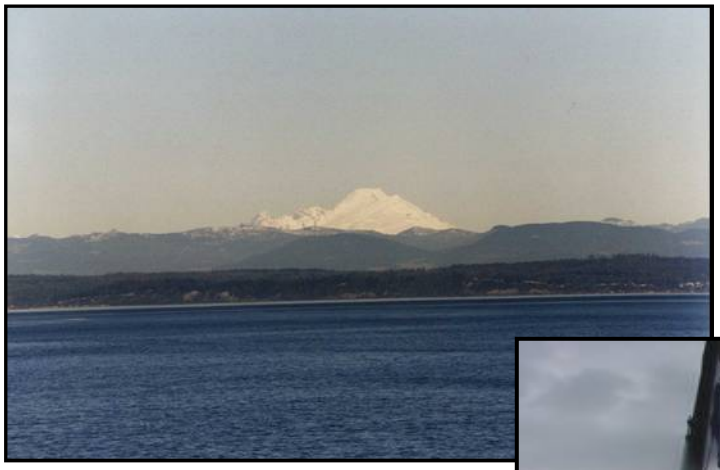

Water Quality Status Report For Marine Waters, 2002 and 2003

KING COUNTY

August 2005

WATER QUALITY STATUS REPORT FOR MARINE WATERS, 2002 and 2003

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EXECUTIVE SUMMARY

The King County Department of Natural Resources and Parks Wastewater Treatment Division operates and maintains three wastewater treatment plants (West Point, South Plant, and Vashon Island) and two combined sewer overflow treatment plants (Alki and Carkeek) that discharge treated effluent into the Central Puget Sound Basin. King County conducted monitoring in 2002 and 2003 as part of a routine marine monitoring program to verify that these discharges are not degrading water quality within the vicinity of the treatment plant outfalls and to identify pollution problems from other sources. The monitoring program consisted of two components: outfall monitoring focusing on areas near treatment plant discharges and ambient monitoring focusing on areas outside the immediate vicinity of treatment plant discharges. Monitoring areas outside the influence of outfall discharges is necessary in order to assess background conditions in central Puget Sound. The marine monitoring program is part of an inter-governmental monitoring effort, the Puget Sound Ambient Monitoring Program (PSAMP).

In 2002 and 2003, 12 outfall sites were sampled: six offshore and six beach. Water samples were collected monthly at all 12 sites and analyzed for fecal indicator bacteria (fecal coliforms and enterococci). Nutrients and physical parameters were also analyzed at nine and ten sites in 2002 and 2003, respectively. Dissolved metals were analyzed in water samples from five beach sites in 2002. Sediment and shellfish were collected in August at four beach sites both years and analyzed for organic compounds, metals, and conventional parameters. Algae samples were collected at the same four sites and analyzed for metals. Offshore sediments were not collected at the treatment plant outfalls in either year, with the exception of the Denny Way CSO site where sediment was collected in 2002 and analyzed for organic compounds, metals, and conventional parameters. Sediments at the treatment plant outfalls are currently collected on a rotational basis once every five years based upon National Pollutant Discharge Elimination System (NPDES) permit cycles.

Twenty-six and twenty-two sites were sampled in 2002 and 2003, respectively, for the ambient monitoring program. In 2002, 11 offshore, 1 creek, and 14 beach sites were sampled and in 2003, 5 offshore, 1 creek, and 16 beach sites were sampled. Water was analyzed for fecal indicator bacteria at 20 and 22 sites in 2002 and 2003, respectively and at 10 sites for nutrients and physical parameters. Dissolved metals were analyzed in water samples from four beach sites in 2002. Offshore and beach sediments were collected at six and four sites respectively in 2002 and beach sediments were collected at three sites in 2003. Shellfish and algae were collected at two sites in 2002 and three sites in 2003. Sediment and shellfish were analyzed for organic compounds, metals, and conventional parameters and algae samples were analyzed for metals.

The Marine Outfall Siting Study (MOSS) sampling program was developed to assist in siting the marine outfall for the Brightwater Treatment System. Beach water sampling began in March 2000 for this program and continued until March 2002 at six sites; three sites were sampled monthly throughout 2002. Water samples were collected at all nine sites and analyzed for fecal indicator bacteria (fecal coliforms, enterococci, and *E. coli*), nutrients, and

physical parameters. Sediment, shellfish, and algae were collected at one site and analyzed for the same parameters as those analyzed for the outfall and ambient programs.

PRECIPITATION DATA

A drier than normal year occurred in 2002 with an annual rainfall total of 31.36 inches compared to the 30-year average of 36.54 inches. Between August and November, 2002 was an usually dry period with only 39% of the normal rainfall amount during these months. This prolonged dry spell also brought warm temperatures. A wetter than normal year occurred in 2003 with an annual rainfall total of 41.78 inches. It rained 5.02 inches on October 20, 2003. If the five inches that fell on this day are excluded from the annual rainfall total, 2003 would have been an average rainfall year.

MONITORING RESULTS

Water

Water quality monitoring results in 2002 and 2003 were consistent with past findings and indicated the following:

- Fecal coliforms in offshore waters were consistently low, with over 75% of all samples collected in 2002 and 2003 having either no detectable levels or 1 colony forming unit (CFU)/100 ml.
- Fecal indicator bacteria levels measured at the wastewater treatment plant outfalls were similar to ambient sites.
- Sites that failed fecal coliform water quality standards were in areas with reduced circulation and/or near a freshwater source.
- A downward trend in geometric means for beach stations was noted for the past several years, but may be related to annual precipitation patterns.
- A well-mixed water column persisted throughout most of the year (for both 2002 and 2003), with seasonal stratification occurring in the summer corresponding to a rise in air temperature and solar radiation.
- Dissolved oxygen concentrations were above the 7.0 mg/L extraordinary water quality standard for most of the year, except during late summer and fall when oceanic water containing naturally low amounts of dissolved oxygen entered the Sound. Concentrations rarely dropped below 5.0 mg/L.
- All ammonia concentrations were well below the Washington State ammonia chronic criterion. The highest ammonia concentrations were detected at the West Point and South Plant outfalls at the trapping depth of each outfall plume.
- Nutrient levels in the water column fluctuated seasonally with phytoplankton growth and uptake.

- The timing of phytoplankton blooms was similar to previous years. A strong bloom was evident at most stations in May and June of 2002 and in July and August in 2003.
- Dissolved metal concentrations at beach sites were below the water quality criterion for each metal and concentrations near wastewater and CSO outfalls were similar to ambient sites. Metal concentrations showed little variability, with the exception of copper. The highest copper values were detected at sites with heavy commercial vessel traffic, possibly corresponding to the use of copper-based antifouling paints on ship hulls. Copper is also a constituent in wood preservatives utilized on pilings.

Sediment

Sediments at the five treatment plant outfalls (West Point, South Plant, Vashon, Alki CSO, and Carkeek CSO) were not collected in either 2002 or 2003 as they are collected on a rotational basis per NPDES permits. Results from offshore sediments collected in 2002 at ambient sites and the Denny Way CSO outfall, and beach sediments collected in both 2002 and 2003 were similar to past findings and indicated the following:

- Silver was only detected in offshore sediments at the sites closest to the Seattle waterfront, where there is known historical contamination.
- Arsenic and mercury were detected in all offshore sediments but none of the beach sediments. Concentrations for both metals were highest at sites along the Seattle waterfront and mercury exceeded the Sediment Quality Standard (SQS) at two of the three waterfront sites.
- Beach sediments contained typical metal concentrations and no value exceeded an SQS.
- The highest concentrations of PCBs, PAHs, and tributyltin were detected at the three stations closest to the Seattle waterfront. PCB and PAH values did not exceed SQSs. An SQS does not exist for tributyltin.
- The phenol concentration measured at the station near the Shilshole Bay Marina exceed the SQS.
- Beach sediments near treatment plant and CSO outfalls (excluding the Denny Way CSO site along the waterfront) had concentrations of metals and organics comparable to or lower than ambient sites.

Shellfish

Shellfish tissues (butter clams) were collected in August of both 2002 and 2003 and analyzed for metals and organic compounds. A minimum of 5 clams were collected and composited into one sample for each site. Results indicated the following and were similar to past findings:

- Butter clams had a low lipids content, less than 1%.

- Tissues contained arsenic, cadmium, chromium, lead, and nickel concentrations below the Food and Drug Administration (FDA) Level of Concern for each of these metals. FDA Levels of Concern were established for the protection of human health from shellfish consumption.
- Mercury concentrations were below the FDA Action Level. Shellfish cannot be commercially traded if values are over this Action Level.
- Metal concentrations in clam tissues from sites near treatment plant outfalls were similar to tissue concentrations from ambient sites.
- Benzoic acid and beta-BHC were the only organic compounds detected.
- Fecal indicator bacteria levels in clam tissues were highly variable both spatially and temporally.

Macroalgae

Macroalgae (algae) samples consisting entirely of the edible algae, *Ulva fenestrata* (known as sea lettuce), were collected in August of 2002 and 2003. Results were consistent with past findings and indicated the following:

- Selenium, beryllium, and mercury were not detected in either year, nor in previous years.
- Metal concentrations varied spatially.
- Concentrations in samples collected near treatment plant outfalls were equivalent to concentrations measured in samples from ambient sites.

SECTION 1
Introduction

1.1 Overview

The King County Department of Natural Resources and Parks and its predecessor agency Metro have a long history of water quality improvements and monitoring water quality in Puget Sound. As part of an ongoing intergovernmental effort to maintain and improve Puget Sound's water quality, the King County Wastewater Treatment Division oversees regional sewerage collection, treatment processes, and disposal systems that discharge wastewater to the Central Puget Sound Basin and waters flowing into the Sound. King County's Water and Land Resources Division's (WLRD) Marine and Sediment Assessment Group supports a comprehensive long-term marine monitoring program that assesses water quality in the Central Puget Sound Basin on behalf of and in coordination with the King County Wastewater Treatment Division.

The marine monitoring program is part of an intergovernmental monitoring effort, the Puget Sound Ambient Monitoring Program (PSAMP), with the County's program focusing primarily on water quality within King County boundaries. Other agencies involved in PSAMP that monitor water quality and/or environmental health of Puget Sound include the Washington Department of Ecology (water and sediment quality), Washington Department of Fish & Wildlife (contaminants in fish tissues, herring and rockfish populations), Washington Department of Natural Resources (nearshore vegetation and habitat), Washington Department of Health (shellfish growing areas and contaminants), National Oceanic and Atmospheric Administration (contaminants in fish), and U.S. Fish & Wildlife (contaminants in birds and fish). These agencies have monitoring stations throughout the Sound, including sites within King County. The main distinction between these programs and King County’s monitoring program is that the County has a larger number of stations within a concentrated area which are targeted near wastewater treatment plant discharges. Although other agencies have monitoring stations within King County, the stations do not overlap with the County's stations which allows a broader area of Puget Sound marine waters to be monitored.

The objectives of the marine monitoring program are to provide an understanding of water quality within King County and to assess water quality near the County's wastewater plant outfalls to identify if discharges are affecting water quality. The County maintains a long-term dataset, with over 35 years of data collected at some sites, that provides insight to natural variations and a basis to assess and measure recent water quality conditions near outfalls and throughout the entire study area.

King County is planning to build a new regional wastewater treatment plant in southern Snohomish County that will discharge secondary treated effluent through a marine outfall located in southwest Snohomish County. In support of siting a suitable location for the

marine outfall, an extensive marine monitoring program called the Marine Outfall Siting Study (MOSS) was initiated in October 1998 and continued throughout 2002.

This report summarizes results of King County's National Pollutant Discharge Elimination System (NPDES) and ambient marine monitoring programs for 2002 and 2003. In addition, MOSS water quality sampling results for 2002 are summarized in this report. The report provides an overview of the sites monitored, matrices (e.g., water and sediment) sampled, parameters measured, and includes a summary of analytical results.

1.2 Wastewater Collection and Treatment

Wastewater from homes, businesses, and industries within King County and southern Snohomish County is transported through pipelines belonging to local sewer agencies and then through King County's system of 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 marine waters. The separated solids are also treated and the resulting rich organic material, known as biosolids, is utilized to enrich agricultural and forest soils. Biosolids are also turned into compost, marketed in the greater Seattle area as GroCo®, which can be used as a soil and lawn conditioner.

The County's Wastewater Treatment Division provides wastewater treatment and disposal services to 17 cities, 16 local sewer and/or water districts, and the Muckelshoot Indian Tribe. The system serves about 1.4 million people in King County, southern Snohomish County, and northern Pierce County, transporting and treating about 200 million gallons of wastewater each day. To accomplish this, King County currently operates and maintains three wastewater treatment plants, two combined sewer overflow (CSO) treatment plants, 42 pump stations, and approximately 539 kilometers (335 miles) of sewer lines (Figure 1-1). The West Point Treatment Plant (TP), South Plant (formerly known as the Renton and East Division Reclamation TP), and Vashon Island TP provide secondary wastewater treatment. The average wet-weather flows (based upon average wet season flows from November through April excluding large storms) for the West Point and South TPs are 133 and 115 million gallons per day (MGD), respectively. The maximum capacity (maximum flows that can be handled by the plants for short periods with a portion of the flows receiving minimal treatment) of the West Point, South, and Vashon TPs are 440, 325, and 1.0 MGD, respectively. The Alki and Carkeek CSO Treatment Plants store combined wastewater and stormwater flow and later pump it to the West Point TP or provide the equivalent of primary treatment and disinfection before discharging it to Puget Sound. The South TP outfall discharges at a water depth of 640 feet (ft), the West Point TP outfall at 230 ft, the Vashon TP outfall at 200 ft, the Alki CSO outfall at 143 ft, and the Carkeek CSO outfall at 200 ft.

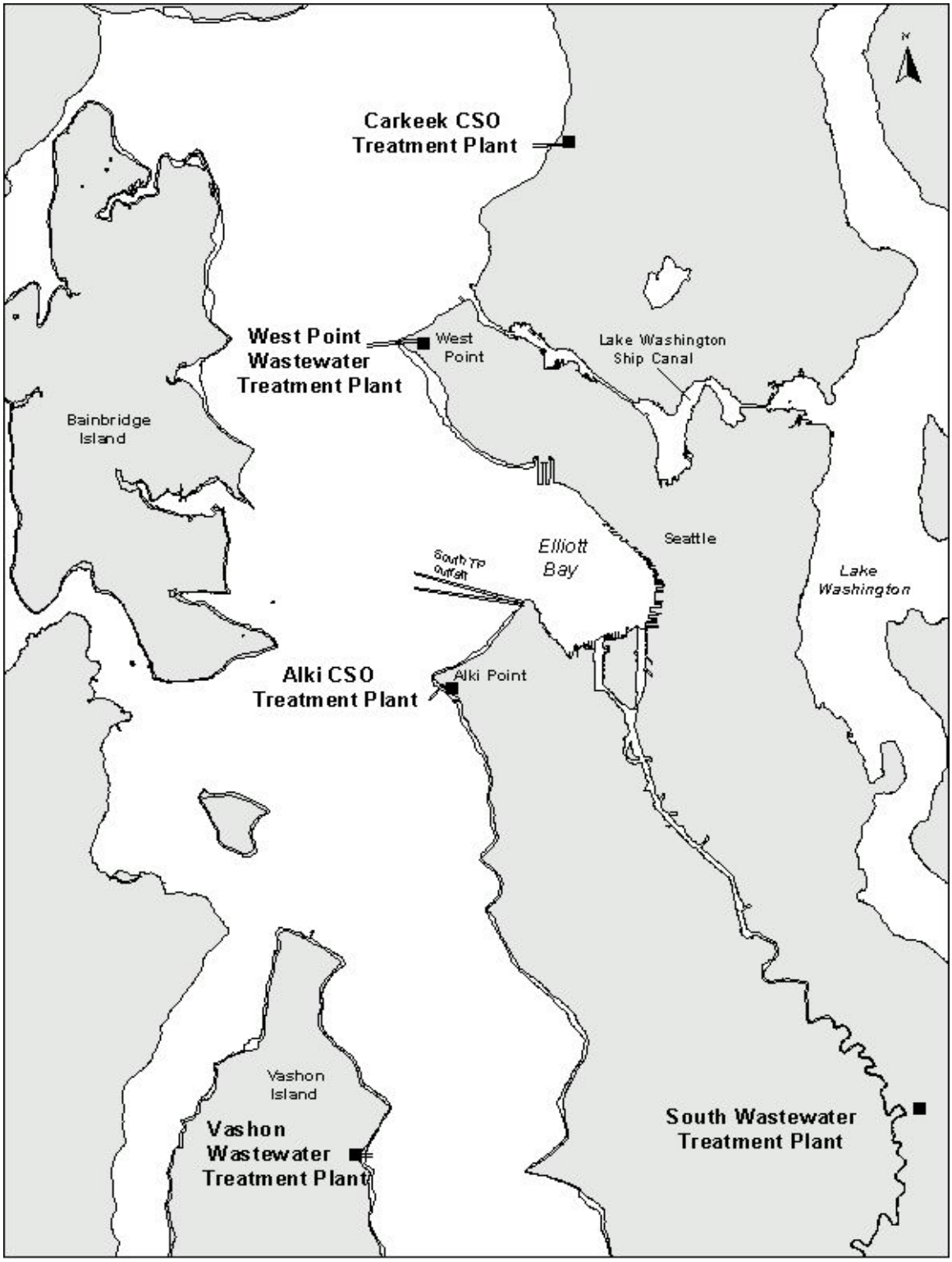

Figure 1-1. King County Wastewater Treatment Plant & Outfall Locations

The West Point TP discharges the largest volume of effluent of the three secondary facilities. In 2002, the average daily discharge rate was 107.1, 74.8, and 0.10 MGD for the West Point, South, and Vashon TPs, respectively. Average monthly wastewater discharge volumes from the two largest TPs are shown for the last 10 years in Figure 1-2, along with monthly total rainfall. The slight decrease in discharge volumes shown in late fall/winter 2000 and 2002 compared to the last several years corresponds to low rainfall amounts, particularly for 2000 which had the lowest recorded rainfall amount (28.7 inches) since 1985. A drier than normal year also occurred in 2002, with a total of 32.1 inches recorded for the year. Effluent discharges peak during times with high rainfall, with January and December having the highest average monthly discharge rates (see Section 3.1 for 2002 rainfall patterns). Average monthly wastewater discharge volumes from the Vashon TP are shown for the last three years in Figure 1-3 along with total rainfall amounts measured at the treatment plant.

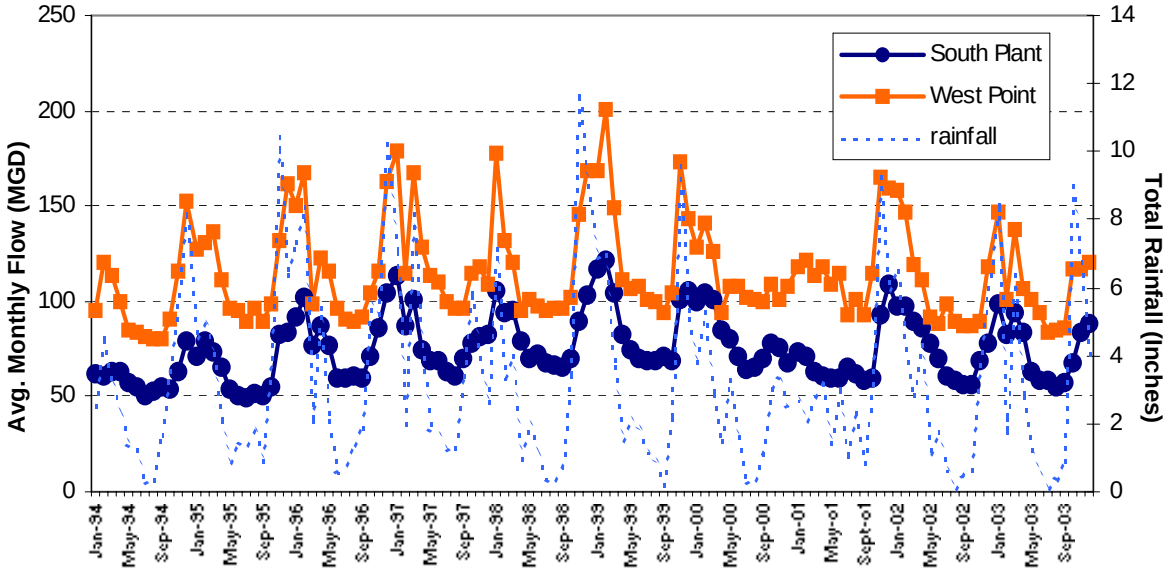

Figure 1-2. Average Monthly Flow from South Plant and West Point TPs and Total Monthly Rainfall (at SeaTac) Between 1994 and 2003

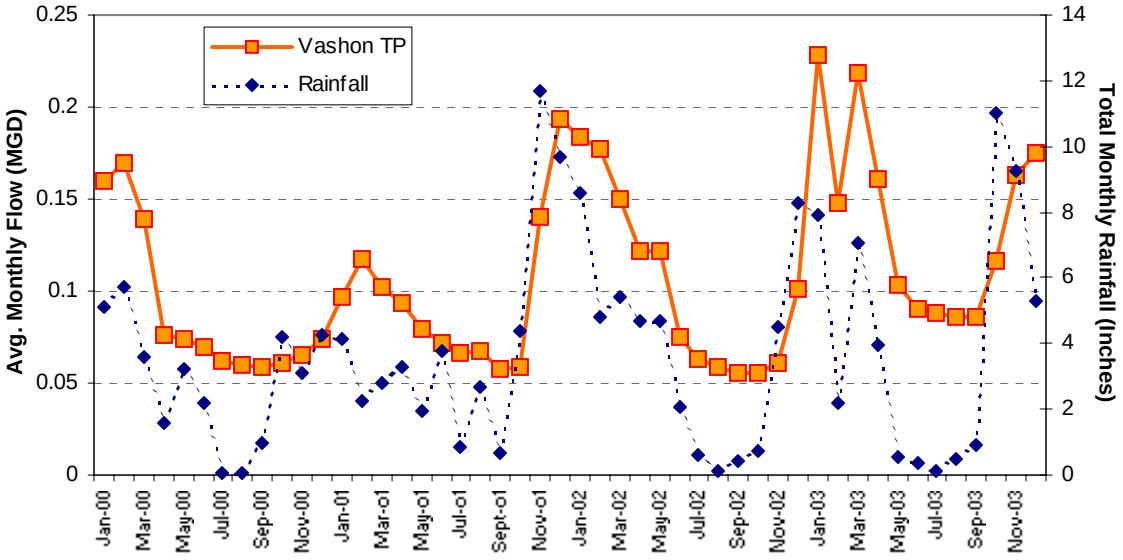

Figure 1-3. Monthly Average Vashon TP Flows and Total Monthly Rainfall (measured at the Vashon TP) Between 2000 and 2003

During 2002, the Alki CSO storage and TP had a total of two discharge events, one in January and one in February. The volume discharged per event was 13.36 and 1.0 MG, respectively. In 2003, there were four discharge events; one in January (8.35 MG), one in March (2.7 MG), one in October (23.43 MG), and one in November (21.76 MG). The Carkeek CSO storage and TP had a total of four discharge events in 2002, one in January, two in February, and one in December. The discharge volumes per event were 7.83, 0.19, 2.03, and 0.4 MG, respectively. In 2003, there were five discharge events at Carkeek; one in January (1.7 MG), two in March (1.5 MG and 0.28 MG), one in October (11.3 MG), and one in November (11.86 MG). In 2003, there were significant rain events in October and November, which are discussed in more detail in Section 3.1.

King County took over operation of the Vashon Island TP in November 1999. The plant previously discharged effluent to a water depth of about –40 feet below mean lower low water (MLLW) through a 1,300 foot outfall pipe located on the east side of Vashon Island south of Point Beals. The County is in the process of planning and constructing a new facility as the current treatment plant is undersized to handle peak wastewater flows. The new treatment facilities include a newly constructed longer outfall pipe that discharges effluent to a water depth of about –200 ft MLLW. The new outfall became operational in early spring 2005.

The wastewater and CSO treatment plants discharge treated effluent 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 an NPDES permit. In Washington, the Washington State Department of Ecology (Ecology) administers the permitting process by delegation from the U.S. Environmental Protection Agency. NPDES permits set limits on the quality and quantity of wastewater that is discharged at each facility. The NPDES permit for the West Point, Carkeek, and Alki TPs was reissued in 2003 and expires in 2008. The South Plant NPDES permit expired in 2002 and was administratively extended until the renewal was issued in 2003. The current Vashon Island TP NPDES permit expired in 2001 and was renewed in 2002. The individual treatment plant NPDES permits can be reviewed at the following website http://www.ecy.wa.gov/programs/wq/permits/northwest_permits.html.

1.2.1 Brightwater Treatment System

The King County Wastewater Treatment Division is making major improvements to its sewage treatment system as part of an approved long-term plan. These improvements are necessary in order to contend with rapid population growth and support the division's mission to protect public health and the environment. One such improvement is the Brightwater Treatment System which includes a new treatment plant, associated conveyance pipes, and a marine outfall in Puget Sound.

A new treatment plant is necessary as the current regional wastewater system will reach capacity by 2010 due to rapid growth in both King and Snohomish Counties and failure to have sufficient capacity in place when needed could lead to problems, such as public health issues. The Brightwater siting process began in 2000 as it takes at least a 10-year period to locate a suitable site, and to design and build the required facility and support structures.

King County conducted an extensive four-year siting process that began by considering over 100 potential sites. Subsequent phases of the process narrowed the number of sites under consideration. An environmental review process was conducted on three system alternatives. A Final Environmental Impact Statement (EIS) was issued on November 19, 2003 that evaluated the potential impacts and possible mitigation measures for the Brightwater system. On December 1, 2003 the King County Executive decided that the regional Brightwater Treatment System would be located northeast of Woodinville. The Brightwater facilities are being located in the north part of the area served by the regional system in order to handle population growth in north King County and south Snohomish County. The outfall will discharge treated wastewater into Puget Sound offshore of Point Wells at a water depth of just over 600 ft.

1.3 Other Puget Sound Discharges

There are several types of anthropogenic inputs that enter Puget Sound marine waters. A brief description of the major inputs is provided below. Discharge locations for marine wastewater treatment plant outfalls in Puget Sound are shown in Figure 1-4. Figure 1-5 shows discharge locations within King County for wastewater treatment plant, CSO, and stormwater discharges.

1.3.1 Wastewater Treatment Plant Effluent

There are both primary and secondary wastewater treatment plant discharges into Puget Sound originating from city, county, tribal, federal, and privately operated wastewater treatment facilities. In 2002 and 2003, King County operated 5 wastewater/stormwater treatment plants and there are 50 other permitted wastewater facilities with discharges to Puget Sound, excluding facilities on the outer coast and north of Admiralty Inlet. Discharge volumes and discharge distance offshore vary dependent upon the capacity of the facility. King County's wastewater treatment plant outfalls, which are located 2,800 (Vashon TP), 3,600 (West Point TP), and 10,294 (South TP) feet offshore, are located the furthest offshore of all Puget Sound outfalls, with the exception of the Kimberly-Clark marine outfall in Port Gardner, which is located 2,700 feet offshore.

1.3.2 Combined Sewer Overflow Discharges

CSO discharges consist of untreated sewage and stormwater occurring when sewers have reached their capacity during heavy rainfall events. Between the late 1800s and 1940s in the City of Seattle, engineers designed combined sewer systems to convey both sanitary sewage and stormwater runoff in a single pipe to the nearest receiving body of water. In the early 1950s, most sewer systems were built as separated systems which conveyed sewage in one pipe and stormwater runoff in another pipe. In the late 1950s, treatment plants were built to treat wastewater. Combined sewer systems still exist in portions of older cities, including Seattle. Figure 1-5 shows locations of King County and City of Seattle CSOs in western King County. All the CSOs within King County are centered around Seattle, as this is the oldest part of the sewer system that has not yet been separated. Wastewater and stormwater from other parts of King County are collected and conveyed to treatment plants for treatment before being discharged. In 2002/2003 King County operated two CSO treatment plants that provide primary treatment before the effluent is discharged into Puget Sound. In 2005, King County began operation of two new CSO TPs, the Elliott West CSO Storage and Treatment Facility and the Henderson/MLK CSO Storage and Treatment Facility. There are also CSOs in other counties within Puget Sound, but the outfall locations were not available for this report.

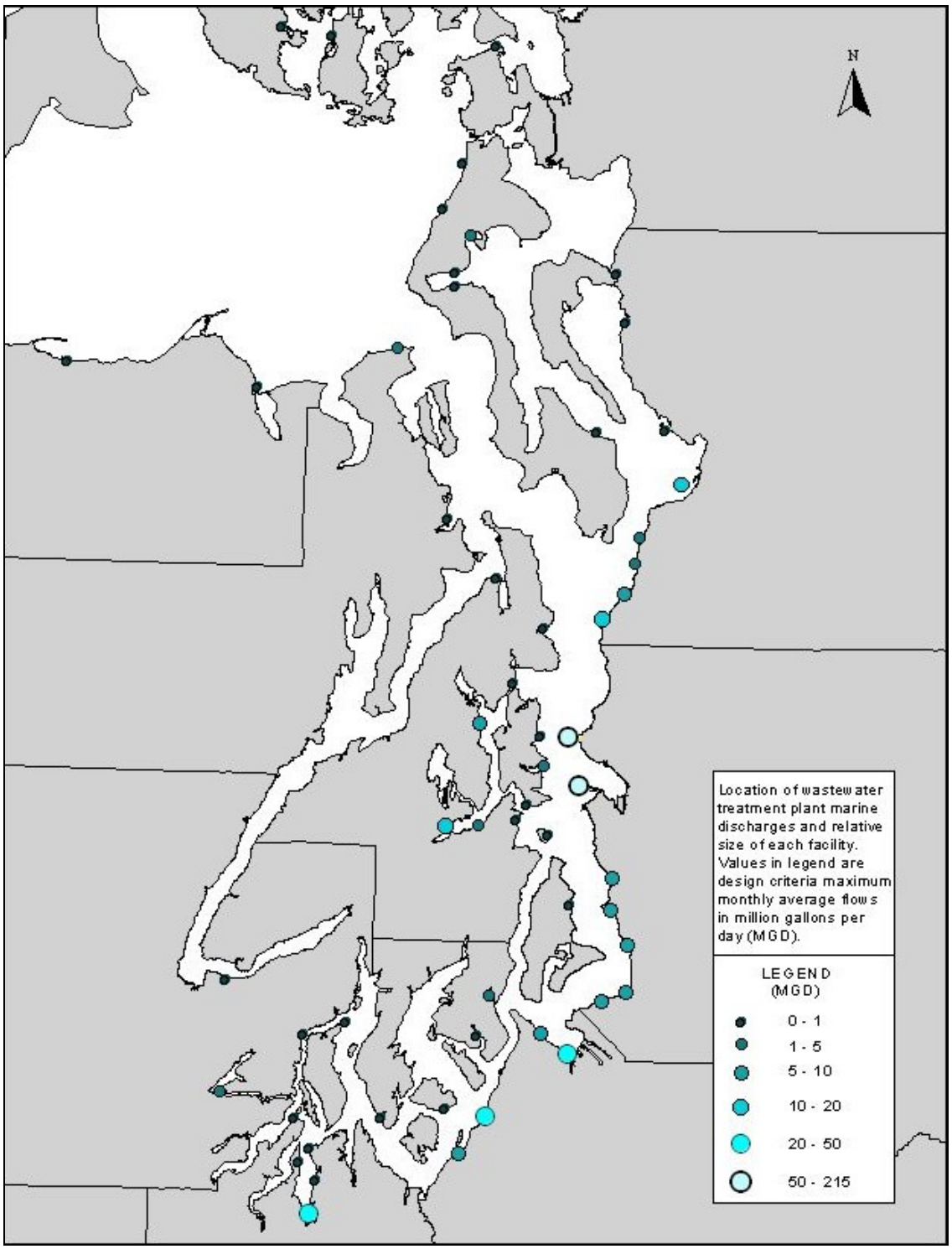

Figure 1-4. Puget Sound Wastewater Treatment Plant Marine Discharge Locations

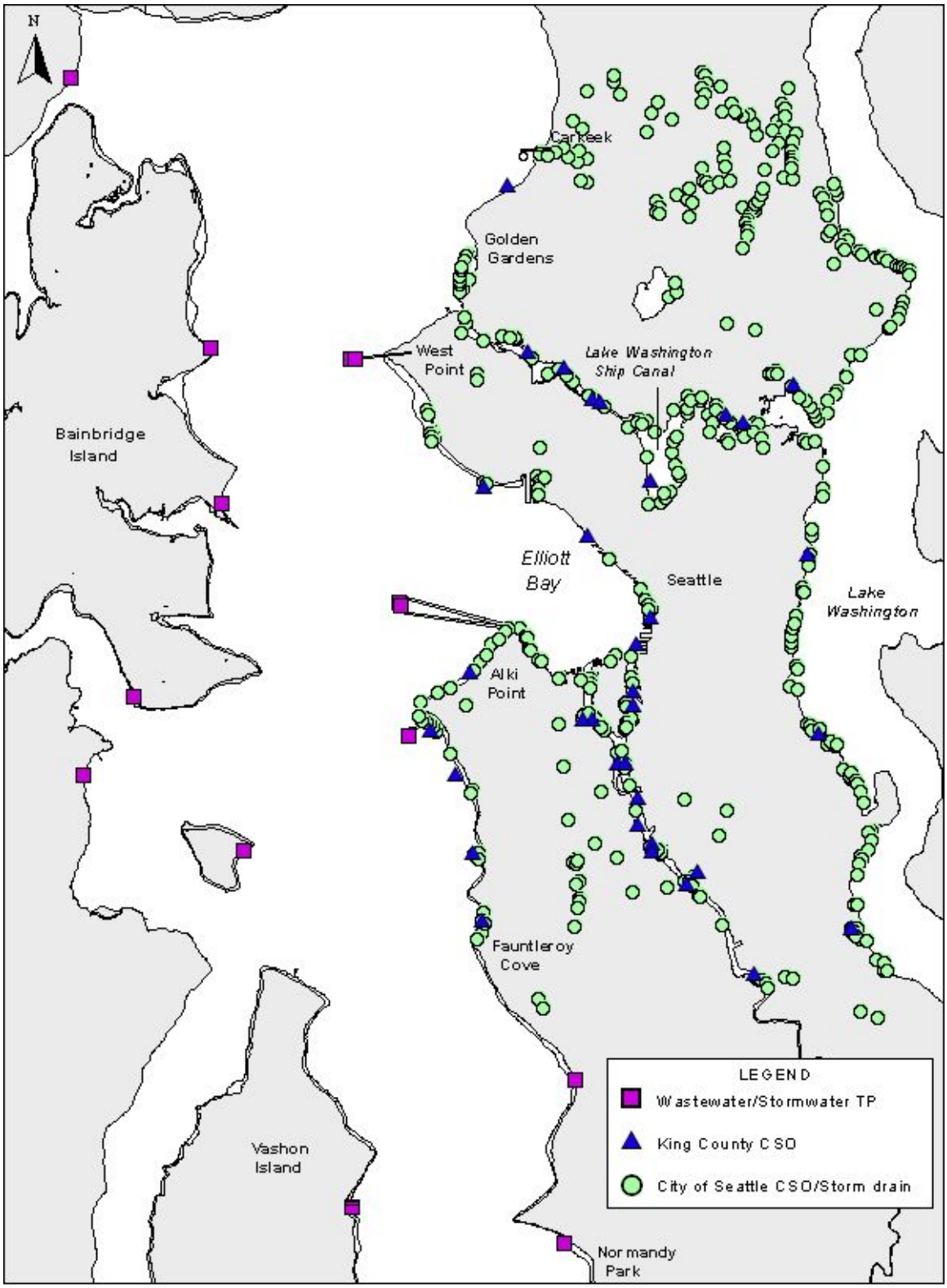

Figure 1-5. Location of Wastewater, CSO, and Stormwater Discharges in Western King County

1.3.3 Stormwater Discharges

Stormwater runoff is the water that flows off surfaces such as paved streets, rooftops, parking lots, and lawns. Stormwater can contain a variety of pollutants, dependent upon the runoff source. For example, runoff from parking lots and streets can contain hydrocarbons from combustible fuel and runoff from lawns and grassy areas can contain pesticides and herbicides. In urban areas, stormwater is collected through storm drains and can then be conveyed in different ways. Stormwater can be conveyed to treatment systems for various types of treatment before being discharged to a receiving water body or directly discharged through a stormwater outfall without receiving treatment. Figure 1-5 shows the location of storm drains and CSOs (which contain some portion of stormwater) within the western portion of King County.

In 1987, the Clean Water Act was amended to require certain industries and municipalities to have a NPDES permit for stormwater discharges. The EPA stormwater regulations for Washington State established two phases for the stormwater permitting process. Phase I NPDES permits have been issued to cover stormwater discharges from certain industries, construction sites over five acres, and municipalities with a population over 100,000 people. King, Snohomish, and Pierce Counties, the City of Seattle, and the City of Tacoma are all covered under the Phase I municipal stormwater NPDES permit. The municipal stormwater permit requires the implementation of a Stormwater Management Program, which includes a plan to reduce the discharge of pollutants through discharge of stormwater, reduce impacts to receiving water, and eliminate illegal discharges. The Phase II regulations expanded the requirements for stormwater permits to all municipalities located in urbanized areas and construction sites between one to five acres.

1.4 Sampling Area

King County's sampling area is located within the Puget Sound Main Basin, extending south to just east of Maury Island in East Passage and north to Edwards Point. Elliott Bay, a large urban embayment which includes the City of Seattle waterfront, is also located within the County's monitoring area. All but two sites sampled in 2002 and 2003 were located in marine waters. One brackish site was located in the Lake Washington Ship Canal directly west of the Ballard Locks and a freshwater site was located in Piper’s Creek. All but seven sampling sites were located within King County waters. The other seven sites were located in Snohomish County waters.

In 2002, the Marine Outfall Siting Study (MOSS) sampling area extended along the eastern nearshore from Mukilteo State Park south to Shilshole Bay. The MOSS study area includes sampling sites in both King and Snohomish Counties.

1.4.1 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. Puget Sound consists of a series of underwater valleys and ridges (called basins) and submerged hills (called sills). Sills impede the flow of water in and out of the Sound and also induce vertical mixing as water moves over the sill. The Sound consists of four major interconnected basins, including the Main (Admiralty Inlet and the Central Basin), Whidbey, Southern, and Hood Canal Basins. The Whidbey Basin is not a basin in the geological sense; its southern boundary is an arbitrarily chosen line running from Possession Point on Whidbey Island across the channel to Picnic Point in southern Snohomish County.

Water from the Pacific Ocean enters the Sound primarily through Admiralty Inlet and secondarily through Deception Pass. The area where Possession Sound and Admiralty Inlet join with the Main Basin is referred to as the Triple Junction. The Main Basin, with depths greater than 280 m, is shielded at the northern entrance to the Sound by the Admiralty Inlet Sill which impedes the exchange of deep waters. However, the Sound has near-oceanic salinity throughout the year and is supplemented with cold, nutrient-rich, low-oxygenated deep oceanic water upwelled off the Washington coast during the late summer months.

Puget Sound has an average depth of 106 meters (m) and contains approximately 168 billion cubic meters of water. The average tidal range is 3.7 to 4.3 m and an average water volume exchange of 8 billion cubic meters occurs 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 relatively high water exchange rates are conducive to maintaining overall favorable water quality conditions in Puget Sound.

Many complex factors influence water quality in Puget Sound, including human activities, water currents, and physical, biological, and chemical processes. 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 Puget Sound's water quality than in most marine 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 predominant sediment sources are from river transport and bluff erosion. The twelve largest rivers entering Puget Sound contribute approximately 1.8 million cubic meters of sediment annually. Their suspended sediment load is highest during winter and early spring when heavy seasonal precipitation from storms erodes soil from the surrounding lowlands. Sediment sampling generally shows the highest levels of organic chemicals are found in nearshore areas of Elliott Bay, where urban runoff from storm drains, industrial sources, and nonpoint sources is the greatest.

Puget Sound marine waters were affected in 1997/1998 by El Niño (a warming episode of Pacific Ocean waters) conditions. The strong 1997/1998 El Niño event was followed almost immediately by a weak to moderate La Niña event (a cooling episode of Pacific Ocean waters) that lasted through 1999. This resulted in a drier than normal year for 2000, however, essentially normal conditions were re-established in 2001. In 2002/2003 a mild El Niño event occurred in the Pacific Ocean. The El Niño developed in the summer of 2002 and dissipated in April of 2003. This El Niño event was milder than the very strong 1997/1998 event, likely due to the influence of the Pacific Decadal Oscillation (PDO). The PDO is a cyclic phenomenon similar to an El Niño /La Niña warming and cooling event but on a much larger scale and lasting decades rather than months. The PDO index describes a pattern of sea surface temperatures in the Pacific Ocean that shifts between warm and cool phases every 20 to 30 years. The PDO was in a warm phase affecting the strong 1997/1998 El Niño and has since been in a cool phase. This cool phase likely tempered the 2002/2003 event and prevented a strong El Niño from forming. La Niña conditions were not observed in 2003 following the El Niño event, as was seen with the previous 1997/1998 El Niño event.

1.4.2 Oceanographic Characteristics

General Circulation Patterns

The estuarine water circulation in Puget Sound generally consists of a two-layered flow, with incoming saltier oceanic water flowing along the bottom and a fresher, less dense water layer flowing out at the surface. The largest single source of freshwater into Puget Sound is the Skagit River, followed by the Snohomish and Stillaguamish Rivers that all flow into the Whidbey Basin. The Puyallup and Nisqually Rivers are the largest freshwater sources into southern Puget Sound. The largest sources of freshwater input into the Main Basin are the Duwamish River, which flows into Elliott Bay, and water from the Lake Washington Ship Canal. The freshwater flow is driven by freshwater runoff from rainfall and the summer snow melt. Salty, cold dense waters enter Puget Sound at depth through Admiralty Inlet and a portion flows south in the Main Basin while the other portion flows northeast through Possession Sound to the Whidbey Basin. Figure 1-6 shows the net circulation pattern in Puget Sound with the deep incoming water flowing beneath the outflowing upper layer. Water tends to flow faster on the eastern side of the Main Basin near Alki Point and Point Wells and along the western side near Point Monroe and north of Kingston, where major topographic features affect the currents. The deeper, denser waters in the Main Basin often move 5 to 10 times faster than deeper currents in the Whidbey Basin as a result of vigorous mixing at the Narrows (Ebbesmeyer and Cannon, 2001).

The circulation of inflowing and outflowing water is affected by the sills, which provide vertical mixing of the two water layers. An exception to the two-layered flow in the Main Basin occurs in the southern portion around Vashon Island. In this area, the net flow is mainly southward through East Passage, around the southern end of Vashon Island, and then north through Colvos Passage (see Figure 1-6). This effect is caused by

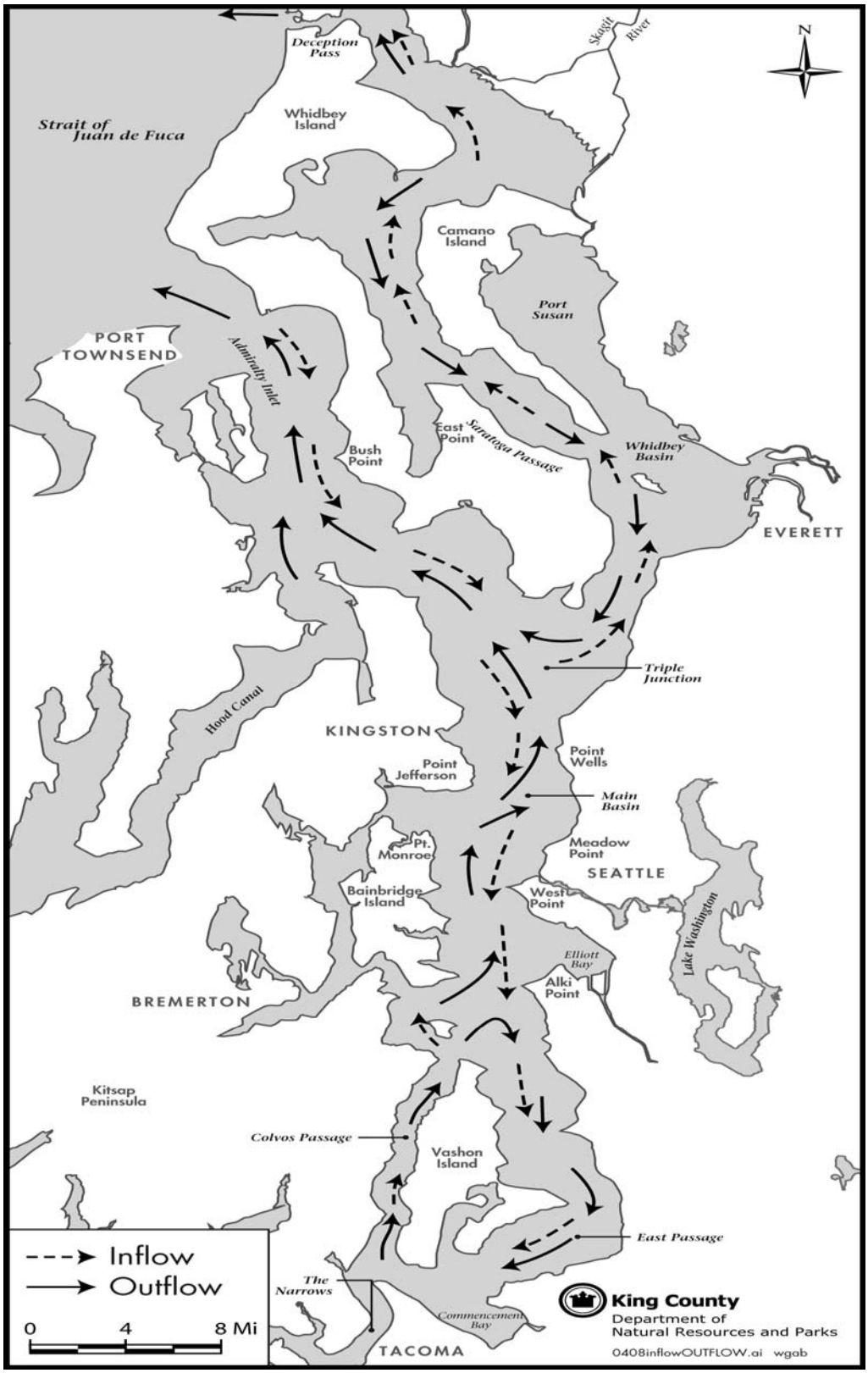

Figure 1-6. Generalized Puget Sound Circulation (from Ebbesmeyer et. al, 2002)

the location of Vashon Island relative to the outflowing water from the Narrows. The outflow from Colvos Passage has a significant effect on surface circulation in the northern portion of the Main Basin (Ebbesmeyer and Cannon, 2001). Water moving northward through Colvos passage is directed across the channel towards Alki Point, where a portion then returns south in East Passage. The other portion flows north toward the triple junction, the area where waters from the Main Basin, Whidbey Basin, and Admiralty Inlet converge.

Winds can cause significant variations in circulation. Southerly winds augment the surface outflowing water and northerly winds can impede and sometimes reverse the surface flow. Bottom water intrusions can also cause significant variations in circulation. Intrusions occur when dense saltwater crosses the Admiralty Inlet sill and replaces deep water in the Main Basin. Bottom water intrusions circulate down Puget Sound at speeds of about 20 centimeters per second (cm/s) near the Admiralty Inlet sill and 10 cm/s along the Main Basin (Ebbesmeyer and Cannon, 2001).

