									2
Crangon sp. juv.		1							
Cylindroleberididae									
Cylindroleberis sp.									
Cyphocaris challengeri							1		1
Desdimelita desdichada			2	1		2	2	1	1
Deutella californica				1	8				
Diastylis santamariensis				1					
Discorsopagurus schmitti				1					
Dulichia sp.				4	2				
Eogammarus confervicolus									3
Ericthonius cf. brasiliensis					1				
Ericthonius rubricornis				6	5				
Eualus subtilis			1	1	1	2	4		
Eudorella pacifica					1				
Eudorellopsis longirostris									
Euphilomedes carcharodonta	1		3	2	2	3	2	5	4
Euphilomedes producta	1			1	1				2

Table E-1. 1998 West Point Outfall Sediment Monitoring
Benthic Community Data (page 6 of 18)

Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Crustacea cont.									
Eusirus columbianus							1	1	
Fabia subquadrata					1				
Gammaridea sp.					1				
Gammaropsis sp.									1
Gammaropsis thompsoni			13	12	8				
Gitanopsis vilordes					1				
Gnathopleustes sp.		2							
Gnorimosphaeroma oregonense									2
Harpacticoida sp.									
Heterophoxus conlanae				1					
Heterophoxus sp.							4		
Hippolytidae sp.				1					
Hippomedon sp.	4	2	1	8	6	1	1		4
Ischyrocerus sp.		2							
Ischyrocerus anguipes group					2				
Leptochelia savignyi					1		1	1	1
Leptostylis abditis									
Leptostylis sp.									
Lophopanopeus bellus diegensis				4					
Mandibulaphoxus mayi									
Mayerella banksia									
Melphidippa cf. borealis							1		
Melphidippidae sp. indet.			1			1			
Melphisana bola				3	1		2	1	
Mesocrangon munitella				1					
Metacrangon munita									
Metaphoxus frequens							1		
Metopa sp.							1		
Microjassa sp.		1							
Nebalia sp.		1					2	1	
Neomysis kadiakensis									
Neotrypaea sp. Juv.									
Nymphon pixellae								1	
Onadarea longimana									
Opisa tridentata		1							
Orchomene decipiens					1				
Oregonia gracilis					1				
Pachynus cf. barnardi	2								
Pagurus sp.									
Parametaphoxus fultoni			1			1			
Parapleustinae sp.									
Parathalestris sp.									
Pardalisca tenuipes			3		2	3			
Philomedes dentata									
Photis sp.		2	16	1	11	16			
Phoxichilidium femoratum				5					
Phoxocephalidae sp.									
Pinnixa schmitti									
Pleurogonium rubicundum									
Poecilostomatoida sp.									
Pontogeneia cf. rostrata					1				

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Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Crustacea cont.									
Protomedeia sp.	1		2	1	1	2	1		
Pugettia gracilis		1							
Rhepoxynius abronius	3	5					9	43	14
Rhepoxynius boreovariatus									
Rutiderma lomae	1		5	5	5	5	1		
Scalpellum columbianum				1					
Scoloura phillipsi	3	1	1		1	1		2	7
Spirontocaris snyderi				1	1				
Stenothoidae sp.		1	3	2	5	3			
Tertanus discaudatus									
Tiron biocellota									
Trachypleustes vancouverensis					1				
Tritella pilimana		2	25	19	11	25	5	1	
Westwoodilla caecula		1					1		1
Crustacea Biomass (g)	**0.05**	**0.02**	**0.01**	**1.59**	**0.79**	**0.20**	**0.05**	**0.07**	**0.03**
Mollusca									
Acila castrensis									
Axinopsida serricata							3	1	3
Bivalvia sp. juv.				1					
Cardiomya pectinata									
Chlamys hastata				21	17	11			
Chlamys rubida									
Clinocardium nuttalli								1	
Clinocardium sp.	1				3	1			
Compsomyax subdiaphana									
Delectopecten sp.				1	8	5		1	
Ennucula tenuis									
Hiatella arctica		25		128	95	138	2	3	2
Lucinoma annulatum				1		3			
Lyonsia californica	6	3		3	9	9		1	2
Macoma carlottensis									
Macoma elimata									
Macoma nasuta								1	
Macoma obliqua				1			1		
Macoma sp. juv.				2	5	2	4	1	
Macoma yoldiformis		1			2		6	10	10
Mactridae sp. Juv.	1	1							
Modiolus modiolus					1		1		
Musculus discors									
Musculus sp.									
Mya arenaria				2	3				
Mytilus sp. Juv.									
Nemocardium centifilosum	5	4		22	59	33	5	1	26
Nuculana minuta									
Nuculana sp. Juv.									
Nutricola lordi							1		
Pandora filosa									
Panopea abrupta							1		
Parvilucina tenuisculpta	1				1		3	8	6