The residence time of water in the Main Basin is about 48 days, depending upon the time of year (Babson, 2004).

1.5 West Point Current Meter Study

Current meters were deployed in the vicinity of the West Point TP outfall for a five week period beginning in February 2003 to support the first phase of a tiered approach in assessing and monitoring sediment quality around King County's West Point TP outfall. The objective was to gather data on water movement in the vicinity of the outfall to determine how the movement of these waters may affect physical properties of sediment around the outfall, as well as effluent transport. Results will be incorporated into the sampling design for Phase 2 of the study. It is important to assess currents at, and in the vicinity of, the effluent discharge point due to the role of currents in mixing and distributing the effluent. Currents can also impact seafloor sediments by creating areas of scouring or deposition.

Four Acoustic Doppler Current Profilers (ADCPs) were deployed between February and March 2003. ADCPs lie on the seafloor and measure currents throughout the water column using acoustic pulses that bounce off particles suspended in the seawater. Water velocities are computed by estimating the differential position of the particles between the outgoing instrument pulses and the returning echoes. The current meters were deployed at depths of -760, -295, -260, and -70 ft below MLLW. Current meter locations were chosen to measure both nearshore and deep water currents that may affect effluent transport. Three of the current meters were placed along a transect parallel to the outfall at shallow, moderate, and deep depths (-70, -260, and -760 ft MLLW, respectively). The fourth current meter was placed north of the outfall, in the general direction of the net current flow, at a moderate depth of -295 ft. A five week deployment period was chosen

in order to collect sufficient data to account for tidal variability. A detailed description of the methods and results are provided in *West Point Treatment Plant Marine Outfall Current Meter Analysis* (Nairn, 2004).

Results are briefly summarized in the following discussion. The three ADCP meters placed along a parallel transect aligned with the outfall all showed tidal currents that flowed predominantly in the southwest/northeast directions, corresponding to the semi-diurnal tides. Tidal currents at the offshore station west of the outfall flowed in a more north/south direction. Currents at depths of 100 m and greater had a wider distribution of direction and aligned more towards the southwest/northeast than the currents at shallower depths. The tidal signal is less apparent in the east-west current component at the outfall discharge point, but more so north of the discharge point where the currents appear to be flowing parallel to the shoreline. The 90th percentile current speeds ranged between 30 and 50 centimeters/second (cm/s). The current direction is influenced by the topography of West Point as the shoreline is approached. Slightly to the north of West Point, currents flowed predominately in the along-shore direction.

Mean current directions are useful for understanding the long-term transport of material and are indicative of the overall estuarine flow. Mean currents were determined for each current meter from the first 29 days of recorded data, a period sufficient to average out the tidal variability. Mean current speeds at the 20 m depth were between 7.3 and 10.9 cm/s, dependent upon location, and between 2.4 and 6.3 cm/s at the 60 m depth. At 220 m, the mean current speed was 2.7 cm/s (Nairn, 2004). Figure 1-7 shows the mean near-surface current direction at depths common to three of the meters and Figure 1-8 shows near-bottom current speeds and direction.

Eddies are known to form downstream of headlands. The current meter data suggest that a recirculation pattern characteristic of an eddy exists at West Point. All four meters showed a predominantly southwest current during strong flood (incoming) currents, while during ebb (outgoing) flows, the meter south of the outfall closest to shore did not exhibit a northward flow. During the ebb, the eastern component of the flow north of the outfall and the western flow southeast of the outfall suggest that a clockwise-rotating eddy is formed north of West Point.

Winds affect currents by pushing the surface water downwind, which in turn results in a compensating flow (upwind) at depth. Typically, wind-related effects are seen at timescales of hours to several days as weather systems move through the area. To look at wind effects with the current meter data collected at West Point, data were compared with wind data obtained at the NOAA C-MAN station WPOW1 at West Point. Northerly winds explained 30 to 40% of the north-south current variability at the bottom depths at the deepest meter closest to the main channel (140 to 220m depths) and near the surface (20m depth) at the meter near the discharge point. This agrees with the anticipated outcome that winds tend to drag the surface waters downwind. The compensating flow appears to be occurring below 140 m. Wind driven flows appeared to be up to 10-15 cm/s in the surface layer and 5-10 cm/s at deeper depths (Nairn, 2004).

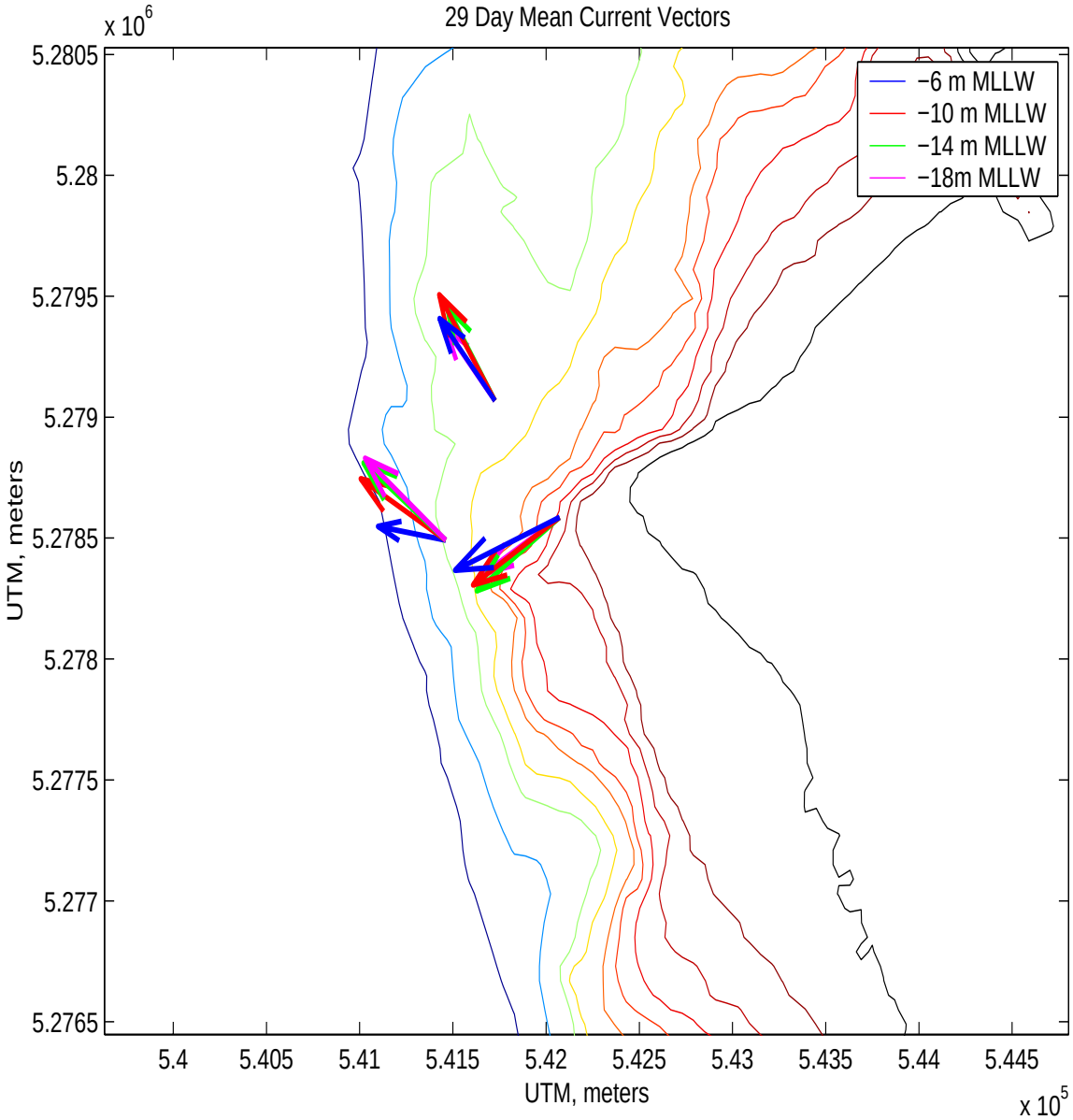

Figure 1-7. Mean Near-surface Current Direction Near West Point

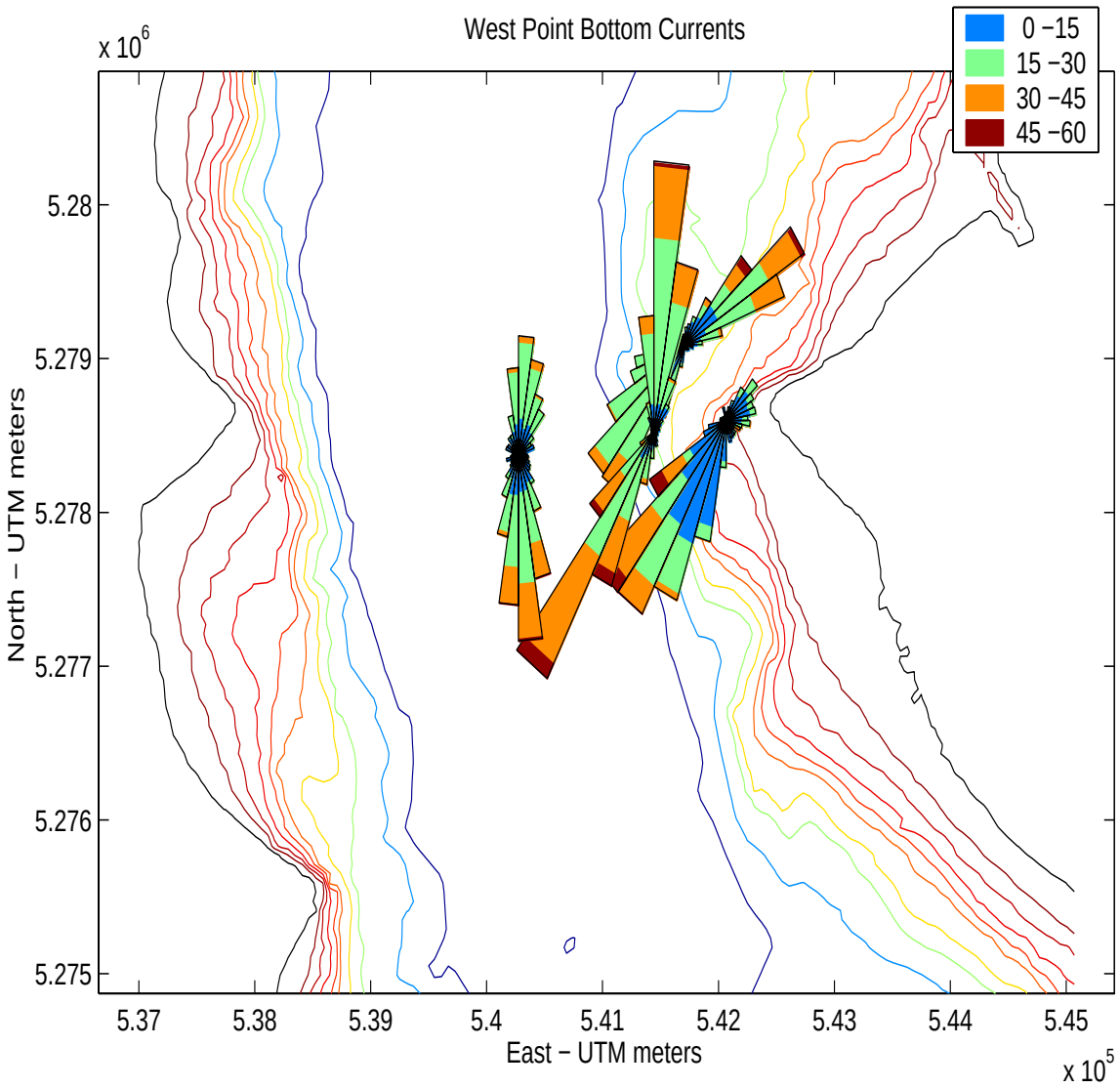

Figure 1-8. Mean Near-bottom Currents Near West Point (cm/s)

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SECTION 2
Water Quality Monitoring Programs

In 2002 and 2003, the King County Department of Natural Resources and Parks (DNRP) operated three wastewater treatment plants and two CSO treatment plants with outfalls discharging directly into Puget Sound marine waters. The Clean Water Act states that all sewage treatment plants that discharge effluent from a point source into surface waters must have a National Pollutant Discharge Elimination System (NPDES) permit. In Washington, the Washington State Department of Ecology (DOE) administers the NPDES permit program by delegation from the U.S. Environmental Protection Agency (EPA).

King County's NPDES permits set limits on the quality of treated wastewater that is discharged through individual outfalls. To verify that the facilities are meeting the goals of the Clean Water Act, King County has voluntarily conducted an extensive point source monitoring program for over 35 years to assess the quality of the receiving water around each outfall and at nearby beaches. To comply with NPDES requirements, King County also monitors sediments around each outfall.

Water quality may be affected by natural processes as well as 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 conveyance, such as an outfall pipe. Point source pollution can be generated by 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 or infiltration from streams, groundwater, stormwater, atmospheric deposition, 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 both nonpoint and point source pollution in nearshore and offshore environments, as well as assess ambient (background) conditions. The stations monitored by the marine program fall into one of two categories; ambient or outfall (point source). Within these categories, stations are classified as either beach (+3 to -3 meter mean lower low water) or offshore (bottom depth greater than -3 m mean lower low water).

Obtaining background data from areas in receiving waters that are not influenced by point sources is important in order to accurately evaluate the overall condition of receiving waters. King County has established an ambient monitoring program in the Central Puget Sound Basin, with stations removed from the direct influence of point source discharges. King County’s goals for ambient monitoring are to better understand regional water quality and provide background data needed to identify trends that might indicate impacts from long-term cumulative pollution, or effects from King County outfalls.

Human population growth in the greater Seattle area has necessitated planning for a new wastewater treatment plant to be located in southern Snohomish County. This new treatment plant will include a marine outfall discharging secondary treated effluent to Puget Sound waters. Starting in 1998, King County began a marine outfall siting study (MOSS) as part of the

planning process to assist with outfall siting and design and to assist with evaluation of potential impacts to the marine environment. The MOSS sampling program consisted of several components, including offshore water column profiling and nearshore/beach water quality monitoring. Sampling for this program started in December 1998 and continued through 2002 at several stations. The sampling program ended in March 2002 at six of the MOSS beach stations.

An overview of the County's ambient, outfall, and MOSS monitoring programs in 2002 and 2003 is provided in Table 2-1.

Table 2-1. Summary of 2002 and 2003 Marine Monitoring Programs

			Number of Stations Sampled				
Location	**Matrix**	**Parameter**	***Ambient***		***Outfall***		***MOSS***
			2002	**2003**	**2002**	**2003**	**2002**
Beach	Water	Bacteria	15	17	6	6	9
		GWQP [1]	5	5	3	4	9
		Metals-dissolved	4	--	--	--	1
	Sediment	Organics	3	3	4	4	1
		Metals	3	3	4	4	1
		Conventionals [2]	3	3	4	4	1
	Shellfish	Organics	2	3	5	4	1
		Metals	2	3	5	4	1
		Bacteria	5	4	4	5	1
	Macroalgae	Metals	4	3	5	5	1
Offshore	Water	Bacteria	5	5	6	6	--
		GWQP	5	5	6	6	--
	Sediment	Organics	7	--	1	--	--
		Metals	7	--	1	--	--
		Conventionals	7	--	1	--	--

[1] GWQP = general water quality parameters. Includes temperaure, salinity, nutrients, dissolved oxygen.

[2] Conventionals include total solids, total volatile solids, total sulfide, total organic carbon, and grain size.

2.1 Outfall and Ambient Monitoring Programs

The outfall and ambient monitoring programs focus on marine water and the underlying sediments. Many marine pollutants are associated with particulates in the water. As these contaminated particles settle out of the water column, pollutant concentrations in the underlying sediments tend to increase. Most pollutant sources are found in shallow 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 can have an impact on both human and marine environmental health, especially in nearshore areas which are generally high contact areas for marine organisms and people.

Nutrients and pathogens which may cause water quality problems in marine waters are also typically seen in nearshore areas in the vicinity of contamination sources. While excess nutrients do not cause immediate harm to organisms living in the water column, they can increase the growth of phytoplankton and algae. The decay of phytoplankton and algae populations can subsequently deplete oxygen to levels incapable of sustaining aquatic organisms.

2.1.1 Marine Outfall Monitoring Program

King County collected offshore water samples for the 2002 and 2003 outfall monitoring program. In addition, beach water, sediment, shellfish tissue, and macroalgae were collected in areas near the treatment plant outfalls. Water samples were collected from multiple depths at the offshore stations and from a single depth at the beach stations. Eleven of the 12 sites were sampled both years. The location where samples were collected in 2002 at the Denny Way CSO site changed in 2003 due to a change in length and configuration of the outfall. The sampling location shifted in 2003 to the end of the newly constructed short outfall, prompting creation of a new station identifier. Station locations are shown in Figure 2-1 and station coordinates are provided in Appendix F.

Offshore water samples were collected monthly and analyzed for temperature, salinity, clarity, dissolved oxygen, nutrients, chlorophyll-*a*, pheophytin-*a*, total suspended solids, photosynthetically active radiation, and fecal indicator bacteria. Beach waters were analyzed monthly for fecal indicator bacteria, temperature, salinity, and nutrients. Beach sediments were collected in August and analyzed for organic compounds, metals, and conventional parameters (total organic carbon, total solids, total volatile solids, and grain size). Shellfish tissues were analyzed for organic compounds, metals, and bacteria. Macroalgae samples were analyzed for metals. Shellfish and algae samples were collected in August and additional shellfish samples for bacterial analyses were collected monthly from May to September. A summary of parameters measured and the frequency sampled for each station is provided in Tables 2-2 and 2-3.

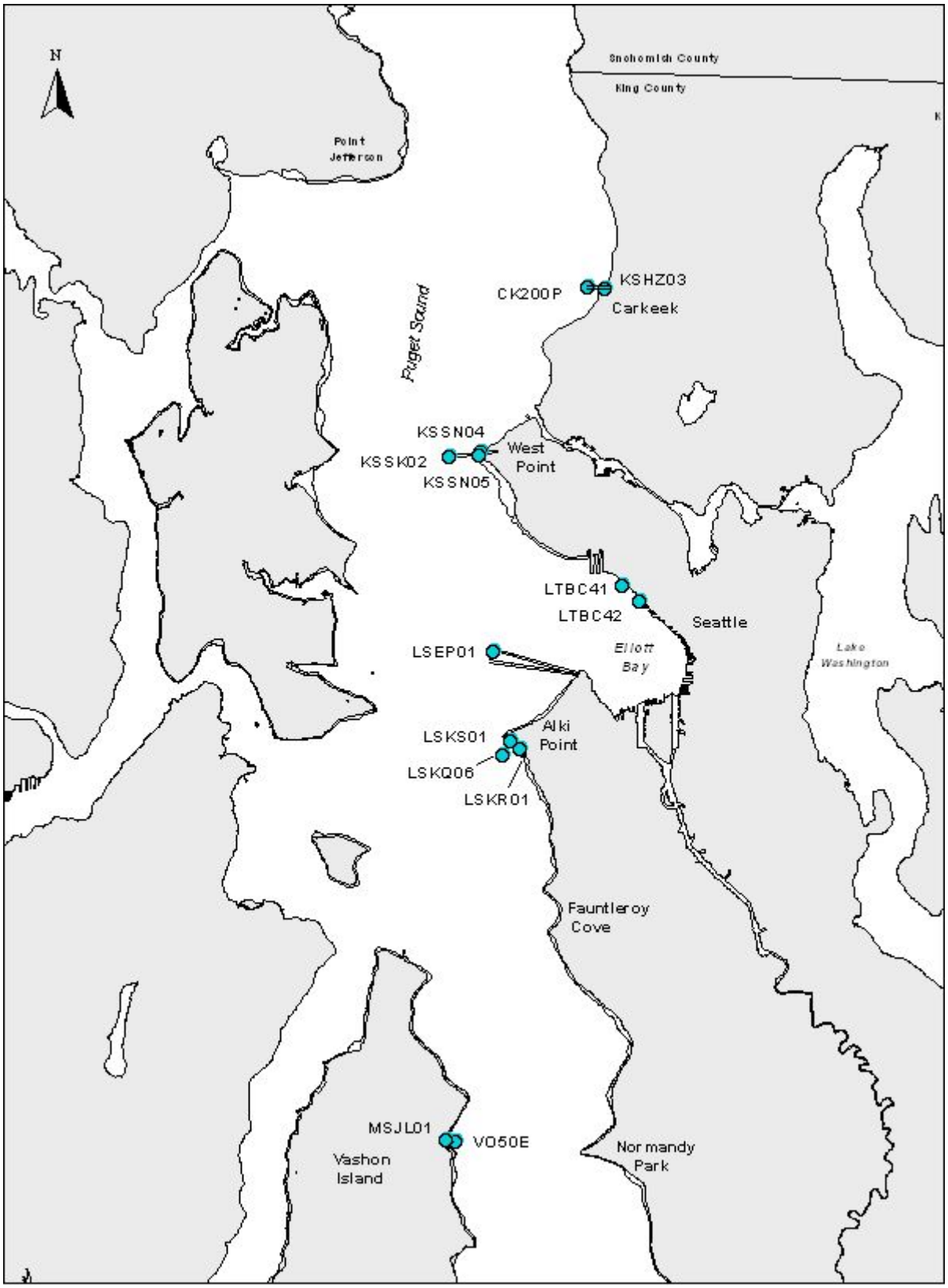

Figure 2-1. Outfall Monitoring Station Locations

Table 2-2. 2002 Outfall Stations, Parameters, and Frequency Measured

			SEDIMENT			WATER			SHELLFISH			ALGAE
STATION	**LOCATION**	**OFFSHORE/ BEACH**	**Organics**	**Metals**	**Conventionals**	**Bacteria**	**GWQP ***	**Metals--dissolved**	**Organics**	**Metals**	**Bacteria**	**Metals**
KSHZ03	Carkeek	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 1	◆ 5	◆ 1
CK200P	Carkeek	Offshore				◆ 12	◆ 12					
KSSN04	West Point	Beach	◆ 1	◆ 1	◆ 1	◆ 12		◆ 1	◆ 1	◆ 1	◆ 5	◆ 1
KSSN05	West Point	Beach				◆ 12	◆ 12	◆ 1	◆ 1	◆ 1		◆ 1
KSSK02	West Point outfall	Offshore				◆ 12	◆ 12					
LTBC41	Denny Way	Offshore	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12					
LSEP01	South Plant outfall	Offshore				◆ 12	◆ 12					
LSKR01	Alki Point	Beach	◆ 1	◆ 1	◆ 1	◆ 12		◆ 1	◆ 1	◆ 1	◆ 5	◆ 1
LSKS01	Alki	Beach				◆ 12						
LSKQ06	Alki outfall	Offshore				◆ 12	◆ 12					
VO50E	Vashon I. Outfall	Offshore				◆ 12	◆ 12					
MSJL01	Vashon Island	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 1	◆ 5	◆ 1

* GWQP = general water quality parameters. Includes nutrients, salinity, temperature, chlorophyll, dissolved oxygen, solids, transparency, photosynthetically active radiation for offshore waters; nutrients, salinity, temperature for beach waters. Numbers indicate frequency sampled per year on a monthly basis.

Table 2-3. 2003 Outfall Stations, Parameters, and Frequency Measured

			SEDIMENT			WATER		SHELLFISH			ALGAE
STATION	**LOCATION**	**OFFSHORE/ BEACH**	**Organics**	**Metals**	**Conventionals**	**Bacteria**	**GWQP ***	**Organics**	**Metals**	**Bacteria**	**Metals**
KSHZ03	Carkeek	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 5	◆ 1
CK200P	Carkeek	Offshore				◆ 12	◆ 12				
KSSN04	West Point	Beach				◆ 12				◆ 5	◆ 1
KSSN05	West Point	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 5	◆ 1
KSSK02	West Point outfall	Offshore				◆ 12	◆ 12				
LTBC42	Denny Way outfall	Offshore				◆ 12	◆ 12				
LSEP01	South Plant outfall	Offshore				◆ 12	◆ 12				
LSKR01	Alki Point	Beach				◆ 12					
LSKS01	Alki	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 5	◆ 1
LSKQ06	Alki outfall	Offshore				◆ 12	◆ 12				
VO50E	Vashon I. Outfall	Offshore				◆ 12	◆ 12				
MSJL01	Vashon Island	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 5	◆ 1

* GWQP = general water quality parameters. Includes nutrients, salinity, temperature, chlorophyll, dissolved oxygen, solids, transparency, photosynthetically active radiation for offshore waters; nutrients, salinity, temperature for beach waters. Numbers indicate frequency sampled per year on a monthly basis.

2.1.2 Marine Ambient Monitoring Program

The ambient program provides background information for comparison of data obtained from the King County outfall monitoring program and contributes to a long-term dataset which enables overall Puget Sound water quality trends to be evaluated.

The 2002 and 2003 ambient monitoring programs included collection of water samples at beach and offshore stations in addition to shellfish, macroalgae, and sediments at beach stations (see Table 2-1). Sediments were also collected at offshore stations. Water samples were collected from multiple depths at the offshore stations and from a single depth at the beach stations. A total of 15 beach stations and 11 offshore stations were sampled in 2002 and 17 beach and 5 offshore stations were sampled in 2003. Two beach stations sampled in 2002 as part of the MOSS sampling program (discussed separately) were shifted to the ambient sampling program in 2003. Offshore sediment samples were collected at seven stations in 2002 as part of the routine bi-annual sediment sampling program. A new offshore water station, NSEX01, was added to the ambient program in 2003 in East Passage to increase monitoring coverage in the southern portion of King County.

Parameters measured for offshore water samples included water clarity, salinity, temperature, nutrients (nitrogen and phosphorus compounds as well as silica), dissolved oxygen, chlorophyll-*a*, suspended solids, and photosynthetically active radiation. Nutrients, temperature, and salinity were measured in beach waters. Fecal coliforms and enterococci were analyzed in both offshore and beach waters. Organic compounds (e.g., polynulcear aromatic hydrocarbons, pesticides, and polychlorinated biphenyls), metals, and conventional parameters (total organic carbon, total solids, total volatile solids, and grain size) were monitored in beach sediments. Organic compounds and metals were monitored in shellfish tissues and only metals were monitored in macroalgae samples. Fecal indicator bacteria were also analyzed in shellfish tissues collected monthly during the summer months. Figure 2-2 shows ambient monitoring station locations and Tables 2-4 and 2-5 provide a summary of parameters and frequency measured at each station. Station coordinates are provided in Appendix F. Samples at beach sites were collected in August for the annual shellfish, macroalgae, and sediment monitoring, as has been done in past years. At sites where shellfish tissues were analyzed for bacteria five times per year, the samples were collected monthly from May to September. Offshore and beach water samples collected for bacteria, physical parameters, and nutrients were analyzed monthly throughout the year.

2.2 MOSS Sampling Program

The MOSS sampling program was developed to assist with siting and design of a new marine outfall for the Brightwater Treatment System. The sampling program included four major study components: physical oceanography, submarine geophysics, water column profiling, and nearshore habitat and water quality. Data collected for the physical oceanography, submarine geophysics, water column profiling, and nearshore habitat components have been reported in separate documents. Beach water quality sampling began in March 2000 for the MOSS program and continued until March 2002 at most stations; for three sites, samples were collected monthly through the remainder of the year. All MOSS water quality sampling ended at the end of 2002.

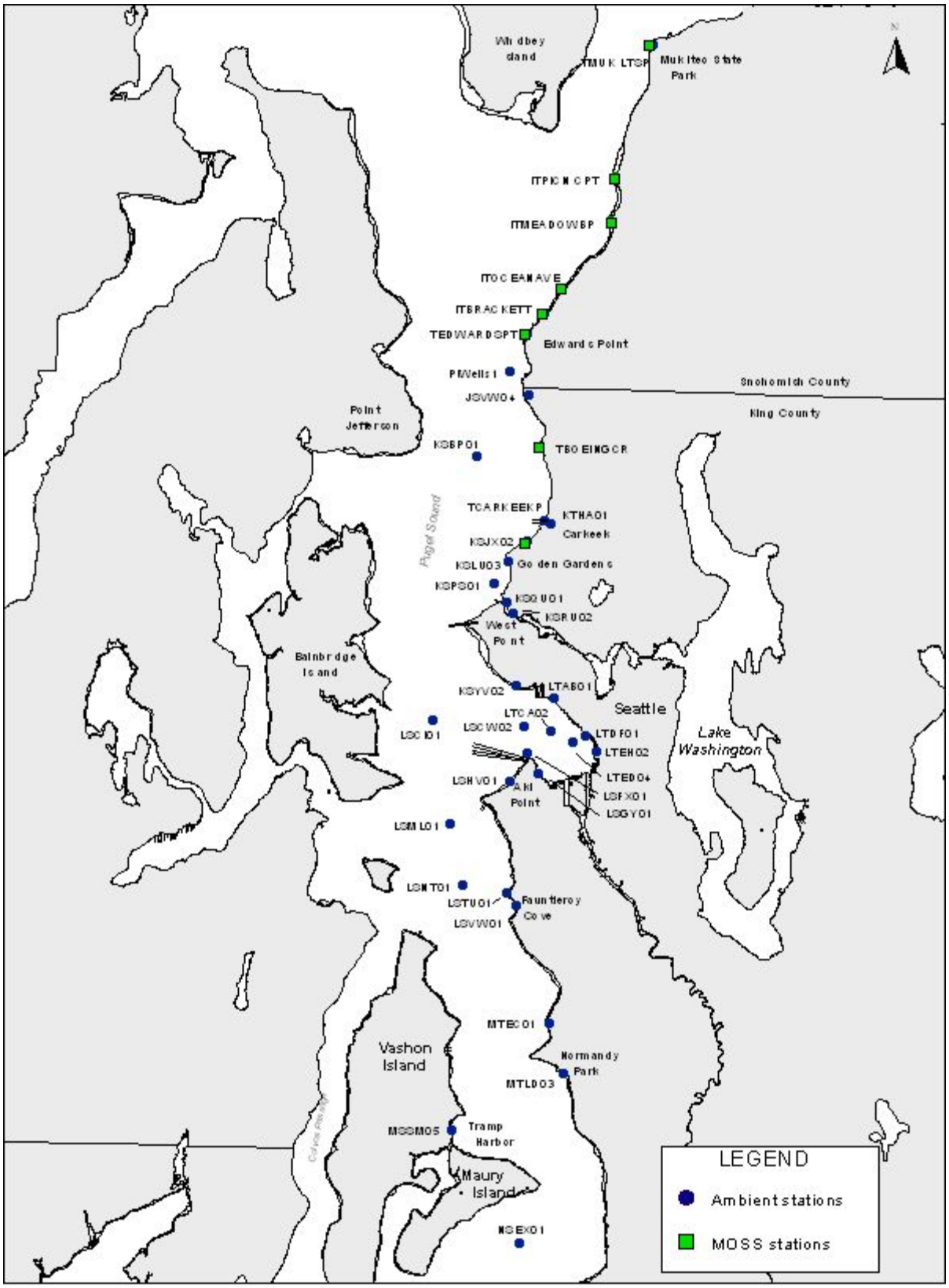

Figure 2-2. Ambient and MOSS Monitoring Station Locations

Table 2-4. 2002 Ambient Stations, Parameters, and Frequency Measured

			SEDIMENT			WATER			SHELLFISH			ALGAE
STATION	**LOCATION**	**OFFSHORE/ BEACH**	**Organics**	**Metals**	**Conventionals**	**Bacteria**	**GWQP ***	**Metals--dissolved**	**Organics**	**Metals**	**Bacteria**	**Metals**
PTWells1	Point Wells	Offshore				◆ 12	◆ 12					
JSVW04	Richmond Beach	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 1	◆ 5	◆ 1
KSBP01	Point Jefferson	Offshore				◆ 12	◆ 12					
KTHA01	Piper's Creek	Creek				◆ 12	◆ 12					
KSLU03	Golden Gardens	Beach				◆ 12	◆ 2	◆ 1			◆ 5	◆ 1
KSQU01	Shilshole Bay	Beach				◆ 12	◆ 2					
KSRU02	LW Ship Canal	Offshore				◆ 12	◆ 12					
KSYV02	Magnolia	Beach	◆ 1	◆ 1	◆ 1	◆ 12		◆ 1				◆ 1
LTAB01	inner Elliott Bay	Beach				◆ 12						
LTEH02	inner Elliott Bay	Beach				◆ 12						
LSGY01	Seacrest	Beach				◆ 12						
LSFX01	Duwamish Head	Beach				◆ 12						
LTED04	Elliott Bay	Offshore	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12					
LSHV01	West Seattle	Beach				◆ 12						
LSNT01	Dolphin Point	Offshore				◆ 12	◆ 12					
LSTU01	Lincoln Park	Beach				◆ 12						
LSVW01	Fauntleroy Cove	Beach				◆ 12	◆ 12					
MTEC01	Seahurst Park	Beach				◆ 6					◆ 5	
MTLD03	Normandy Park	Beach	◆ 1	◆ 1	◆ 1	◆ 6		◆ 1	◆ 1	◆ 1	◆ 5	◆ 1
MSSM05	Tramp Harbor	Beach				◆ 6					◆ 5	
KSPS01	Shilshole Bay	Offshore	◆ 1	◆ 1	◆ 1							
LSML01	West Seattle	Offshore	◆ 1	◆ 1	◆ 1							
LTDF01	inner Elliott Bay	Offshore	◆ 1	◆ 1	◆ 1							
LSCI01	Central Basin	Offshore	◆ 1	◆ 1	◆ 1							
LSCW02	outer Elliott Bay	Offshore	◆ 1	◆ 1	◆ 1							
LTCA02	inner Elliott Bay	Offshore	◆ 1	◆ 1	◆ 1							

* GWQP = general water quality parameters. Includes nutrients, salinity, temperature, chlorophyll, dissolved oxygen, solids, transparency, photosynthetically active radiation for offshore waters. Includes nutrients, salinity, temperature for beach waters.

Numbers indicate frequency sampled per year on a monthly basis.

Table 2-5. 2003 Ambient Stations, Parameters, and Frequency Measured

STATION	LOCATION	OFFSHORE/ BEACH	SEDIMENT			WATER		SHELLFISH			ALGAE
			Organics	Metals	Conventionals	Bacteria	GWQP *	Organics	Metals	Bacteria	Metals
ITEDWARDSPT	Edwards Point	Beach				◆ 12	◆ 12				
PTWells1	Point Wells	Offshore				◆ 12	◆ 12				
JSVW04	Richmond Beach	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 5	◆ 1
KSBP01	Point Jefferson	Offshore				◆ 12	◆ 12				
ITCARKEEKP	Carkeek Park	Beach				◆ 12	◆ 12				
KTHA01	Piper's Creek	Creek				◆ 12	◆ 12				
KSLU03	Golden Gardens	Beach	◆ 1	◆ 1	◆ 1	◆ 12		◆ 1	◆ 1	◆ 5	◆ 1
KSQU01	Shilshole Bay	Beach				◆ 12					
KSYV02	Magnolia	Beach				◆ 12					
LTAB01	inner Elliott Bay	Beach				◆ 12					
LTEH02	inner Elliott Bay	Beach				◆ 12					
LSGY01	Seacrest	Beach				◆ 12					
LSFX01	Duwamish Head	Beach				◆ 12					
LTED04	Elliott Bay	Offshore				◆ 12	◆ 12				
LSHV01	West Seattle	Beach				◆ 12					
LSNT01	Dolphin Point	Offshore				◆ 12	◆ 12				
LSTU01	Lincoln Park	Beach				◆ 12					
LSVW01	Fauntleroy Cove	Beach				◆ 12	◆ 12				
MTEC01	Seahurst Park	Beach				◆ 6					
MTLD03	Normandy Park	Beach	◆ 1	◆ 1	◆ 1	◆ 6		◆ 1	◆ 1	◆ 5	◆ 1
MSSM05	Tramp Harbor	Beach				◆ 6				◆ 5	
NSEX01	East Passage	Offshore				◆ 12	◆ 12				

* GWQP = general water quality parameters. Includes nutrients, salinity, temperature, chlorophyll, dissolved oxygen, solids, transparency, photosynthetically active radiation for offshore waters. Includes nutrients, salinity, temperature for beach waters.

Numbers indicate frequency sampled per year on a monthly basis.

Although all MOSS beach water sampling ended in 2002, two of the stations that were sampled as part of this program, ITEDWARDSPT and ITCARKEEKP, continue to be sampled as part of the marine ambient monitoring program. Data for beach water samples collected prior to 2002 are reported in the *Water Quality Status Report for Marine Waters, 1999 and 2000* (King County, 2001) and *Water Quality Status Report for Marine Waters, 2001* (King County, 2002). MOSS beach water data collected and analyzed in 2002 are provided in this report.

Nearshore sediment samples were collected in 2003 along the proposed outfall alignment and data have been reported in a separate document titled *Nearshore Subsurface Sediment Characterization for the Brightwater Marine Outfall* (King County, 2004). Results for water column samples collected in 1999 and 2000 were reported in the *Water Quality Status Report for Marine Waters, 1999 and 2000* (King County, 2001) and 2001 data were reported in the *Water Quality Status Report for Marine Waters, 2001* (King County, 2002). MOSS station locations are shown in Figure 2-2 and a summary of the stations and parameters analyzed are provided in Table 2-6.

Table 2-6. 2002 MOSS Stations, Parameters, and Frequency Measured

			SEDIMENT			WATER			SHELLFISH			ALGAE
STATION	**LOCATION**	**OFFSHORE/ BEACH**	**Organics**	**Metals**	**Conventionals**	**Bacteria**	**GWQP ***	**Metals--dissolved**	**Organics**	**Metals**	**Bacteria**	**Metals**
ITMUKILTSP	Mukilteo Pk.	Beach				◆ 2	◆ 2					
ITPICNICPT	Picnic Point	Beach				◆ 2	◆ 2					
ITMEADOWBP	Meadowdale Pk	Beach				◆ 2	◆ 2					
ITOCEANAVE	Ocean Avenue	Beach	◆ 1	◆ 1	◆ 1	◆ 12	◆ 12	◆ 1	◆ 1	◆ 1	◆ 5	◆ 1
ITBRACKETT	Brackett's Landing	Beach				◆ 12	◆ 12					
ITEDWARDSPT	Edwards point	Beach				◆ 12	◆ 12					
ITBOEINGCR	Boeing Creek area	Beach				◆ 2	◆ 2					
ITCARKEEKP	Carkeek Park	Beach				◆ 2	◆ 2					
KSJX02	Blue Ridge	Beach				◆ 2	◆ 2					

* GWQP = general water quality parameters. Includes nutrients, salinity, temperature, chlorophyll, dissolved oxygen, solids, transparency, photosynthetically active radiation for offshore/nearshore waters. Includes nutrients, salinity, temperature for beach waters.
Numbers indicate frequency sampled per year on a monthly basis.

The MOSS beach monitoring component was initiated in March 2000 to evaluate physical, chemical, and fecal indicator bacteria characteristics of nearshore waters in the study area (see Figure 2-2). The station locations were selected to provide coverage of the entire MOSS study area and to assess water quality conditions in areas of particular interest for both ecological and human health risk assessments. A total of nine beach stations were sampled in 2002 for the MOSS program. Of those, six were only sampled twice in January and February in order to obtain two complete years of monthly data (sampling began in March 2000). Samples from the six sites were analyzed for salinity, temperature, nutrients (nitrogen, phosphorus, and silica), dissolved oxygen, and bacteria (fecal coliforms, enterococci, and *E. coli*). An additional two sites, ITEDWARDSPT and ITBRACKETT, were sampled monthly throughout 2002 for the same parameters listed above. One site, ITOCEANAVE, was sampled monthly for the same parameters listed in addition to dissolved metals. Sediment, shellfish, and algae were also collected in August at this station. Sediment and shellfish samples were analyzed for organic compounds and metals and algae was analyzed for metals only. Grain size, total solids, and total organic carbon were included in the sediment analyses and total solids and lipids were analyzed in the shellfish tissue samples.

2.3 Water Column Monitoring

Water column monitoring at ambient and outfall sites 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 to identify changes from anthropogenic inputs. General water quality parameters including temperature, salinity, transparency, dissolved oxygen, chlorophyll-*a*, pheopigment, photosynthetically active radiation, ammonia, nitrate+nitrite, total phosphorus, silica, and total suspended solids, are monitored at multiple depths at each site with one exception. Temperature, salinity, and bacteria were the only parameters measured at station KSRU02 located near the mouth of the Lake Washington Ship Canal. Sampling at this station was discontinued at the end of 2002. Bacteria are monitored at all water column monitoring sites.

2.3.1 Bacteria

Biologists and agencies responsible for protecting public health define water quality in terms of several variables, including the presence of certain types of bacteria. Fecal coliforms are found in the feces of humans and other warm-blooded animals. These bacteria may enter the aquatic environment directly from humans and animals, agricultural and stormwater runoff, and wastewater. Although fecal coliform bacteria are usually not pathogenic, they may occur along with disease-causing bacteria and thereby serve as an indicator of the potential for pathogens to be present. Generally, a high fecal coliform count indicates a greater possibility for pathogens to be present. Fecal coliforms are typically found in higher numbers than pathogens and are easier and safer to test for in the laboratory.

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

The Washington State Department of Ecology (DOE) recently proposed changes for marine surface water bacteriological criteria. The proposed changes incorporated the use of *Enterococcus* as an indicator of bacterial contamination in marine waters, along with the continued use of fecal coliforms for shellfish protection standards. Enterococci, like fecal coliforms, are also found in the intestinal tract of warm-blooded mammals and birds. Specific proposed changes for marine waters included adopting an *Enterococcus* geometric mean criterion of 35 colony forming units (CFU)/100 milliliters (ml) with no more than ten percent of the samples exceeding 104 CFU/100 ml. The state proposed to keep the current fecal coliform standards to protect commercial and recreational shellfish harvesting. However, following review of comments submitted on the proposed changes the Department of Ecology decided to keep fecal coliforms as the bacteriological standard. Thus, the fecal coliform geometric mean standard of 14 CFU/100 ml with no more than ten percent of the samples used to calculate the geometric mean exceeding 43 CFU/100 ml are the current primary contact marine water standards.

A component of fecal coliform flora, *Escherichia coli* (*E. coli*), has also been used as an indicator for the presence of pathogens. Although *E. coli* is not routinely monitored as part of the County's marine monitoring program, it was measured for the MOSS program and the results are being used to assist in the project's human-health risk assessment and provided in this report. Pathogenic strains of *E. coli* are rarely found in high numbers and the aquatic environment does not generally support their growth.

2.3.2 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 tidal mixing, wind, storms, amount of freshwater input, and degree of vertical stratification.

Both temperature and salinity influence water column stratification, although salinity is more important in determining stratification in estuaries due to its effect on density. 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.

2.3.3 Dissolved Oxygen

Dissolved oxygen 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 with high concentrations of dissolved oxygen are generally considered healthy ecosystems and are capable of sustaining many species of aquatic organisms.

Several factors influence dissolved oxygen concentrations. Seasonal climatic fluctuations 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. Most 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. 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.

2.3.4 Transparency

Transparency, or water clarity, is measured to determine the depth at which light capable of supporting plant growth penetrates the water column (euphotic zone). Several factors affect transparency, including the amount of suspended silt and soil particles (measured as total suspended solids) and the amount of phytoplankton and zooplankton in the water column. Silt from streams and rivers (particularly after storms) stirred up by wave action also affect transparency. Low transparency conditions that 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 in which aquatic plants and primary producers can grow. In addition, many marine organisms feed by filtering water and large amounts of suspended matter may obstruct their filter-feeding systems.

2.3.5 Photosynthetically Active Radiation (PAR)

Sunlight consists of a wide spectrum of wavelengths of which only a small portion can be used for photosynthesis. This small range of light energy available for photosynthesis is in the 400 to 700 nanometer range. Photosynthetically active radiation (also referred to as light intensity) is measured at various depths throughout the water column to determine the amount of light energy available to phytoplankton, macrophytes, and some diatoms for photosynthesis. PAR is an important factor as phytoplankton and other plants can only grow in the water column where enough light penetrates to support photosynthesis. Turbidity, waves, and time of year are factors which may affect PAR levels.

2.3.6 Nutrients

The addition of nutrients, such as nitrogen and phosphorus, into marine waters can have a considerable effect on water quality. This is particularly true in nearshore habitats where most nutrient input typically occurs. Nutrients may enter marine waters from wastewater discharges, nonpoint runoff, and from riverine and oceanic sources. The greatest impact these nutrients may have is a sudden increase in aquatic plant growth.

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, increases from sources such as wastewater or fertilizers can cause increases in phytoplankton growth, particularly in areas with reduced circulation. An increase in phytoplankton biomass may cause a decline in dissolved oxygen as the phytoplankton cells respire and decay. This depression in dissolved oxygen can become critical to non-motile marine organisms. The marine waters within King County have not experienced 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 ion are forms of inorganic nitrogen used by phytoplankton in the aquatic environment. Nitrates and nitrites are formed through the oxidation of ammonium ion by nitrifying bacteria. As noted 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, stormwater, 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 leading to unfavorable conditions. Potential sources of phosphorus entering the marine environment include wastewater from municipal discharges, industrial wastes, nonpoint agricultural and urban 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. Water column silica concentrations can be used as an indicator of plankton blooms, along with chlorophyll-*a*, as silica concentrations in the photic zone will decrease 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.

2.3.7 Chlorophyll and Pheopigments

Chlorophyll-*a* is a green pigment used by algae and other green plants during the process of photosynthesis to convert light, carbon dioxide, and water to sugar. Chlorophyll-*a* concentration is an indicator of phytoplankton biomass since all marine planktonic algae contain this photosynthetic pigment. However, chlorophyll-*a* concentrations are not an exact measurement of phytoplankton abundance. The ratio of phytoplankton biomass to chlorophyll varies with species 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.

2.3.8 Water Column Sampling Methods

Field Methods. Offshore water column samples were collected in accordance with the *Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissues in Puget Sound* (PSEP, 1997) by the King County Environmental Services Section. A brief description is provided below.

Offshore water samples were collected from the *R/V Liberty*, a 42-foot (ft) boat equipped with a hydraulic crane on the rear deck. Water column profiles were sampled using a SeaBird Electronics SBE 25 SEALOGGER conductivity-temperature-depth (CTD) profiler. Parameters measured by the CTD included: temperature, salinity, turbidity, dissolved oxygen, photosynthetically active radiation (PAR), and chlorophyll-*a* (measured by fluorescence). Density is a calculated parameter using temperature and salinity measurements. 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 above the seabed. Multiple five-liter Niskin bottles were mounted onto the CTD for collecting discrete water samples at predetermined depths for nutrients, total suspended solids, and bacteria. The CTD was electronically programmed to close individual bottles at specific depths 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 powdered $MnSO_4$ (manganous sulfate) and AIA (alkali iodide azide), and 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 a 12-inch diameter black-on-white Secchi disk. Secchi depths were recorded to the nearest 0.1 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 in a consistent manner.

Intertidal (beach) water samples were collected at approximately knee-depth by inverting sample containers just above the water surface, then sinking the bottle down to approximately 12-inches below the water surface. The bottles were not filled completely in order to allow room for

mixing. Samples were collected from approximately knee-deep water when possible. At some sites where accessibility is difficult, such as LTAB01 located in inner Elliott Bay, samples were collected with a container lowered on a rope from a pier and then transferred into the sample container. Trace metal samples were collected using non-metallic equipment and employing the "clean hands/dirty hands" technique in accordance with EPA Method 1669 (EPA, 1995).

Laboratory Methods. Temperature, Secchi disk transparency, and CTD parameters were measured in the field. All other water column parameters were analyzed at the King County Environmental Laboratory. Laboratory methods and detection limits are provided in Table 2-7.

Fecal coliforms and enterococci were analyzed using membrane filtration methodology according to Standard Methods 9222D and 9230C, respectively (APHA, 1998). *E. coli* was analyzed according to King County Environmental Laboratory Standard Operating Procedure (SOP) 6.5.1.

All samples were analyzed within the recommended holding times and quality assurance/quality control procedures included the use of blanks, duplicates, and spikes when appropriate. All data were reviewed prior to entry into the LIMS (Laboratory Information Management System) database.

Table 2-7. Laboratory Methods and Detection Limits for Water Samples

Parameter	Units	MDL	RDL	Method
Salinity	PSS	0.005	0.01	SM2520-B
Dissolved Oxygen	mg/L	0.5	1.0	SM4500-O-C
Chlorophyll-*a*	mg/m^3	0.01	0.02	EPA 445.0
Pheophytin-*a*	mg/m^3	0.01	0.02	EPA 445.0
Ammonia-Nitrogen	mg/L	0.01	0.02	SM4500-NH3-H
Nitrate+Nitrite (NO_3+NO_2)	mg/L	0.02	0.04	SM4500-NO3-F
Total Phosphorous	mg/L	0.005	0.01	SM4500-P-B,E
Total Suspended Solids (TSS)	mg/L	0.5	1.0	SM2540-D
Silica	mg/L	0.05	0.1	SM4500-SI-D
Turbidity	FTU	0.5	1.0	SM2310-B
Fecal coliform	CFU/100 ml	--	--	SM9222-D
Enterococci	CFU/100 ml	--	--	SM9230-C
E. coli	CFU/100 ml	--	--	Metro SOP 6.5.1
Metals, total & dissolved	µg/L	variable *	variable *	EPA 1640 (ICP-MS)
Semi-volatile organics	µg/L	variable *	variable *	EPA 625
Chlorinated pesticides/PCBs	µg/L	variable *	variable *	EPA 608

PSS = practical salinity scale
mg/L = milligram per liter
µg/L = microgram per liter
mg/m^3 = milligram per meter cubed
CFU = colony forming unit
MDL = method detection limit
RDL = reported detection limit

* Detection limits vary with parameter analyzed. Detection limits for individual samples and analytes are provided in the Appendix A.

2.4 Sediment Monitoring

Many pollutants (organics and trace metals) tend to be associated with particles that settle out onto bottom sediments so sediment monitoring is a component of the County's ambient and outfall monitoring programs. At sufficient concentrations, these compounds may be harmful to benthic organisms and may bioaccumulate. Total solids, total volatile solids, grain size distribution, total organic carbon, ammonia, and total sulfides, referred to as conventional parameters, 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 sediment conventional parameters are measured is provided below.

2.4.1 Total Solids

Total solids are the inorganic and organic particles remaining after a sediment sample has been dried in an oven at 103 to 105° Celsius. This parameter is measured to allow the conversion of metals and organic chemical concentrations from wet weight to dry weight for reporting uniformity.

2.4.2 Total Volatile Solids

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

2.4.3 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 those sediments with a large proportion of small particles (silt and clay) tend to have higher chemical concentrations. Grain size also influences benthic and infaunal community structure.

2.4.4 Total Organic Carbon

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

2.4.5 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.

2.4.6 Sediment Sampling and Analytical Methods

Field Methods. Offshore sediment samples were collected by the King County Environmental Services Section from the *R/V Liberty*. 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 and placed in the appropriate sample containers. Sediment samples were collected in accordance with the *Puget Sound Estuary Program (PSEP) Recommended Protocols* (PSEP, 1997) and the County's *Standard Protocol for Marine Sediments* (King County, 1997).

Intertidal (beach) sediment sampling locations were determined using a measuring staff, tide chart, and an optical level to sight the proper height on the measuring staff. Samples were collected at +6.5 feet above mean lower low water (MLLW) at each location. If the appropriate tidal elevation was within an area with gravel, cobbles or boulders, then sediments without gravel/cobbles or other large objects closest to the area at the same tidal elevation were sampled instead. Sediment samples were collected using hand-held 2-inch diameter stainless steel coring 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 pre-cleaned for use at a single site. All samples were stored on ice until submitted to the laboratory.

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 2-8. All metals were analyzed using inductively coupled plasma (ICP) emission spectrometry with the exception of mercury, which was analyzed using cold-vapor atomic absorption spectrophotometry (CVAA). 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 when appropriate. All data were reviewed prior to entry into the LIMS database.

Table 2-8. Laboratory Methods and Detection Limits (wet weight) 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	PSEP, 1986
Metals, total, ICP	mg/kg	variable[1]	EPA 3050/6010
Mercury, total, CVAA	mg/kg	0.019 [1]	EPA 7471
Semivolatile (BNA[2]) Organics	µg/kg	variable[1]	SW 846 8270
Pesticides/PCBs	µg/kg	variable[1]	SW 846 8081/8082
Organotins	µg/kg	0.3 [1]	Krone, 1988
Grain Size Distribution	%	0.1	PSEP, 1991

[1]Detection limits vary with parameter analyzed and/or total solids content. Detection limits for individual samples and analytes are provided in Appendix B.
[2] BNA indicates base/neutral/acid compounds

2.5 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 outfall 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 health risks to both shellfish and humans that consume them. Chlorinated organic compounds (chlorine atoms attached to organic compounds) have been used in pesticides since the 1940s and tend to accumulate in tissue with higher lipid concentrations. Percent lipids in shellfish are also monitored as this parameter affects the concentration of organic pollutants accumulated.

Algae absorb metals directly from seawater (Phillips, 1994; Hou and Yan, 1998), so they are monitored to assess metal concentrations in intertidal areas.

2.5.1 Shellfish and Algae Sampling Methods

Field Methods. The King County Environmental Services Section collected shellfish samples. Butter clams (*Saxidomus giganteus*) from each sampling station were collected by hand 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 number of clams were obtained, they were placed in four-liter glass jars, with the exception noted below, and stored on ice until delivered to the laboratory. A minimum of five butter clams with a shell length between 60 to 120 millimeters were collected at each station for analyses of metal and organic parameters and composited into a single sample. A minimum of 10 butter clams were collected and composited for the monthly microbiological analyses. Clams collected for microbiological analyses were placed in clean, sealable bags rather than glass jars. A minimum of 130 grams of tissue was necessary for this analysis.

Algae samples were collected by the King County Environmental Services Section. Samples of attached, healthy *Ulva fenestrata* (sea lettuce) were collected and placed in 250 ml acid-washed plastic specimen cups. Discolored or free-floating algae were not collected. The sampling strategy was 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 strategy. After the required amount of algae was obtained, the containers were stored on ice until delivered to the laboratory.

Laboratory Methods. Shellfish samples were processed at the King County Environmental Laboratory in accordance with PSEP recommended protocols (PSEP, 1997). Before the clams were opened, the shells were rinsed with deionized water to remove sand and other adhering material. Each clam was measured and the lengths recorded. Tissue from each clam was removed with ceramic blade scalpels, composited with their liquor, and then homogenized in a sterilized blender equipped with stainless steel blades. Samples were frozen until analyzed, with the exception of the sample portion removed for bacterial analysis. Fecal coliform and enterococci 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 plant blades. Samples from each station were processed in a blender equipped with titanium blades. 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 2-9. With the exception of mercury, all metals were analyzed using ICP and/or ICP-MS depending upon detection limit requirements. Mercury was analyzed using cold-vapor atomic absorption spectroscopy. Semi-volatile organics were extracted with an organic solvent and 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. Quality assurance/quality control procedures included the use of blanks, duplicates, surrogates, and spikes when appropriate. All data were reviewed prior to entry into the LIMS database.

Table 2-9. 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	mg/kg	variable[1]	PSEP (1997)
Metals, total, ICP-MS	mg/kg	variable[1]	PSEP (1997)
Mercury, total, CVAA	mg/kg	0.004	PSEP (1997)
Semivolatile Organics	µg/kg	variable[1]	SW 846 8270
Pesticides/PCBs	µg/kg	variable[1]	SW 846 8081/8082
Fecal Coliform Bacteria	MPN/100g	20	SM9221-E
Enterococci Bacteria	MPN/100g	20	SM9230-B

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

2.6 Regulatory Standards

The focus of water quality guidelines includes human health and the health of aquatic organisms, largely as a result of 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 implements wildlife-based water quality standards along with human health-based standards for surface waters. When permitting point source discharges, DOE also considers technology-based standards.

Current marine sediment standards are derived from the Apparent Effects Threshold (AET) method (EPA, 1988). This method compares measured chemistry values with associated biological effect data to arrive at empirically-derived chemical concentrations that predict when adverse biological effects should occur. Chemical concentrations below the standard values are predicted to have "no adverse effect". The criteria for marine sediments were developed primarily to protect benthic invertebrates, with the assumption that such criteria would also be protective of other species.

The use of bacterial indicators and water and sediment quality criteria are used to evaluate data obtained from monitoring programs. Water quality management decisions can then be 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 Clean Water Act requires the States to adopt federal water quality criteria or develop their own standards which afford equal or better protection to receiving waters. Washington State has promulgated both water and sediment quality standards.

2.6.1 Washington State Standards for Marine Surface Waters

Washington State currently has marine surface water quality standards for conventional pollutants (ammonia, chlorine, and cyanide) and some toxics (metals, pesticides, and PCBs) (WAC 173-201A). These standards were derived for the protection and propagation of fish, shellfish, and other aquatic life. Water quality standards for conventional pollutants and toxics in marine surface waters are provided in Table 2-10.

Marine water quality standards were recently revised by DOE in late 2003. Marine standards for conventional pollutants and toxics did not change from the previously published standards with the exception of the water use classification system. Prior to the 2003 update, Washington State surface waters were divided into five classes: AA, A, B, C, and Lake. Currently, the letter designations are no longer used and recreational water use is divided into primary contact recreation and secondary contact recreation categories. Other use designations include aquatic life (for fish and other aquatic species), shellfish harvesting, and miscellaneous uses such as wildlife habitat, commerce and navigation, boating, and aesthetics. Aquatic life use is further categorized into extraordinary quality, excellent quality, good quality, and fair quality. EPA must approve the revisions before they can be used for Clean Water Act purposes. EPA partially approved the revisions in early 2005, which includes approval of the use designations and freshwater bacteria criteria.

2.6.2 Washington State Standards for Fecal Coliforms

Washington State has marine surface water quality bacteria standards, based upon fecal coliforms, that were derived for the protection of human health, including protection from primary and secondary contact recreation as well as from consumption of shellfish. As stated in Section 2.6.1, marine water quality standards were updated in 2003 for some parameters. The bacteria standards did not change from those previously published with the exceptions of the water use classification system stated above and that the values used to calculate the geometric mean shall not exceed a 12-month period. The formerly Class AA marine water standard is now the primary contact recreation standard and the formerly Class A freshwater standard is now the primary contact freshwater standard. Fecal coliform counts in samples collected from both marine water and freshwater for both the ambient and outfall monitoring programs are compared with the primary contact recreation standards. Although the use designations were approved by EPA in 2005, the marine bacteria numeric criteria have not yet been approved. The approved use designations along with the numeric criteria promulgated in 1997 are provided in Table 2-11.

The state fecal coliform standards are expressed in part as geometric mean values. The reason for this is the high variability in fecal coliform counts, as bacteria tend to clump and adhere to particulates in water and 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 simplifies plotting the data by numerically compensating for the exponential growth rate of bacteria. Results obtained from King County's monitoring programs are expressed as a moving geometric mean to facilitate comparisons with State bacteria standards. The geometric mean standard is 14 colonies/100 ml. This value is obtained by taking

Table 2-10. Washington State Marine Surface Water Quality Standards

Contaminant	Marine Water Quality Standard		Contaminant	Marine Water Quality Standard	
Trace Metals (µg/L)	**Acute**	**Chronic**	**Semivolatile Organic Compounds (µg/L)**	**Acute**	**Chronic**
Arsenic[a]	69.0	36.0	Pentachlorophenol	13.0	7.9
Cadmium [a]	42.0	9.3	Total PCBs	10.0	0.030
Chromium VI[a]	1100.0	50.0			
Copper [a]	4.8	3.1			
Lead [a]	210.0	8.1			
Mercury	1.8[a]	0.025[b]			
Nickel [a]	74.0	8.2	**Other (µg/L)**		
Selenium[a]	290	71.0	Ammonia [c] (mg/L)	0.233	0.035
Silver [a]	1.9	---	Chlorine (residual)	13.0	7.5
Zinc [a]	90.0	81.0	Cyanide (weak dissoc.)	1.0	---
Pesticides (µg/L)					
Aldrin/Dieldrin	0.71	0.0019			
Chlordane	0.09	0.004			
Chloropyrifos	0.011	0.0056			
DDT (and metabolites)	0.13	0.001			
Endosulfan	0.034	0.0087			
Endrin	0.037	0.0023			
Heptachlor	0.053	0.0036			
Lindane	0.16	---			
Toxaphene	0.21	0.0002			

[a] Criteria are based on the dissolved fraction of the metal.
[b] Criterion is based on the total recoverable fraction of the metal.
[c] Criterion is based on un-ionized ammonia.
Source: WAC 173-201a, November 18, 1997.

the geometric mean value for the 30 most recent samples as directed by the National Shellfish Sanitation Program guidelines for systematic random sampling. Any value reported as zero was assigned a value of one in the geomean calculation.

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 primary contact recreation (formerly Class AA) marine water standard this value is 43 colonies/100 ml and 100 colonies/100 ml for the corresponding freshwater standard. The recent revisions to the bacteria standards state that values used to calculate the geometric mean shall not exceed a 12-month period. Although the revisions have not yet been approved by EPA, geometric means will be reported using the 12 most recent monthly samples in anticipation of EPA approval. Geometric means will also be calculated and reported in Appendix A using the 30 most recent monthly values for comparative purposes.

Table 2-11. Fecal Coliform Standards (colonies/100 ml)

Class	Moving Geometric Mean	Peak[a]
Primary Contact Recreation:		
Freshwater	100	200
Marine	14	43
Secondary Contact Recreation:		
Freshwater	200	400
Marine[b]	70	208
Extraordinary primary contact recreation		
Freshwater	50	100

[a] Not more than 10 percent of the samples used to calculate the geometric mean may exceed this value.
[b] Standard is based upon enterococci bacteria.

Source: WAC 173-201a, 1997, 2003; NSSP, 1995.

2.6.3 Washington State Standards for Sediment

Chemicals may occur in sediment as part of the natural environment and from atmospheric deposition. Sediment may also become contaminated by industrial and municipal discharges and non-point sources. Sediment quality guidelines provide a means of assessing sediment quality which leads to informed management decisions regarding sediments and overlying waters.

In 1991, Ecology promulgated the Sediment Management Standards (SMS) which contain numeric criteria for specific organic and metal compounds (Table 2-12). 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 metals and ionizable organic compounds 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 dry weight concentration in µg/Kg divided by the dry weight total organic carbon content in mg/Kg multiplied by 1000).

The presence of contaminants in sediment does not necessarily indicate that the sediment is toxic to marine organisms. An important factor in determining toxicity is how much of a compound is available for uptake directly into an organism or accumulated through the food chain. In general,

Table 2-12. Washington State Sediment 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

In general, organic compounds, which make up the largest class of chemicals of concern, are 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) are soluble and therefore 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 and/or diversity of organisms due to natural toxic effects associated with enhanced 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). Grain size affects the amount of organic carbon contained in sediments with predominantly silt/clay sediments usually containing higher amounts of organic carbon than sandy sediments due to fine-grained sediments having a greater amount of surface area for adsorption of organic matter.

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 is obtained if the data are “normalized” for the total organic carbon (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 dry weight 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 than 0.2%, dry weight values are more appropriate to use than organic carbon normalized values (Michelson, 1992).

2.6.4 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 Food and Drug Administration (FDA) guidelines.

SECTION 3
Summary of 2002 and 2003 Monitoring Data

This section summarizes data collected in 2002 and 2003 from the ambient, outfall, and Marine Outfall Siting Study (MOSS) monitoring programs. A total of 47 stations were sampled in 2002; 26 ambient, 12 outfall, and 9 MOSS stations. A total of 34 stations were sampled in 2003; 22 ambient and 12 outfall. The MOSS sampling program ended in 2002. In 2003, two stations previously sampled for the MOSS program, ITEDWARDSPT and ITCARKEEKP, were added to the ambient monitoring program. Other changes to the ambient program in 2003 included the addition of a new water column station in East Passage (NSEX01) and the discontinuation of station KSRU02 located in the Lake Washington Ship Canal. Station LTBC41, which is part of the outfall monitoring program, was replaced in 2003 by a new locator, LTBC42, to reflect the offshore location of the newly extended Denny Way CSO outfall. Offshore sediments were sampled in 2002 for the ambient program. No outfall offshore sediments were sampled in either 2002 or 2003. All data for stations monitored are presented in Appendices A through F. Station locator maps are provided in Section 2, along with specific station information such as matrix, parameters, and frequency measured. Also included in this section is a summary of 2002 and 2003 precipitation data as pollutants, particularly fecal indicator bacteria, may increase in nearshore and offshore waters following rainstorms.

A summary of results for specific parameters (e.g., salinity, bacteria, metals) and matrices (e.g., water, sediment, shellfish) are provided. A discussion of the results for the ambient, outfall, and MOSS samples are combined in order to facilitate the interpretation of the data. Each matrix is discussed separately.

3.1 2002 and 2003 Precipitation Data

Monthly total precipitation data for 2002 and 2003 were obtained from the National Climatic Data Center and are shown in Figure 3-1. The rainfall totals were measured at the Sea-Tac International Airport station (station #24233). The data do not include snow or ice pellet accumulations, as the 30-year average does not include these data.

A drier than normal year occurred in 2002, with a total annual rainfall of 31.36 inches compared to 36.54 inches for the 30-year average. A wetter than normal year occurred in 2003 with a total annual precipitation total of 41.78 inches. A total of 8.96 inches of rain fell in October with 5.02 inches falling in a single day on October 20, 2003. This was the wettest day in Seattle weather history since 1891. If the five inches that fell on October 20 are excluded from the annual rainfall total, 2003 would have been an average rainfall year.

Between August and November, 2002 was an unusually dry year with only 4.64 inches of rain recorded compared to the 30-year average of 11.79 inches during those same months. This prolonged dry spell also brought warm temperatures and was the driest period during these

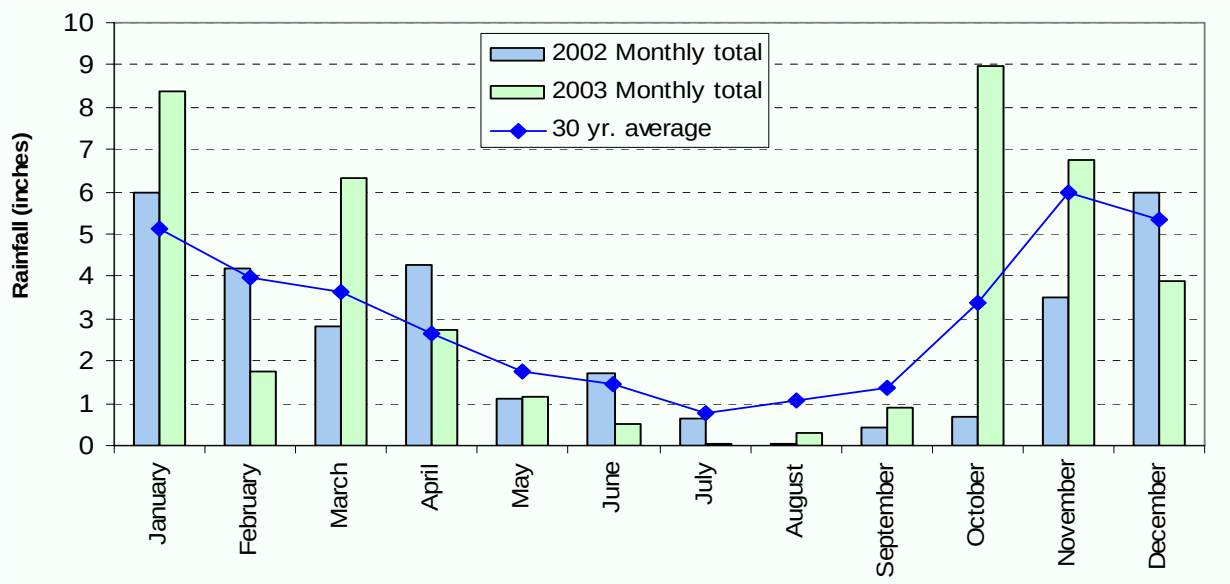

Figure 3-1. Monthly Precipitation for 2002 and 2003

months since 1987. Rainfall between July and September, historically among the driest months of the year, accounted for only 1.1% of the total annual rainfall amount. The driest months in 2003 were June through September, accounting for less than 1% of the total annual rainfall. Conversely, January, March, and October rainfall totals were above average in 2003 and the remaining months had typical rainfall amounts.

Rainfall is recorded at the Vashon Treatment Plant, which is located on the northeastern side of Vashon Island (see Figure 1-1 for plant location). Rainfall amounts were higher at this location than at the Sea-Tac station. Annual totals at the Vashon TP were 45.00 and 49.16 inches in 2002 and 2003, respectively. Monthly totals for 11 months (all except July) during 2002 were all higher at the Vashon TP than the monthly rainfall amounts recorded at Sea-Tac and 9 months in 2003 had higher monthly totals than Sea-Tac. Figure 3-2 shows monthly rainfall totals at Sea-Tac and the Vashon TP for the past four years.

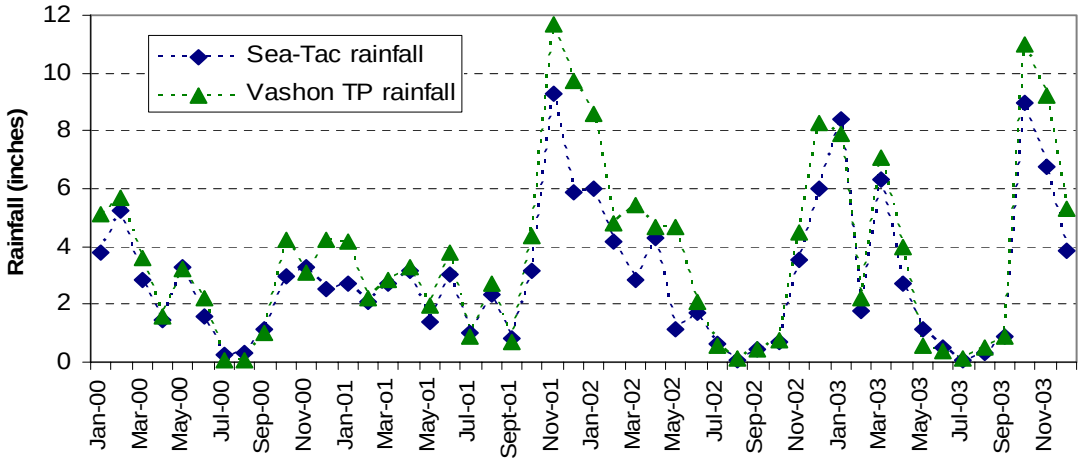

Figure 3-2. Monthly Precipitation Totals at the Vashon TP and Sea-Tac Stations

3.2 Water Column Data Results

Water column sampling is a large component of the County's water quality monitoring program and includes offshore and beach sites (see Figures 2-1 and 2-2). The monitoring program is structured to detect natural seasonal changes in the water column and to identify anthropogenic inputs and influences.

Water quality parameters, including temperature, salinity, turbidity, dissolved oxygen, total suspended solids, Secchi disk transparency, light intensity, chlorophyll-*a*, pheophytin, photosynthetically active radiation, and nutrients (ammonia, nitrate+nitrite, and total phosphorus) were measured at 11 offshore stations in both 2002 and 2003 (see Tables 2-2 through 2-5). Temperature, salinity and nutrients were measured monthly at 9 beach stations in 2002 and twice at 8 other beach stations in 2002. In 2003, temperature, salinity and nutrients were measured monthly at 9 stations. Dissolved metals were measured at 10 beach stations in 2002.

Fecal indicator bacteria (fecal coliforms and enterococci) were monitored monthly at 21 beach stations and 11 offshore stations and 6 times (May through October) at 3 stations in 2002. Bacteria were monitored twice (January and February) at six MOSS stations in order to complete two full years of sampling at those stations. *E. coli* was also monitored at the MOSS beach stations. Bacteria were monitored monthly at 20 beach and 11 offshore stations in 2003 and 6 times at 3 stations. At the sites where only bacteria was monitored (i.e., salinity and nutrients were not measured), temperature data were also collected. All water column data are provided in Appendix A.

3.2.1 Bacteria

Both fecal coliforms and enterococci were monitored at all water stations. In addition, *E. coli* was monitored at the MOSS stations. Data from the freshwater stations located in Piper's Creek (KTHA01) and the Lake Washington Ship Canal (KSRU02) are compared to freshwater fecal coliform standards and all other stations are compared to the marine fecal coliform standards. Washington State primary contact recreation fecal coliform standards for surface marine waters (formerly Class AA designation) 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 to calculate the geometric mean may exceed 43 colonies/100 ml. Freshwater standards for primary contact recreation (formerly Class A designation) state that organism counts shall not exceed a geometric mean value of 100 colonies/100 ml and not more than 10 percent of the samples used to calculate the geometric mean may exceed 200 colonies/100 ml (WAC 173-201, 2003). Freshwater standards for secondary contact recreation (formerly Class B designation) state that organism counts shall not exceed a geometric mean value of 200 colonies/100 ml and not more than 10 percent of the samples used to calculate the geometric mean may exceed 400 colonies/100 ml (WAC 173-201, 2003). Values from station KSRU02 in the Ship Canal were compared to the primary contact standard and values from KTHA01 in Piper's Creek were be compared to the secondary contact standard. Previously, King County used results from the 30 most recent surface samples to calculate geometric mean values in accordance with guidelines from the National Shellfish Sanitation Program (NSSP, 1995). The 2003 update to Washington's Water

Quality Standards for Surface Waters states that when calculating the geometric mean, only results within a 12-month period should be used and be well distributed throughout the reporting period. As samples are collected monthly for bacteria testing, a total of 12 sample results are available to calculate the geometric mean. Although, changes to the fecal coliform standards have not yet been approved by EPA, geometric mean results using 12 sample points will be reported for compliance with bacteria standards in anticipation of EPA approval. Geometric means calculated using the 30 most recent sample points are also provided in Appendix A for comparative purposes.

Offshore. All offshore water column stations at ambient and outfall sites met the primary contact fecal coliform geometric mean and peak standards in both 2002 and 2003. Figure 3-3 shows fecal coliform values detected in surface waters (collected one meter below the surface) at all offshore stations in both 2002 and 2003. Over 75% of the samples collected in 2002 and 2003 at both ambient and outfall sites had either no detectable fecal coliforms or contained 1 colony forming unit (CFU)/100 ml. Stations along the Seattle waterfront in Elliott Bay had the highest values of all the offshore stations.

Samples were collected at multiple depths at the five wastewater and CSO treatment plant outfalls and at the Denny Way CSO outfall in order to assess fecal coliform levels throughout the water column at these sites. Fecal coliform levels were not higher near the discharge depth and the majority of water column samples had no detectable fecal coliform levels. Table 3-1 provides a summary of the fecal coliform levels detected at various depths at the West Point and South Plant outfalls which have continuous discharges and the highest flows of the three WWTPs.

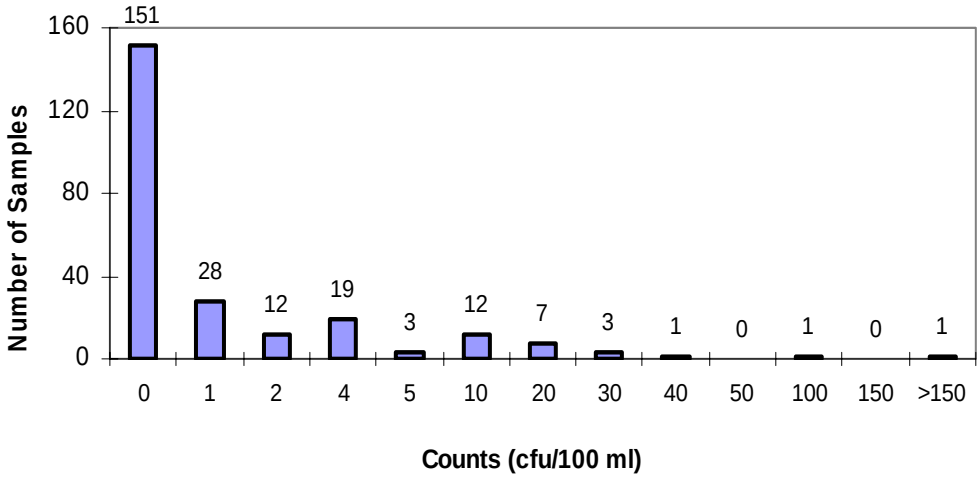

Figure 3-3. Fecal Coliforms in Surface Waters at Offshore Stations in 2002 and 2003

Enterococci were not detected in the majority of offshore surface water samples in both 2002 and 2003. For the two years combined, 62% of the samples had no detectable levels and 15% had enterococci values of 1 CFU/100 ml. As seen with fecal coliforms, the highest enterococci values

were detected at the Seattle waterfront stations. Table 3-2 provides a summary of the enterococci levels detected at various depths at the West Point and South Plant outfalls which have continuous discharges and the highest flows of the three WWTPs. Figure 3-4 shows enterococci levels in surface waters at all offshore stations.

Table 3-1. Water Column Fecal Coliform Levels at West Point & South Plant Outfalls in 2002 and 2003

	Fecal Coliform Counts (cfu/100 ml)	
Sample depth (m)	Mean	Maximum
1	0.8	7
15	0.1	1
25	0.1	1
35	0.2	2
55	0.2	2
100	0.0	0
≥ 150	0.1	3

Table 3-2. Water Column Enterococci Levels at West Point & South Plant Outfalls in 2002 and 2003

	Enterococci Counts (cfu/100 ml)	
Sample depth (m)	Mean	Maximum
1	1.0	13
15	0.9	21
25	0.5	5
35	0.5	6
55	0.8	24
100	0.5	3
≥ 150	0.1	2

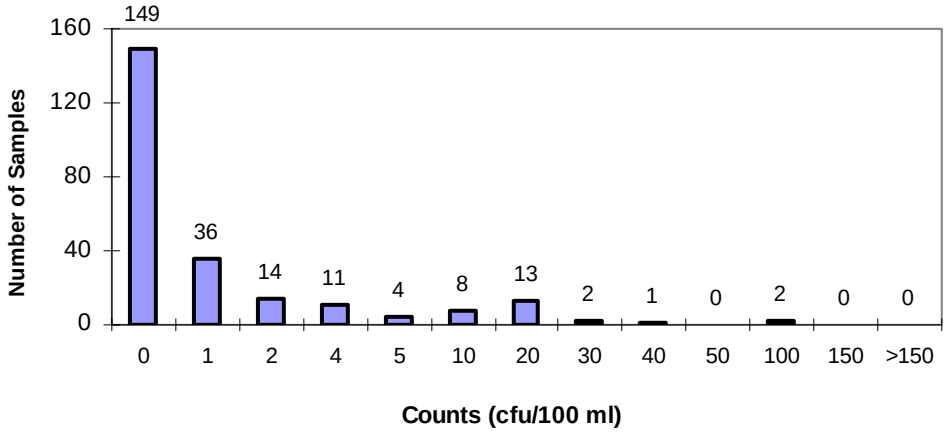

Figure 3-4. Enterococci in Surface Waters at Offshore Stations in 2002 and 2003

Beach. Of the 21 beach stations monitored monthly in 2002, 9 sites met both the geometric mean and peak marine standards throughout the year. Tables 3-3 through 3-6 provide a summary of station results throughout 2002 and 2003. Sample collection at a new beach station near the Vashon TP outfall, MSJL01, began in 2002, therefore, the geometric mean at this station could not be calculated until December 2002. Data at this station indicated low fecal coliform levels that passed both standards. Fecal coliforms at the following five stations failed both standards in 2002: ITBRACKETT, KSQU01, LTEH02, LSVW01, and LSKS01. These sites have failed standards during past years and KSQU01, LTEH02, and LSVW01 are all affected by nearby freshwater sources and fail standards more often than sites away from freshwater input. LSKS01 is located south of Alki Point and it is not clear why water samples consistently fail the fecal coliform standards at this site. Sample collection at the MOSS station ITBRACKETT began in 2000 and ended in December 2002. This site is located in Edmonds at Brackett's Landing in an area with poor circulation and 47% of the 34 monthly samples exceeded 43 CFU/100 ml. However, Figure 3-5 suggests that bacteria levels are improving at this site as indicated by the downward trend in geometric means (calculated with the most recent 12 sample results).

There were four stations sampled in 2002 that met the geometric mean and peak standards at various times throughout the year but failed during some months. Stations KSSN05, KSYV02, and LSKR01 met the standards throughout most of year while KSLU03 failed the standards the majority of the year.

Sample results in 2003 were similar to those in 2002, in that sites which passed the standards in 2002 also met the standards in 2003 and sites that failed standards did so in both 2002 and 2003. Stations near Duwamish Head and the north side of Alki Point consistently had the lowest fecal coliform counts in both 2002 and 2003. Results in 2003 were different for stations LSVW01 and KSSN05. Station LSVW01 did not meet the geometric mean standard throughout 2002 but did meet the standard during the latter part of 2003. Station KSSN05 had two exceedences in 2002

Table 3-3. Summary of 2002 Outfall Station Compliance With Standards

Station	Meets Primary Contact Recreation Marine Surface Water Standards													
	Moving Geometric Mean[a] (≤14 CFU/100 mL)													Peak[b] (43 CFU/100 mL)
	J	F	M	A	M	J	J	A	S	O	N	D		
Beach														
KSHZ03	**N**	**N**	**N**	**N**	**N**	**N**	**N**	Y	Y	Y	Y	Y		YES
KSSN04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSSN05	**N**	Y	Y	Y	Y	**N**	Y	Y	Y	Y	Y	Y		YES
LSKR01	**N**	**N**	**N**	Y	Y	Y	Y	Y	Y	Y	Y	Y		**NO**
LSKS01	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
MSJL01[c]	--	--	--	--	--	--	--	--	--	--	--	Y		YES
Offshore														
CK200P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSSK02	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LTBC41	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSEP01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSKQ06	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
VO50E	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES

[a]The geometric means were calculated using a sample size of the 12 most recent fecal coliform concentrations.

[b]The peak criterion refers to not more than 10% of the samples taken before Dec. 2002 exceeding this value.

[c]Monthly sampling at MSJL01 was initiated January 2002.

but none in 2003. For sampling years 2002 and 2003, the overall conditions at each location are summarized in Figure 3-6 based upon whether at least half of the monthly assessments passed or exceeded the standards.

Three stations have been sampled for several years in the Carkeek Park area. Station KSHZ03 is located at the beach close to the outflow of Piper's Creek and has been sampled for over 15 years. Station KTHA01 is a freshwater site located in Piper's Creek upstream (above the location) of the Carkeek CSO treatment plant and has also been sampled for over 15 years. Data collection began at the third station located north of the freshwater influence of Piper's Creek, ITCARKEEKP, in 2000 as part of the MOSS program and continues to be sampled as part of the marine ambient monitoring program.

Table 3-4. Summary of 2002 Ambient Station Compliance With Standards

Station	Meets Primary Contact Recreation Marine Surface Water Standards													
	Moving Geometric Mean[a] (≤14 CFU/100 mL)													Peak[b] (43 CFU/100 mL)
	J	F	M	A	M	J	J	A	S	O	N	D		
Beach														
ITOCEANAVE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
ITBRACKETT	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
ITEDWARDSPT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
JSVW04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KTHA01[c]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		**NO**
KSLU03	Y	**N**	**N**	**N**	**N**	**N**	**N**	**N**	Y	Y	Y	Y		**NO**
KSQU01	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
KSYV02	Y	Y	Y	**N**	**N**	**N**	**N**	Y	Y	Y	Y	**N**		**NO**
LTAB01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LTEH02	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
LSGY01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSFX01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSHV01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSTU01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSVW01	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
Offshore														
PTWELLS1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSBP01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LTED04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSNT01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSRU02[d]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES

[a]The geometric means were calculated using a sample size of the 12 most recent fecal coliform concentrations.

[b]The peak criterion refers to not more than 10% of the samples taken before Dec. 2002 exceeding this value.

[c]Freshwater standards for secondary contact recreation (Geomean ≤200 CFU/100 mL; Peak 400 CFU/100 mL) were used for evaluation of KTHA01.

[d]Freshwater standards for primary contact recreation (Geomean ≤100 CFU/100 mL; Peak 200 CFU/100 mL) were used for evaluation of KSRU02.

Table 3-5. Summary of 2003 Outfall Station Compliance With Standards

Station	Meets Primary Contact Recreation Marine Surface Water Standards													
	Moving Geometric Mean[a] (≤14 CFU/100 mL)													Peak[b] (43 CFU/100 mL)
	J	F	M	A	M	J	J	A	S	O	N	D		
Beach														
KSHZ03	Y	**N**	**N**	**N**	**N**	**N**	Y	Y	Y	Y	Y	Y		YES
KSSN04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSSN05	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSKR01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSKS01	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
MSJL01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**	**N**		**NO**
Offshore														
CK200P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSSK02	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LTBC42[†]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSEP01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSKQ06	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
VO50E	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES

[a]The geometric means were calculated using a sample size of the 12 most recent fecal coliform concentrations.

[b]The peak criterion refers to not more than 10% of the samples taken before Dec. 2003 exceeding this value.

[†]Station LTBC42 replaced LTBC41 in early 2003. The station location was adjusted approximately 1km sout

Fecal coliform results at ITCARKEEKP were consistently low in both 2002 and 2003 and passed both the geometric mean and peak standards. For station KSHZ03, the geometric mean standard was exceeded during most of 2002 and early 2003, however, the standard was met towards mid 2003. Although fecal coliform geometric means decreased at this site in 2003, this may be attributable to the drier than normal year in 2002 resulting in less freshwater input from Piper's Creek. In both 2002 and 2003, the peak standard at KSHZ03 was met at various times throughout the year. Station KTHA01 met the secondary contact freshwater geometric standard in both 2002 and 2003 but only met the peak standard at various times in 2002 and 2003. In 2002, the peak standard was met the majority of the year (during 9 months) but was only met during May and June in 2003. Figure 3-7 shows the geometric means for all three Carkeek Park stations for the last several years, including results from 2004.

Figure 3-8 shows an overall decrease in fecal coliform levels at the majority of beach sites over the last two years, including the sites that have historically failed fecal coliform standards. These figures also show that fecal coliform conditions at beaches nearby treatment plant discharges have results similar to ambient sites and meet bacteria standards the majority of the time.

Table 3-6. Summary of 2003 Ambient Station Compliance With Standards

Station[c]	Meets Primary Contact Recreation Marine Surface Water Standards													
	Moving Geometric Mean[a] (≤14 CFU/100 mL)													Peak[b] (43 CFU/100 mL)
	J	F	M	A	M	J	J	A	S	O	N	D		
Beach														
ITEDWARDSPT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
JSVW04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
ITCARKEEKP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSLU03	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSQU01	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
KSYV02	**N**	**N**	**N**	**N**	Y	Y	Y	Y	Y	Y	Y	Y		**NO**
LTAB01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		**NO**
LTEH02	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**NO**
LSGY01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSFX01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSHV01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSTU01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSVW01	**N**	**N**	**N**	**N**	**N**	**N**	**N**	Y	Y	Y	Y	Y		**NO**
KTHA01[d]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		**NO**
Offshore														
PTWELLS1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
KSBP01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LTED04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
LSNT01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES
NSEX01[e]	--	--	--	--	--	--	--	--	--	--	--	Y		YES

[a]The geometric means were calculated using a sample size of the 12 most recent fecal coliform concentrations.

[b]The peak criterion refers to not more than 10% of the samples taken before Dec. 2003 exceeding this value.

[c]There were three stations (MTEC01, MTLD03, MSSM05) with insufficient data to calculate water quality standards.

[d]Freshwater standards for secondary contact recreation (Geomean ≤200 CFU/100 mL; Peak 400 CFU/100 mL) were used for evaluation of KTHA01.

[e]Monthly sampling at MSJL01was initiated January 2002.

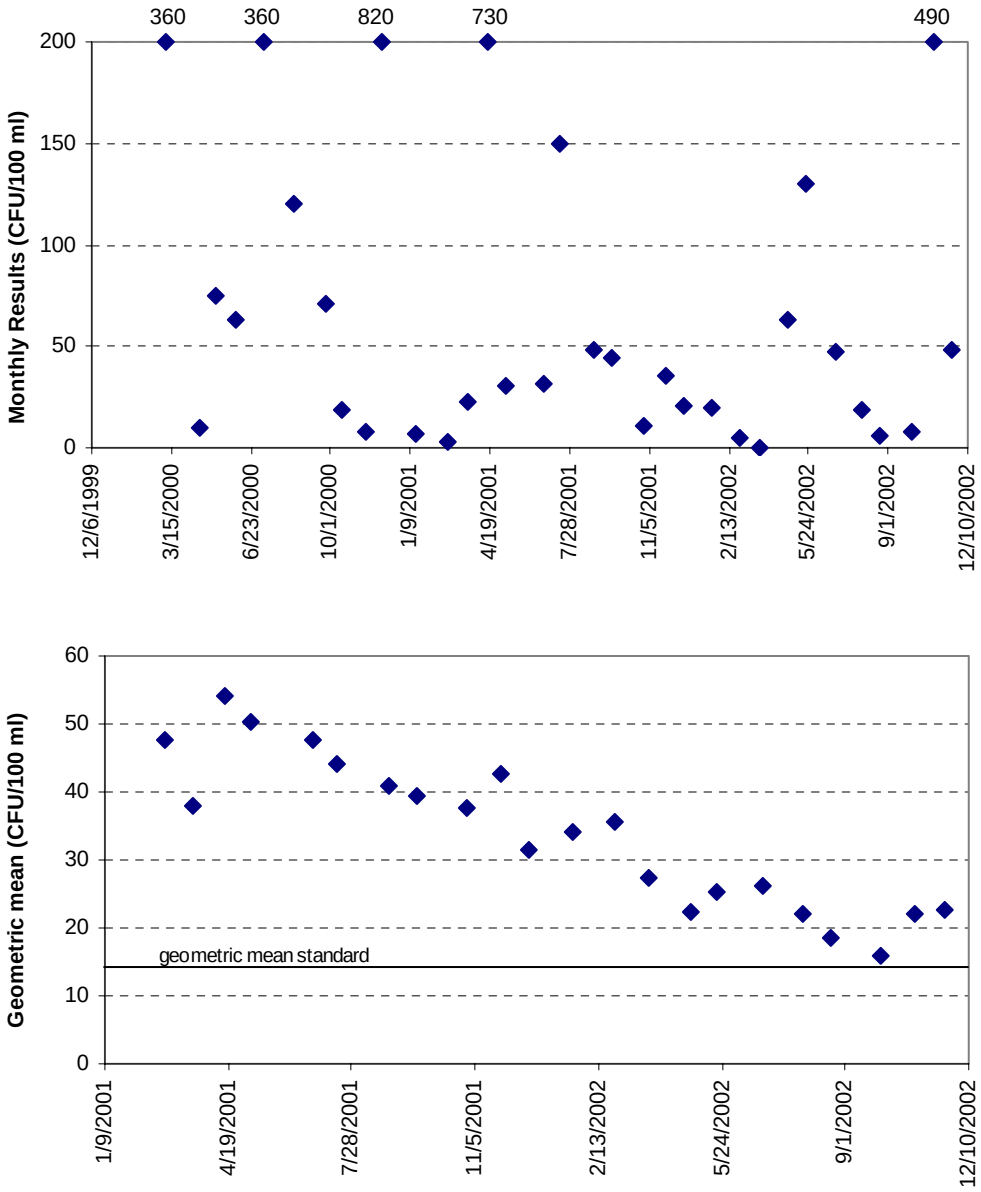

Figure 3-5. Fecal Coliform Results at Brackett's Landing Station ITBRACKETT

Enterococci counts at beach stations varied from station to station and from month to month. Table 3-7 provides a summary of results at the stations sampled in 2002 and 2003. Values were generally highest in the winter months and at stations LSVW01, ITBRACKETT, KSYV02, LTEH02, and MSJL01. Stations with higher fecal coliform counts did not have correspondingly higher enterococci counts and this lack of correlation has been noted in the past.