Table E-1. 1998 West Point Outfall Sediment Monitoring
Benthic Community Data (page 8 of 18)

Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Mollusca cont.									
Pectinidae sp. juv.		1		1		9			
Pododesmus									
Rochefortia tumida				1	1	3	1	1	1
Scintillona bellerophon						1			
Solamen columbiana					1	1	1	1	
Solen sicarius									
Tellina modesta							5	2	1
Tellina nuculoides							1		
Yoldia scissurata									
Aoelidiacea sp.					1	4			
Alvania compacta		1		2	6				
Astyris gausapata		3			1			3	2
Lirobittium sp.									
Lirobittium munitum									
Caecum sp.									
Cephalispidea sp.									
Cylichna alba						1		1	
Cylichna attonsa				2					
Crepipatella lingulata		1		2	1				
Epitonium sp. juv.		1		2					
Gastropoda sp. juv.									
Gastropteron pacificum								1	
Haminoea sp.									
Lacuna sp.									
Lirobittium attenuatum	1								
Margarites pupillus						2	1		1
Margarites sp. juv.									
Melanella montereyensis					1				
Melanochlamys diomedea									
Odostomia spp.		4		5	4	9		3	1
Olivella baetica	15	7	20	1		1	11	13	7
Philine sp.						2			
Polygireulima rutila						2	1		1
Retusa obtusa									
Rictaxis punctocaelatus		2				1			
Trichotropis cancellata	1	1				3			
Turbonilla sp.				3				1	
Turridae sp.									
Volvulella sp.									
Mollusca Biomass (g)	**3.84**	**1.79**	**3.47**	**1.19**	**0.99**	**0.76**	**0.99**	**2.17**	**1.00**
Miscellaneous									
Abietinaria sp.									
Aglaophenia sp.		P							
Amphiodia spp.									
Amphiodia urtica									
Amphipholis sp.		8		12	1		1		1
Amphipholis squamata		2		3	2				
Amphiuridae spp.									

Table E-1. 1998 West Point Outfall Sediment Monitoring
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Taxa	WPD215N			WPD215S			WP1500N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Miscellaneous cont.									
Athecata spp. Indet.				P					
Barentsia benedeni					P	P			
Bimeria sp. Indet.		P		P					
Bowerbankia gracilis								P	
Bugulidae sp.					P				
Caulibugula occidentalis				P					
Cerebratulus spp.				5	1				
Cerebratulus montgomeryi			1	1					
Chiridota sp.									
Clytia sp.		P							
Crisia sp.				P					
Cucumaria piperata				5					
Dendrochirotida spp.									
Distaplia occidentalis									
Emplectonematidae sp.		1							
Euphysa ruthae				2.00		3.00			
Golfingia vulgaris		1			5	3			
Halacaridae spp.									
Hoplonemertea spp.		1		4			5		
Kaburakia excelsa									
Lafoea sp.									
Leptoplanidae spp.				1		1			2
Leptosynapta clarki	1					1			
Leptosynapta transgressor				1	1		1		
Lineidae spp.		1		3	6	6			
Molgula sp.						1			
Monostylifera sp.									
Nematoda				7	1	6			
Nynantheae spp.		1	2	14	1	1	2	1	1
Obelia sp.				P				P	
Ophiurida spp.					1				
Ophiura sp.					1				
Ophiura luetkenii							1		
Pachycerianthus fimbriatus				2	1				
Pentamera pediparva				3	3	1			
Pentamera spp.				1					
Pentamera lissoplaca				2	1	2			
Plumularia sp.									
Phlebobranchia sp.					1				
Sertularella sp.		P		P					
Sertulariidae sp.							P		
Solasteridae sp.				1.00		1.00			
Thysanocardia nigra					2	2			
Tubulanus spp.				2	1		1		
Tubularia spp.		2		2		4			
Valvatida sp.				1					
Miscellaneous Biomass (g)	**0.76**	**0.06**	**0.85**	**1.64**	**0.68**	**0.18**	**0.14**	**0.01**	**0.002**
Total Sample Biomass (g)	**5.56**	**6.18**	**7.58**	**16.21**	**12.02**	**7.54**	**4.15**	**3.02**	**2.77**

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 10 of 18)

Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta									
Amage anops				1					
Ampharete cf. crassiseta				7	8	6			
Amphicteis mucronata				1					
Amphitrite robusta				1	1				
Anobothrus gracilis				2	4				
Aphelochaeta sp.		2		1	4	1	1		
Aphelochaeta sp. N2									
Apistobranchus ornatus									
Aricidea catherinae									
Aricidea hartleyi									
Aricidea lopezi				3	5	7			
Aricidea sp.									
Artacamella hancocki					1				
Asabellides lineata		1		8	15	13			
Asclerocheilus beringianus				2	3	8			
Autolytinae (epitokous)				1	2	2			
Autolytus magnus				1	1	1			
Autolytus verrilli									
Barantolla nr. americana		1							
Betapista dekkerae				4	7	7			
Bispira elegans					4	1			
Boccardiella hamata						1			
Capitella capitata hyperspecies					1				
Caulleriella pacifica		1			2				
Chaetopteridae spp. Indet.									
Chaetopterus variopedatus					1				
Chaetozone acuta		2		3	6	4			
Chaetozone nr. setosa									
Chaetozone sp. N2									
Chaetozone sp.					1				
Chone aurantiaca			1	2	2	3			
Chone sp.					1	1			
Cirratulus sp. juv		37		4	1	1			
Cirratulus spectabilis									
Cirratulidae, unident.					5	1			
Clymenura columbiana				1					
"Clymenura" gracilis									
Cossura pygodactylata									
Demonax medius				3	4	3	1		
Demonax sp.				2	8	6			
Diopatra ornata				9	4	6			
Dipolydora akaina		8		43	124	72			
Dipolydora socialis				1	5	1			
Dipolydora sp.				2	11	2			
Dorvillea annulata				1		4			
Drilonereis falcata						1			
Drilonereis longa				1					
Ehlersia heterochaeta		1		7	10	10			
Ehlersia hyperioni		1		5	17	17	1		
Enipo nr. chuckchi				1					

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 11 of 18)

Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta cont.									
Eteone sp.		1		2					
Euclymene cf. zonalis									
Euchone incolor									
Euclymeninae sp.				4	7	1			
Eudistylia catherinae									
Eudistylia polymorpha									
Eudistylia vancouveri					1	1			
Eudistylia sp.				2		1			
Eulalia californiensis				3	4	9			
Eulalia quadrioculata									
Eumida longicornuta		1		5	8	7	1		
Eumida sp.				1					
Eunoe oerstedi (?)									
Eusyllis blomstrandi									
Eusyllis habei				2	16	2			
Exogone dwisula					3				
Exogone lourei				6	13	5			
Galathowenia oculata				1	4				
Gattyana ciliata						1			
Gattyana cirrosa				8	5	4			
Glycera americana	1			1					
Glycera nana			1		2		3		
Glycinde armigera	1	4	2	2	3	2			
Glycinde polygnatha				1	3				
Goniada maculata	1			1		3			
Harmothoe extenuata				1	1	1			
Harmothoe imbricata									
Harmothoe multisetosa				2	4	7			
Harmothoinae spp. indet.									
Idanthyrsus saxicavus				3	3	10			
Isocirrus longiceps						2			
Lanassa nordenskioeldi		1		1	4	2			
Lanassa venusta					3	2			
Laonice pugettensis				1	1				
Laonice spp. juv.									
Leitoscoloplos pugettensis		1							
Lepidasthenia berkeleyae				1					
Lepidasthenia longicirrata				5	3	4			
Lepidonotus spiculus					2	1			
Lepidonotus squamatus				3	12	6			
Levinsenia gracilis					1				
Lumbrineris californiensis				10	19	15			
Lumbrineris cruzensis						2			
Lumbrineris sp. juv.									
Lumbrineris latreilli									
Lysilla loveni						1			
Lysilla pacifica									
Magelona longicornis	1	3	2	1	5				
Magelona sacculata									
Maldane sarsi				1					