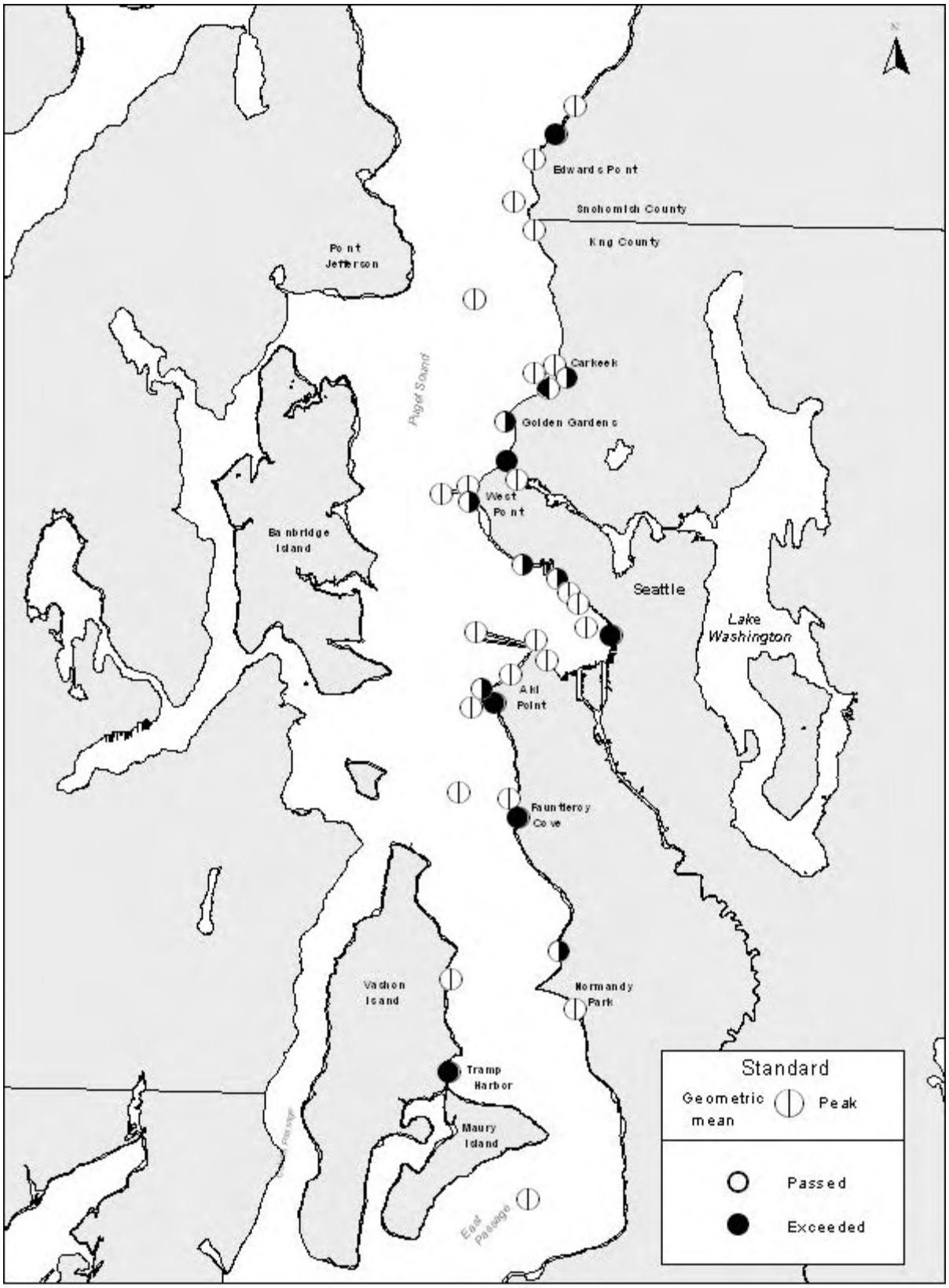

Figure 3-6. 2002 & 2003 Fecal Coliform Results: Comparison with Standards

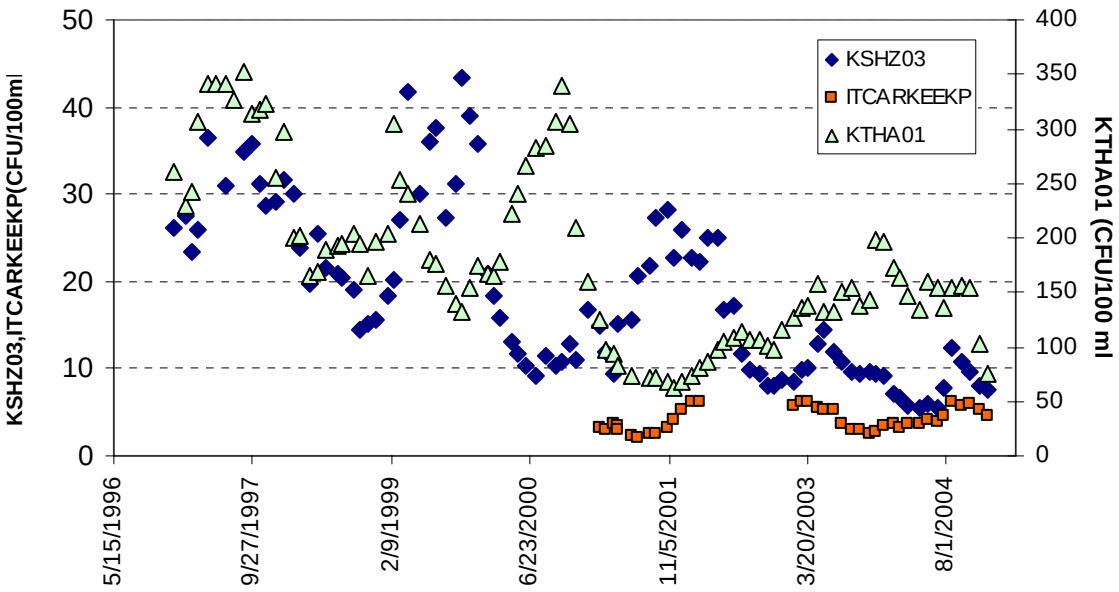

Figure 3-7. Fecal Coliform Geometric Means at Carkeek Park Stations

Table 3-7. Summary of Enteroccocci Values at Beach Stations in 2002 & 2003

Station	% of Samples ≥ 104 cfu/100 ml [a]	% of Samples ≥ 276 cfu/100 ml [b]	Mean (cfu/100 ml)	Median (cfu/100 ml)	Maximum Value (cfu/100 ml)	Number of Samples
ITBRACKETT	17	0	34	14	150	12
ITOCEANAVE	0	0	5	2	24	12
ITEDWARDSPT	9	0	21	6	119	22
JSVW04	0	0	7	4	29	22
ITCARKEEKP	0	0	6	2	22	12
KSHZ03	0	0	19	8	82	24
KSLU03	0	0	13	7	67	24
KSQU01	0	0	13	8	53	24
KSSN04	0	0	4	2	23	24
KSSN05	0	0	10	4	60	24
KSYV02	14	9	49	6	430	24
LTAB01	4	0	25	4	200	24
LTEH02	8	8	70	14	690	24
LSFX01	4	0	9	1	130	24
LSGY01	4	0	12	1	170	24
LSHV01	0	0	8	2	51	24
LSKR01	4	0	15	4	85	24
LSKS01	8	4	63	8	1005	24
LSTU01	0	0	6	1	38	24
LSVW01	17	8	76	20	830	24
MTLD03	0	0	12	4	52	12
MSJL01	8	8	97	14	970	24
MSSM05	13	7	52	4	420	15

[a] Indicates EPA marine beach advisory level for single sample concentration.
[b] Indicates EPA marine beach warning level for single sample concentration.

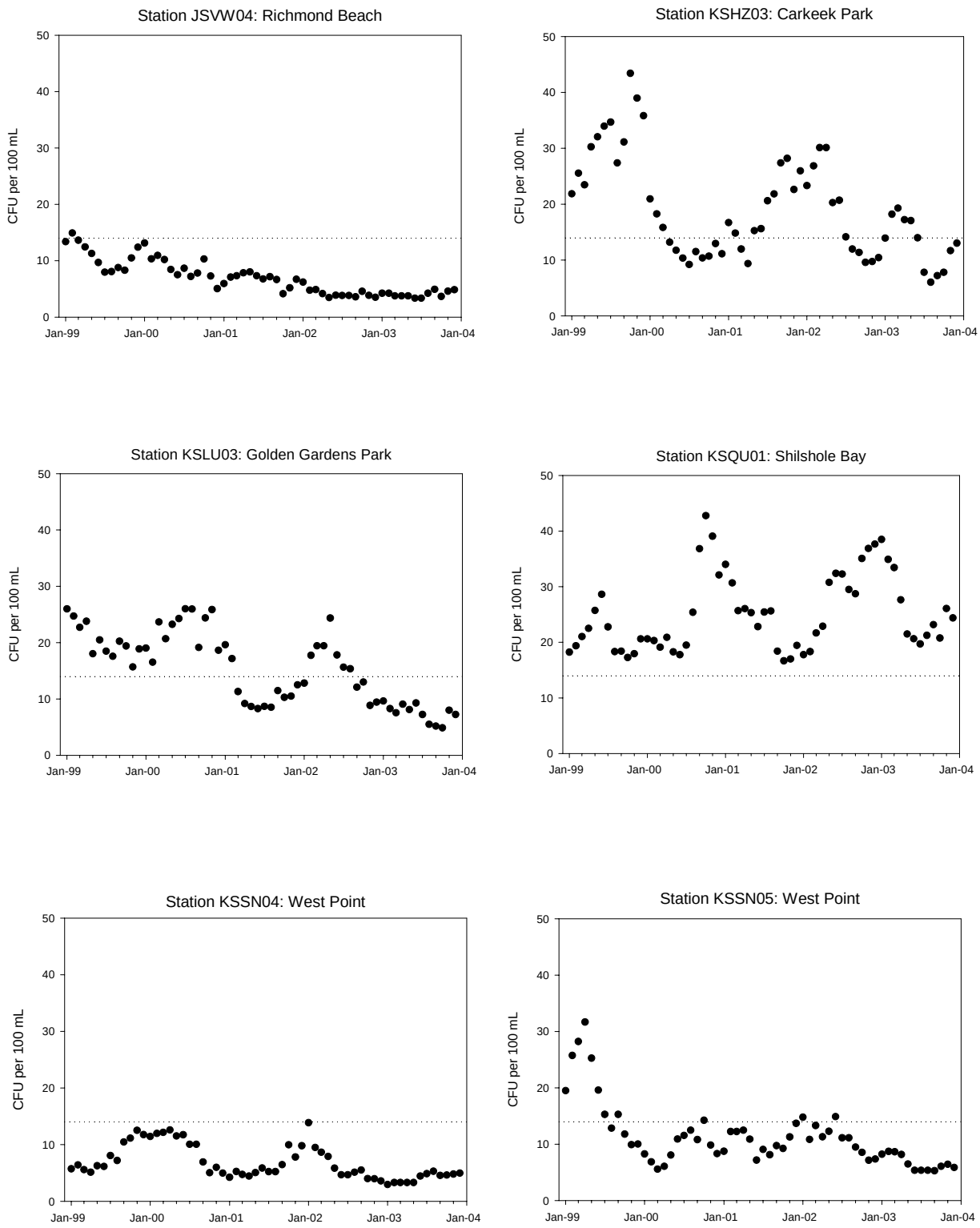

Figure 3-8. Fecal Coliform Geometric Means for 20 Beach Stations Sampled From 1999-2003 (dashed line indicates geometric mean primary contact standard)

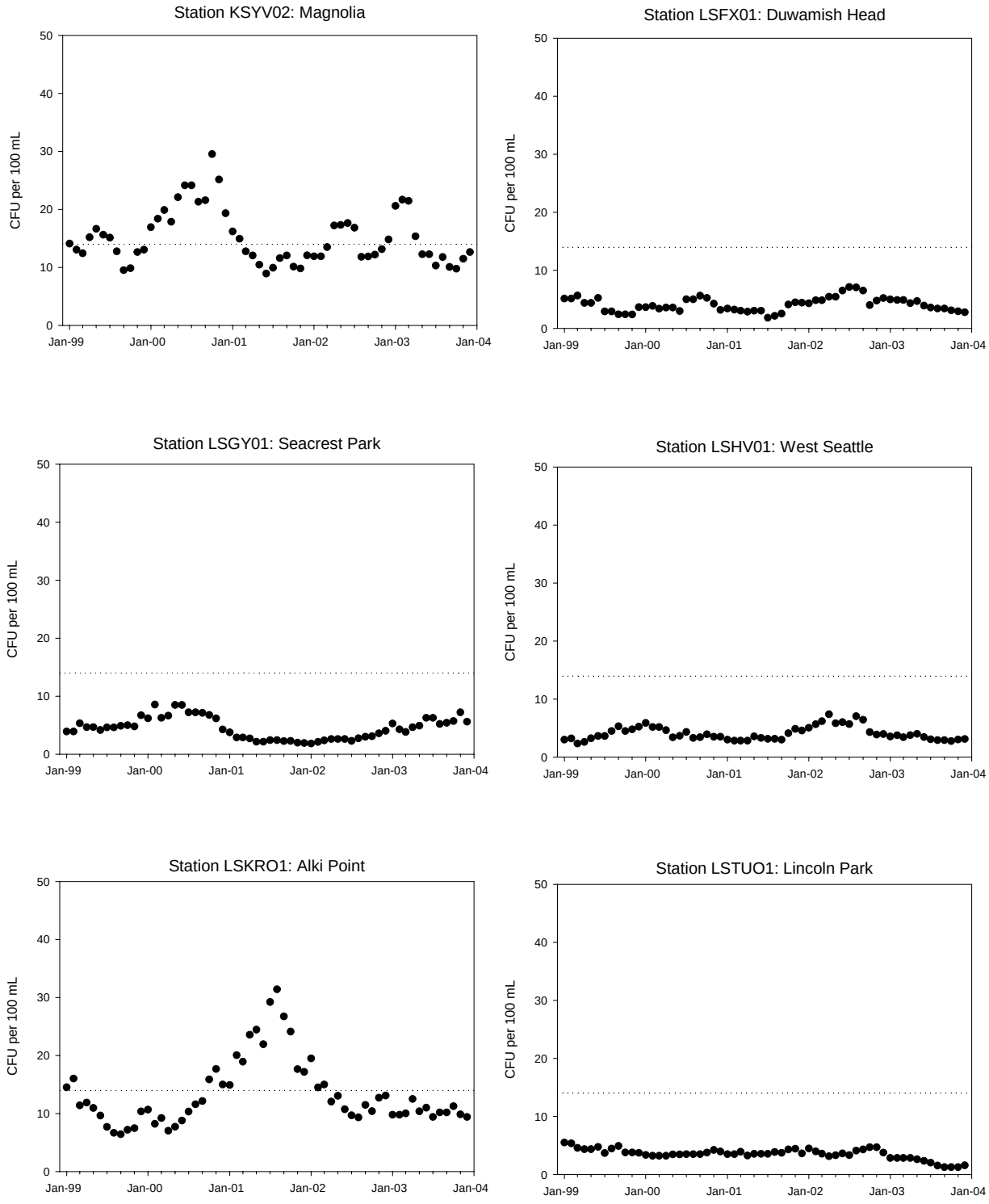

Figure 3-8 cont. Fecal Coliform Geometric Means for 20 Beach Stations Sampled From 1999-2003 (dashed line indicates geometric mean primary contact standard)

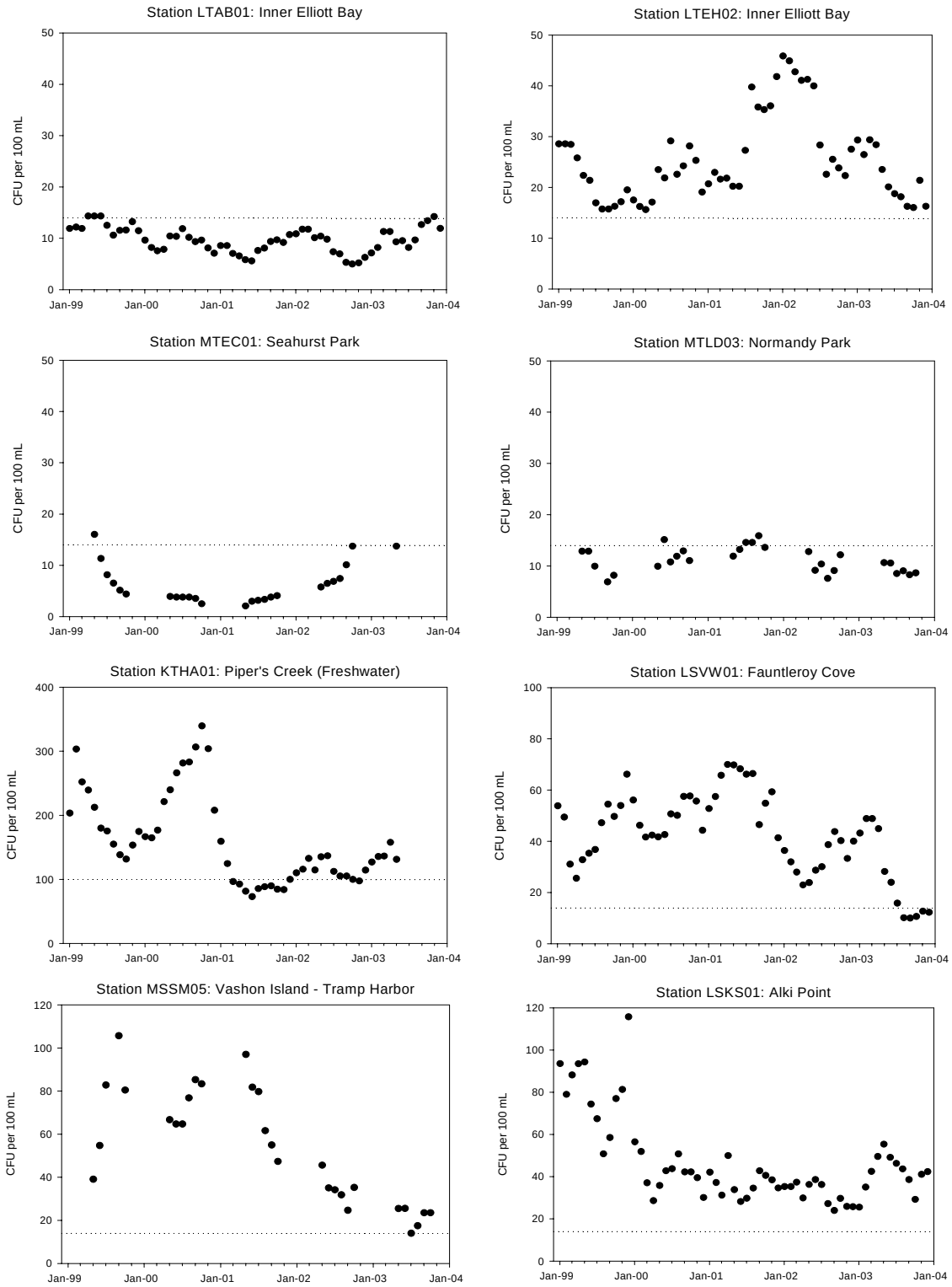

Figure 3-8 cont. Fecal Coliform Geometric Means for 20 Beach Stations Sampled From 1999-2003 (dashed line indicates geometric mean primary contact standard)

3.2.2 Water Temperature

Offshore Stations. Temperature measurements were made throughout the water column from the surface to just above the seafloor at each offshore station. CTD temperature profiles are provided in Appendix F. For offshore stations sampled in 2002 and 2003, temperatures ranged from 7.0 to 16.9 ^{o}C (including data from all depths), with a mean temperature of 10.4 ^{o}C. This is a slight increase from a mean water temperature of 10.1 ^{o}C found in 2001. Water temperatures in 2002 were lower, on average, than those measured in 2003. Temperatures ranged from 7.1 to 15.1 ^{o}C (mean = 10.0 ^{o}C) in 2002, while temperatures ranged from 7.7 to 16.9 ^{o}C (mean = 10.8 ^{o}C) in 2003. Temperatures over 15.8 ^{o}C were found in surface waters at ten of the eleven offshore stations sampled on July 28 and 29, 2003. Air temperatures for July 2003 averaged 2.6 ^{o}F above normal, the fifth-hottest July on record in Seattle. The warmest days were July 29 and 30 when air temperatures reached highs of 93 and 92 ^{o}F, respectively. Water temperature variations during the winter and early spring months were minimal, particularly deeper in the water column. Surface temperatures varied significantly from season to season due to differences in air temperature, cloud cover, wind speed, and solar radiation. The seasonal surface temperature pattern observed in central Puget Sound included minimums in January (Figure 3-9), February, and March, followed by increases in April (Figure 3-10), May, June, and July (Figure 3-11). Surface temperatures began decreasing in late September and continued to decrease throughout the remainder of the year (Figure 3-12).

In both 2002 and 2003, a seasonal thermocline (a depth range over which temperature decreases rapidly with depth) extending down to approximately 50 meters developed in late spring and persisted into late summer. By late September, the water column was well-mixed. Figures 3-13 and 3-14 provide vertical temperature profiles for 2002 and 2003, respectively, from six stations located throughout the sampling area. Temperature values and patterns observed at these six stations are representative of the other stations monitored. The profiles illustrate the high variability of water temperatures at the surface and the presence of a well-mixed water column at deeper depths even when seasonal stratification is present. Temperature values at discrete depths are provided in Appendix A.

Water temperatures measured over a five year period, from 1999 to 2003, are shown in Figure 3-15 for stations KSBP01 and LSNT01. Overall, the figures indicate a well-mixed water column throughout most of the year, with thermocline development during the summer corresponding to a rise in air temperature and an increase in solar radiation. Variations in water temperature from 1999-2003 for all 2002/2003 offshore stations can be found in Appendix E. Mean, minimum, and maximum values for temperature and other general water quality parameters for the past ten years of sampling at stations KSBP01 and LSNT01 are summarized in Table 3-8.

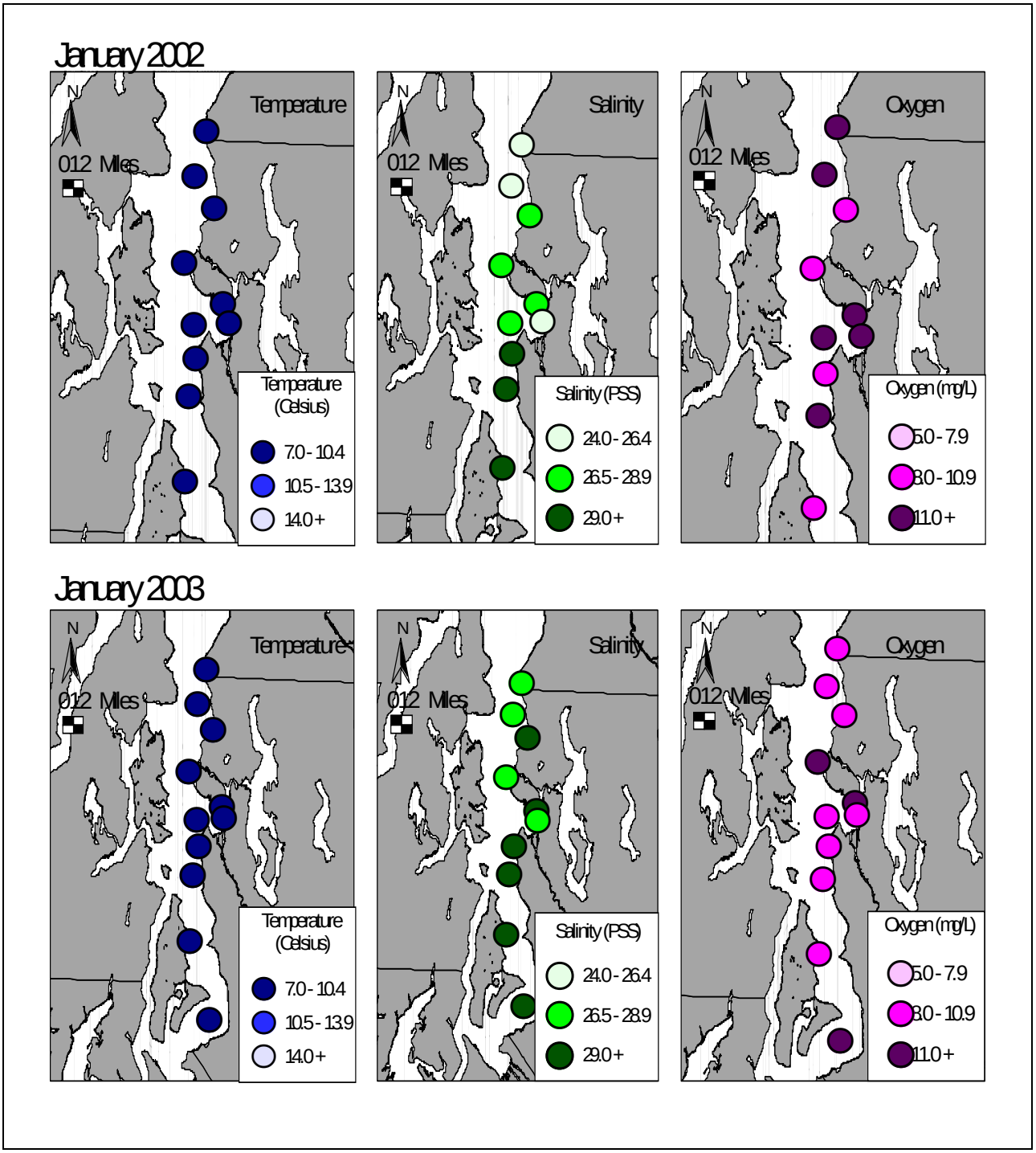

Figure 3-9. Seasonal Temperature, Salinity, and Dissolved Oxygen Distributions in Surface Water at Offshore Stations for 2002 & 2003 in January

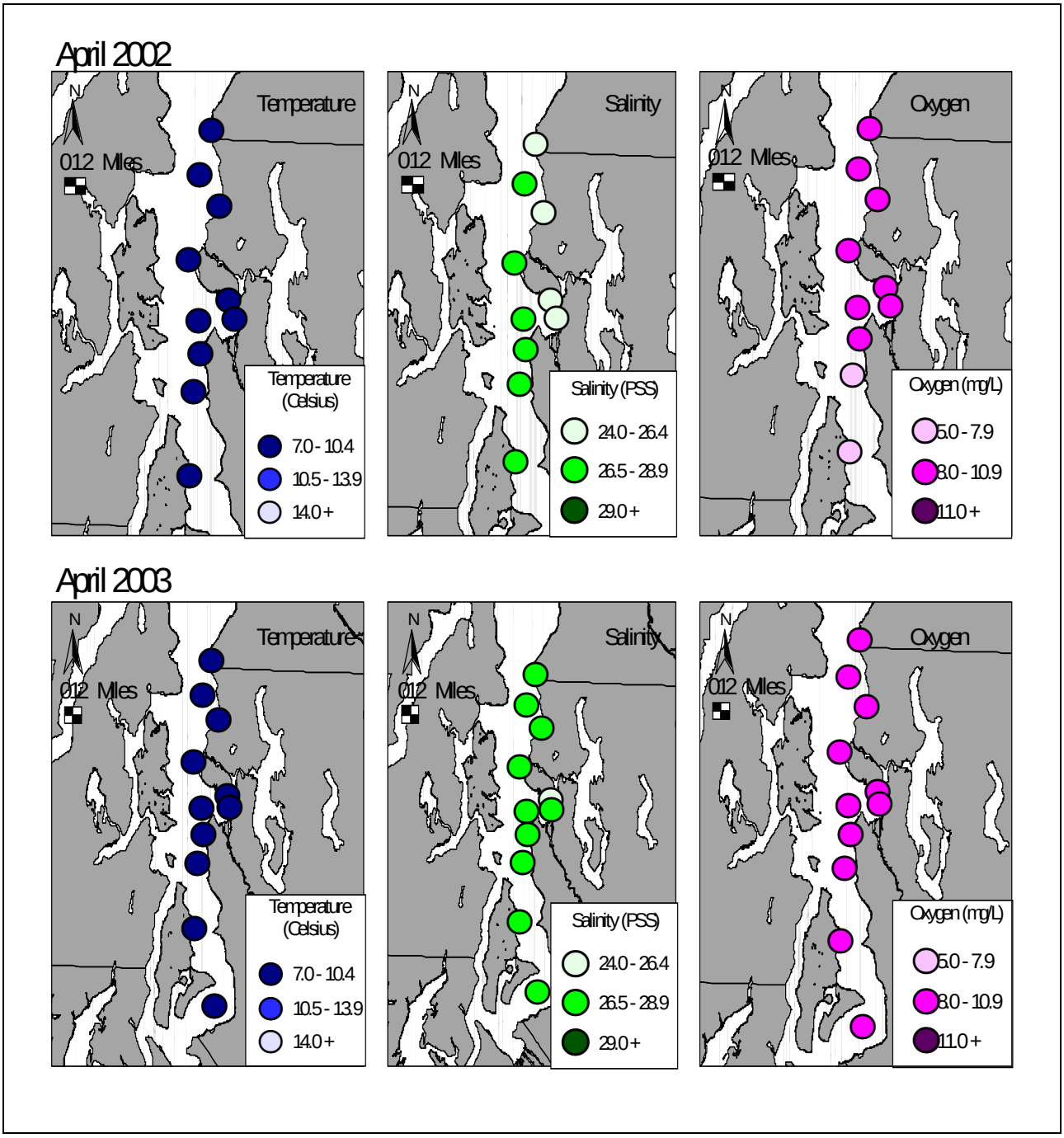

Figure 3-10. Seasonal Temperature, Salinity, and Dissolved Oxygen Distributions in Surface Water at Offshore Stations for 2002 & 2003 in April

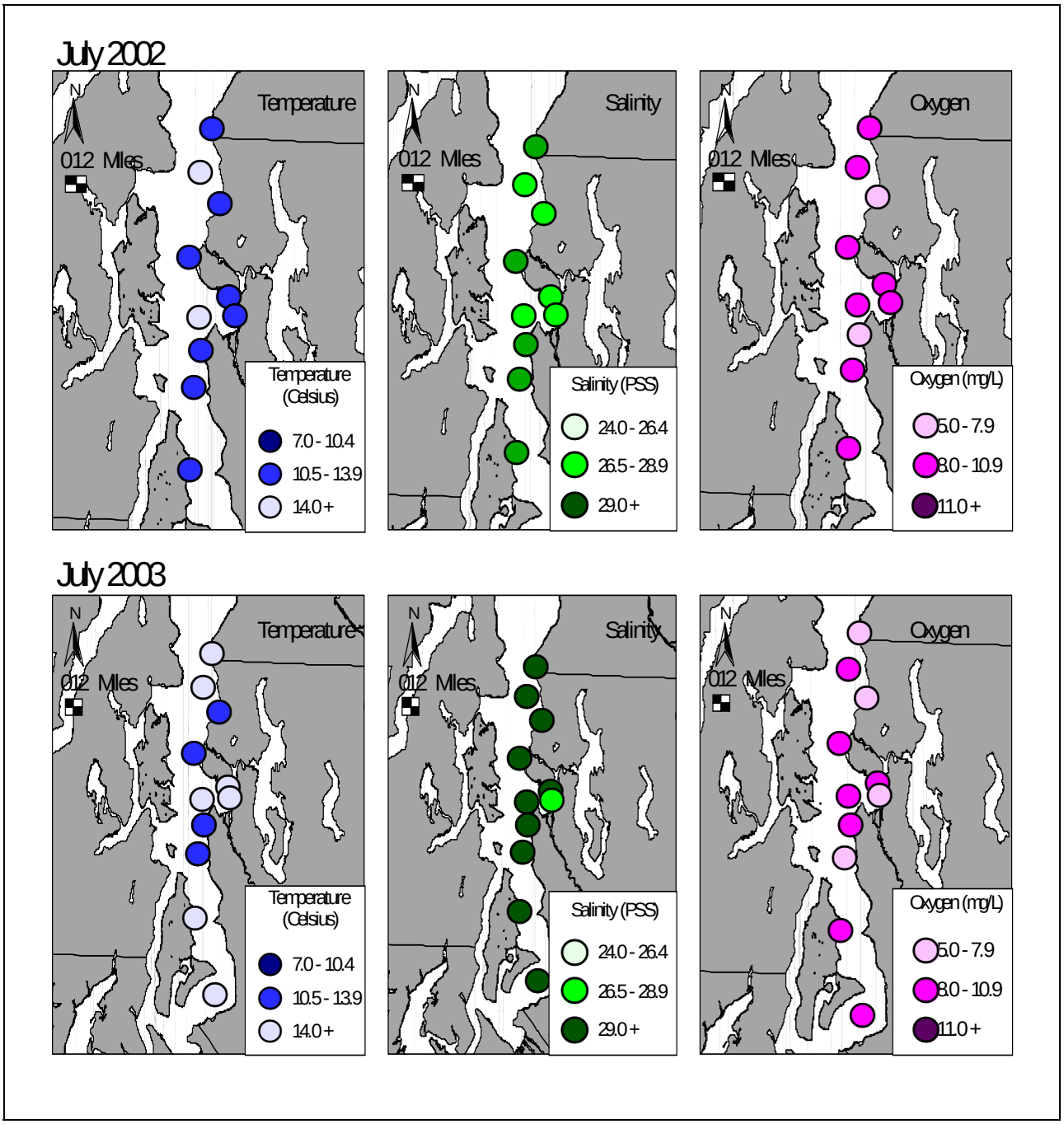

Figure 3-11. Seasonal Temperature, Salinity, and Dissolved Oxygen Distributions in Surface Water at Offshore Stations for 2002 & 2003 in July

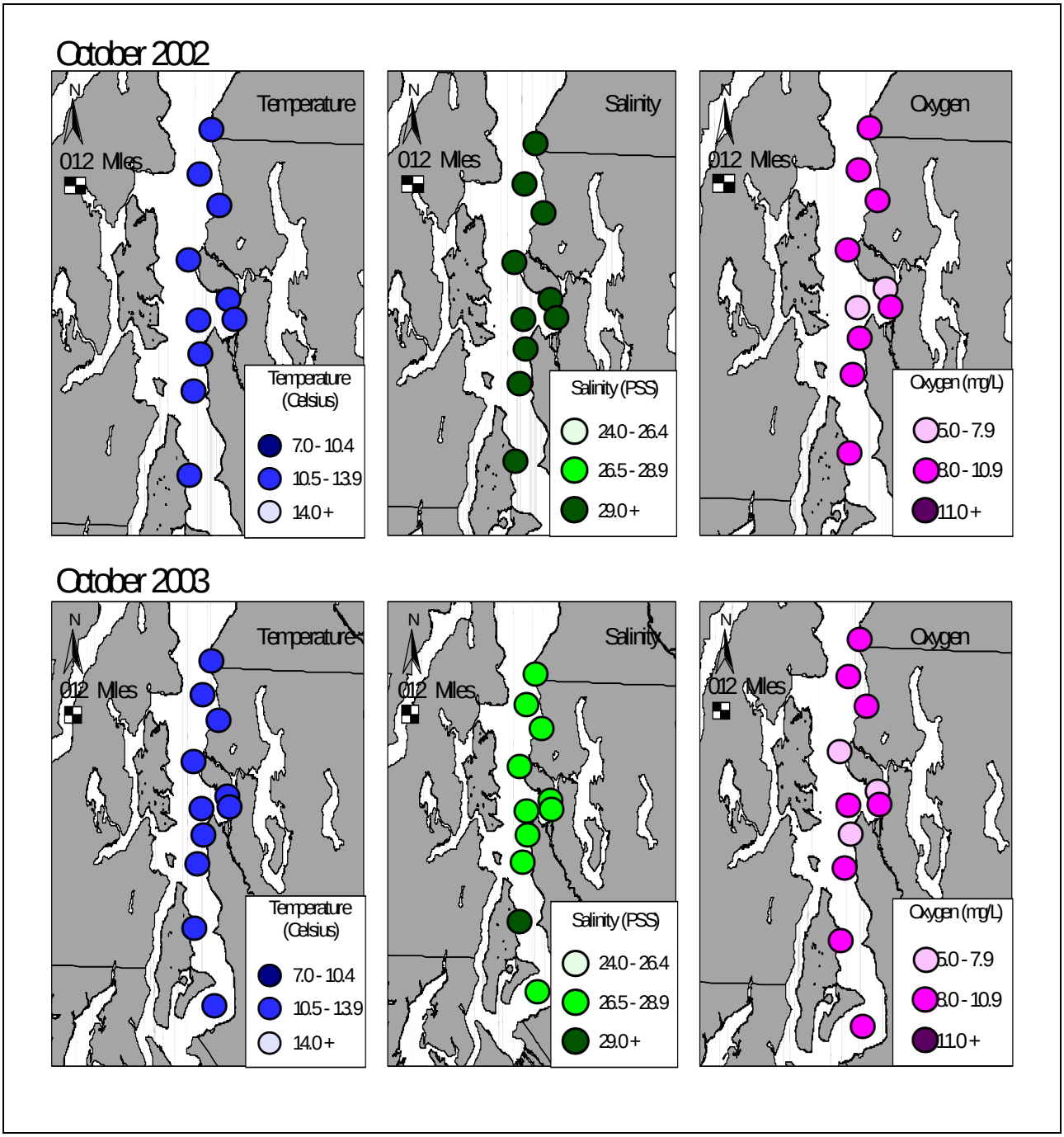

Figure 3-12. Seasonal Temperature, Salinity, and Dissolved Oxygen Distributions in Surface Water at Offshore Stations for 2002 & 2003 in October

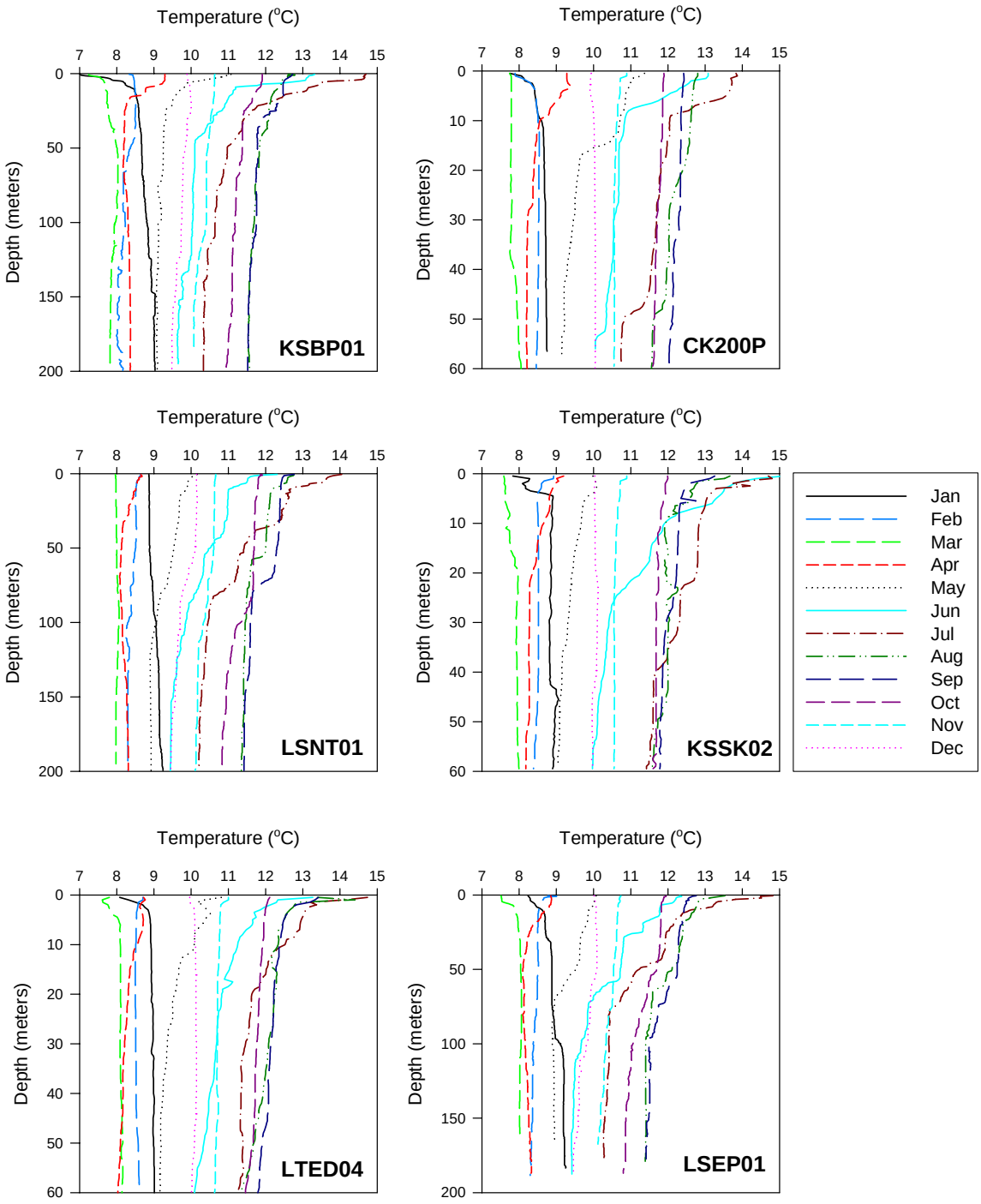

Figure 3-13. 2002 Vertical Temperature Profiles from Select Offshore Stations

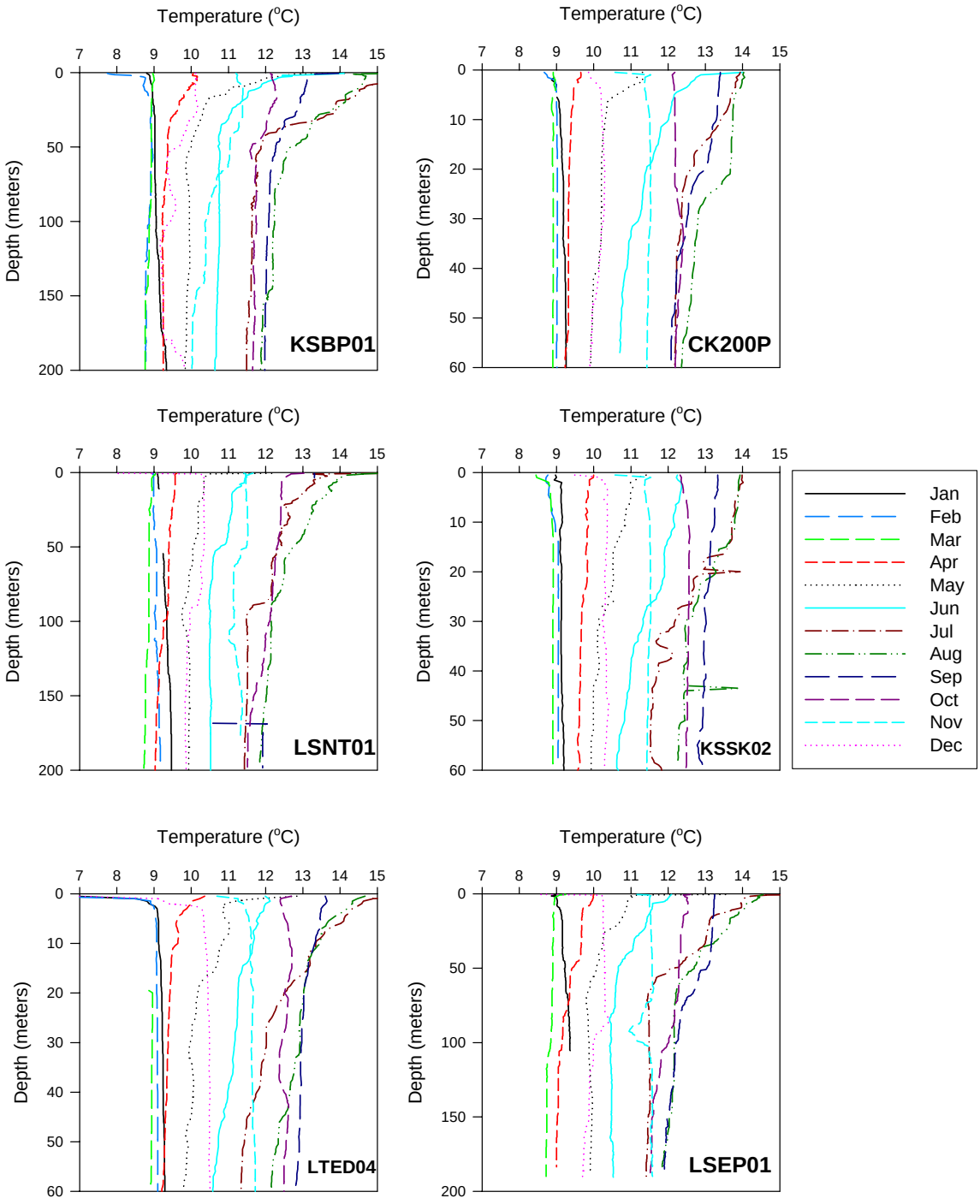

Figure 3-14. 2003 Vertical Temperature Profiles from Select Offshore Stations

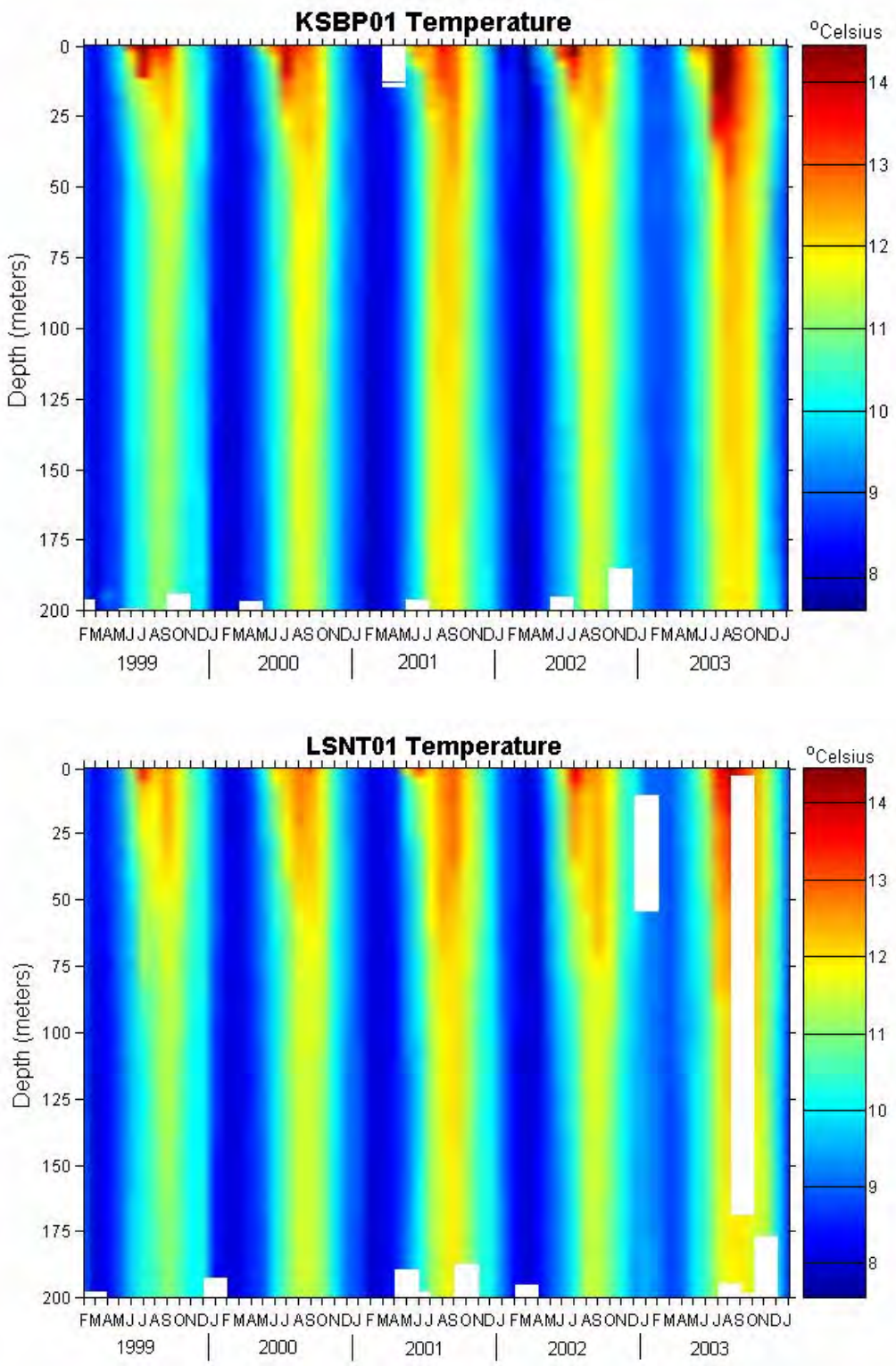

Figure 3-15. Temperature Variations at Stations KSBP01 and LSNT01 from 1999-2003

Table 3-8. General Water Quality Parameter Variations at KSBP01 and LSNT01 from 1994-2003 (includes all depths)