Table E-1. 1998 West Point Outfall Sediment Monitoring
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Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta cont.									
Malmgreniella bansei									
Malmgreniella berkeleyorum									
Malmgreniella liei									
Malmgreniella nigralba									
Malmgreniella scriptoria				2					
Malmgreniella sp.		1							
Mediomastus californiensis									
Mediomastus sp.				1	4	1			
Megalomma splendida				19	35	46			
Melinna oculata									
Micropodarke dubia				1	5	1			
Monticellina tesselata						2			
Myxicola infundibulum				2	6	14			
Naineris quadricuspida						1			
Naineris uncinata		1							
Neosabellaria cementarium		1		75	150	76			
Nephtys caeca				1					
Nephtys cornuta			1						
Nephtys ferruginea (signifera)	1	1	1	4	8	8			1
Nereis procera				4					
Nicomache lumbricalis					2				
Nicomache personata				10		1			
Nicolea zostericola				1					
Notomastus latericeus		1							
Notomastus tenuis				7	6	6			
Odontosyllis phosphorea				3	1	4			
Oligochaeta									
Onuphis elegans		2		1	1				
Onuphis iridescens	2			2	1	2			
Onuphis sp. juv		1		2					
Ophelia limacina	1							1	
Ophelina acuminata				2			1		
Ophelina groenlandica									
Owenia fusiformis					2	2			
Paleanotus bellis				1	1				
Paranaitis polyniodes									
Paraprionospio pinnata				1					
Pectinaria californiensis									
Pectinaria granulata						2			
Pherusa plumosa				1		1			
Pholoe sp. N1									
Pholoides asperus				93	216	134			
Phyllochaetopterus prolifica						1			
Phyllodoce cuspidata					1	1			
Phyllodoce groenlandica									
Phyllodoce longipes					1	2			
Phyllodoce sp. juv.				2					
Phylo felix									
Pionosyllis uraga					3	1			
Pista bansei				2	1	3			

Table E-1. 1998 West Point Outfall Sediment Monitoring
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Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Polychaeta cont.									
Pista brevibranchiata				1	4	6			
Pista elongata				7	5	4			
Pista moorei						2			
Pista sp.				3		1			
Pista wui						1			
Platynereis bicanaliculata						1			
Podarke pugettensis									
Podarkeopsis glabrus									
Polycirrus californicus		3		9	12	3			
Polycirrus sp.	3	8		20	25	14	6	2	2
Polycirrus sp. A (sensu Phillips)		2							
Polycirrus sp. I (sensu Banse)									
Polycirrus sp. II (sensu Banse)							2	2	1
Polycirrus sp. V (sensu Banse)									
Polydora limicola				1	3	8			
Polynoidae unident (dried)									
Praxillella sp.									
Prionospio (Minuspio) lighti				2	1				
Prionospio steenstrupi (jubata)	4	1	2	5	4	5			
Prionospio multibranchiata		1		4	12	9			
Proceraea cornuta									
Proceraea sp. N1					3	1			
Proclea graffi				10	16	11			
Protodorvillea gracilis		1		2	4	7			
Pseudopotamilla myriops									
Pterocirrus macrocirros									
Pygospio elegans				2	23	6			
Rhodine bitorquata					1				
Sabellinae, unident.				2	4	2			
Scalibregma inflatum									
Schistocomus hiltoni				1		1			
Schizobranchia insignis									
Scionella japonica				1	1	2			
Scoletoma luti									
Sigalion spinosus									
Sphaerodoropsis sphaerulifer									
Sphaerosyllis ranunculus									
Spio filicornis									
Spio sp, unident.						1			
Spiochaetopterus costarum				1		4			
Spiophanes berkeleyorum					2	3		1	
Spiophanes bombyx	1		1		1				
Sternaspis scutata									
Streblosoma bairdi				2	1				
Syllis gracillis					1				
Tenonia priops									
Terebellides californica				1					
Terebellides cf kobei				2	1	2			
Tharyx sp.					3				
Thelepus setosus				9	10	9			
Typosyllis harti						2			
Polychaeta Biomass (g)	**0.26**	**0.93**	**0.14**	**6.47**	**4.78**	**8.58**	**0.18**	**0.23**	**0.05**

Table E-1. 1998 West Point Outfall Sediment Monitoring
Benthic Community Data (page 14 of 18)

Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Crustacea									
Aetidius divergens		1							
Americhelidium variabilum			1						
Americhelidium shoemakeri								1	
Americhelidium rectipalmum									
Ampelisca agassizi				1	1	3			
Ampelisca careyi		2		1	2	1			
Ampelisca hancocki									
Ampelisca lobata				5	16	4			
Ampelisca unsocalae									
Ampelisca sp.						2			
Anoplodactylus sp.									
Anoplodactylus erectus									
Anoplodactylus viridintestinale				5	2	3			
Aoroides intermedius									
Aoroides spinosus									
Aoroides sp. Juv.									
Araphura breviaria									
Aruga holmesi							1		
Bathyleberis sp.									
Bathymedon pumilus									
Byblis millsi				27	29	15			
Byblis sp. Juv.									
Calanus pacificus				1		1			
Calliopius sp.									
Callipallene pacifica					2	6			
Campulaspis canaliculata									
Campulaspis rubromaculata				2		1			
Campylaspis hartae				6	7	6			
Cancer oregonensis					1	3			
Caprella irregularis					12	30			
Caprella mendax				9	7	20			
Caprella sp. juv.				10	4	8			
Caprellidea juv.									
Collembola									
Crangon sp. juv.									
Cylindroleberididae									
Cylindroleberis sp.									
Cyphocaris challengeri								1	
Desdimelita desdichada									
Deutella californica									
Diastylis santamariensis					1	3			
Discorsopagurus schmitti					1				
Dulichia sp.									
Eogammarus confervicolus							2		1
Ericthonius cf. brasiliensis				1		4			
Ericthonius rubricornis				1			1	1	
Eualus subtilis				2	1	1			
Eudorella pacifica				1	10	2			
Eudorellopsis longirostris				1	4	3			
Euphilomedes carcharodonta				2	3	7			
Euphilomedes producta				3	2				

Table E-1. 1998 West Point Outfall Sediment Monitoring
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Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Crustacea									
Eusirus columbianus									
Fabia subquadrata					1				
Gammaridea sp.					2	3			
Gammaropsis sp.							1		
Gammaropsis thompsoni				2	1	1			
Gitanopsis vilordes					1				
Gnathopleustes sp.									
Gnorimosphaeroma oregonense							1		
Harpacticoida sp.					8				
Heterophoxus conlanae									
Heterophoxus sp.				2	3	2			
Hippolytidae sp.						1			
Hippomedon sp.	3		5			3			
Ischyrocerus sp.									
Ischyrocerus anguipes group									
Leptochelia savignyi									
Leptostylis abditis									
Leptostylis sp.				1					
Lophopanopeus bellus diegensis									
Mandibulaphoxus mayi							4	9	2
Mayerella banksia									
Melphidippa cf. borealis									
Melphidippidae sp. indet.									
Melphisana bola						1			
Mesocrangon munitella					1				
Metacrangon munita				1					
Metaphoxus frequens									
Metopa sp.									
Microjassa sp.						2			
Nebalia sp.			1						2
Neomysis kadiakensis									
Neotrypaea sp. Juv.									
Nymphon pixellae					2				
Onadarea longimana							2		
Opisa tridentata		1							
Orchomene decipiens	2								
Oregonia gracilis									
Pachynus cf. barnardi									
Pagurus sp.			1						
Parametaphoxus fultoni						2			
Parapleustinae sp.					2				
Parathalestris sp.	1								
Pardalisca tenuipes				7	6	3			
Philomedes dentata						1			
Photis sp.				8	11	25			
Phoxichilidium femoratum				3					
Phoxocephalidae sp.						1			
Pinnixa schmitti									
Pleurogonium rubicundum									
Poecilostomatoida sp.					2				
Pontogeneia cf. rostrata									