		Temperature (^{0}C)	Salinity (PSS)	Dissolved oxygen (mg/L)	Chlorophyll-a (mg/m^3)	Pheophytin (mg/m^3)	NO3+NO2 (mg/L)	NH3-N (mg/L)	Phosphorous (total) (mg/L)	TSS* (mg/L)	Silica (mg/L)
Means											
1994	KSBP01	11.0	30.04	8.0	4.48	1.41	0.28	0.19	0.07	3.0	no data
	LSNT01	10.9	30.13	7.7	3.27	1.03	0.28	0.18	0.07	3.9	no data
1995	KSBP01	11.6	29.75	7.9	4.51	1.17	0.26	0.04	0.07	4.3	2.0
	LSNT01	11.0	29.68	7.7	2.89	0.68	0.28	0.04	0.07	3.8	2.4
1996	KSBP01	10.2	29.17	7.6	1.07	0.62	0.29	0.04	0.07	4.4	2.2
	LSNT01	10.0	29.27	7.7	1.47	0.61	0.29	0.04	0.07	4.3	2.5
1997	KSBP01	11.1	29.21	7.1	2.22	0.40	0.33	0.03	0.08	4.4	2.8
	LSNT01	11.4	29.20	6.9	1.77	0.41	0.32	0.03	0.08	4.5	2.8
1998	KSBP01	11.1	29.68	7.5	3.42	0.70	0.29	0.02	0.07	3.4	2.5
	LSNT01	11.3	29.70	7.4	2.04	0.29	0.29	0.02	0.07	3.2	2.8
1999	KSBP01	9.9	29.57	7.2	3.35	0.70	0.30	0.02	0.06	3.8	2.4
	LSNT01	10.0	29.62	6.9	1.20	0.44	0.30	0.03	0.07	4.0	2.6
2000	KSBP01	9.8	29.90	7.5	2.78	0.72	0.33	0.03	0.07	2.2	2.8
	LSNT01	9.8	29.83	7.6	2.60	0.40	0.34	0.02	0.07	2.5	3.1
2001	KSBP01	10.0	30.47	7.1	3.43	0.73	0.37	0.03	0.07	1.8	2.6
	LSNT01	10.1	30.42	7.1	4.09	0.44	0.32	0.03	0.07	2.0	2.7
2002	KSBP01	9.8	29.99	6.9	2.69	0.63	0.33	0.04	0.07	2.6	2.6
	LSNT01	9.9	29.97	6.8	3.18	0.46	0.32	0.04	0.07	2.8	2.6
2003	KSBP01	10.6	30.09	6.9	4.15	0.91	0.31	0.02	0.07	2.9	2.4
	LSNT01	10.5	29.99	6.8	2.04	0.55	0.32	0.02	0.07	2.9	2.6
Minimums											
1994	KSBP01	8.3	25.48	5.8	0.18	0.03	0.08	0.02	0.04	0.6	no data
	LSNT01	8.5	27.18	5.2	0.07	0.02	0.06	0.02	0.05	0.8	no data
1995	KSBP01	8.2	22.06	5.3	0.02	0.10	0.07	0.02	0.02	0.7	0.4
	LSNT01	7.7	25.85	5.5	0.04	0.09	0.07	0.02	0.03	0.8	0.7
1996	KSBP01	7.7	26.53	5.5	0.09	0.06	0.07	0.02	0.05	0.8	1.0
	LSNT01	7.6	27.39	5.2	0.13	0.09	0.08	0.02	0.05	0.5	1.0
1997	KSBP01	7.5	26.81	5.5	0.03	0.01	0.13	0.02	0.04	0.7	0.5
	LSNT01	7.8	27.33	5.2	0.13	0.02	0.21	0.02	0.05	0.9	1.2
1998	KSBP01	8.7	26.48	5.4	0.14	0.05	0.07	0.01	0.03	1.2	0.7
	LSNT01	9.0	28.58	5.5	0.16	0.01	0.12	0.01	0.04	1.2	1.7
1999	KSBP01	8.0	24.22	5.1	0.13	0.07	0.05	0.01	0.03	1.8	0.3
	LSNT01	8.0	27.81	4.9	0.15	0.08	0.11	0.01	0.04	1.9	1.1
2000	KSBP01	8.0	25.59	4.2	0.21	0.09	0.06	0.01	0.04	0.5	0.3
	LSNT01	8.0	26.90	4.2	0.21	0.03	0.10	0.01	0.05	0.5	1.2
2001	KSBP01	7.8	26.56	3.9	0.17	0.13	0.09	0.01	0.04	0.5	1.1
	LSNT01	7.9	28.06	4.5	0.17	0.08	0.16	0.01	0.03	0.6	0.7
2002	KSBP01	7.0	24.18	4.5	0.16	0.09	0.10	0.01	0.04	0.5	0.7
	LSNT01	8.0	28.40	4.5	0.18	0.03	0.13	0.01	0.05	0.6	1.5
2003	KSBP01	7.7	24.08	4.8	0.05	0.10	0.05	0.01	0.03	0.6	0.3
	LSNT01	8.0	24.61	4.0	0.20	0.07	0.14	0.01	0.05	0.5	1.8
Maximums											
1994	KSBP01	16.0	31.54	15.0	28.00	7.10	0.45	1.15	0.10	16.0	no data
	LSNT01	13.9	31.51	12.0	11.00	4.50	0.44	0.45	0.09	14.0	no data
1995	KSBP01	19.0	31.92	13.0	31.00	5.60	0.41	0.08	0.11	10.0	3.7
	LSNT01	14.3	31.87	11.0	12.00	2.70	0.48	0.06	0.12	11.4	4.1
1996	KSBP01	14.3	30.66	9.9	8.50	2.80	0.44	0.17	0.11	11.4	3.8
	LSNT01	14.0	30.72	9.4	5.30	2.80	0.43	0.12	0.10	9.7	4.1
1997	KSBP01	15.0	30.08	12.6	15.90	1.90	0.49	0.04	0.13	13.2	3.9
	LSNT01	14.6	30.09	9.9	7.10	5.60	0.42	0.06	0.12	10.8	3.6
1998	KSBP01	15.5	30.78	14.1	31.50	3.30	0.39	0.04	0.13	7.9	3.9
	LSNT01	14.7	30.75	10.5	13.40	1.10	0.39	0.04	0.12	8.8	4.5
1999	KSBP01	14.8	30.67	13.8	26.10	4.00	0.41	0.05	0.08	8.8	3.8
	LSNT01	13.5	30.55	9.9	17.50	1.50	0.41	0.06	0.08	10.9	3.8
2000	KSBP01	14.0	30.88	11.5	23.00	3.80	0.41	0.05	0.08	8.2	3.9
	LSNT01	13.1	31.17	9.9	18.40	2.60	0.44	0.05	0.09	6.5	4.2
2001	KSBP01	13.6	30.95	15.1	30.00	2.87	0.43	0.06	0.09	4.4	3.6
	LSNT01	13.4	30.94	20.1	28.60	2.78	0.43	0.06	0.08	5.2	4.0
2002	KSBP01	14.7	31.61	12.9	24.40	3.38	0.44	0.08	0.09	11.7	3.9
	LSNT01	14.1	31.12	11.2	13.10	2.66	0.44	0.08	0.09	9.2	3.7
2003	KSBP01	16.6	31.03	13.2	25.10	5.30	0.42	0.05	0.09	7.0	3.3
	LSNT01	15.7	32.75	10.9	10.50	2.96	0.44	0.05	0.09	5.9	3.4

***Total Suspended Solids**

Beach Stations. Temperatures at beach stations sampled in 2002 and 2003 ranged from 6.5 to 19.5 °C (mean = 11.2 °C). As shown in Figure 3-16, temperatures varied dependent upon location sampled. Temperatures were slightly higher in 2003 (mean = 11.6 °C) than in 2002 (mean = 10.9 °C). The range of maximum temperatures (standard deviation = 1.6 °C and 1.4 °C in 2002 and 2003, respectively) observed was greater than the range of minimum temperatures (standard deviation = 0.4 °C in both years). June and August had the highest temperatures in 2002 and 2003, respectively. Temperature data for beach stations is provided in Appendix A.

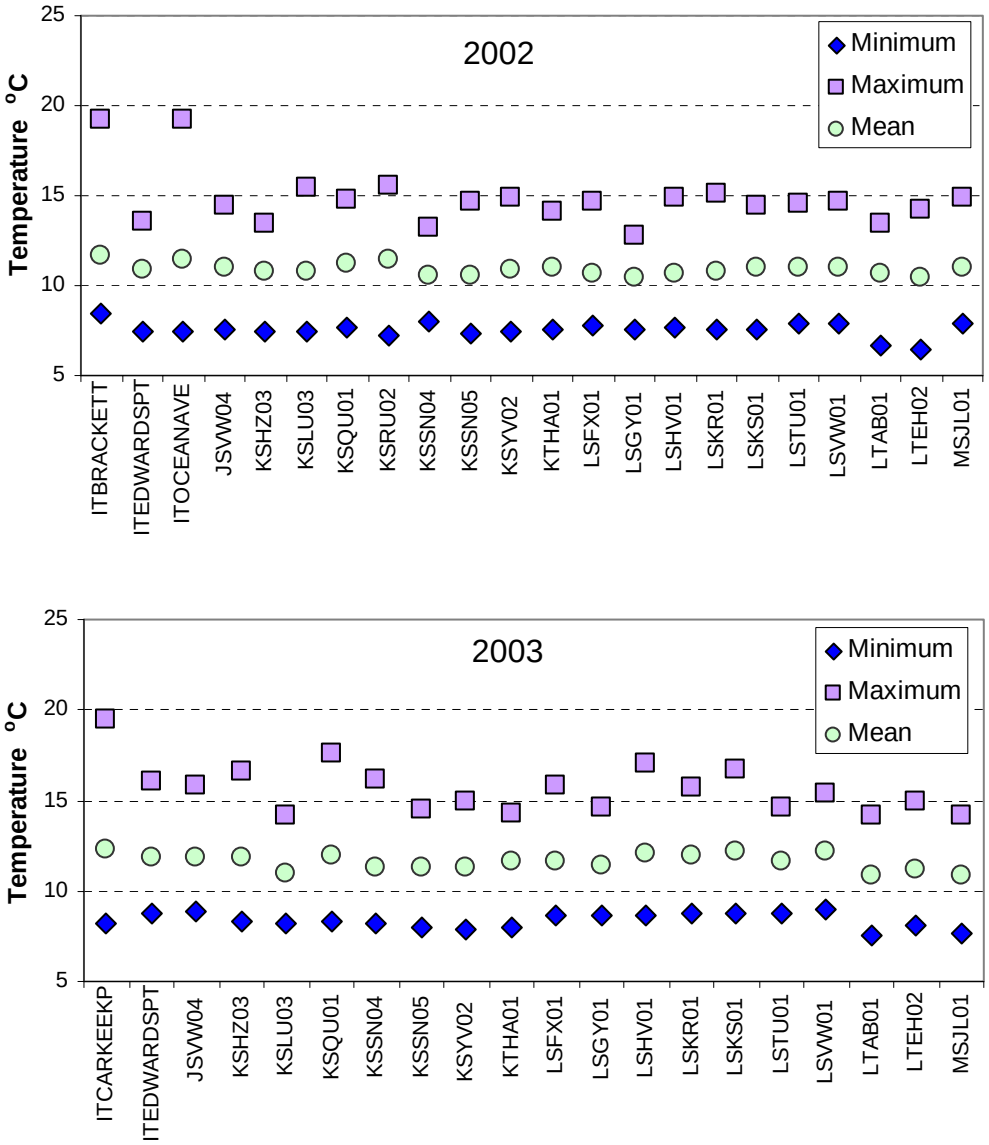

Figure 3-16. Water Temperature at Beach Stations in 2002 & 2003

3.2.3 Salinity and Density

Offshore Salinity. Salinity measurements were made throughout the water column at each offshore station. CTD salinity profiles are provided for select stations in Appendix F. Salinities ranged from 20.91 to 31.61 in 2002, and from 19.36 to 31.13 in 2003 on the Practical Salinity Scale (PSS). Mean salinities varied only slightly between the years with 2002 at 29.85 PSS and 2003 at 30.00 PSS. In both years, the lowest salinities occurred in the surface waters of Elliott Bay (LTBC41 in 2002; LTBC42 in 2003) primarily due to freshwater runoff from the Duwamish River, in addition to discharge from the nearby Denny Way CSO, following rain events on 5/27/02 and 4/29/03. The highest salinities (>31.00 PSS) were found offshore at depths greater than 100 meters during the month of November. This may be attributed to the increased input of salty deep oceanic water upwelled along the Pacific coast and entering Puget Sound during late summer and fall. Salinity values at discrete depths are provided in Appendix A for offshore stations.

Salinities varied due to seasonal influences as shown in the vertical salinity profiles for six stations in 2002 (Figure 3-17) and 2003 (Figure 3-18). Apart from the surface layer, where wide ranges were observed (Figures 3-9 through 3-12), salinity showed little variability over the depth profile, indicating a well-mixed water column. Salinities were lowest in surface waters during the winter and spring months when contributions from freshwater sources were highest. The three inner Elliott Bay stations (LTBC41, LTBC42, and LTED04) had persistently low salinities at the surface due to freshwater flow from the Duwamish River. Generally, salinities were highest from August to December, potentially due to an increased contribution of saltier deep Pacific water from upwelling along the outer coast during late summer in combination with a decrease in freshwater input from rivers and runoff. The months in which uniform salinities are seen from surface to depth can be attributed to low rainfall and, therefore, low input from rivers and runoff.

Salinities for all depths measured over a five year period, from 1999 to 2003, are shown in Figure 3-19 for stations KSBP01 and LSNT01. Overall, the figures indicate a well-mixed water column throughout most of the year, with no development of a strong halocline (a rapid change in salinity with depth). The seasonal decrease in surface water salinity was notably less in 2001 than in the other years, most likely due to the drought conditions of late 2000/early 2001. The cycle of coastal upwelling and its influence upon the waters of Puget Sound is seen as a deep, salty signal in late summer and fall of each year. Lower salinities in surface waters at station KSBP01 is due to the greater influence of freshwater at this location compared to station LSNT01. Variation in salinity from 1999-2003 for all stations can be found in Appendix E. Mean, minimum, and maximum values for the past ten years of sampling at stations KSBP01 and LSNT01 are summarized in Table 3-8.

Beach Salinity. Salinity at beach stations ranged from 11.53 to 30.70 PSS (mean = 26.70 PSS) in 2002, and from 10.25 to 30.45 PSS (mean = 28.08 PSS) in 2003 (Figure 3-20). Salinities were lowest at stations near a freshwater source. Stations KSHZ03 and MSJL01 are near creeks draining into the Sound and station KSRU02 is located within the Lake Washington Ship Canal. There was no notable difference in salinity between stations from north to south other than variations due to proximity to a freshwater source. Seasonal changes in salinity showed highest

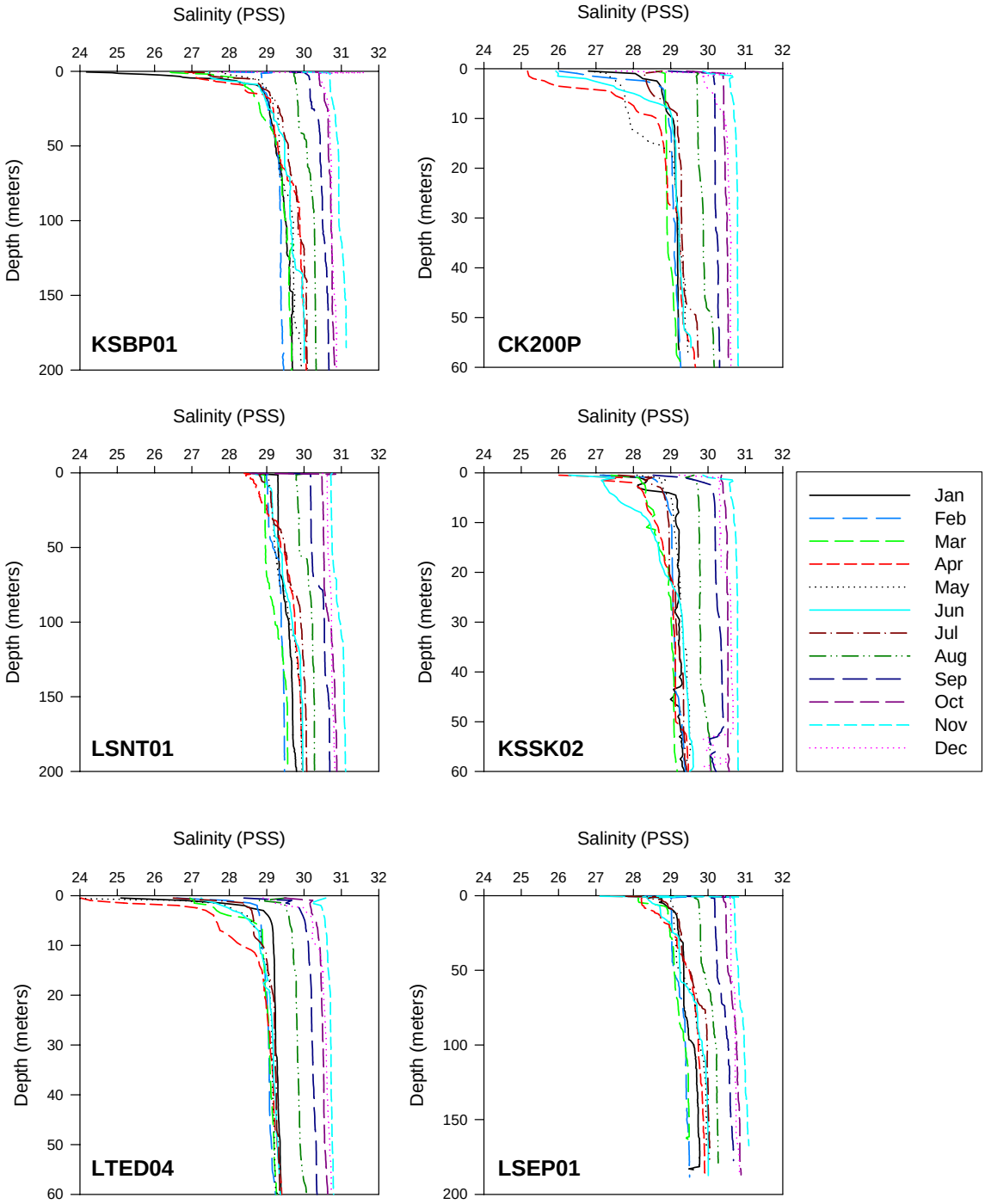

Figure 3-17. 2002 Vertical Salinity Profiles from Select Offshore Stations

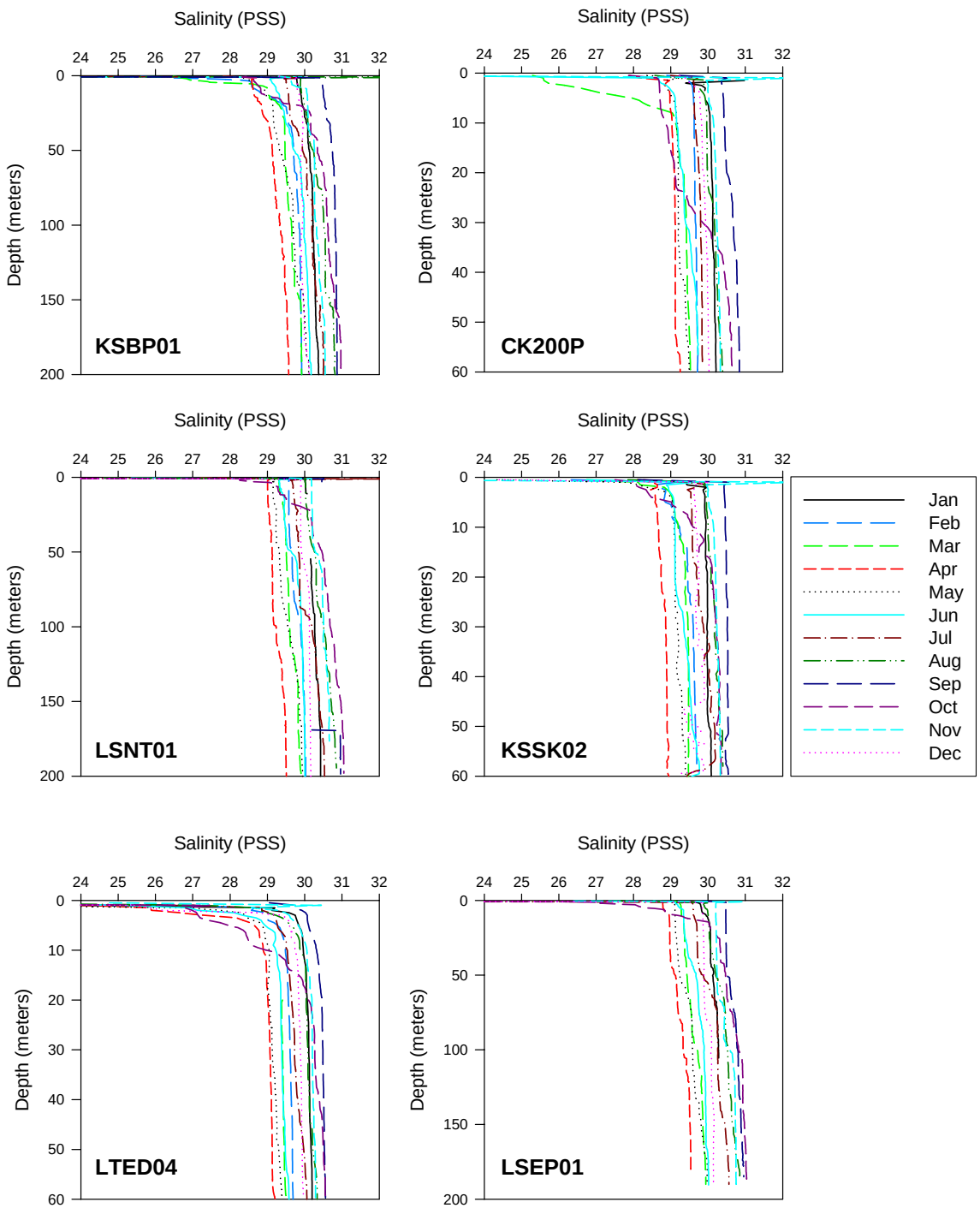

Figure 3-18. 2003 Vertical Salinity Profiles from Select Offshore Stations

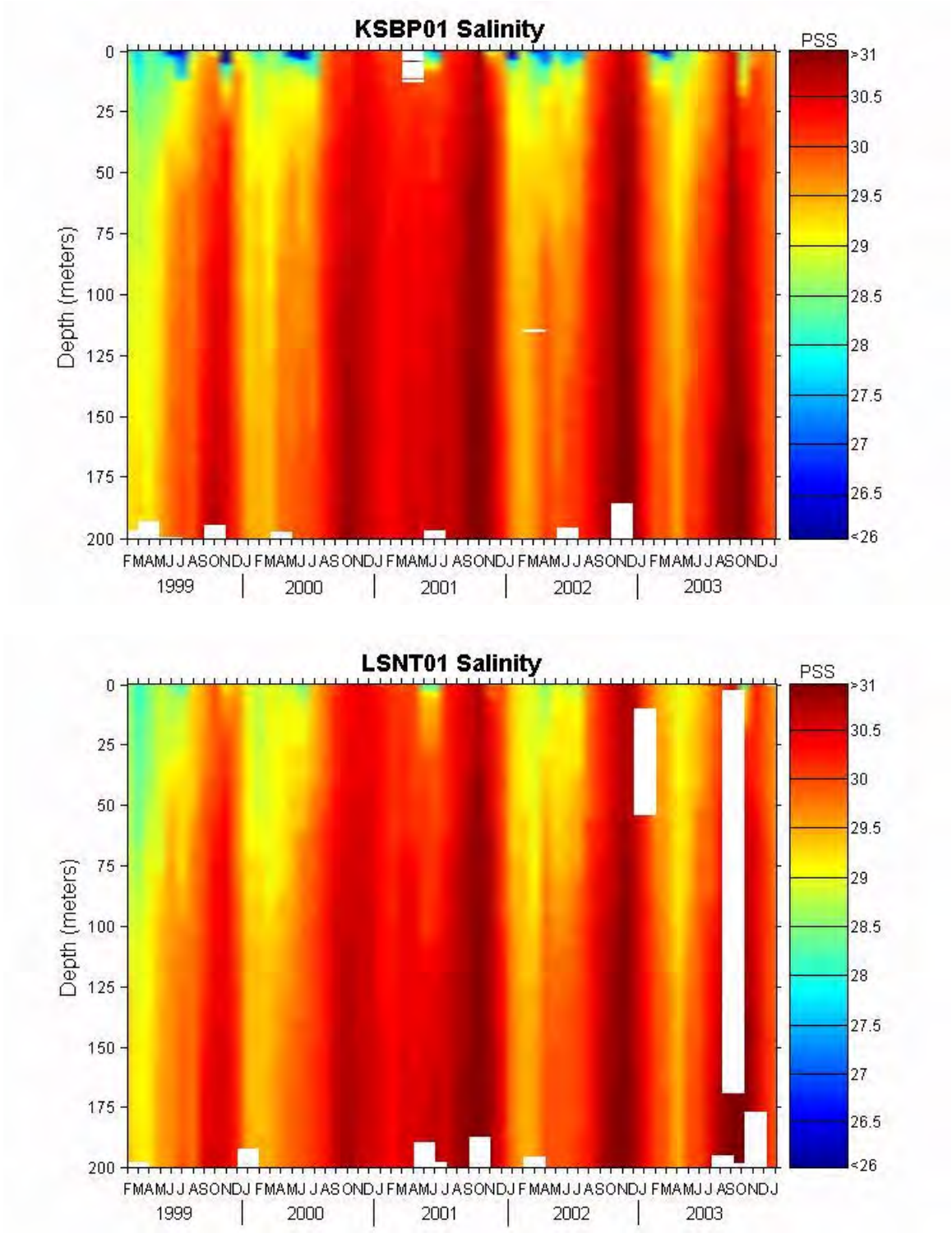

Figure 3-19. Salinity Variations at Stations KSBP01 and LSNT01 from 1999-2003

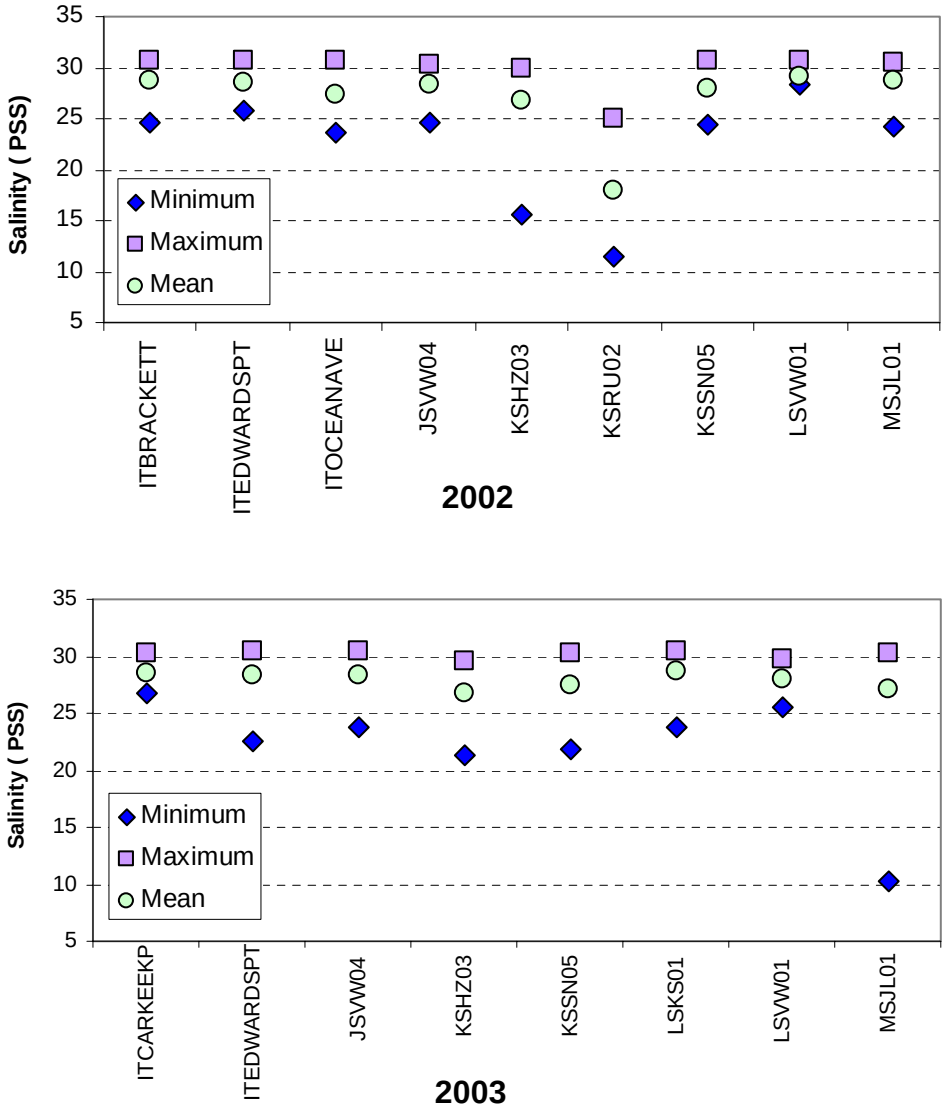

Figure 3-20. Water Salinity at Beach Stations in 2002 & 2003

values from September to November, and decreasing values in December due to increased precipitation and runoff, reaching a minimum in February and March. A notable exception to this pattern is the salinity of 10.25 PSS measured at station MSJL01 on 11/18/2003, the lowest beach salinity found in 2003. This measurement corresponds to the 24-hour period in which a significant level of precipitation was recorded in 2003. Salinity data for beach stations is provided in Appendix A.

Offshore Density. Water density is a function of both salinity and temperature, with density increasing with higher salinity and lower temperature. Salinity tends to be a stronger influence than temperature on density structure in Puget Sound. Density stratification within the water column impedes vertical mixing and can, therefore, affect the concentration of substances found

at differing depths in the water column. Figures 3-21 and 3-22 show the vertical density profiles at six offshore stations sampled in 2002 and 2003, respectively. In general, density stratification is strongest during the summer due to increased solar heating and freshwater runoff from snow melt, both of which lead to a decrease in surface water density. Stratification weakens in the winter due to reduced solar influence and increased wind-induced mixing of the water column.

Due to the seasonal cycles of temperature and salinity in Puget Sound, a light density phase, particularly at surface depths, occurs during the spring and summer months (Figure 3-23). This is followed by a dense phase in fall and winter. The weakened light density phase in 2001 can be attributed to the drought conditions of late 2000/early 2001, which led to reduced input of lighter, fresher water from rivers and runoff. Density values at discrete depths are provided in Appendix A for offshore outfall stations. Variations in density from 1999-2003 for all stations can be found in Appendix E, and vertical density profiles at select stations are located in Appendix F.

3.2.4 Dissolved Oxygen

Physical processes affecting dissolved oxygen (DO) in Puget Sound include processes such as the input of low-oxygenated fresh or ocean water, stratification intensity, circulation patterns and mixing regimes, and the exchange of oxygen across the air-sea interface. Biological activity (e.g. photosynthesis, respiration) also affects ambient levels of DO and its distribution both vertically and horizontally. Another factor affecting DO is chemical oxidation.

Dissolved oxygen measurements were made throughout the water column from the surface to just above the seafloor at each offshore station. Values at discrete water depths are provided in Appendix A. CTD DO profiles are provided for select stations in Appendix F. Dissolved oxygen concentrations at all offshore stations and depths sampled in 2002 and 2003 ranged from 4.5 to 13.8 mg/L, with no significant variation between years. In 2002, the mean concentration at all depths was 6.96 mg/L and the mean concentration for measurements made at discrete depths was 7.10 mg/L. In 2003, the mean concentration at all depths was 6.95 mg/L and the mean concentration at discrete depths was 7.22 mg/L. Note that the mean calculated from discrete depths is higher than that calculated from all depths at which measurements were taken. This is due to the focus of discrete depth sampling on the upper water column where DO values are usually higher. The range and mean values observed in 2002 and 2003 are similar to measurements made in previous years. As shown in Figures 3-23 and 3-24, DO generally decreased with depth to 50 m, and remained constant at lower depths. Mean DO concentration in surface waters at 1 m during 2002 and 2003 was 9.07 mg/L, compared to a mean of 6.57 mg/L at 200 m. Concentrations decreased with depth as most of the oxygen is obtained through exchange across the air-sea interface and from photosynthetic activity in surface waters, and most oxygen consumption occurs via bacterial respiration below the mixing zone.

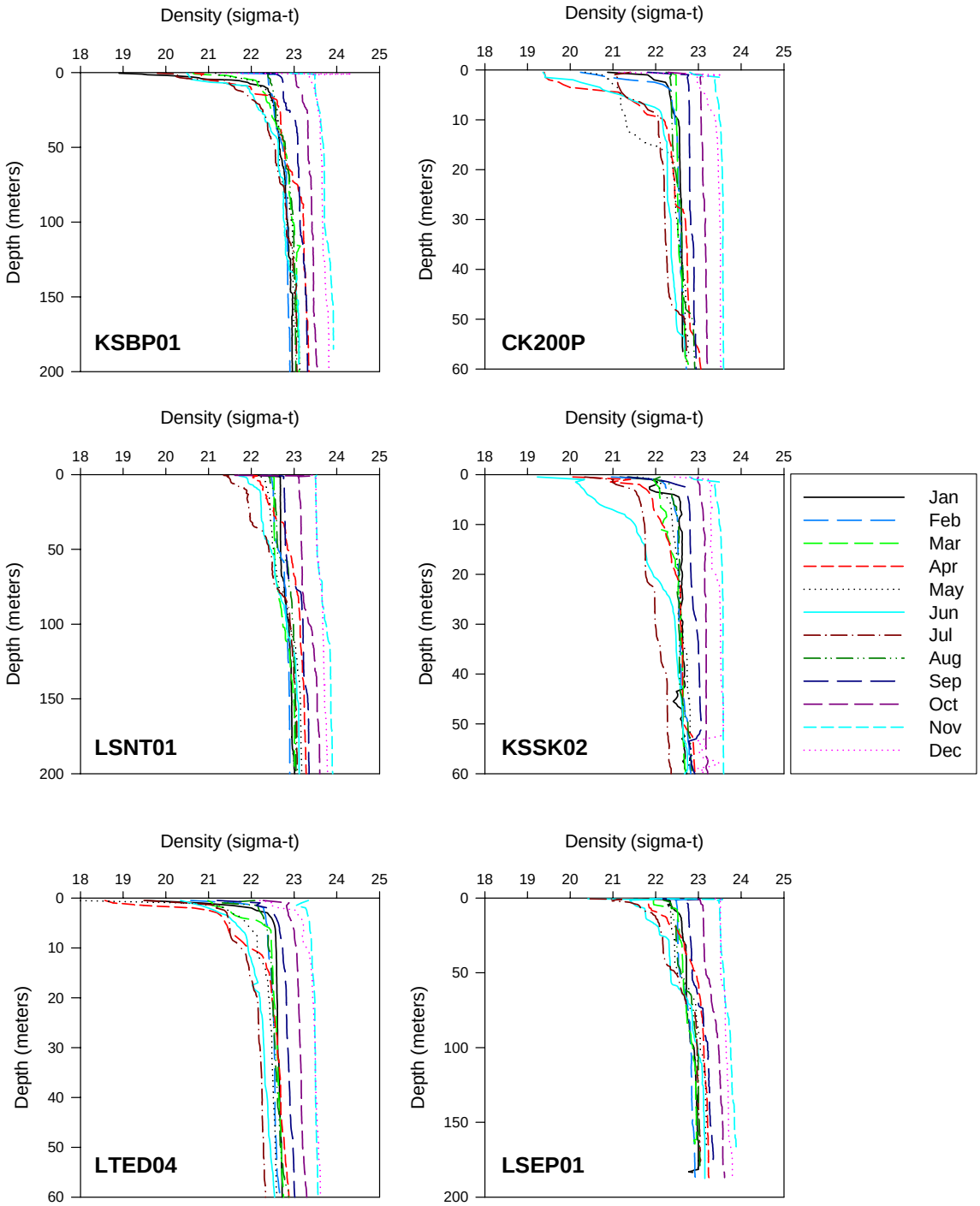

Figure 3-21. 2002 Vertical Density Profiles from Select Offshore Stations

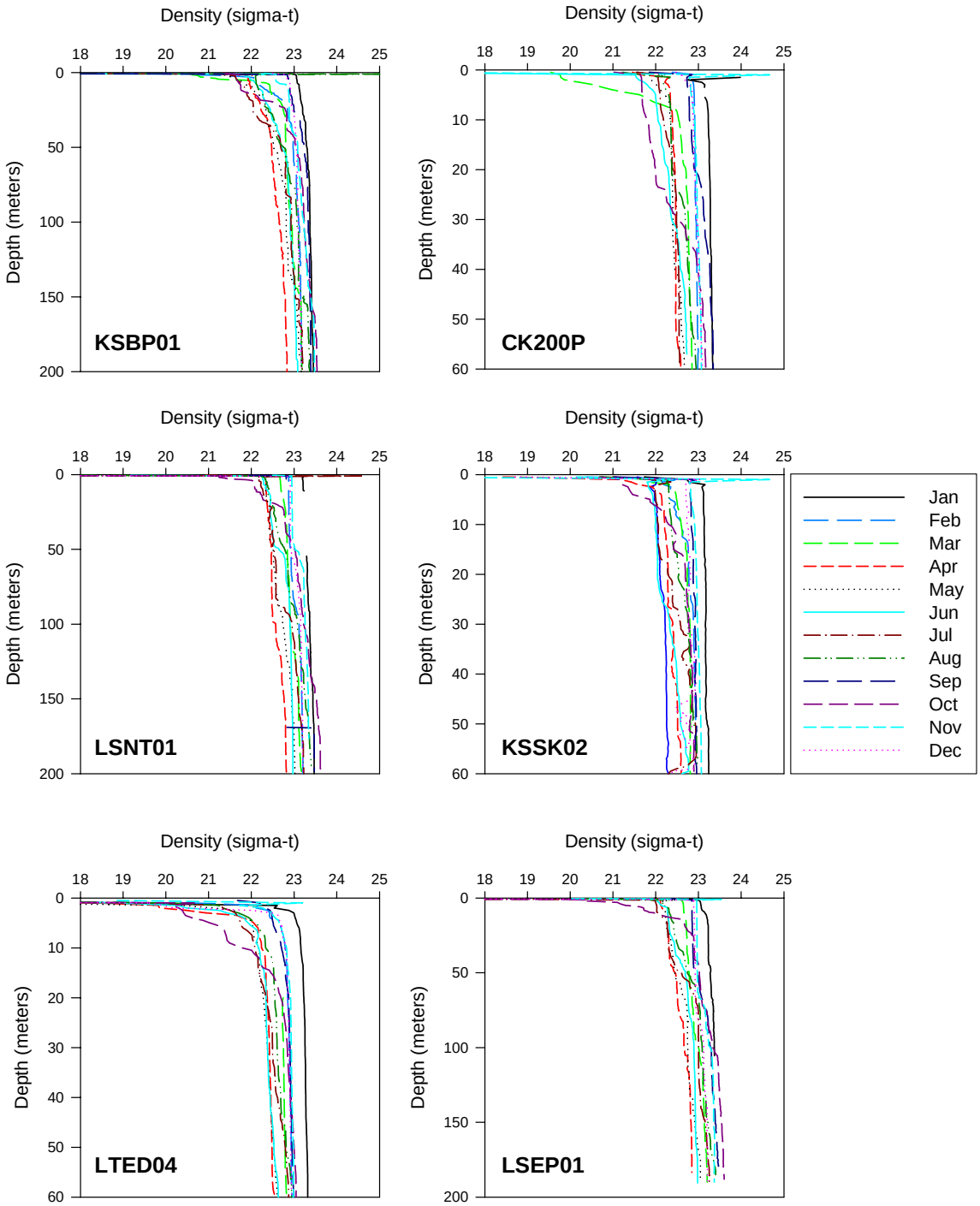

Figure 3-22. 2003 Vertical Density Profiles from Select Offshore Stations

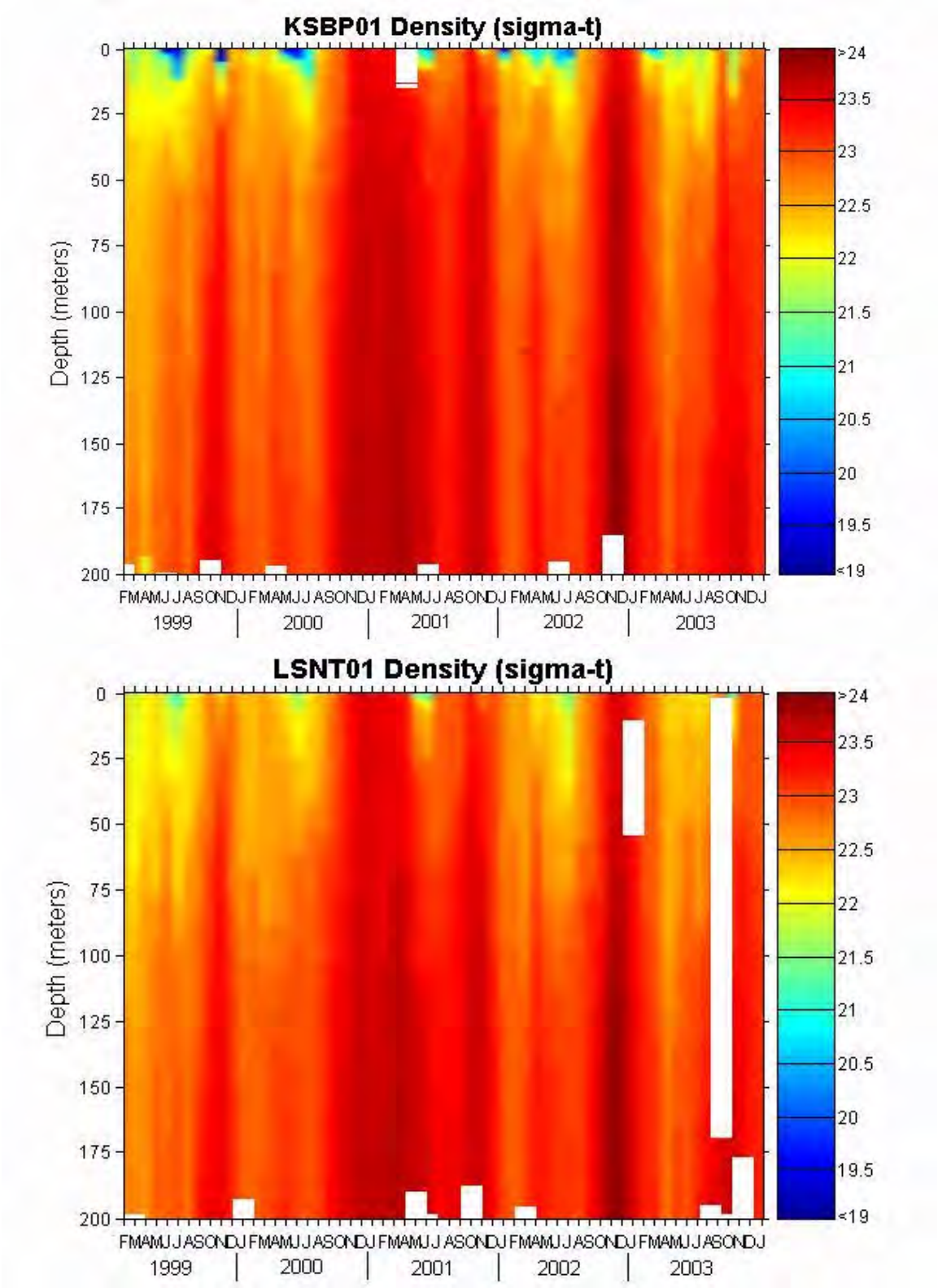

Figure 3-23. Density Variations at Stations KSBP01 and LSNT01 from 1999-2003

Seasonal DO distributions in surface water at offshore stations are shown in Figures 3-24 and 3-25. Dissolved oxygen concentrations below 7 mg/L (the Washington State Water Quality Standard for Class AA marine surface waters) occurred in deep water during late summer and fall as a result of the seasonal influx of deep oceanic water, which has lower concentrations of DO, coinciding with the oxidation of organic matter from phytoplankton blooms. Increased density stratification coincides with low summer DO levels. Density stratification of the water column favors the occurrence of low DO in deep water, as it impedes vertical mixing. Seasonal dissolved oxygen variations from 1999 to 2003 at stations KSBP01 and LSNT01 (Figure 3-26) are due to the input of deep oceanic water and consumption of oxygen by bacterial respiration over the late summer/fall months, and the production of oxygen by primary producers in the upper 25 meters or so during late spring and summer. The maximum seen in dissolved oxygen corresponds to a maximum in chlorophyll-a concentration, temporally and spatially in Puget Sound, and may be attributed to primary productivity.

Dissolved oxygen variability from 1999-2003 for all stations can be found in Appendix F. Mean, minimum, and maximum values for the past ten years of sampling at stations KSBP01 and LSNT01 are in Table 3-8.

Dissolved oxygen concentrations in Puget Sound are generally above 7.0 mg/L in the late winter and early summer months at all depths and locations sampled. Throughout the year, DO levels rarely drop below 5.0 mg/L, the upper limit for “biological stress” induced by low DO (NOAA, 1998). During summer and fall, a seasonal influx of deep oceanic water low in DO results in naturally occurring DO concentrations below 7.0 mg/L. Figures 3-27 and 3-28 show the seasonal variation in DO concentrations for 2002 and 2003, respectively, at both ambient and outfall offshore sites at discrete depths. There was no apparent difference in DO concentrations between outfall and ambient monitoring stations in either year. Several measurements in 2002 fell below 5.0 mg/L in the late fall/early winter months. However, these samples came from both outfall and ambient stations and were from depths greater than 50 meters. These low levels are possibly due to the input of deep oceanic water which contains low amounts of oxygen.

3.2.5 Transparency and Light Intensity

Secchi Disk. Secchi disk measurements were taken to determine the transmission of visible light through the water. Secchi disk measurements of water clarity provide an approximate transparency value. The disk is lowered into the water and the depth at which it is lost to sight is recorded. Therefore, the higher the Secchi disk value, the greater the water transparency. Environmental factors that influence Secchi transparency include turbidity, riverine input, runoff, shoreline erosion, resuspension of bottom sediment, and primary productivity levels (phytoplankton blooms). Secchi disk values ranged from 1.7 to 13 m in 2002, and from 2.2 to 16 m in 2003. Table 3-9 lists the mean Secchi depths by station for 2002 and 2003 combined data. There was no difference in transparency between ambient and point source stations. Monthly Secchi transparency depths, along with chlorophyll-*a* levels, are presented in Figures 3-29 and 3-30 for 2002 and 2003, respectively. Secchi depths were fairly constant from January through March of 2002. In April, Secchi transparency became shallower at the Elliott Bay stations, most

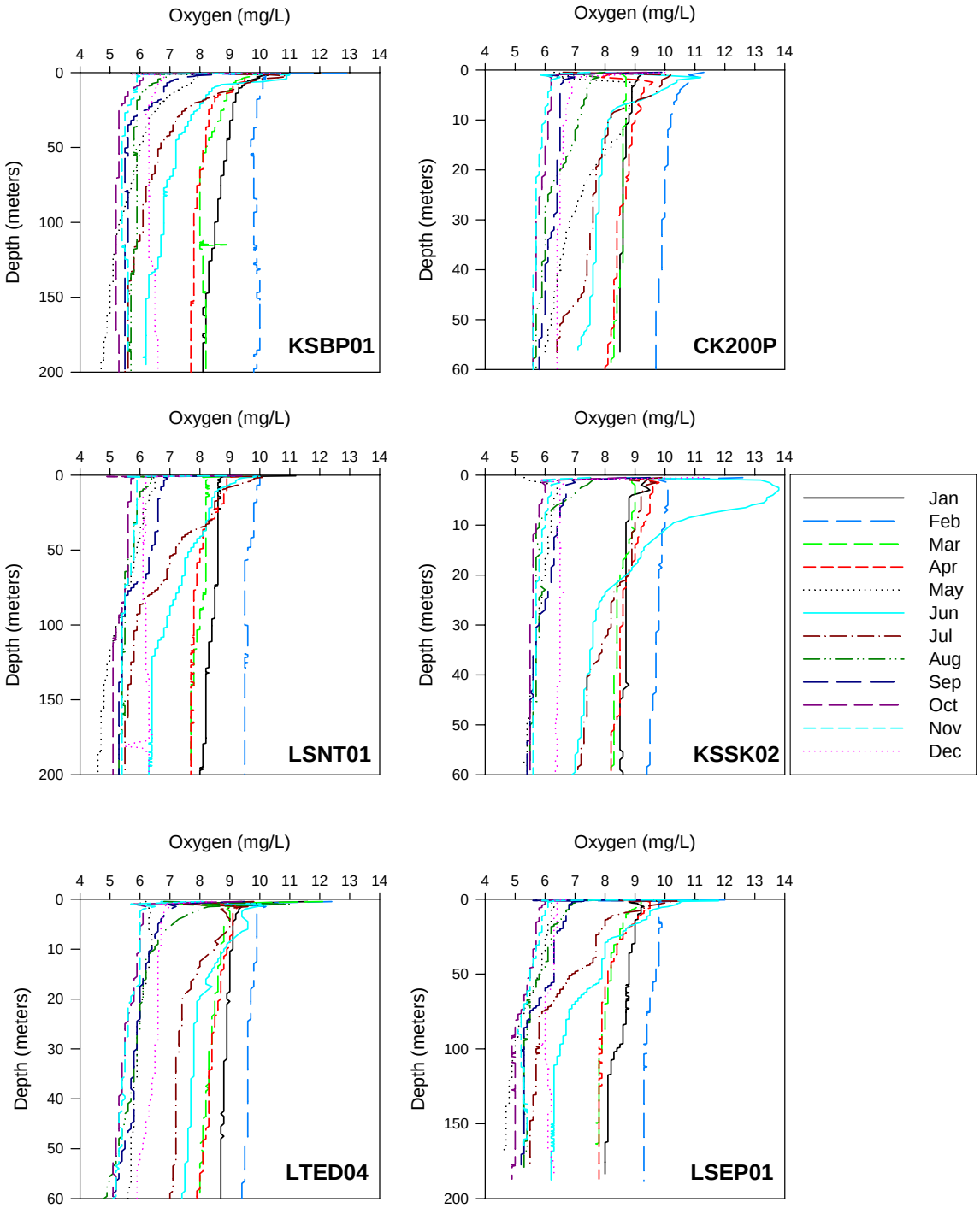

Figure 3-24. 2002 Vertical Dissolved Oxygen Profiles from Select Offshore Stations

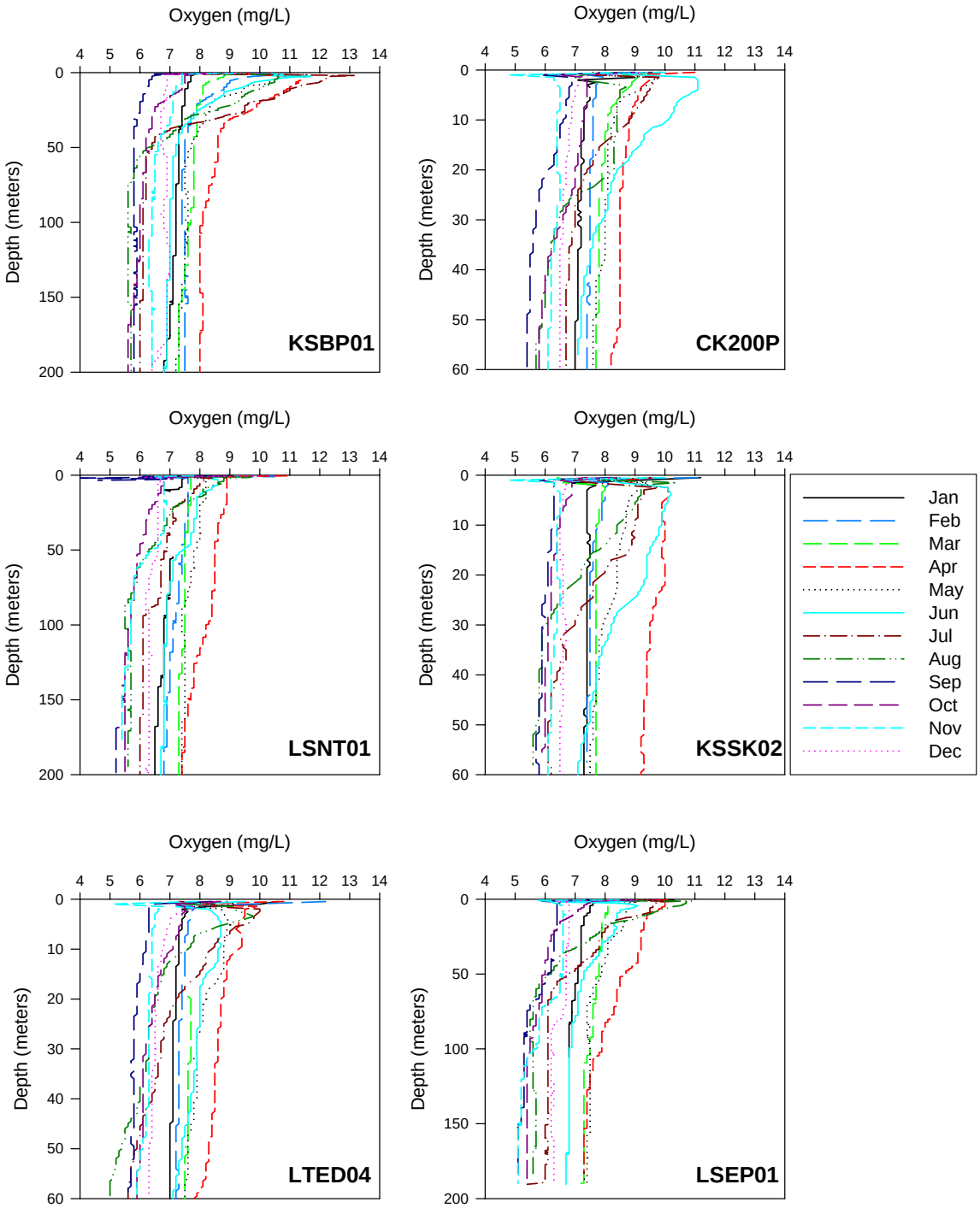

Figure 3-25. 2003 Vertical Dissolved Oxygen Profiles from Select Offshore Stations

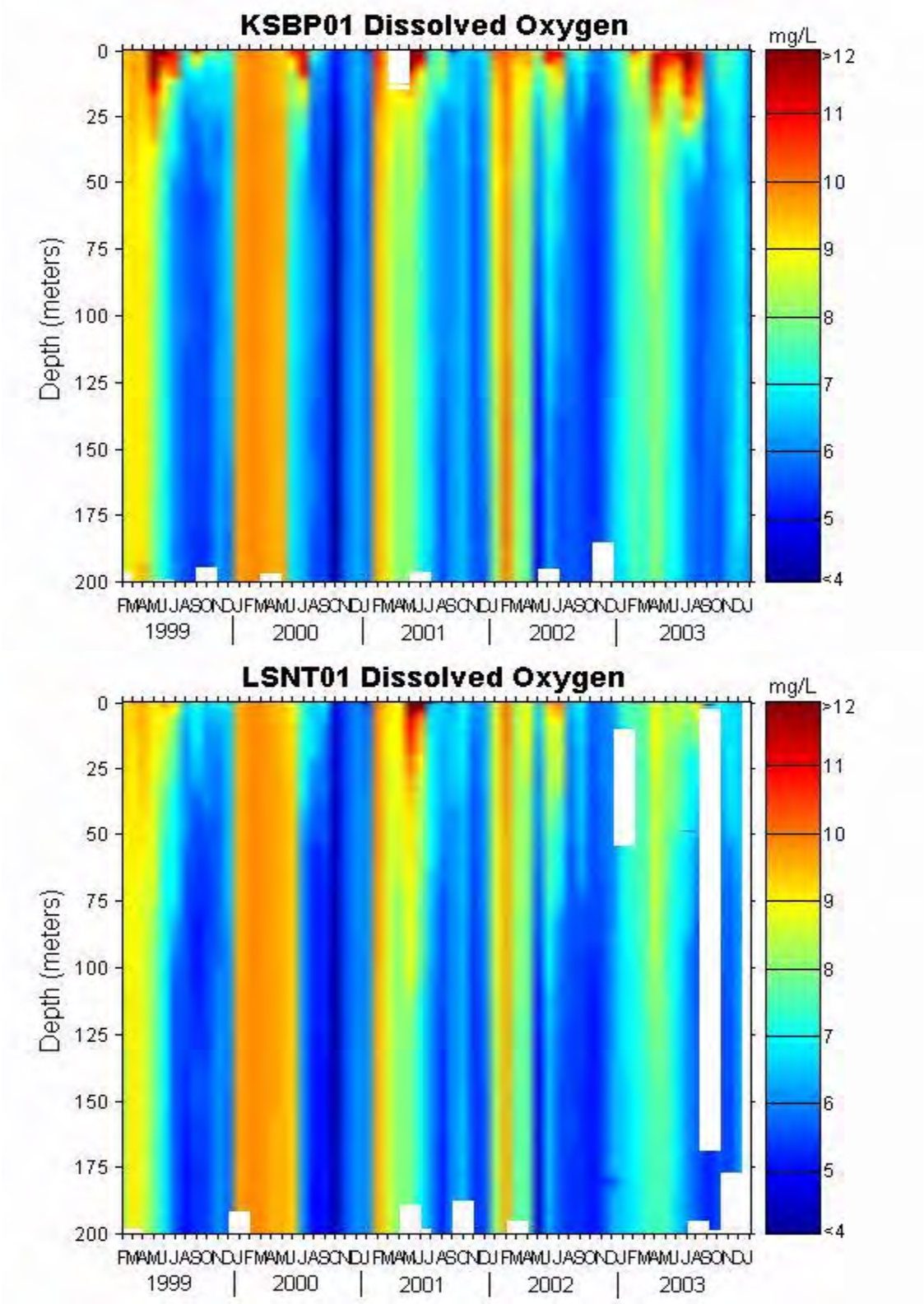

Figure 3-26. Dissolved Oxygen Variations at Stations KSBP01 and LSNT01 from 1999-2003

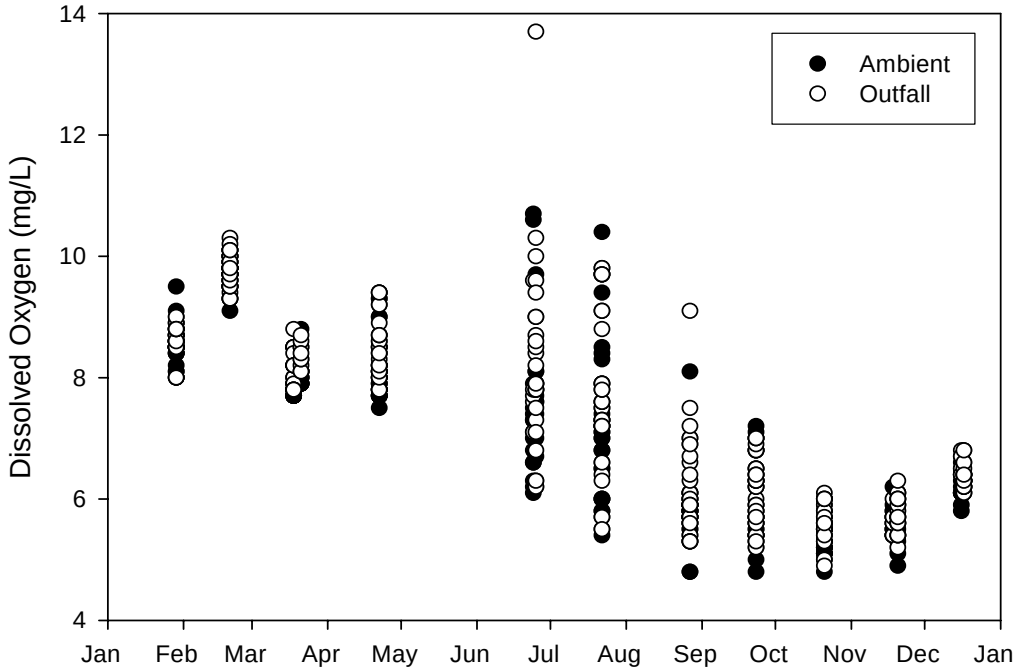

Figure 3-27. 2002 Dissolved Oxygen Concentrations at Discrete Depths Ranging from 1 – 200 Meters

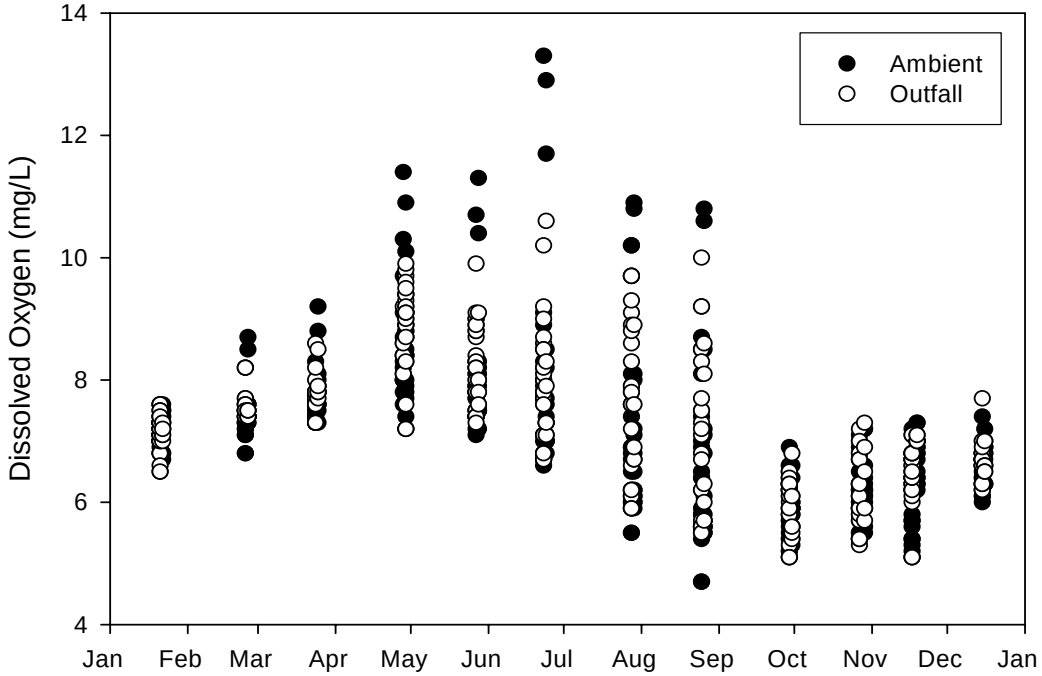

Figure 3-28. 2003 Dissolved Oxygen Concentrations at Discrete Depths Ranging from 1 – 200 meters

likely due to run-off from the Duwamish River since chlorophyll levels remained low. Offshore, Secchi depths decreased as chlorophyll-*a* levels rose due to increasing primary productivity which continued to rise in May and June. In July, chlorophyll-*a* concentrations remained high and began decreasing in August, particularly at the southern stations where low chlorophyll-*a* levels and high transparency depths were observed. In Elliott Bay, high chlorophyll-*a* levels and shallow transparency depths indicated an August bloom. A rise in the chlorophyll-*a* concentrations occurred in September at the southern stations, yet transparency remained high and became greater at the majority of other stations as well. Chlorophyll-*a* levels remained low through the remainder of 2002, which coincided with greater Secchi depths.

In February 2003, chlorophyll-*a* levels above 10 µg/L were observed at the far north and far south stations. In April, chlorophyll-*a* levels rose north of Alki and in the East Passage (Station NSEX01). Secchi transparency declined at Point Wells in May and at Carkeek Park and Vashon Island in June. In July, high chlorophyll-*a* levels were observed at all stations. A notable increase in Secchi transparency occurred off Vashon Island in July and August during this period of high productivity. High chlorophyll-*a* levels persisted through August but had decreased significantly by September. Secchi transparency reached maximum depths throughout the study area in November and shallowed somewhat in December. All Secchi measurements made in 2002 and 2003 can be found in Appendix A.

Table 3-9. Average Secchi Disk Depths (m), All Data Combined, 2002 and 2003

Station	Number of Observations	Mean Secchi Depth (m)	Secchi Depth Standard Deviation
PTWELLS1	23	7.6	3.1
KSBP01	23	7.0	2.8
CK200P	23	7.3	2.6
KSSK02	23	7.4	2.4
LTBC41/42	24	6.6	2.2
LSEP01	24	8.5	2.8
LTED04	24	7.3	2.2
LSKQ06	24	9.3	2.6
LSNT01	24	8.8	1.9
VO50E	23	8.9	2.7
NSEX01	12	9.0	3.4

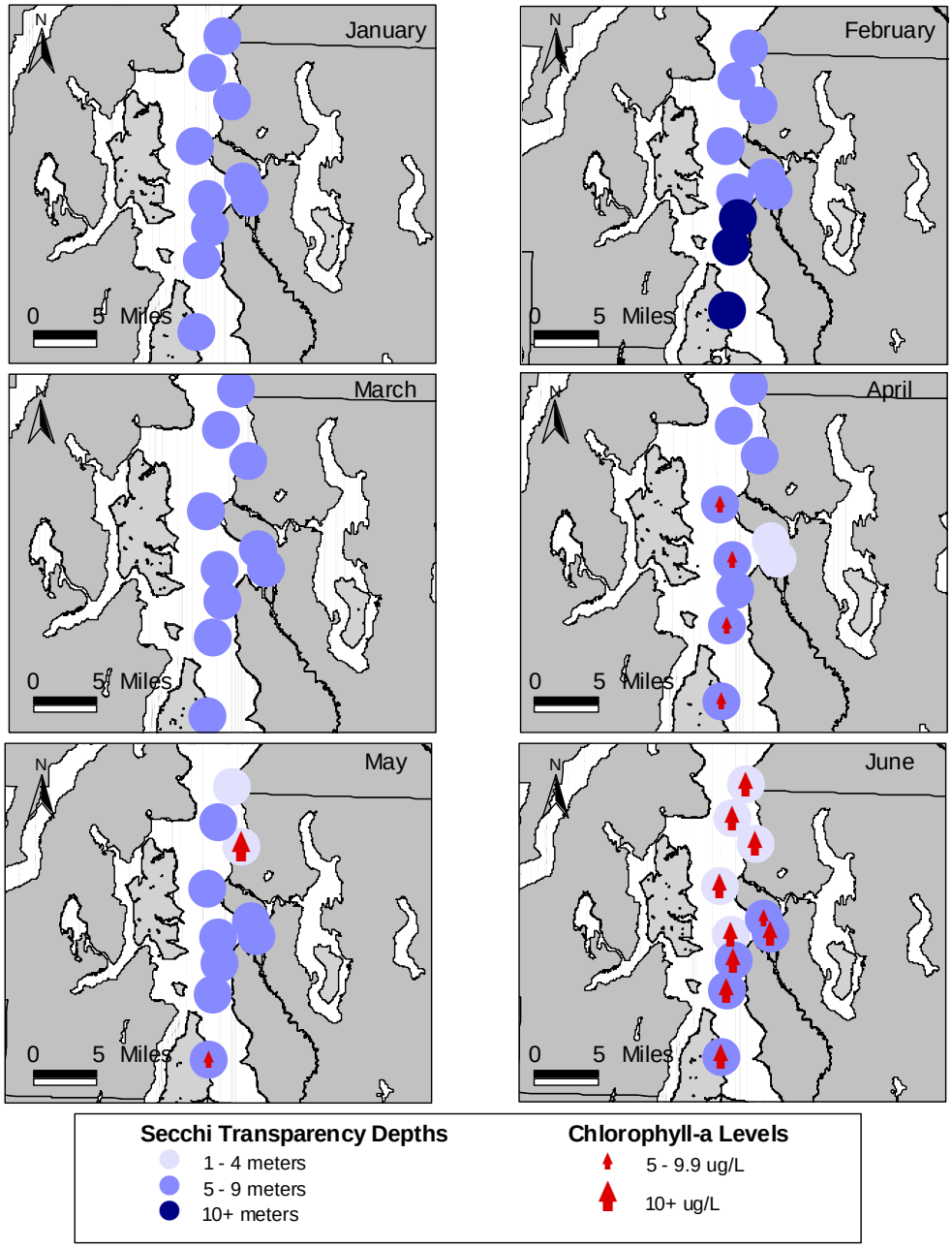

Figure 3-29. 2002 Monthly Secchi Transparency Depths and Chlorophyll-*a* Levels

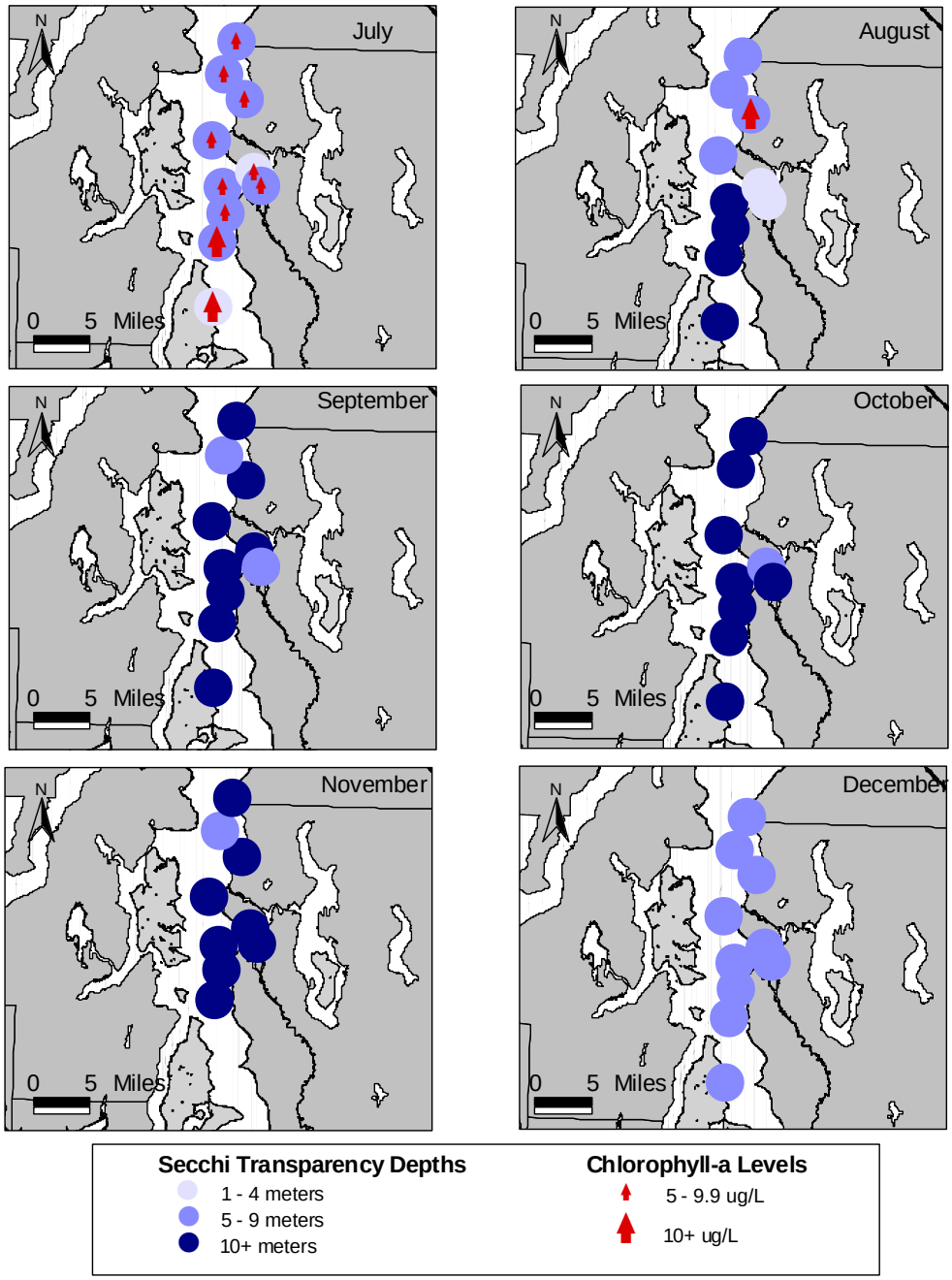

Figure 3-29 cont. 2002 Monthly Secchi Transparency Depths and Chlorophyll-*a* Levels

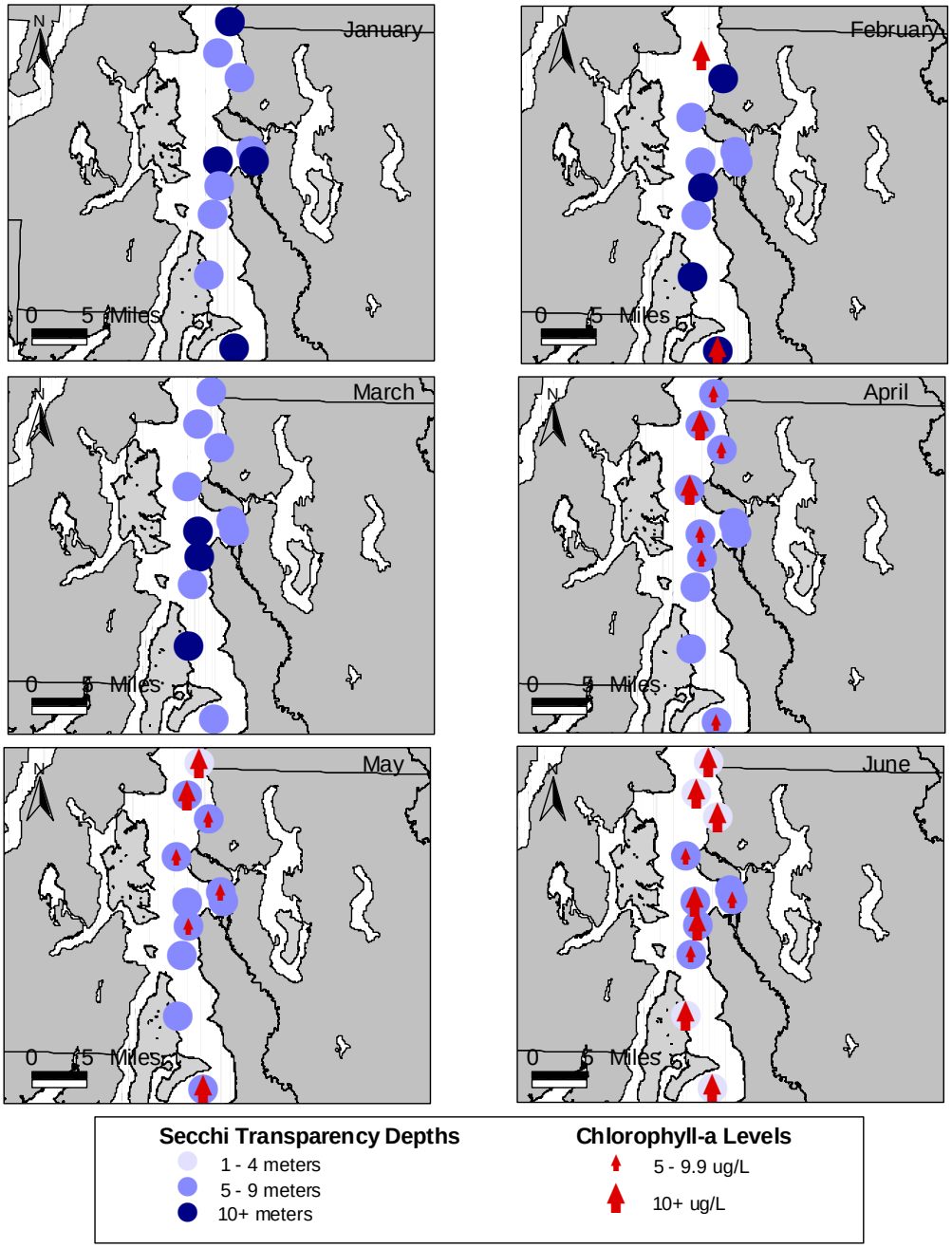

Figure 3-30. 2003 Monthly Secchi Transparency Depths and Chlorophyll-*a* Levels

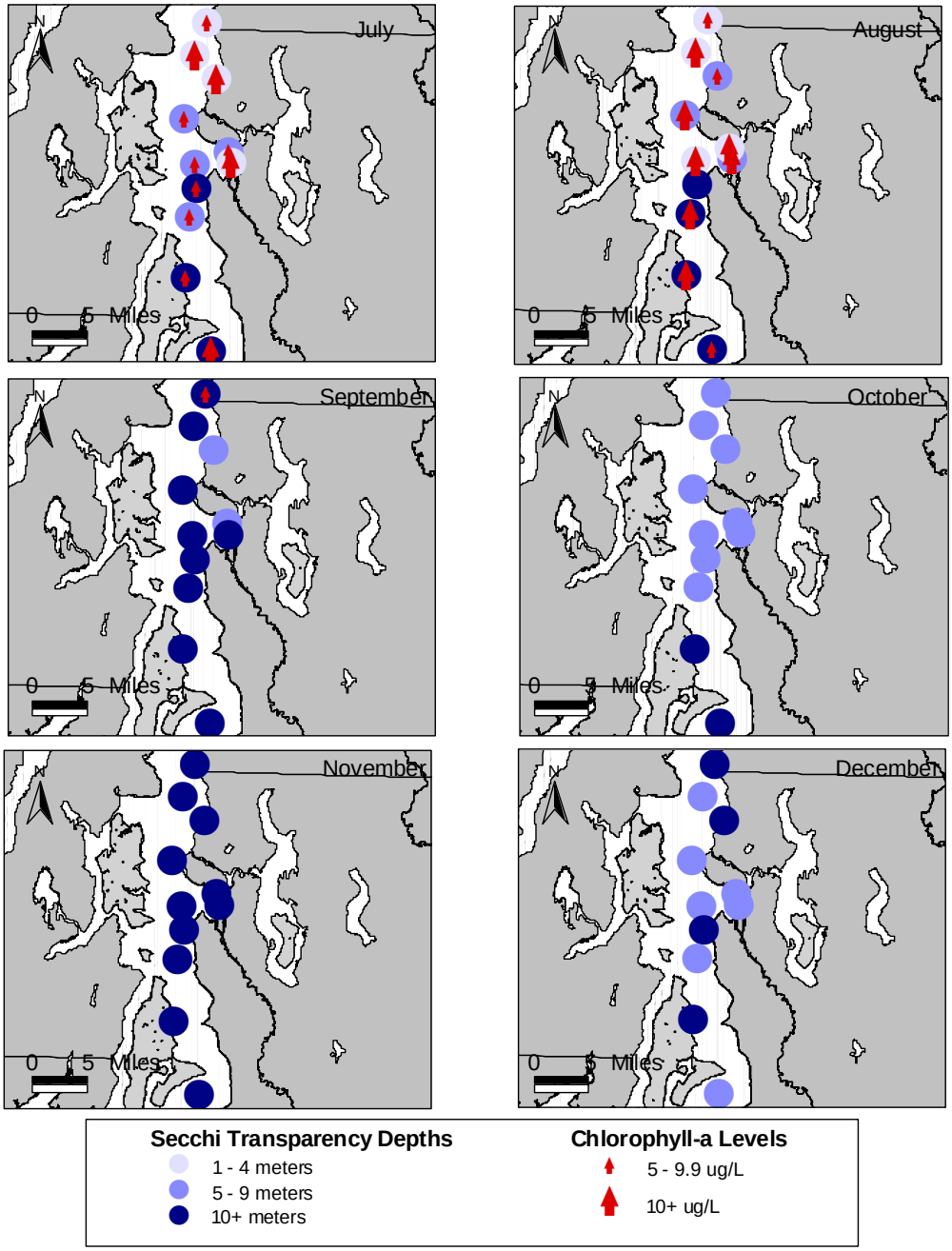

Figure 3-30 cont. 2003 Monthly Secchi Transparency Depths and Chlorophyll-*a* Levels

Turbidity. Turbidity is another measure of water clarity but differs from Secchi disk measurements in that it is an expression of the amount of light scattered or reflected (the lower the turbidity value, the more transparent the water). Dissolved and suspended solids (including detritus, plankton, and particulates), can affect the water's optical properties resulting in high turbidity values. Wind and waves can indirectly increase turbidity by stirring up particulates in the water. In 2002, turbidity values ranged from less than 0.5 to 20.5 Nephelometric Turbidity Units (NTU). Highest turbidities were observed at surface and bottom depths. July had the highest turbidity values, which differed from previous years. In 2003, turbidity values ranged from less than 0.5 to 13.8 NTU. The highest turbidity values occurred in November and December. Appendix A contains turbidity values at discrete depths for all offshore stations sampled in 2002 and 2003. Variations in turbidity from 1999-2003 are presented in Appendix F.

Photosynthetically Active Radiation. Photosynthetically active radiation (PAR), also expressed as light intensity, is a measure of the amount of light available to macrophytes and phytoplankton for photosynthesis. Light intensity values for both 2002 and 2003 ranged from 0 to 3733 micromoles per second per square meter ($\mu mol/s/m^2$), with the highest single value measured at station NSEX01 (East Passage) in May 2003. Figure 3-31 shows the seasonal attenuation of PAR with depth. As expected, the highest PAR levels occurred at or near the surface for all stations throughout the year, and dropped rapidly with depth. Less than one percent of the surface PAR was propagated to depths greater than 35 meters. This suggests that photosynthesis is limited to the upper 35 meters of the water column. The highest penetration of surface PAR occurs during winter when productivity is relatively low. Light penetration decreases during the spring and summer blooms, with the lowest light penetration occurring in October. This can be attributed to high particulate loads resulting from the first large rain events of the fall. PAR measurements at discrete depths are located in Appendix A. Variations in PAR from 1999-2003 can be found in Appendix F.

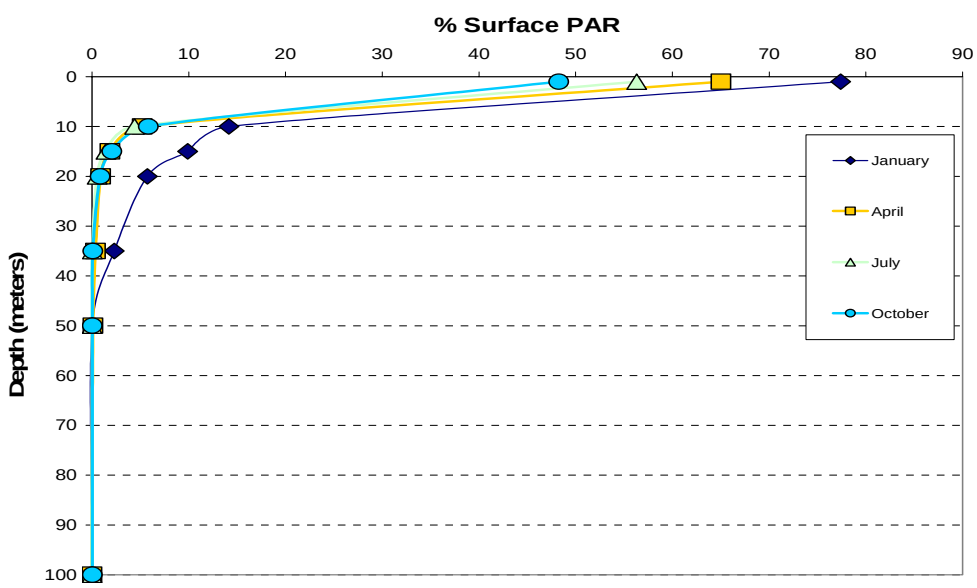

Figure 3-31. Seasonal Attenuation of 2002 and 2003 Mean Photosynthetically Active Radiation (PAR) with Depth at All Offshore Stations

3.2.6 Nutrients

Nitrogen Compounds

Nitrogen is ubiquitous in the marine environment and occurs in many organic and inorganic chemical forms. Dissolved inorganic nitrogen compounds include ammonium ion (NH_4^+), nitrate (NO_3^-), and nitrite (NO_2^-), of which nitrate is the predominant form in seawater. King County reports dissolved ammonia concentrations (ammonium ion that has been converted to ammonia), and the sum of nitrate and nitrite concentrations (nitrate + nitrite) due to the analytical methodology employed. Nitrite concentrations in the water column are naturally low compared to nitrate, so the nitrate + nitrite results can be considered almost entirely nitrate. Discussion of the results for dissolved inorganic nitrogen compounds is provided below.

Ammonia-Nitrogen

Offshore. Maximum ammonia-nitrogen (NH_3-N) concentrations observed at all offshore stations were 0.22 mg/L in 2002, and 0.41 mg/L in 2003. The maximum concentrations were detected at the West Point TP outfall station (KSSK02) in both years. The mean concentrations for all stations and depths were 0.028 mg/L and 0.020 mg/L in 2002 and 2003, respectively. These means were calculated by assigning non-detects (values < MDL) concentrations of 0.01 mg/L, thereby biasing the mean values high. Higher concentrations of NH_3-N tended to occur at greater depths at all stations. This distribution reflects the decay of organic nitrogen from phytoplankton settling out of the photic zone. Figures 3-32 and 3-33 show NH_3-N vertical profiles for six stations in 2002 and 2003, respectively. Of the 687 NH_3-N measurements made in 2002, only four exceeded concentrations of 0.10 mg/L. Three of these occurred at the West Point TP outfall station and one occurred at the South TP outfall station (LSEP01). In 2003, there were eight concentrations greater than 0.10 mg/L: seven at the West Point TP outfall station, and one at the Point Wells station (0.14 mg/L) at a depth of 129 meters in May. This corresponded with high phytoplankton concentrations at that location. The vertical distribution of NH_3-N at outfall stations reflect the trapping depth of the outfall plume. This explains the maximum values seen at 25 and 35 meters at KSSK02, and at 100 meters at LSEP01. Ammonia concentrations at stations KSBP01 and LSNT01 from 1994-2003 are presented in Table 3-8.

Washington State ammonia criteria for marine surface waters are based upon nonionized ammonia. However, for total ammonia, which is measured by King County, the State uses U.S. EPA's criteria concentrations based upon total ammonia. These total ammonia criteria are based on water temperature, salinity, and pH. Assuming a temperature of 15 ^oC, a salinity of 30 PSS, and a pH of 8.0, all ammonia concentrations measured at offshore stations were well below the 1.6 mg/L chronic criterion. The highest concentration measured was almost four times lower than the criterion.

Beach Stations. NH_3-N concentrations at beach stations ranged from less than the MDL (0.01 mg/L) to a maximum of 0.11 mg/L found at the intertidal station just south of the West Point TP (KSSN05) in 2002. In 2003, NH_3-N ranged from less than 0.01 mg/L to a maximum of 0.39 mg/L measured at the Fauntleroy Cove station (LSVW01). Excluding the maximum value measured for each year, all other concentrations were below 0.08 mg/L. Mean concentrations

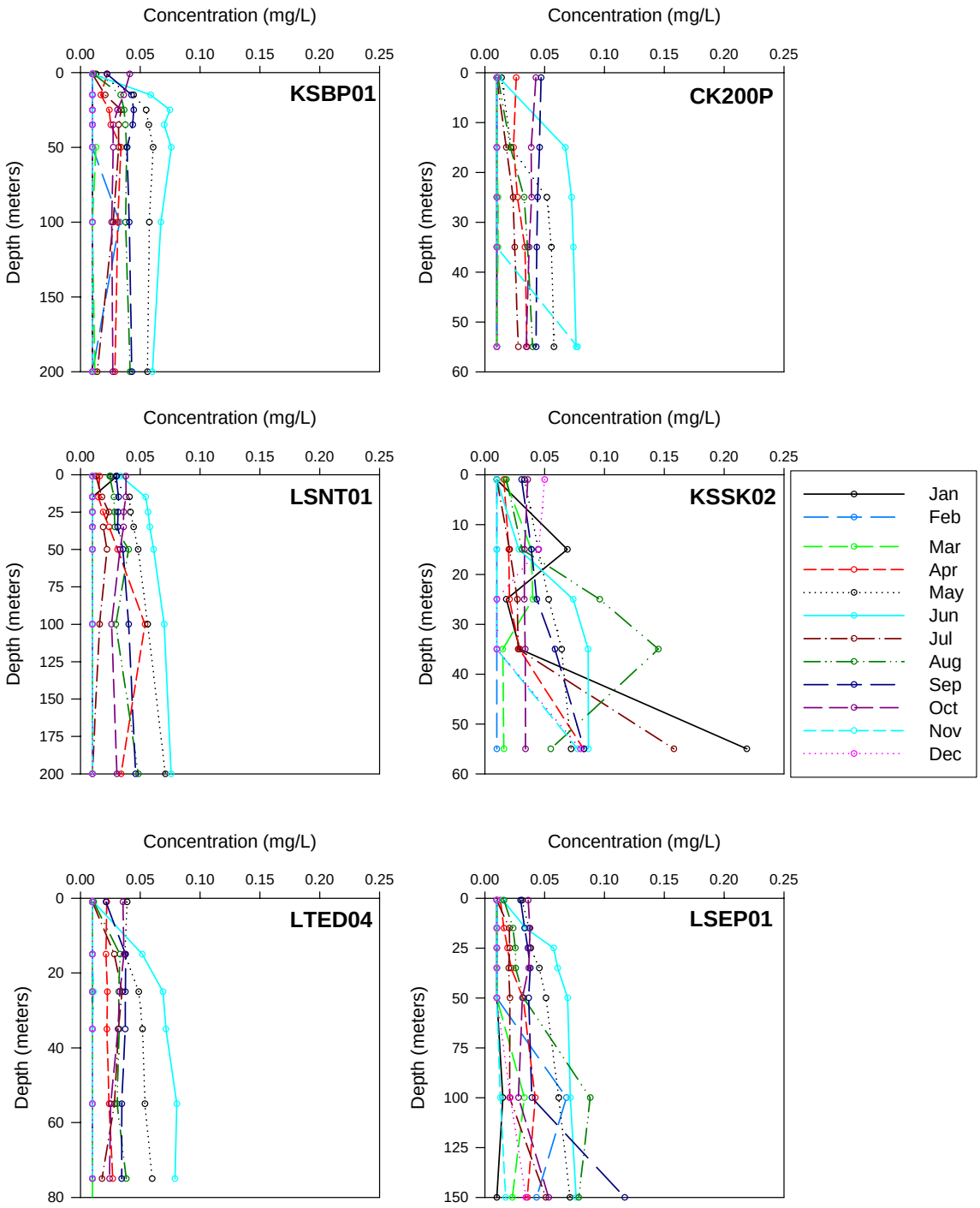

Figure 3-32. Ammonia-Nitrogen Concentrations (mg/L) at Six Stations in 2002

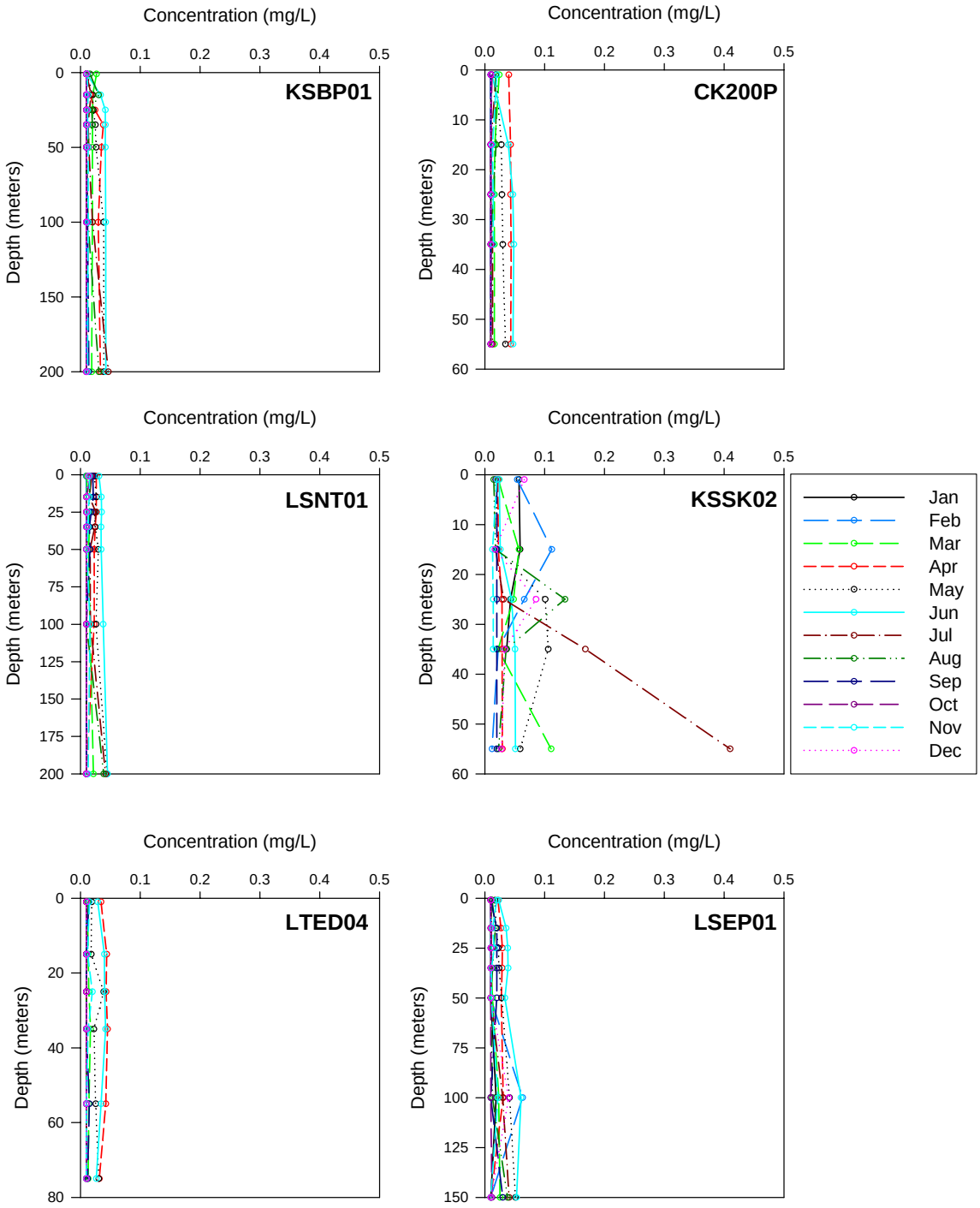

Figure 3-33. Ammonia-Nitrogen Concentrations (mg/L) at Six Stations in 2003

for all stations, assuming 0.01 mg/L for values reported as less than the MDL, were 0.026 mg/L and 0.030 mg/L in 2002 and 2003, respectively. Figure 3-34 shows the seasonal pattern of mean NH_3-N concentrations for beach stations in 2002 and 2003. Although the highest concentrations were found in June of both years, the highest mean concentrations were observed in October 2002 and June 2003. The highest concentrations at beach stations generally occurred in summer and autumn months and lowest concentrations occurred in the winter months, similar to what was observed at ambient offshore stations. Assuming a temperature of 15 ^{o}C, a salinity of 30 PSS, and a pH of 8.0, all NH_3-N concentrations measured for beach stations were well below the 1.6 mg/L chronic criterion.