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 16 of 18)

	WP230D			WPD430S			WPD430N		
Taxa	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Crustacea									
Protomedeia sp.		1	1			1			
Pugettia gracilis					1				
Rhepoxynius abronius		1	1	1					
Rhepoxynius boreovariatus									
Rutiderma lomae				10	37	6			
Scalpellum columbianum				1	3	6			
Scoloura phillipsi				2	1	3			
Spirontocaris snyderi					1	1			
Stenothoidae sp.				5	6	2			
Tertanus discaudatus				1					
Tiron biocellota				1		1			
Trachypleustes vancouverensis									
Tritella pilimana				3		1		1	
Westwoodilla caecula			1		1				
Crustacea Biomass (g)	**0.003**	**0.01**	**0.15**	**0.44**	**0.44**	**0.92**	**0.02**	**0.02**	**0.01**
Mollusca									
Acila castrensis									
Axinopsida serricata				2					
Bivalvia sp. juv.									
Cardiomya pectinata					2				
Chlamys hastata				6	1	3			
Chlamys rubida						1			
Clinocardium nuttalli			1			1			
Clinocardium sp.					1	4			
Compsomyax subdiaphana									
Delectopecten sp.				9	11	4			
Ennucula tenuis		1							
Hiatella arctica				128	330	200			
Lucinoma annulatum									
Lyonsia californica				9	7	6			
Macoma carlottensis		1							
Macoma elimata					1				
Macoma nasuta									
Macoma obliqua				3					
Macoma sp. juv.		1		4	7	5			1
Macoma yoldiformis				2	1	3			
Mactridae sp. Juv.									
Modiolus modiolus				2	2				
Musculus discors									
Musculus sp.									
Mya arenaria					2	1			
Mytilus sp. Juv.									
Nemocardium centifilosum				111	144	141			1
Nuculana minuta				1	5				
Nuculana sp. Juv.						1			
Nutricola lordi									
Pandora filosa					1				
Panopea abrupta									
Parvilucina tenuisculpta				4	4	4			

Table E-1. 1998 West Point Outfall Sediment Monitoring
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Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Mollusca cont.									
Pectinidae sp. juv.					13				
Pododesmus					1				
Rochefortia tumida				1	4	2			
Scintillona bellerophon				6	3				
Solamen columbiana				6	2	1			
Solen sicarius									
Tellina modesta									
Tellina nuculoides	1	1	1						1
Yoldia scissurata									
Aoelidiacea sp.						1			
Alvania compacta				2	13	7			
Astyris gausapata			1	1	1	2			1
Lirobittium sp.				1					
Lirobittium munitum				1					
Caecum sp.				1.00					
Cephalispidea sp.						1			
Cylichna alba									
Cylichna attonsa				1		2			
Crepipatella lingulata					3	4			
Epitonium sp. juv.									
Gastropoda sp. juv.							1		
Gastropteron pacificum									
Haminoea sp.									
Lacuna sp.									
Lirobittium attenuatum									
Margarites pupillus				1	4	6			
Margarites sp. juv.					1				
Melanella montereyensis				4	2	1			
Melanochlamys diomedea						1			
Odostomia spp.				4	19	6			
Olivella baetica	4	26	19			1	10	14	5
Philine sp.									
Polygireulima rutila				1	1	2			
Retusa obtusa						2			
Rictaxis punctocaelatus		1							
Trichotropis cancellata				2		6			
Turbonilla sp.				1	1				
Turridae sp.					1				
Volvulella sp.									
Mollusca Biomass (g)	**0.99**	**4.81**	**3.99**	**2.83**	**4.85**	**1.58**	**2.16**	**1.55**	**1.13**
Miscellaneous									
Abietinaria sp.						P			
Aglaophenia sp.				P		P			
Amphiodia spp.									
Amphiodia urtica									
Amphipholis sp.				6	5	7	1		
Amphipholis squamata				6	4	3			
Amphiuridae spp.				1		1			