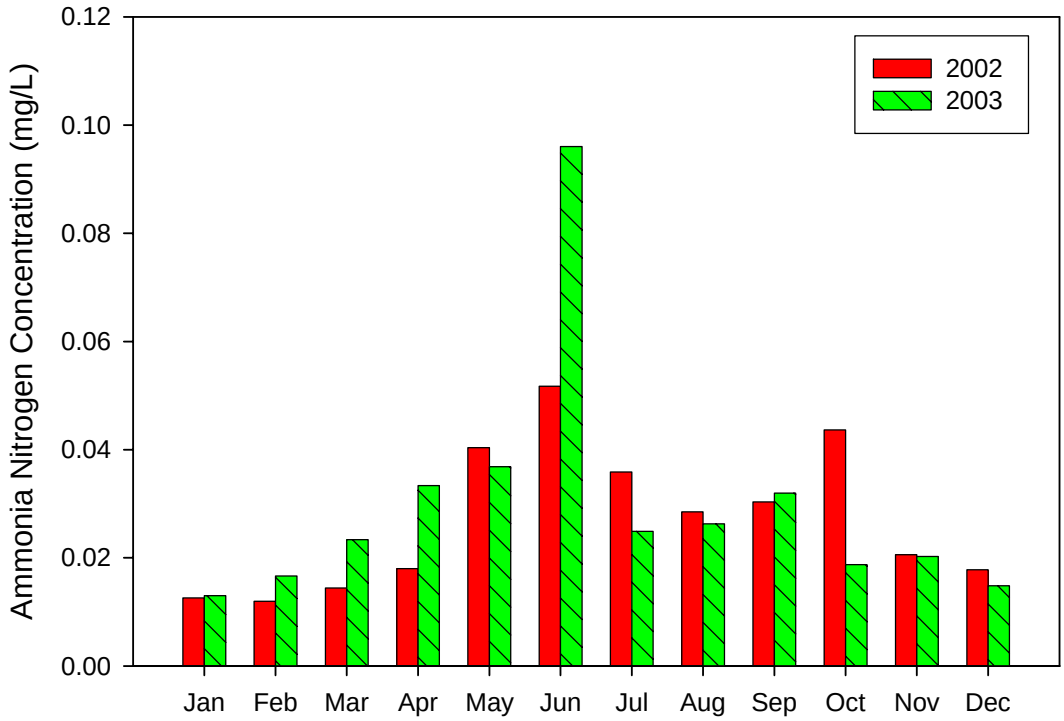

Figure 3-34. Monthly Mean Ammonia-nitrogen Concentrations (mg/L) at Beach Stations in 2002 and 2003

Nitrate + Nitrite

Offshore. Nitrate+nitrite concentrations ranged from 0.04 to 0.44 mg/L in 2002, and from 0.03 to 0.49 mg/L in 2003. The lowest value in 2002 was found in the surface waters at station LTBC41, a nearshore station along the Seattle waterfront. The lowest value in 2003 was found in the surface waters at station VO50E, located at the Vashon Island outfall. The seven highest concentrations in 2002 were found in January at several locations. The highest concentration in

2003 was measured in October at the southernmost offshore station, NSEX01, at a depth of 55 meters. The mean concentrations for all stations and depths combined were 0.323 mg/L and 0.320 mg/L in 2002 and 2003, respectively. Concentrations were generally higher during the winter months when phytoplankton growth was lowest and fluvial input was highest. Concentrations declined in the upper portion of the water column (surface to 25 meters) during the spring and summer months due to increased levels of nutrient uptake by phytoplankton. As with NH_3-N, concentrations tended to increase with depth due to the remineralization of organic nitrogen from settling phytoplankton. Results for six representative stations are shown in Figures 3-35 and 3-36 for vertical nitrate+nitrite distributions in 2002 and 2003, respectively. Nitrate+nitrite concentrations at stations KSBP01 and LSNT01 from 1994-2003 are presented in Table 3-8.

Beach. Nitrate+nitrite concentrations at beach stations ranged from less than the MDL (0.02 mg/L) in both years to 0.47 mg/L in 2002 and 0.77 mg/L in 2003. The mean concentrations were 0.248 mg/L and 0.262 mg/L in 2002 and 2003, respectively. Overall, the patterns were similar to those of the offshore stations. Concentrations were highest in the winter and lowest in the summer. Figure 3-37 shows the monthly mean nitrate+nitrite concentrations for all beach stations in both years.

Total Phosphorus

Offshore. Phosphorus occurs as dissolved inorganic, dissolved organic, and particulate phosphorus in seawater. Generally, particulate phosphorus is the most abundant of the three forms. There are several forms of inorganic phosphorus found in the marine environment, with the most abundant being orthophosphate. Total phosphorus, which includes all forms of inorganic and organic phosphorus, is measured by King County.

Phosphorus concentrations at all offshore stations (all depths combined) ranged from 0.032 to 0.119 mg/L in 2002, and from 0.033 to 0.108 mg/L in 2003. Mean concentrations in each year were equivalent and measured 0.069 mg/L. These results are comparable to previous years. There was very little variability in phosphorus concentrations by depth, with mean surface concentrations of 0.064 mg/L and mean concentrations at depths greater than 190 m of 0.071 mg/L. A seasonal trend in phosphorus concentrations was observed; highest concentrations occurred in the winter and lowest concentrations occurred during the summer in surface waters where photosynthesis was actively occurring. Phosphorus concentrations at stations KSBP01 and LSNT01 from 1994-2003 are presented in Table 3-8.

Beach. Total phosphorus at the beach stations ranged from 0.032 to 0.258 mg/L in 2002, and from 0.039 to 0.313 mg/L in 2003. Mean concentrations were 0.077 and 0.089 mg/L in 2002 and 2003, respectively. Variability was greater at beach stations than at offshore stations due to differences in freshwater inputs (greater at beach stations due to proximity to streams and rivers). The highest values were measured at the southern West Point Station (KSSN05) in May 2002 and December 2003. The same seasonal trend observed at the offshore stations also occurred at the beach locations.

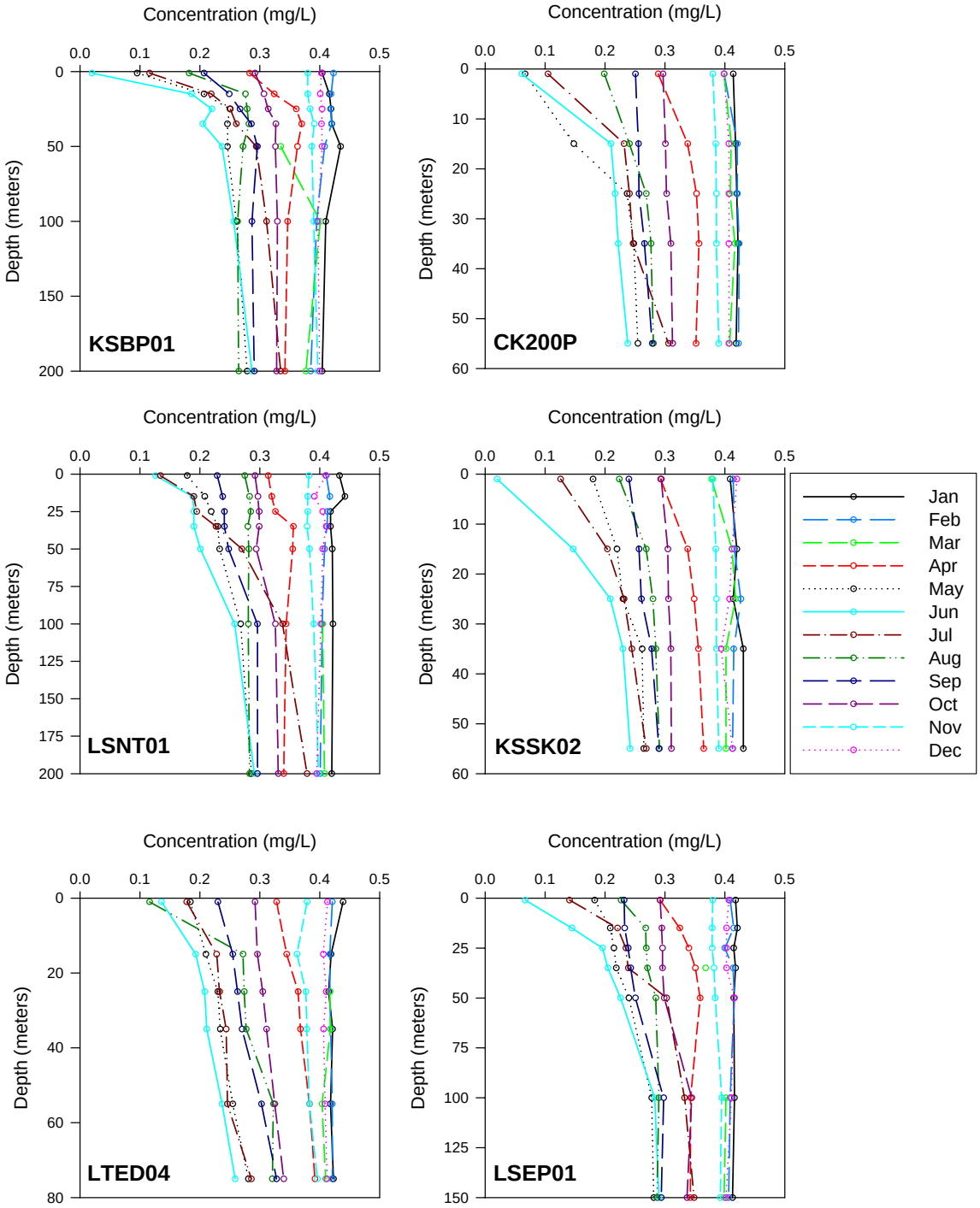

Figure 3-35. Nitrate+Nitrite Concentrations (mg/L) at Six Stations in 2002

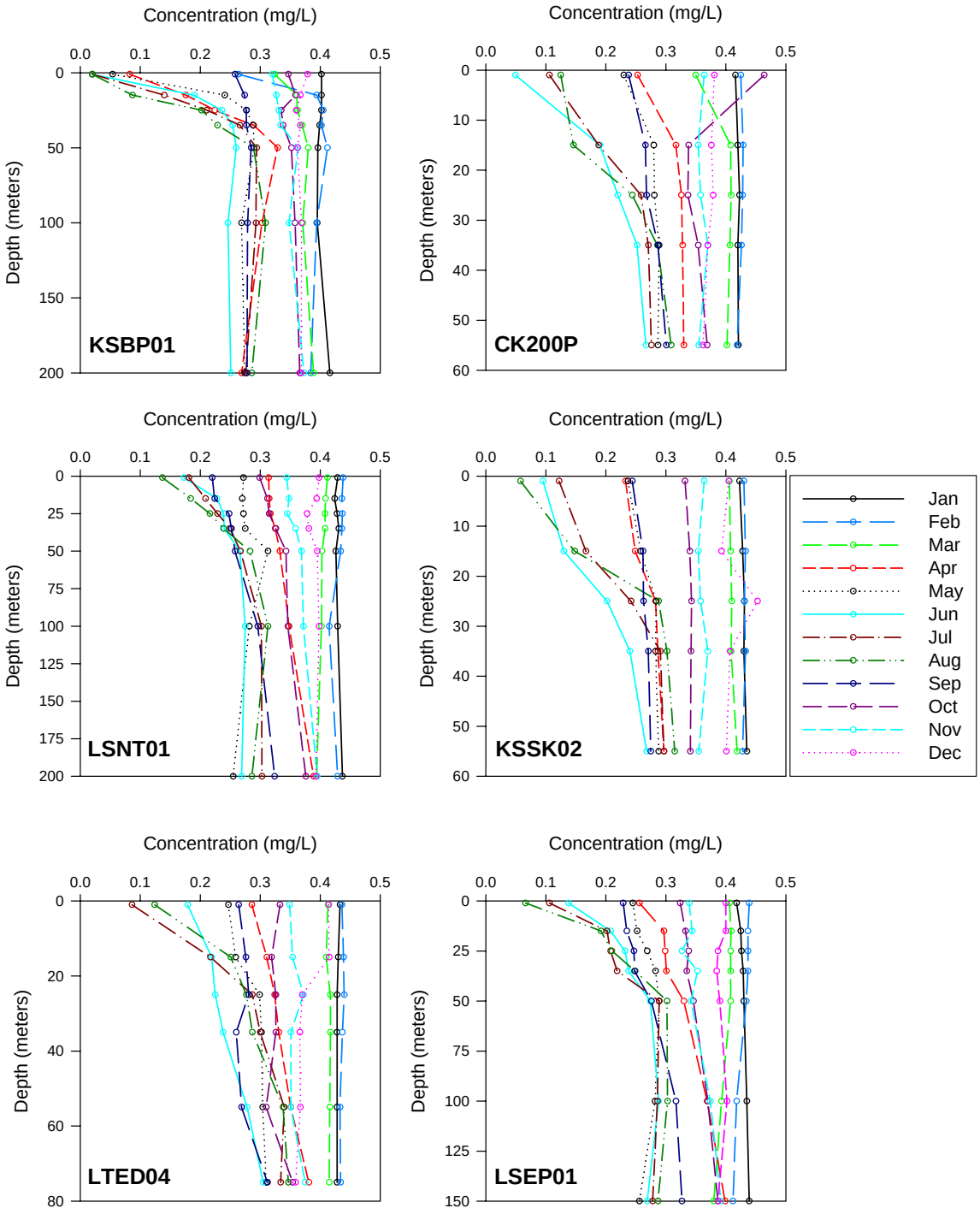

Figure 3-36. Nitrate+Nitrite Concentrations (mg/L) at Six Stations in 2003

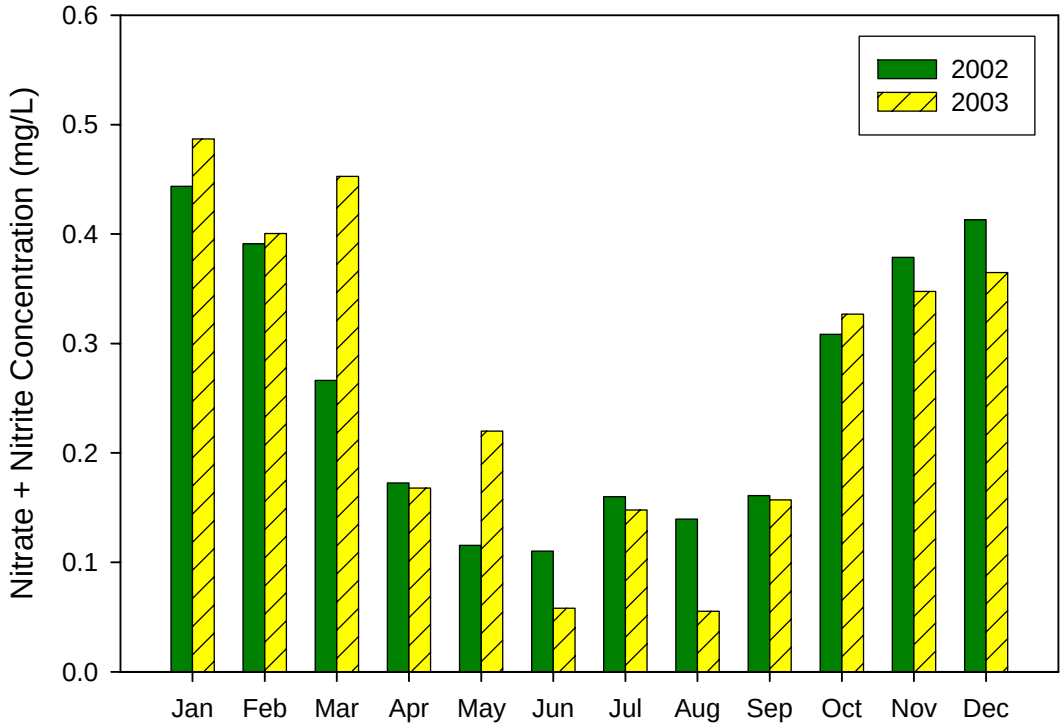

Figure 3-37. Monthly Mean Nitrate+nitrite Concentrations (mg/L) at Beach Stations in 2002 and 2003

Silica

Offshore. Silica concentrations at offshore stations ranged from 0.22 to 4.7 mg/L in 2002, and from 0.34 to 3.9 mg/L in 2003. The mean concentration for all offshore samples combined was 2.6 mg/L in 2002 and 2003. This matches historical levels of silica measured at offshore stations. Silica concentrations are shown in Figures 3-38 and 3-39 for six selected stations in 2002 and 2003, respectively. Concentrations tended to be lower in the surface layer during the summer months when diatoms that use silica for frustule growth were most abundant. Highest concentrations occurred during the winter months when uptake by phytoplankton was low and freshwater inputs were relatively high. Surface concentrations at the Elliott Bay station, LTED04, were higher in the winter months than at the other sites due to riverine input from the Duwamish River. Silica concentrations at stations KSBP01 and LSNT01 from 1994-2003 are presented in Table 3-8.

Beach Stations. Silica concentrations at beach stations were slightly higher than those of offshore stations due to the closer proximity of beach stations to sources of freshwater runoff. Values in 2002 ranged from 0.48 to 5.2 mg/L, with a mean concentration of 2.7 mg/L.

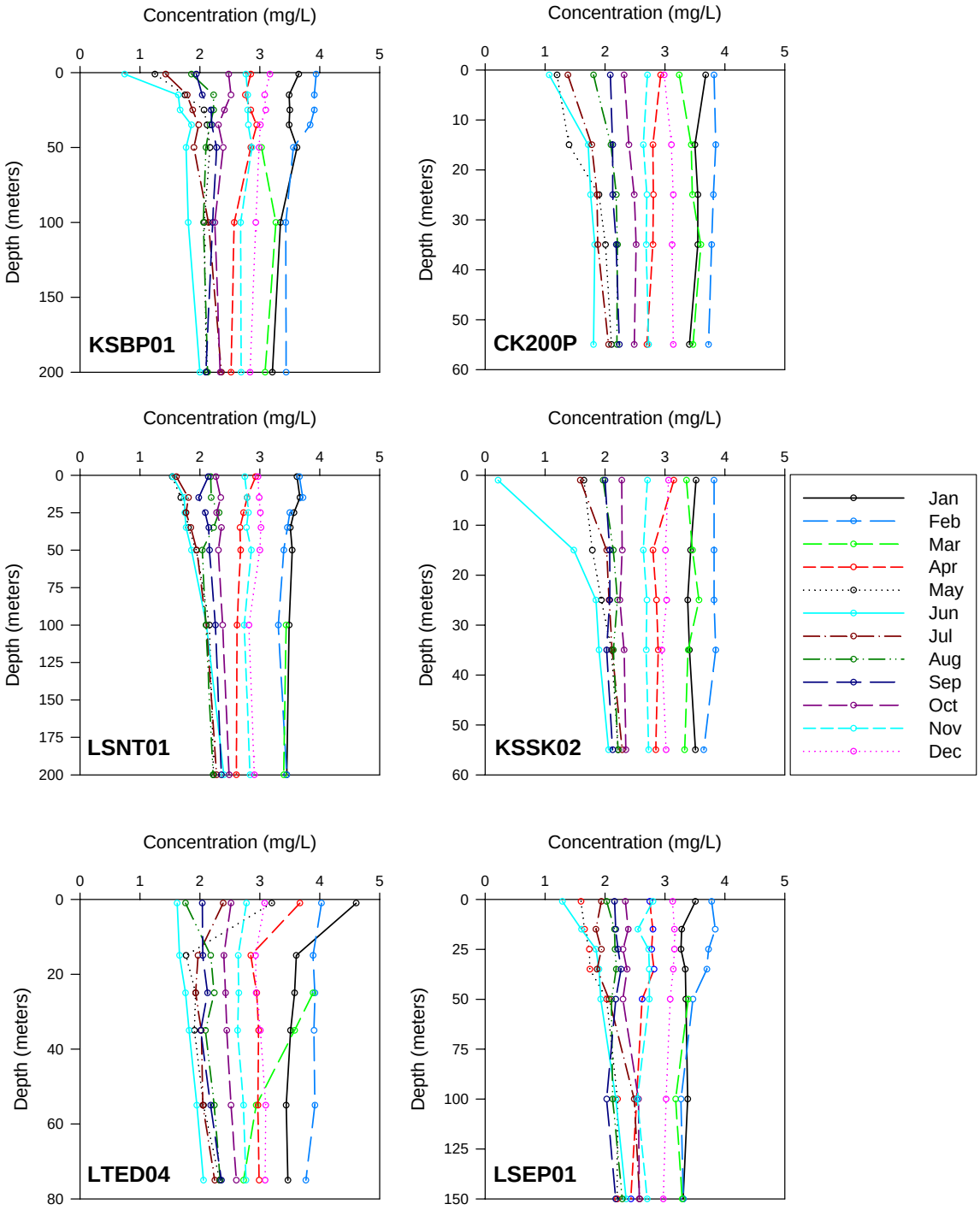

Figure 3-38. Silica Concentrations (mg/L) at Six Stations in 2002

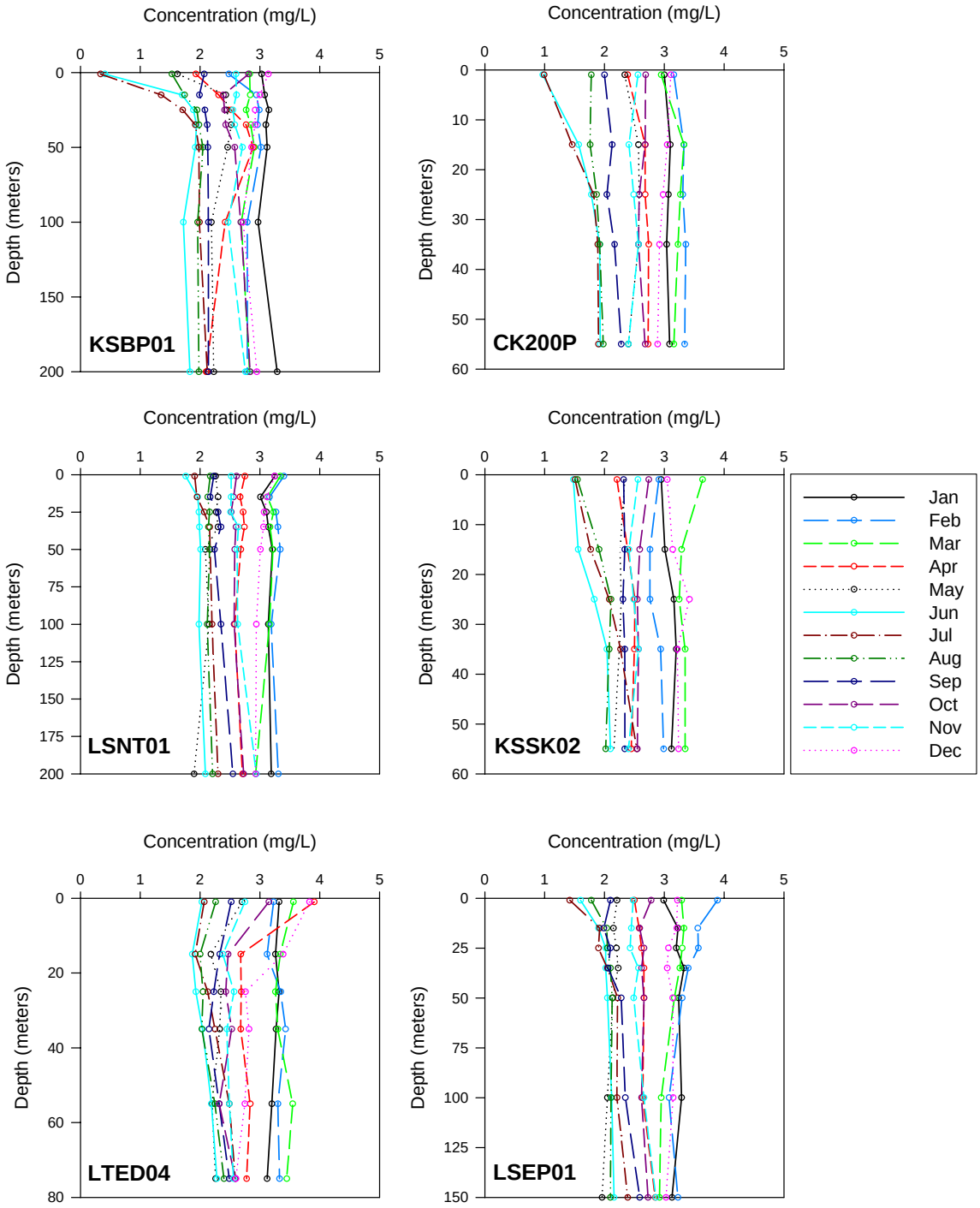

Figure 3-39. Silica Concentrations (mg/L) at Six Stations in 2003

Concentrations in 2003 ranged from 1.1 to 10.0 mg/L, with a mean of 3.0 mg/L. The higher concentrations observed in 2003 can be attributed to increased precipitation and, thus, a higher level of freshwater runoff and associated silica transport to marine waters. Figure 3-40 shows the monthly mean silica concentrations at beach stations for 2002 and 2003. The highest concentrations in both years was measured at station KSHZ03 (Carkeek Park), near the mouth of Piper's Creek. Station ITCARKEEKP, which is also located near Carkeek Park, but outside the influence of Piper's Creek, had silica concentrations lower than KSHZ03, the station at the mouth of Piper's Creek. This suggests that the silica at KSHZ03 is fluvial in origin.

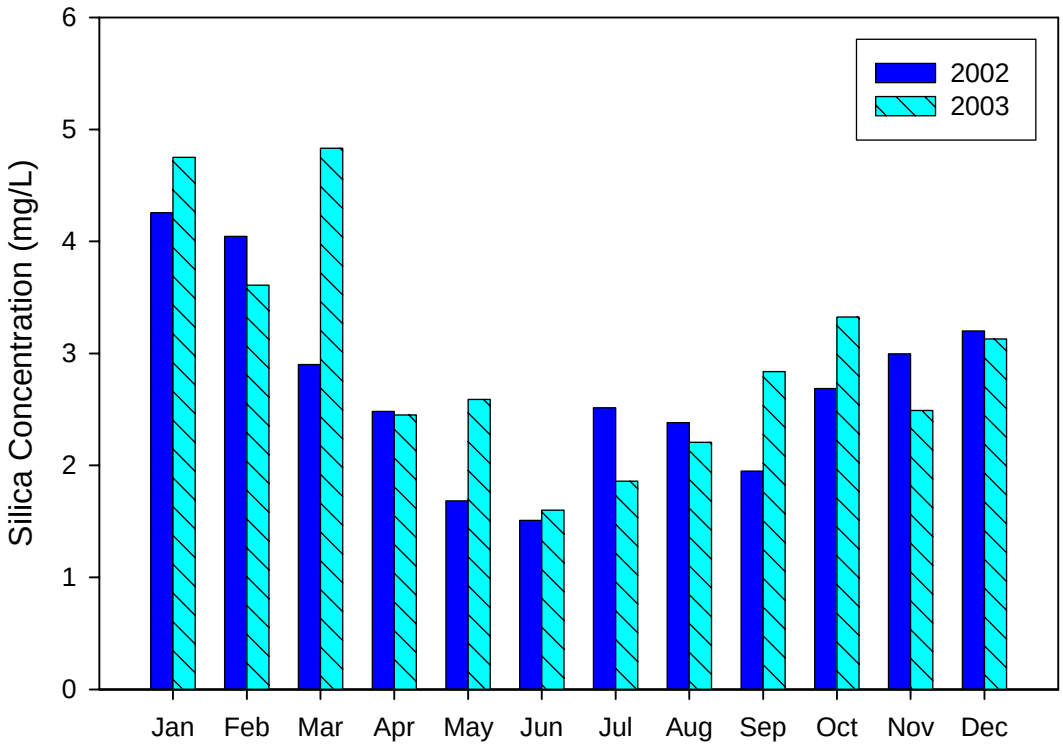

Figure 3-40. Monthly Mean Silica Concentrations (mg/L) at Beach Stations in 2002 and 2003

3.2.7 Chlorophyll-*a* and Pheophytin

Chlorophyll-*a* (a photosynthetic pigment) and pheophytin (a degradation product of chlorophyll) measurements were made at depths between 1 and 35 m at all offshore stations. Chlorophyll-*a* and pheophytin were not measured at beach stations. Several factors influence chlorophyll concentrations, including availability of light and nutrients, physiological status of phytoplankton, air temperature, wind, and zooplankton grazing. Pheopigments, such as

pheophytin, are degradation products of chlorophyll produced when zooplankton graze on phytoplankton cells. Consequently, pheophytin concentrations tend to be highest when chlorophyll concentrations are high. Chlorophyll-*a* values for both 2002 and 2003 ranged from 0.05 to 32.70 micrograms per liter (μg/L), with a mean concentration of 2.66 μg/L. Pheophytin values for both 2002 and 2003 ranged from less than the MDL (0.02 μg/L) to 3.94 μg/L, with a mean concentration of 0.59 μg/L. Concentrations were similar in both years with mean chlorophyll-*a* and pheophytin concentrations of 2.80 and 0.50 μg/L in 2002, and of 2.53 and 0.68 μg/L in 2003, respectively. The highest levels of chlorophyll-*a* were found in surface waters at Point Wells in May 2002 and June 2003. The highest levels of pheophytin were observed at the Vashon Outfall station in June 2002 and at the West Point Outfall station in August 2003. Chlorophyll-*a* and pheophytin values for 2002 and 2003 can be found in Appendix A. Mean, minimum, and maximum values for the past ten years of sampling at stations KSBP01 and LSNT01 are summarized in Table 3-8.

Seasonal distributions of chlorophyll-*a* and pheophytin were similar due to reasons discussed above. Concentrations were lowest during the winter and highest from April through August, indicating spring and summer phytoplankton blooms. Vertical distributions of chlorophyll-*a* at six select stations for 2002 and 2003 are shown in Figures 3-41 and 3-42, respectively. Concentrations were highest at the surface and decreased with depth due to the decreased light available for photosynthesis. Vertical distributions for pheophytin are shown in Figures 3-43 and 3-44, respectively, and are similar to the chlorophyll-*a* distribution patterns.

Tables 3-10 and 3-11 show the timing of phytoplankton blooms, as indicated by chlorophyll-*a* concentrations, by station location for 2002 and 2003, respectively. The 2001 temporal trend of blooms was not apparent in either 2002 or 2003. Although maximum chlorophyll-*a* concentrations vary annually, phytoplankton blooms (indicated by high chlorophyll-*a* levels) generally occur in April or May and June or July of each year. In 2002 and 2003, blooms followed this pattern as evidenced by elevated chlorophyll-*a* levels during those months (see Figure 3-29). Another large bloom occurred in August of both years in the waters at Jefferson Head and Elliott Bay in 2002 and the Vashon Outfall in 2003. Major blooms were also detected in February 2003 at Jefferson Head and within East Passage. In both years, chlorophyll-*a* levels were elevated from April through September, with a large phytoplankton bloom in September 2002 near Jefferson Head. Variations in chlorophyll-*a* from 1999-2003 for stations KSBP01 and LSNT01 are shown in Figure 3-45 (note that this figure's units are in mg/m^3, which is equivalent to μg/L). Variations in chlorophyll-*a* from 1999-2003 for all stations can be found in Appendix F.

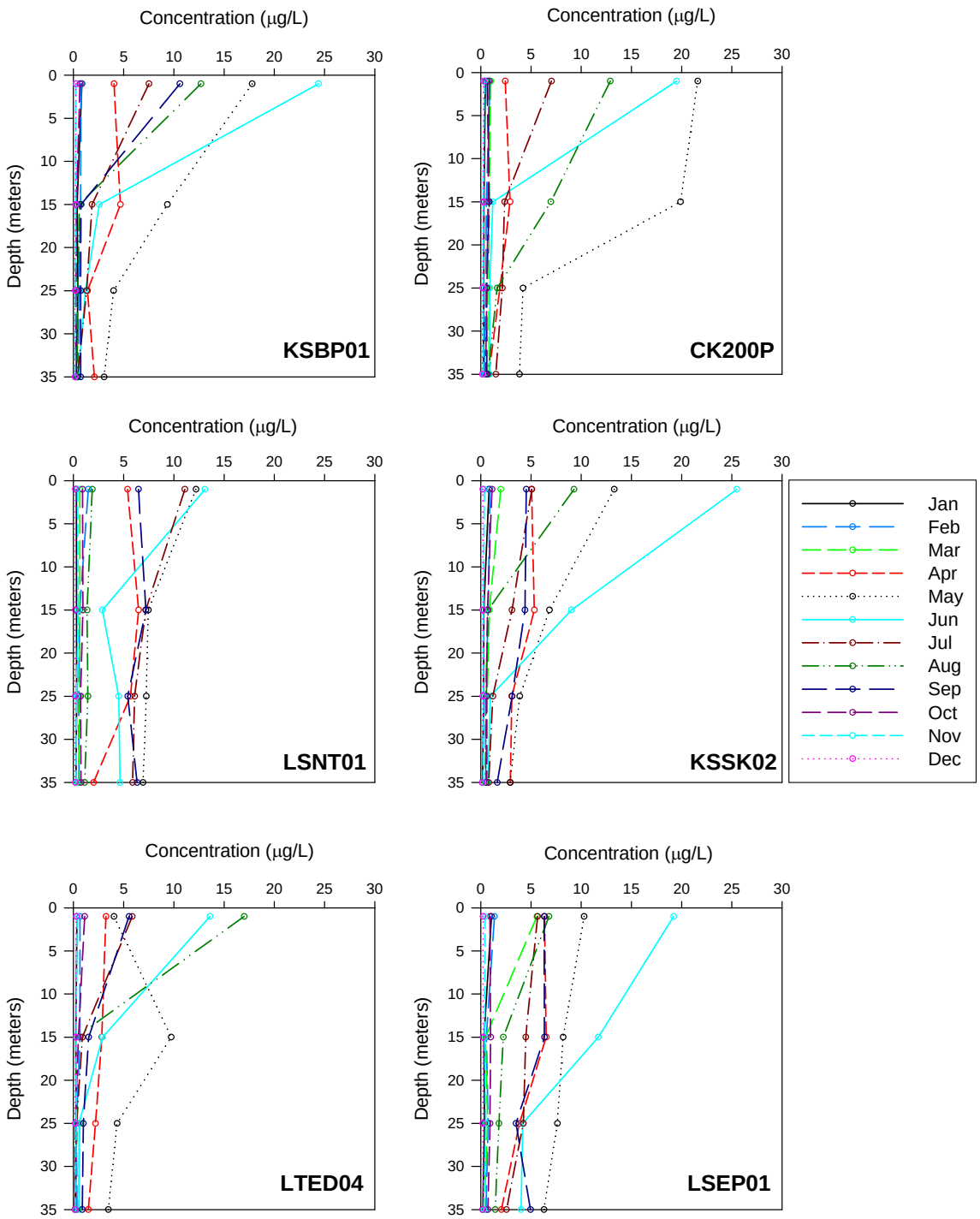

Figure 3-41. 2002 Chlorophyll-*a* Concentrations from Select Offshore Stations

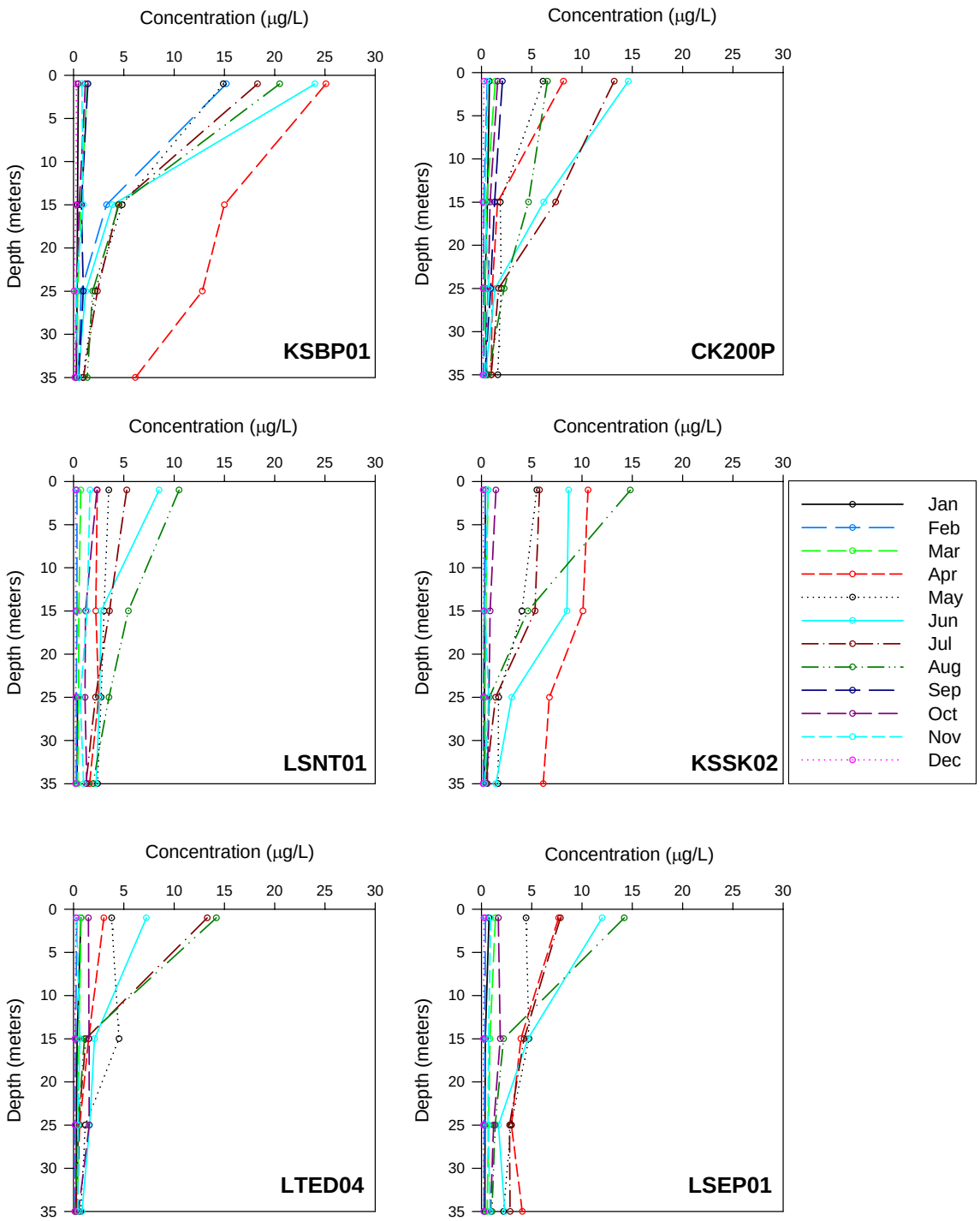

Figure 3-42. 2003 Chlorophyll-*a* Concentrations from Select Offshore Stations

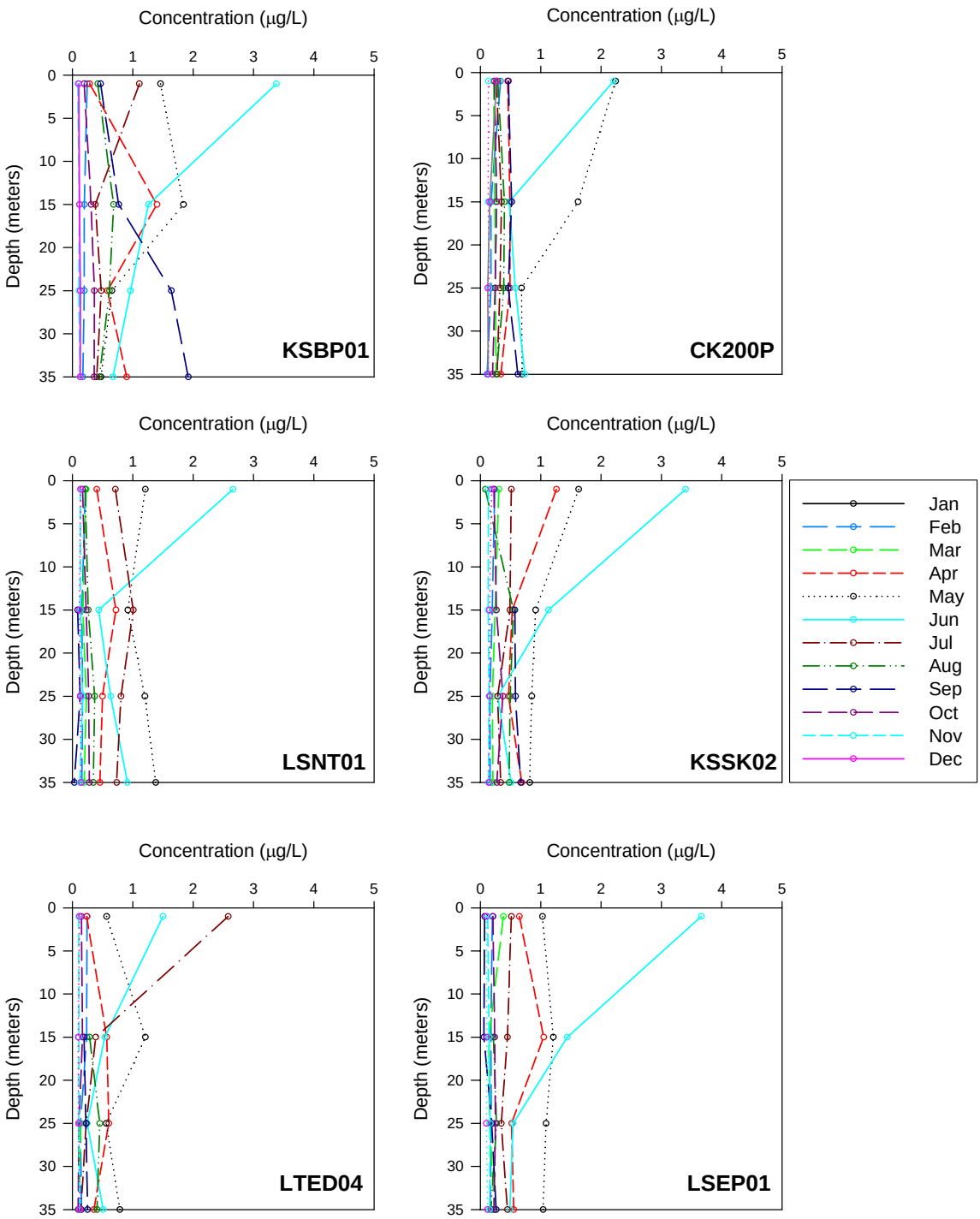

Figure 3-43. 2002 Pheophytin Concentrations from Select Offshore Stations

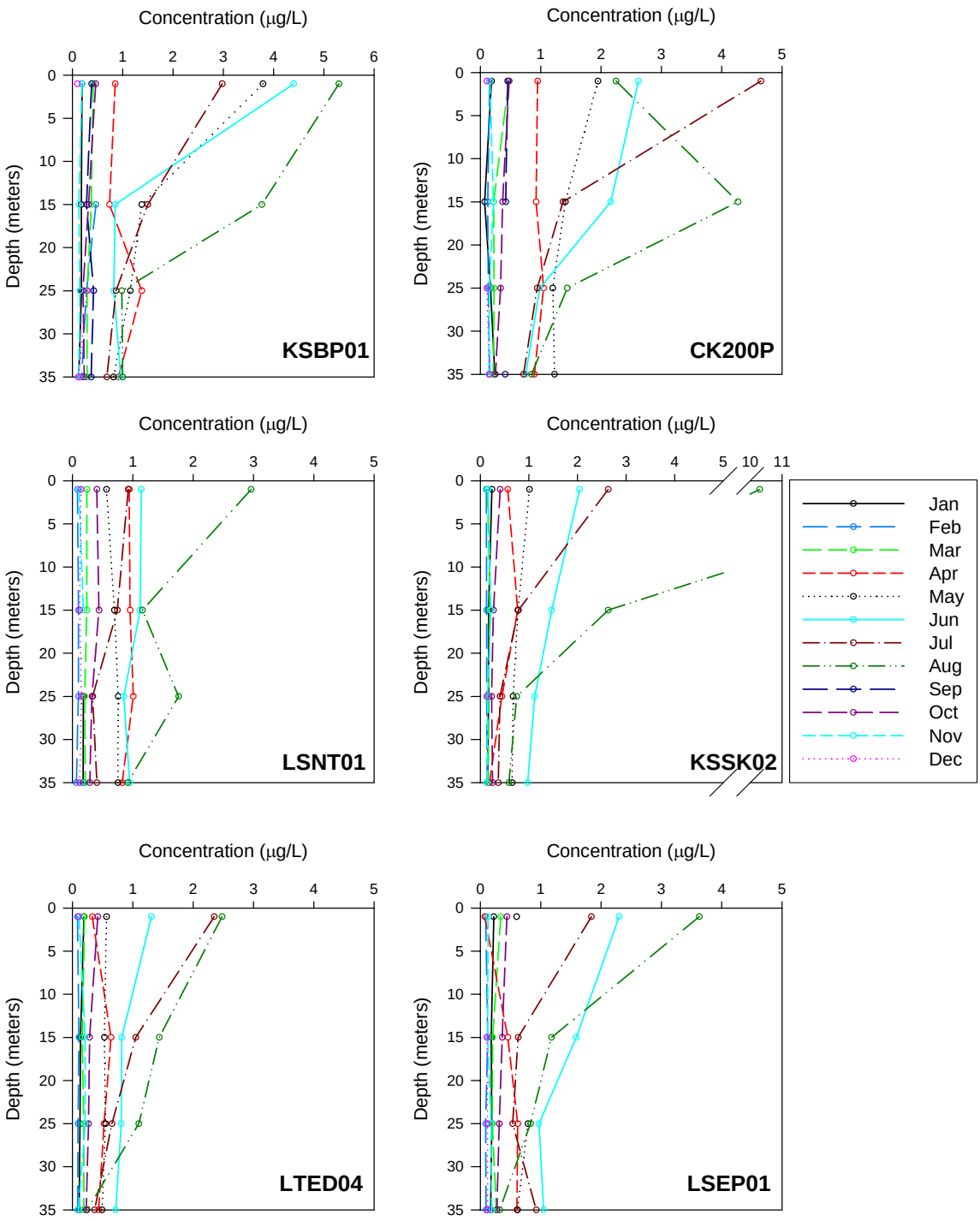

Figure 3-44. 2003 Pheophytin Concentrations from Select Offshore Stations

Table 3-10. 2002 Phytoplankton Bloom Occurrence as Indicated by Chlorophyll-*a* Concentrations (stations are listed from north to south)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Point Wells					**B**	**B**	b	b	b			
Jefferson Head					**B**	**B**	b	**B**	**B**			
Carkeek CSO Outfall					**B**	**B**	b	**B**				
West Point Outfall				b	**B**	**B**	b	b	b			
Denny CSO Outfall						b	b	**B**	b			
Elliott Bay						**B**	b	**B**	b			
South Plant Outfall				b	**B**	**B**	b	b	b			
Alki Outfall					b	**B**	b		b			
Dolphin Point				b	**B**	**B**	**B**		b			
Vashon Outfall				b	b	**B**	**B**		b			

B = Chlorophyll concentrations above 10.0 μg/L
b = Chlorophyll concentrations above 5.0 μg/L and less than 10.0 μg/L

Table 3-11. 2003 Phytoplankton Bloom Occurrence as Indicated by Chlorophyll-*a* Concentrations (stations are listed from north to south)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Point Wells				b	**B**	**B**	b	b	b			
Jefferson Head		**B**		**B**	**B**	**B**	**B**	**B**				
Carkeek CSO Outfall				b	b	**B**	**B**	b				
West Point Outfall				**B**	b	b	b	**B**				
Denny CSO Outfall					b		b	**B**				
Elliott Bay						b	**B**	**B**				
South Plant Outfall				b		**B**	b	**B**				
Alki Outfall				b	b	**B**	b					
Dolphin Point						b	b	**B**				
Vashon Outfall						**B**	b	**B**				
South East Passage		**B**		b	**B**	**B**	**B**	b	b			

B = Chlorophyll concentrations above 10.0 μg/L
b = Chlorophyll concentrations above 5.0 μg/L and less than 10.0 μg/L

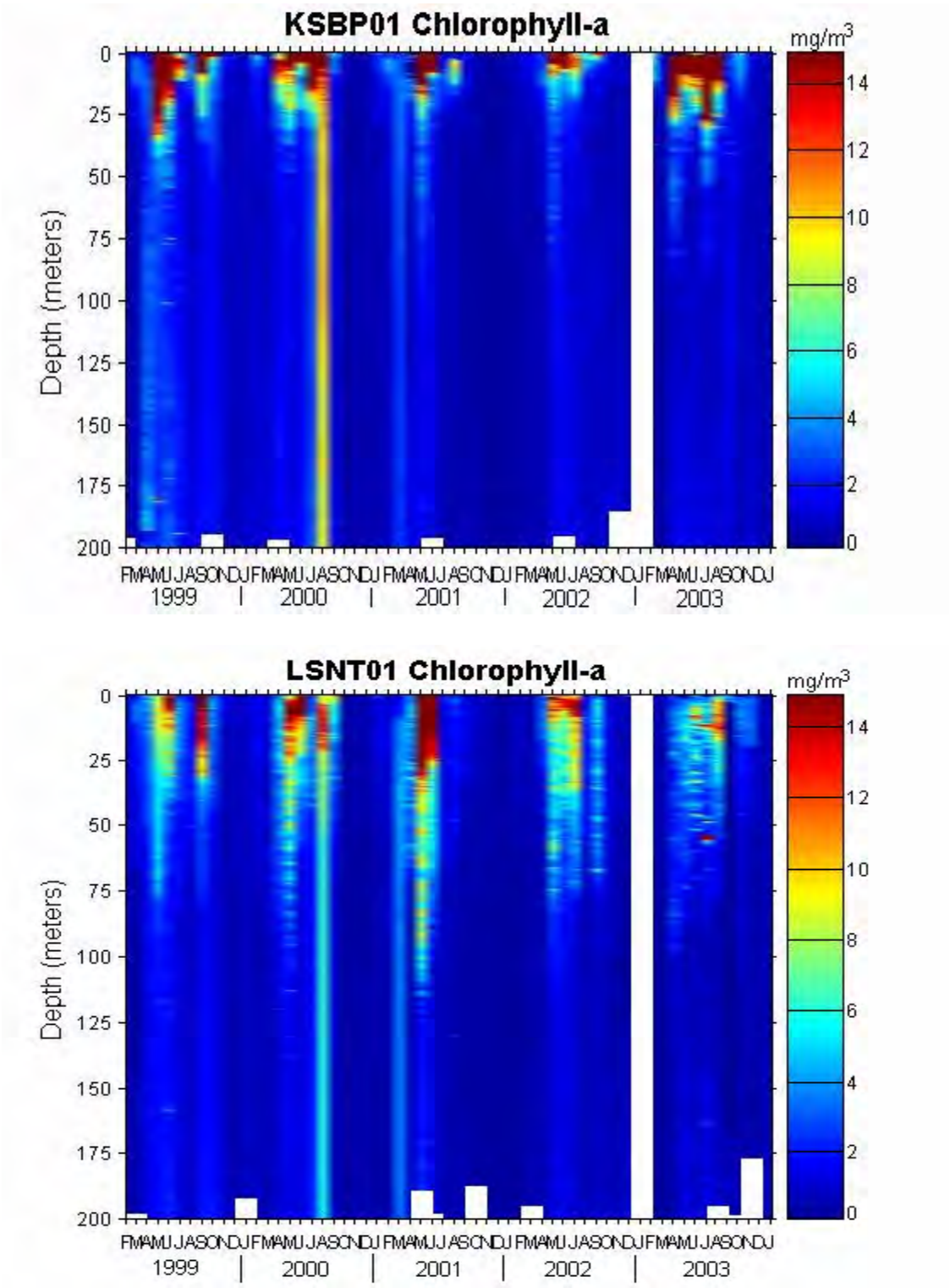

Figure 3-45. Chlorophyll-*a* Variations at Stations KSBPO1 and LSNT01 from 1999-2003

3.2.8 Beach Water Metals

Water samples from 10 beaches were collected and analyzed for dissolved metals in 2002. Water samples were not analyzed for dissolved metals in 2003 after a review of the past five years of data indicated no additional sampling was required at this time. Metals analysis may be added back to the marine beach sampling program in the future on an as needed basis.