Table E-1. 1998 West Point Outfall Sediment Monitoring Benthic Community Data (page 18 of 18)

Taxa	WP230D			WPD430S			WPD430N		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Miscellaneous cont.									
Athecata spp. Indet.						P			
Barentsia benedeni				P		P			
Bimeria sp. Indet.									
Bowerbankia gracilis									
Bugulidae sp.				P		P			
Caulibugula occidentalis				P		P			
Cerebratulus spp.					1				
Cerebratulus montgomeryi				1					
Chiridota sp.				1					
Clytia sp.									
Crisia sp.									
Cucumaria piperata				3	6	4			
Dendrochirotida spp.						1			
Distaplia occidentalis						P			
Emplectonematidae sp.									
Euphysa ruthae						1.00			
Golfingia vulgaris				3	3	7			
Halacaridae spp.				2		1			
Hoplonemertea spp.				1			1		
Kaburakia excelsa									
Lafoea sp.				P					
Leptoplanidae spp.				2	1	6			
Leptosynapta clarki					1				
Leptosynapta transgressor									
Lineidae spp.				6	8	10			
Molgula sp.				2		2			
Monostylifera sp.									
Nematoda	1	1		9	28	159	2		
Nynantheae spp.				9	1	3			2
Obelia sp.				P					
Ophiurida spp.									
Ophiura sp.					1				
Ophiura luetkenii									
Pachycerianthus fimbriatus						1			
Pentamera pediparva				3	15	10			
Pentamera spp.				2		1			
Pentamera lissoplaca				1		1			
Plumularia sp.						P			
Phlebobranchia sp.					1				
Sertularella sp.									
Sertulariidae sp.									
Solasteridae sp.				3.00	4.00	3.00			
Thysanocardia nigra				1					
Tubulanus spp.				2	1		2	1	
Tubularia spp.				3		3			
Valvatida sp.									
Miscellaneous Biomass (g)	**0.02**	**0.02**	**0.0**	**3.98**	**7.22**	**3.30**	**0.001**	**0.001**	**0.04**
Total Sample Biomass (g)	**1.28**	**5.77**	**4.28**	**13.71**	**17.29**	**14.38**	**2.36**	**1.80**	**1.22**

Table F-1. Location of 1998 Ambient Stations

Station	Location	Bottom Depth (m)	Northing	Easting	Latitude	Longitude
Offshore						
KSBP01	Point Jefferson	260	275214	1247880	47 44 36	122 25 44
KSRU02	Lake WA Ship Canal	not available	247213	1254282	47 40 01	122 24 02
LSNT01	Dolphin Point	207	198653	1245194	47 32 00	122 26 00
JSTU01	Point Wells	40	288694	1254480	47 46 50	122 24 11
LTED04	Elliott Bay	90	224199	1264780	47 36 16	122 21 22
KSPS01	Shilshole Bay	20	252651	1250971	47 40 54	122 24 52
LSML01	West Seattle	247	209645	1242953	47 33 48	122 26 36
LTDF01	inner Elliott Bay	33	225366	1267270	47 36 28	122 20 46
LSCI01	central basin	204	228252	1240053	47 36 51	122 27 24
LSCK01	central basin	198	226919	1242460	47 36 38	122 26 48
LSCW02	outer Elliott Bay	183	227106	1256271	47 36 43	122 23 27
LSDZ01	inner Elliott Bay	157	226077	1258823	47 36 33	122 22 49
LSEZ01	inner Elliott Bay	134	224109	1259158	47 36 14	122 22 44
LTCA02	inner Elliott Bay	132	226303	1260915	47 36 36	122 22 19
Intertidal						
JSWX01	Richmond Beach	--	284335	1257771	47 46 07	122 23 26
JSVW04	Richmond Beach	--	286171	1257194	47 46 25	122 23 35
KSXS02	Magnolia	--	237125	1251031	47 38 21	122 24 46
KSUR01	Magnolia bluff	--	241466	1249640	47 39 03	122 25 08
MTEC01	Seahurst park	--	174011	1260832	47 27 59	122 22 09
KSLU03	Golden Gardens	--	256354	1253305	47 41 31	122 24 19
MTLD03	Normandy Park	--	165142	1263285	47 26 33	122 21 26
MSSM05	Tramp Harbor	--	154907	1243459	47 24 47	122 26 16
KRJY01	Fay Bainbridge Park	--	261334	1228574	47 42 14	122 30 26
KSQU01	Shilshole Bay	--	249160	1253227	47 40 20	122 24 18
KSYV02	Magnolia	--	234436	1254742	47 37 55	122 23 51
LTAB01	inner Elliott Bay	--	232168	1261581	47 37 34	122 22 11
LTEH02	inner Elliott Bay	--	222696	1269069	47 36 02	122 20 19
LSGY01	Seacrest	--	218711	1258776	47 35 21	122 22 48
LSFX01	Duwamish Head	--	222264	1256896	47 35 55	122 23 16
LSHV01	West Seattle	--	217159	1253750	47 35 04	122 24 01
LSTU01	Lincloln Park	--	197288	1253039	47 31 48	122 24 05
LSVW01	Fauntleroy Cove	--	194969	1254846	47 31 26	122 23 38

Table F-2. Location of 1998 Point Source Stations

Station	Location	Bottom Depth (m)	Northing	Easting	Latitude	Longitude
Offshore						
WP430N	West Point outfall	78	245512	1242559	47 39 41	122 26 52
WP215N	West Point outfall	80	245405	1242338	47 39 40	122 26 56
WP230P	West Point outfall	77	245225	1242333	47 39 39	122 26 56
WP215S	West Point outfall	80	244992	1242397	47 39 36	122 26 55
WP430S	West Point outfall	79	244800	1242452	47 39 34	122 26 54
WPD430N	West Point outfall	70	245633	1242899	47 39 43	122 26 47
WPD215N	West Point outfall	70	245432	1242803	47 39 41	122 26 49
WP230D	West Point outfall	70	245219	1242755	47 39 39	122 26 49
WPD215S	West Point outfall	70	245000	1242686	47 39 36	122 26 50
WPD430N	West Point outfall	70	244793	1242667	47 39 34	122 26 51
WP1500N	West Point outfall	77	246459	1243578	47 39 51	122 26 38
WP1500S	West Point outfall	75	243710	1242817	47 39 24	122 26 48
KSSK02	West Point outfall	77	245156	1242705	47 39 38	122 26 50
LSEP01	Renton outfall	192	223637	1247496	47 36 12	122 25 33
CP245/W310	Carkeek Park	30	263754	1258176	47 42 45	122 23 10
CP246/W312	Carkeek Park	39	263857	1258109	47 42 46	122 23 12
CP246/W315	Carkeek Park	54	263862	1257836	47 42 46	122 23 15
CP246/W319	Carkeek Park	72	263868	1257562	47 42 46	122 23 19
CP248/W308	Carkeek Park	22	264055	1258319	47 42 48	122 23 08
KSIV01	Carkeek Park	28	261370	1255802	47 42 21	122 23 44
KSIW02	Carkeek Park	36	262458	1257124	47 42 32	122 23 25
LSKQ06	Alki Outfall	48	212165	1248493	47 34 14	122 25 16
LTBC41	Denny Way	18	230921	1261799	47 37 02	122 21 44
Intertidal						
KSHZ03	Carkeek Park	--	263736	1259784	47 42 45	122 22 46
KTHA01	Piper's Creek	--	263290	1261108	47 42 41	122 22 27
KSSN04	West Point	--	245728	1246032	47 39 45	122 26 02
KSSN05	West Point	--	245272	1245980	47 39 40	122 26 03
LSKR01	Alki Point	--	213666	1249416	47 34 29	122 25 03
LSKS01	Alki Point	--	212834	1250427	47 34 21	122 24 48