In 2002, samples were collected in August, filtered, and analyzed for the following 12 metals: antimony, arsenic, cobalt, chromium, copper, lead, nickel, selenium, silver, thallium, vanadium, and zinc.

Reportable concentrations for 9 of the 12 metals were detected in every sample (arsenic, cadmium, chromium, cobalt, copper, nickel, thallium, vanadium, and zinc). Zinc values will not be discussed further as the results were compromised by laboratory contamination. It is difficult to avoid laboratory contamination for dissolved zinc analysis and achieve low detection limits as the filters used to separate the dissolved from the total fraction contain trace amounts of zinc. Two metals, silver and selenium, were not detected in any of the 10 samples. Lead was detected in 6 of the 10 samples (Table 3-12). Metal concentrations at sites near wastewater and CSO outfalls were not higher than at ambient sites.

Table 3-12. Dissolved Metal Concentrations (μg/L) in Beach Water Samples from 10 Sites

Metal	FOD %	Minimum	Maximum	Mean	Median
Antimony	100	0.0645	0.0942	0.0820	0.0822
Arsenic	100	1.16	1.60	1.32	1.30
Cadmium	100	0.036	0.064	0.053	0.056
Chromium	100	0.120	0.180	0.143	0.140
Cobalt	100	0.0259	0.0520	0.0381	0.0393
Copper	100	0.322	1.230	0.571	0.441
Lead	60	< 0.007	0.0180	0.0108	0.0092
Nickel	100	0.301	0.514	0.414	0.424
Selenium	0	--	--	--	--
Silver	0	--	--	--	--
Thallium	100	0.0090	0.0147	0.0104	0.0093
Vanadium	100	1.190	2.160	1.469	1.405

FOD = frequency of detection

There was little variability in the 2002 concentrations for antimony, arsenic, cadmium, chromium, cobalt, lead, nickel, and thallium as has been noted in past sampling events. Table 3-13 shows the mean concentrations for seven ambient and outfall monitoring sites sampled between 1999 and 2002 compared to the means for the same seven stations sampled in 2002. Three sites were not included in the calculations as sampling did not begin until 2000 (KSYV02 and ITOCEANAVE) and 2002 (MSJL01).

Table 3-13. Mean Metal Concentrations at Seven Beach Sites

	Mean Dissolved Metal Concentrations (ug/L)	
	1999 - 2002 N = 44	**2002 N = 7**
Antimony	0.0807	0.0807
Arsenic	1.09	1.36
Cadmium	0.0577	0.0562
Chromium	0.12	0.15
Cobalt	0.0358	0.0408
Nickel	0.423	0.436
Thallium	0.0096	0.0109

N = number of samples

There was little variability between vanadium concentrations at eight sites, with values ranging from 1.19 to 1.52 µg/L. The remaining two sites, MTLD03 at Normandy Park and KSLU03 at Golden Gardens, had values of 1.78 and 2.16 µg/L, respectively. While all vanadium concentrations were low, results from stations MTLD03 and KSLU03 were significantly higher than the other values at the 95% confidence interval (Mann-Whitney non-parametric test). Vanadium does not occur in nature in the metallic form. It is used as an alloy additive in various types of steel and commonly used in the atomic energy and aircraft construction industries. It is also used as a catalyst in chemical manufacturing, particularly for the production of plastics (WHO, 1988). Power and heat-producing plants using fossil fuels cause the main discharge into the environment. Most vanadium entering the marine environment is in suspension or colloidal form and only about 10% is present in soluble form (WHO, 1988). Vanadium occurs in low concentrations in marine water as it continuously removed from the water by largely unknown mechanisms.

Dissolved copper had the most variability between sites, with the highest concentration (1.230 µg/L) detected at station KSYV02, located just west of the Elliott Bay Marina. The second highest concentration of 0.912 µg/L was detected at station KSLU03, located at Golden Gardens north of the Shilshole Bay Marina (Figure 3-46). Statistical analysis of the copper data indicated that the data were not normally distributed and the results from stations KSYV02 and KSLU03

were significantly higher than the other eight sites at the 95% confidence interval (Mann-Whitney non-parametric test). Station KSLU03 consistently has the highest dissolved copper concentrations compared to other sites, with a mean concentration of 1.18 µg/L measured between 1999 and 2002. The mean dissolved copper concentration at station KSYV02 between 2000 and 2002 is 1.13 µg/L. The mean dissolved copper concentrations for all other sites part of the ambient and outfall monitoring programs between 1999 and 2002 was 0.65 µg/L. It is not unexpected that the two sites in close proximity to marinas had the highest copper concentrations. Copper is a biocide constituent of boat anti-fouling paints and is also used as a wood preservative on pilings and bulkheads in the form of chromated copper arsenate to prevent damage from marine boring organisms. Subsequent to the U.S. EPA restricting use of tributyltin (TBT) as a constituent in anti-fouling paint to ships larger than 25 meters in the late 1980s, copper-based biocides have become the primary anti-fouling paint used on recreational boats and small ships.

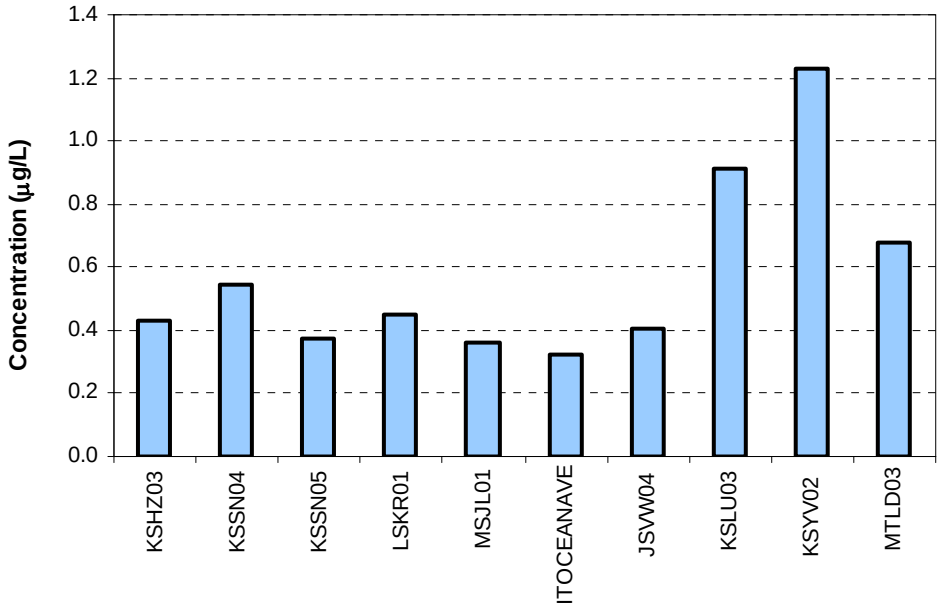

Figure 3-46. Dissolved Copper Concentrations at Beach Sites

Table 3-14 shows Washington State water quality criteria for seven metals. All criteria are based upon the dissolved metal fraction with the exception of the selenium criterion, which is based upon the total amount. Concentrations for all measured metals were well below the applicable criteria.

Table 3-14. Washington State Marine Water Quality Criteria for Metals

Metal	Criterion Dissolved or Total Fraction Based	Marine Water Criteria (µg/L)	
		Acute	Chronic
Arsenic	Dissolved	69	36
Cadmium	Dissolved	42	9.3
Copper	Dissolved	4.8	3.1
Lead	Dissolved	210	8.1
Nickel	Dissolved	74	8.2
Selenium	Total	290	71
Silver	Dissolved	1.9	--

3.3 Sediment Chemistry Data Results

Marine sediments were collected at seven offshore stations in 2002 for the ambient sampling program. One offshore sediment sample was collected in 2002 for the outfall sampling program at the Denny Way CSO outfall. Beach sediments were collected from eight stations in 2002 (three ambient, four outfall, and one MOSS) and seven in 2003 (three ambient and four outfall).

Offshore sediments were analyzed for conventional parameters, including total solids, total volatile solids, total sulfide, oil and grease, ammonia nitrogen, total organic carbon (TOC), and grain size distribution. Beach sediments were analyzed for total solids, total organic carbon, and grain size distribution. Beach sediments are composed mainly of sand and past analysis has shown that volatile solids, ammonia, and total sulfides are below method detection limits, therefore, these parameters were not analyzed in 2002 and 2003. Both offshore and beach sediments were also analyzed for metals and organic compounds including chlorinated pesticides, polychlorinated biphenyls (PCBs), and semi-volatile organics (including polynuclear aromatic hydrocarbons).

Metals and ionizable organics data are presented on a dry weight basis. Non-ionizable organics were also normalized to organic carbon content for comparison to organic carbon normalized sediment standards. All sediment data are provided in Appendix B.

3.3.1 Sediment Conventionals

The physical structure of the sediments influence conventional parameter results as sandy sediments contain less organic carbon, ammonia, and fine material. Offshore sediments from stations in deep water were composed mainly of silt and clays, whereas the shallow station north of the Ship Canal (KSPS01) and the two Seattle waterfront stations (LTDF01 and LTBC41) were

composed primarily of sand and gravel. Table 3-15 provides conventional parameter mean values for the eight offshore sediment stations partitioned by depth.

TOC values at offshore stations ranged between 3,470 and 23,900 mg/Kg dry weight (dw), whereas values at beach stations ranged between < 500 and 3,580 mg/Kg dw. Figure 3-47 shows the relationship between TOC and grain size.

The sand and gravel fraction in offshore sediments ranged from 7.1 to 93.2%. The 93.2% value was measured in sediment from the shallowest station, KSPS01, located at a depth of 12 m. Beach sediments were composed almost entirely of coarse-grained sediments, containing sand and gravel ranging from 95.4 to 99.1%.

Ammonia-nitrogen was analyzed in offshore sediments only. Values ranged from 2.16 to 18.7 mg/Kg dw, with the lowest values detected at stations containing the highest proportion of sand and gravel and the lowest amount of silt and clay. The highest ammonia value was detected at LSCW02 located in central Elliott Bay, the station with the highest silt and clay fraction at 93%. Ammonia values had a strong correlation with grain size and TOC, which is consistent with previous sampling results.

Table 3-15. Offshore Station Mean Values for Conventional Parameters by Depth

	Station Depth (meters)		
	< 20	**35 - 90**	**130 - 250**
	N = 2	**N = 2**	**N = 4**
Total Solids (%)	69.7	46.8	32.5
Total Organic Carbon (mg/Kg dw)	5,260	19,350	21,025
Sand & gravel (%)	80.8	41.2	15.0
Silt & Clay (%)	19.1	58.8	85.0
Ammonia nitrogen (mg/Kg dw)	2.67	6.55	16.2
Total Sulfide (mg/Kg dw)	22.2	32.1	145.0

dw = dry weight
N= number of samples

Total sulfides were analyzed in offshore sediments only and were detected in five of the eight samples at concentrations ranging between 30.4 to 278 mg/Kg dw. Detected concentrations were not strongly correlated with grain size, as was seen with other parameters.

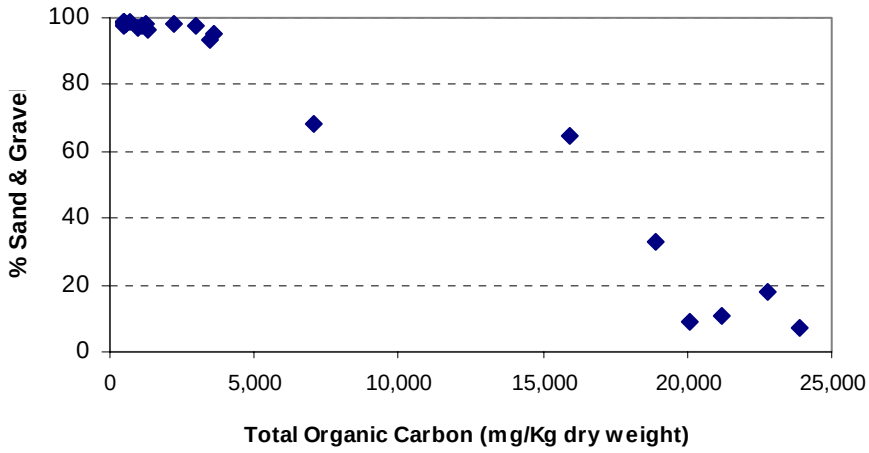

Figure 3-47. Total Organic Carbon and Grain Size Relationship

3.3.2 Sediment Metals

Sixteen metals were analyzed in offshore sediments and 14 were analyzed in beach sediments. Antimony and thallium were not analyzed in beach sediments as these metals have not been detected in previous samples. Table 3-16 provides a summary for metal results in both offshore and beach sediments. All results presented in this section are on a dry weight basis.

Of the 16 metals analyzed in the eight offshore sediment samples in 2002, three were never detected (antimony, selenium, and thallium) and cadmium was detected at the method detection limit in only one sample. The earth metals, aluminum, iron, and manganese, were detected in all samples at typical concentrations.

For offshore sediments, silver was only detected at the three sites closest to the Seattle waterfront, LTDF01, LTED04, and LTBC41. Silver was not detected in any of the beach samples analyzed in 2002 but was detected just above the method detection limit in all beach samples analyzed in 2003, ranging between 0.23 and 0.35 mg/Kg dry weight. Silver has not been detected in beach sediments in the past and the 2003 results are likely due to a change in analytical instrumentation. Silver is an element that naturally occurs as a soft metal and can enter the marine environment through mining, smelting, photographic film-processing, and sewage wastes. Other sources of silver include steel refining, cement manufacturing, and fossil fuel consumption (PTI, 1991). Silver is commonly detected in sediments along the Seattle waterfront, and other urban Puget Sound embayments, where there is a historical source of contamination. Once in the environment, silver remains until removed by physical or biological processes. Silver can change forms depending upon environmental conditions and sorption and precipitation are the dominant processes affecting movement in water and sediments (PTI, 1991). All detected silver values were at least 10 times below the Sediment Quality Standard of 6.1 mg/Kg dw.

Table 3-16. Offshore and Beach Sediment Metals Summary

	Concentration (mg/Kg dry wt.)		Detection Frequency (%)	
	Offshore	Beach	Offshore	Beach
	2002	2002 & 2003	2002	2002 & 2003
Aluminum	6,180 - 19,200	2,980 - 6,310	100	100
Antimony	not detected	not analyzed	0	--
Arsenic	3.5 - 17	not detected	100	0
Beryllium	0.11 - 0.46	<0.057 - 0.129	100	93
Cadmium	<0.2 - 0.49	not detected	12	0
Chromium	17.0 - 42.8	5.37 - 20.5	100	100
Copper	6.93 - 55.3	3.02 - 8.72	100	100
Iron	8,680 - 28,000	5,130 - 10,700	100	100
Lead	6.5 - 48.0	<1.70 - 8.40	100	93
Manganese	148 - 477	82.3 - 172	100	100
Mercury	0.034 - 0.43	not detected	100	0
Nickel	18.1 - 35.9	6.45 - 27.3	100	100
Selenium	not detected	not detected	0	0
Silver	<0.27 - 0.63	<0.20 - 0.35	38	47
Thallium	not detected	not analyzed	0	--
Zinc	24.0 - 99.3	14.8 - 29.8	100	100

Arsenic and mercury were detected in all offshore sediments but none of the beach sediments. Both arsenic and mercury concentrations were highest at the stations along the Seattle waterfront and lowest at the station outside of Elliott Bay, north of the Lake Washington Ship Canal. All arsenic values were at least three times below the Sediment Quality Standard (SQS) but mercury values at stations LTDF01 (0.42 mg/Kg dw) and LSCW02 (0.43 mg/Kg dw) were above the SQS of 0.41 mg/Kg dw. Mercury has exceeded the SQS at station LTDF01 every year sampled since 1988, which includes 10 sampling events. Mercury is a known contaminant along the Seattle waterfront and can enter the environment from atmospheric deposition, boat paints, smelting operations, electrical equipment, fossil fuel combustion, and creosote. Historical data indicates that compounds containing mercury may have been loaded onto ships docked along the waterfront during the Klondike gold rush in the late 1800's (Seattle Engineering Dept., 1996). Sediments from station LSCW02 in central Elliott Bay exceeded the SQS for mercury in 1992, 2000, and 2002 but did not exceed the SQS in 1991, 1993, 1994, 1995, 1996, and in 1998.

Chromium, copper, nickel, and zinc were detected in all offshore and beach samples. The highest concentration detected for each metal was at station LSCW02, the site with the highest

percentage of fine-grained particles. All results for chromium, copper, and zinc were well below the SQS criteria. A sediment standard for nickel does not currently exist for Washington State. As stated in the previous section, some metals have a strong association with fine-grained sediments, particularly aluminum, arsenic, chromium, copper, lead, nickel, and zinc. Figures 3-48 and 3-49 show the correlation between four metals and fine-grained particles for all sediments analyzed in 2002 and 2003. Lead results were also influenced by the amount of fine-grained particles within the sample. However, the highest concentration was detected at station LTDF01 and not the site with the highest percentage of fine-grained particles. Station LTBC41 located near the Denny Way CSO outfall contained a similar amount of fine-grained particles to that of station LTDF01, however, sediments at the Denny Way outfall site contained a lower amount of lead. All lead results were a minimum of nine times below the SQS. Lead can enter the environment through leaded gasoline, motor vehicle emissions, smelter emissions, and is also present in some types of batteries, solder, and plumbing materials. Urban runoff is one of the most common sources of lead in the marine environment, therefore, it is not unexpected that the stations closest to the City of Seattle and sources of runoff had the highest lead value.

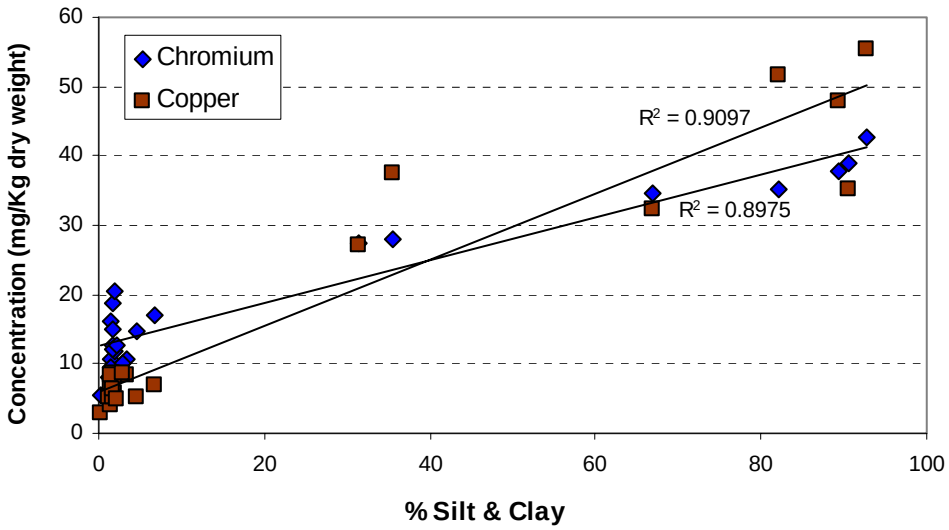

Figure 3-48. Sediment Grain Size and Copper & Chromium Values

3.3.3 Sediment Organics

Semi-volatile organics, chlorinated pesticides, and polychlorinated biphenyls (PCBs) were analyzed in eight offshore and eight beach samples in 2002 and in seven beach samples in 2003. Organotins were analyzed in the offshore sediment samples in 2002. All organics data are presented in Appendix B. All 2002 offshore semi-volatile results were qualified by the laboratory due to a holding time exceedence. Samples were extracted within the method holding time but analyzed 10 days beyond the extract-analysis holding time. Although the holding time was exceeded, the data are considered acceptable as an indication of the relative presence and concentration of specific compounds in the samples.

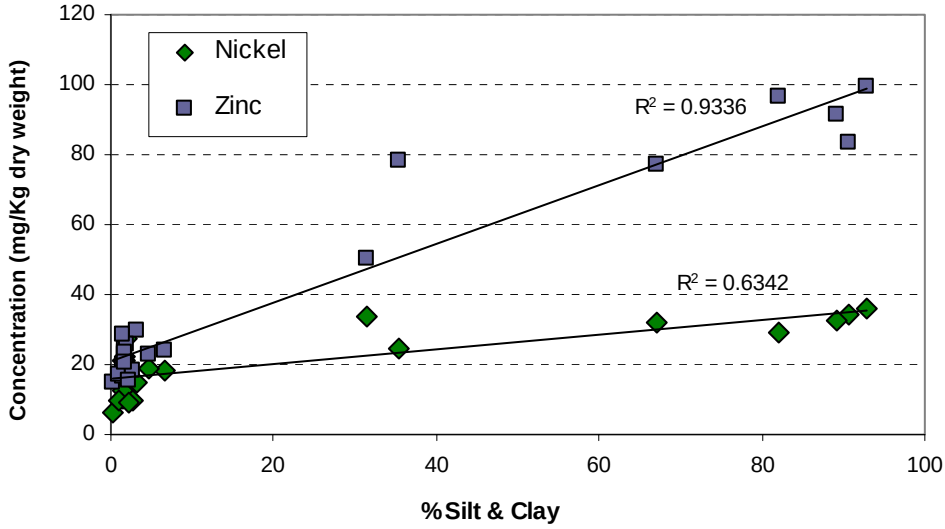

Figure 3-49. Sediment Grain Size and Nickel & Zinc Values

Offshore Sediments. A total of 27 organic compounds, 15 of which were polynuclear aromatic hydrocarbons (PAHs), were detected in the offshore sediments. Table 3-17 provides a summary of detected compounds. Three PCB Aroclors were detected: Aroclor 1248 in three samples and Aroclors 1254 and 1260 in five samples. All three Aroclors were detected in the three samples collected closest to the Seattle waterfront, LTDF01, LTED04, and LTBC41, with total PCB concentrations (the sum of all individual Aroclors) ranging from 64.0 to 84.2 µg/Kg dry weight. Total PCB concentrations for the other two samples ranged from 39.9 to 47.0 µg/Kg dry weight. Total PCB organic carbon (OC) normalized values for all samples with detectable concentrations ranged between 1.5 and 9.1 mg/Kg OC, which is below the SQS of 12 mg/Kg OC. PCBs were widely used as insulating material until their production was banned in the U.S. in 1977. However, they are present in electrical transformers and capacitors still in use and resist degradation due to their chemical structure. Current evidence suggests that the major source of commonly detected Aroclors (1248, 1254, and 1260) is cycling of previously introduced PCBs into the environment, release from landfills containing PCB waste materials, incineration of municipal refuse, and improper disposal of PCB-laden materials. The cycling process involves volatilization from ground surfaces (water, soil) into the atmosphere with subsequent removal from the atmosphere via deposition and revolatilization. PCBs are also cycled through the environment by biological processes, such as bioaccumulation and food chain transfer.

Two chlorinated pesticides, 4,4'-DDT and 4,4'-DDD (a breakdown product of DDT) were detected in sediments from two stations. A value of 2.8 µg/Kg dry weight of 4,4'-DDD was detected at station LTDF01 and a value of 12.0 µg/Kg dry weight of 4,4'-DDT was detected at station LTCA02. There are no Washington State Sediment Standards for these two pesticides.

Table 3-17. 2002 Sediment Summary for Organics

	Subtidal		Beach	
Compound	**Range**	**Detection Frequency**	**Range**	**Detection Frequency**
Aroclor 1248	< 1.8 - 21.7	3/8	---	0/15
Aroclor 1254	< 1.8 - 35.0	5/8	---	0/15
Aroclor 1260	< 1.8 - 34.8	5/8	< 1.3 - 15.2	1/15
4,4'-DDD	< 1.5 - 2.8	1/8	---	0/15
4,4'-DDT	< 1.5 - 12.0	1/8	---	0/15
Acenapthene	< 9.5 - 67.8	1/8	---	0/15
Acenaphthylene	< 20 - 74.0	1/8	---	0/15
Anthracene	< 13 - 306	7/8	< 4.0 - 6.5	1/15
Benzo(a)anthracene	20.0 - 729	8/8	< 2.0 - 19.1	2/15
Benzo(a)pyrene	29.4 - 958	8/8	< 3.0 - 18.9	3/15
Benzo(b)fluoranthene	25.6 - 1,120	8/8	< 3.0 - 9.57	1/15
Benzo(g,h,i)perylene	30 - 466	8/8	< 8.0 - 12.0	2/15
Benzo(k)fluoranthene	14 - 569	8/8	< 3.0 - 17.5	2/15
Benzoic acid	88 - 130	8/8	< 13 - 43.0	8/15
Benzyl butyl phthalate	< 8.2 - 24	4/8	< 6.0 - 15.0	1/15
Bis(2-ethylhexyl)phthalate	20.8 - 81.7	8/8	< 6.7 - 22.8	12/15
Chrysene	21 - 754	8/8	< 4.0 - 19.4	2/15
Coprostanol	---	0/8	< 14 - 74.6	1/15
Dibenzo(a,h)anthracene	24 - 163	8/8	---	0/15
Dibenzofuran	< 19 - 32	1/8	---	0/15
Di-n-butyl phthalate	14.4 - 30	8/8	< 5.0 - 96.5	14/15
Fluoranthene	33 - 1,180	8/8	< 8.0 - 41.6	3/15
Hexachlorobenzene	---	0/8	< 0.66 - 2.51	1/15
Indeno(1,2,3-cd)pyrene	47 - 457	8/8	< 9.0 - 10.0	1/15
Naphthalene	< 19 - 30	1/8	---	0/15
Phenanthrene	16 - 545	8/8	< 4.0 - 42.2	3/15
Phenol	< 30 - 852	7/8	< 9.0 - 20.3	1/15
Pyrene	41.2 - 1,080	8/8	<4.0 - 55.2	5/15
Tri-n-butyltin	0.6 - 56.6	8/8	---	---

Units are µg/Kg dry weight

Several PAHs were detected in all eight samples. PAHs are constituents in creosote and can also enter the environment from fossil-fuel combustion and asphalt sealants. PAHs are associated with urbanization and can be transported into the marine environment through atmospheric deposition, runoff from streams and storm drains, and from creosote-treated pilings. PAHs are not associated with treated wastewater effluent and PAHs are not usually detected in effluent from the West Point or South Plant Treatment Plants. Creosote is used as a wood preservative

on marine pilings and contains a complex mixture of compounds, typically consisting of about 85% PAHs and 2-17% phenolic compounds. PAHs that contain two or three benzene rings are considered low molecular weight PAHs (LPAHs) and degrade more rapidly than high molecular weight PAHs (HPAHs) which contain four or more benzene rings. HPAHs have a relatively slow degradation rate.

Total LPAH concentrations (includes the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, and phenanthrene) ranged from 27.7 to 1,091.6 μg/Kg dry weight (1.4 to 68.7 mg/Kg OC). Figure 3-50 shows the spatial distribution of LPAH concentrations. Phenanthrene contributed the highest percentage to overall LPAH concentrations, with concentrations accounting between 57 and 100% (mean was 68%) of the total LPAH value. Although sediments from station LTDF01 along the waterfront contained the highest LPAH concentrations, all sediment results for total LPAHs and individual PAHs that comprise the total LPAH value were below SQS criteria.

Total HPAH concentrations includes the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene, and chrysene. Total HPAH values ranged from 285 to 7,476 μg/Kg dry weight (15.1 to 470.8 mg/Kg OC). Figure 3-51 shows the spatial distribution of HPAH concentrations. Benzofluoranthenes contributed between 14 and 23%, pyrene between 14 and 21%, and fluoranthene between 13 and 16% of the total HPAH values. Sediment from the station closest to the Seattle shoreline, LTDF01, had the highest HPAH concentration followed by sediment from KSPS01 located near the Shilshole Bay Marina. All sediment values for total HPAHs and individual PAHs that comprise the total HPAH value were below SQS criteria.

Other semi-volatile organics detected in offshore sediments included benzoic acid, phenol, and three phthalate compounds. No values exceeded SQS criteria. Organotins, mainly in the form of tri-n-butyltin (TBT), were detected in all sediments but SQS criteria does not exist for organotins.

Figure 3-52 and 3-53 show spatial distributions for phenol and TBT. Phenol was detected in seven samples at concentrations ranging from 26.4 to 851.9 μg/Kg dry weight. The highest value, detected at station KSPS01 near the Shilshole Bay Marina, exceeded the phenol SQS of 420 μg/Kg dry weight. As stated above, creosote can contain between 2 and 17% phenolic compounds and is also used as a general disinfectant, in the manufacture of artificial resins and epoxys, and contained in some paints and varnish removers. Although there are still some creosote-treated pilings in and around the marina, phenol was not detected from this site previously. TBT was detected at all sites with the highest concentrations found at stations LTBC41 (56.6 μg/Kg dry weight) and LTDF01 (32.0 μg/Kg dry weight). TBT is allowed as a component in anti-fouling paints on ships over 25 meters, therefore, it is not unexpected that sediments from the two sites in Elliott Bay closest to the shoreline with heavy commercial vessel traffic contained the greatest amount of TBT.

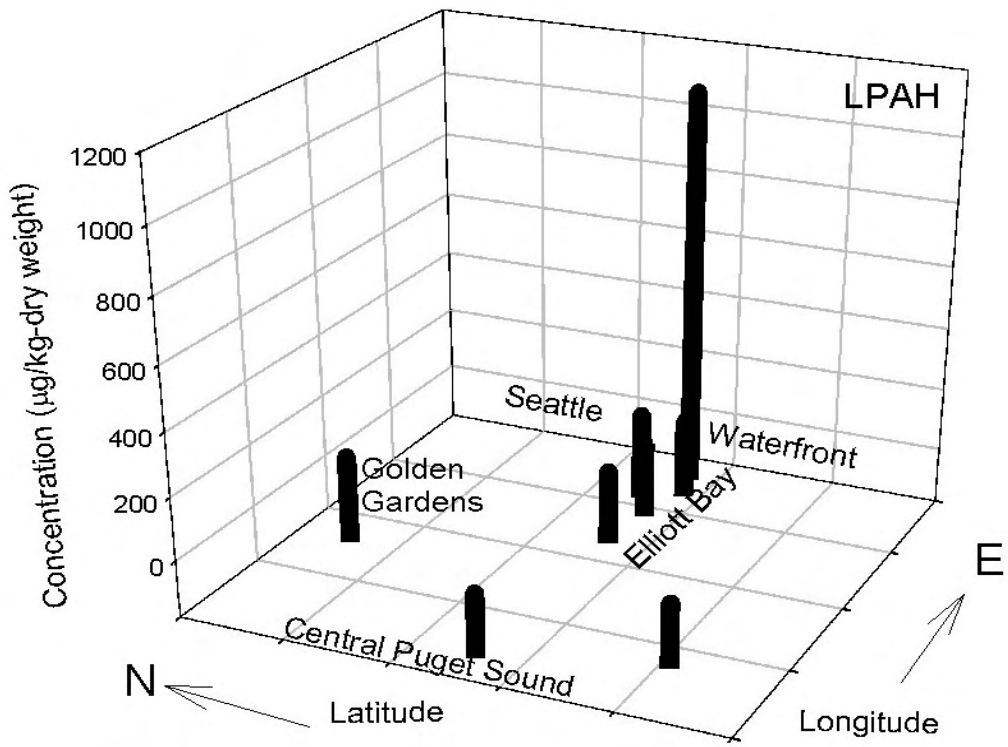

Figure 3-50. 2002 Offshore Sediment LPAH Concentrations

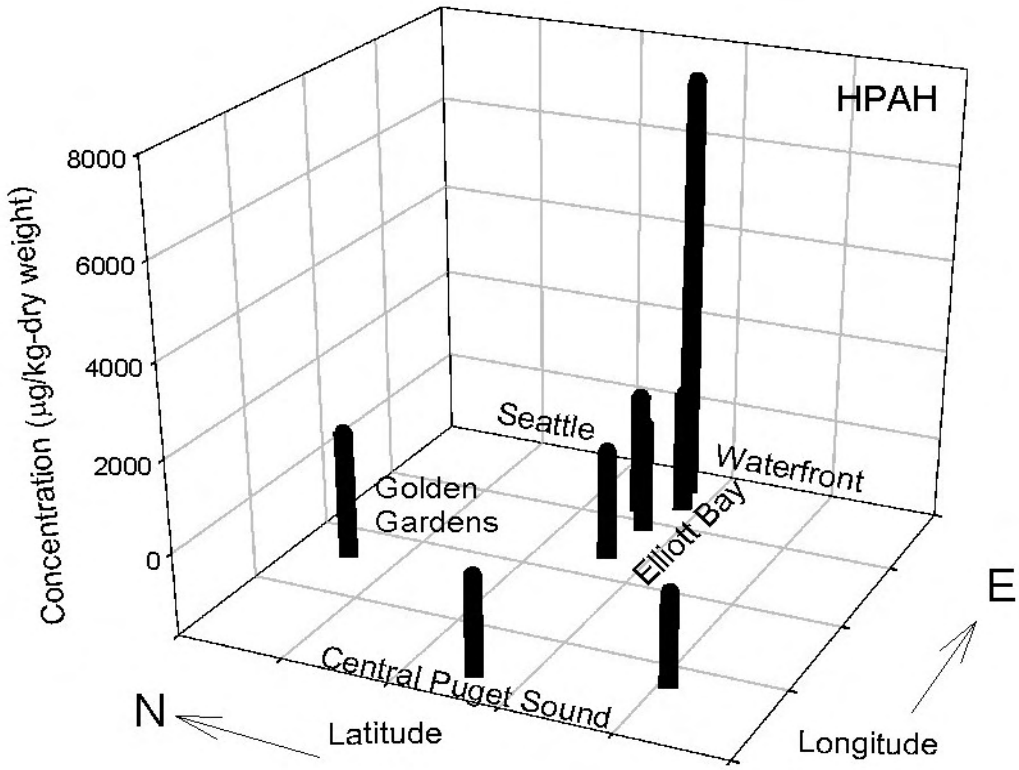

Figure 3-51. 2002 Offshore Sediment HPAH Concentrations

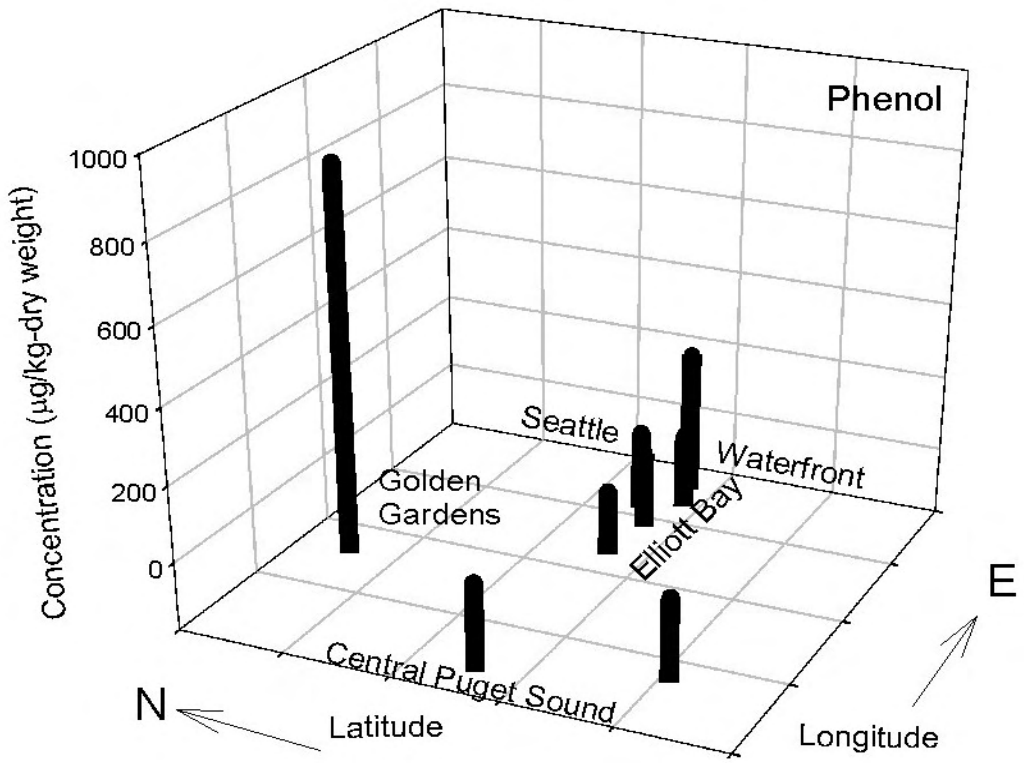

Figure 3-52. 2002 Offshore Sediment Phenol Concentrations

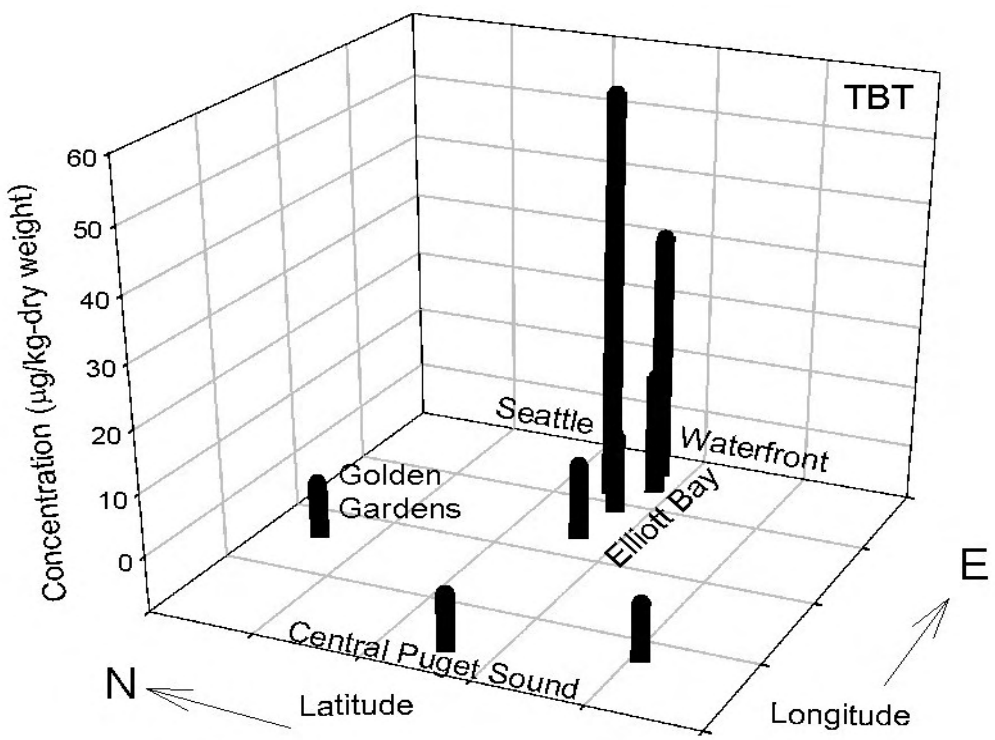

Figure 3-53. 2002 Offshore Sediment TBT Concentrations

Beach Sediments. A total of 19 organic compounds were detected in beach sediments: 11 of which were PAHs. Eight compounds were only detected in 1 out of 15 samples analyzed in both 2002 and 2003 (see Table 3-17).

Of the beach sites monitored, KSHZ03 (Carkeek Park) had the most compounds detected: 9 and 11 PAHs detected in 2002 and 2003, respectively. Except for station MSJL01, sediments from beach stations contained two percent or less of organic carbon. Station MSJL01 contained between 0.30 and 0.36 % dry weight OC in 2002 and 2003, respectively. Due to the low organic carbon content, it is not appropriate to organic carbon normalize the data to assess compliance with regulatory standards that are organic carbon based. Lowest Apparent Effect Thresholds (LAETs), which are dry weight based, are more appropriate for the beach sediments. All detected values were well below AETs.

Sites onshore of treatment plant or CSO outfalls had very few detected compounds compared to the other sites.

3.4 Shellfish Data Results

Shellfish tissue composite samples consisting entirely of butter clams, *Saxidomus giganteus*, were collected from beaches as a part of the ambient and outfall monitoring programs.

Shellfish were collected in August 2002 and August 2003 and analyzed for lipids, metals, semi-volatile organics, pesticides, and PCBs. Shellfish were collected at five outfall stations in 2002: KSHZ03 (Carkeek), KSSN04 and KSSN05 (West Point), LSKR01 (Alki Point), and MSJL01 (Vashon). In 2003, shellfish were collected at four outfall stations, with station KSSN04 dropped from the sampling plan. Two ambient stations, JSVW04 (Richmond Beach) and MTLD03 (Normandy Park), were sampled both years. Additionally, station ITOCEANAVE (Edmonds) was sampled in 2002 and station KSLU03 (Golden Gardens) was sampled in 2003.

Shellfish were collected monthly from May through September for the analysis of fecal coliforms and enterococci. Shellfish sampling for bacterial analysis included stations KSHZ03, KSSN04, LSKR01, MSJL01, ITEDWARDSPT (Edwards Point), ITOCEANAVE, JSVW04, KSLU03, MSSM05 (Tramp Harbor), MTEC01 (Seahurst Park), and MTLD03 in 2002, and stations KSHZ03, KSSN04, KSSN05, LSKR01, MSJL01, JSVW04, KSLU03, MSSM05, and MTLD03 in 2003.

Results are provided in Appendix C and are presented on a wet weight basis unless otherwise noted. Shell lengths measured for each clam included in a composite sample are also provided in Appendix C.

3.4.1 Lipids

Shellfish tissue samples were analyzed for lipid content. The amount of lipid affects the accumulation of certain organic compounds. Lipid content ranged from 0.40 to 0.76 percent in 2002, and from 0.60 to 0.83 percent in 2003 (Figure 3-54). Results were similar to those in previous years, with the exception of station MTLD03 in 2003, where lipid content was almost twice that of 2002.

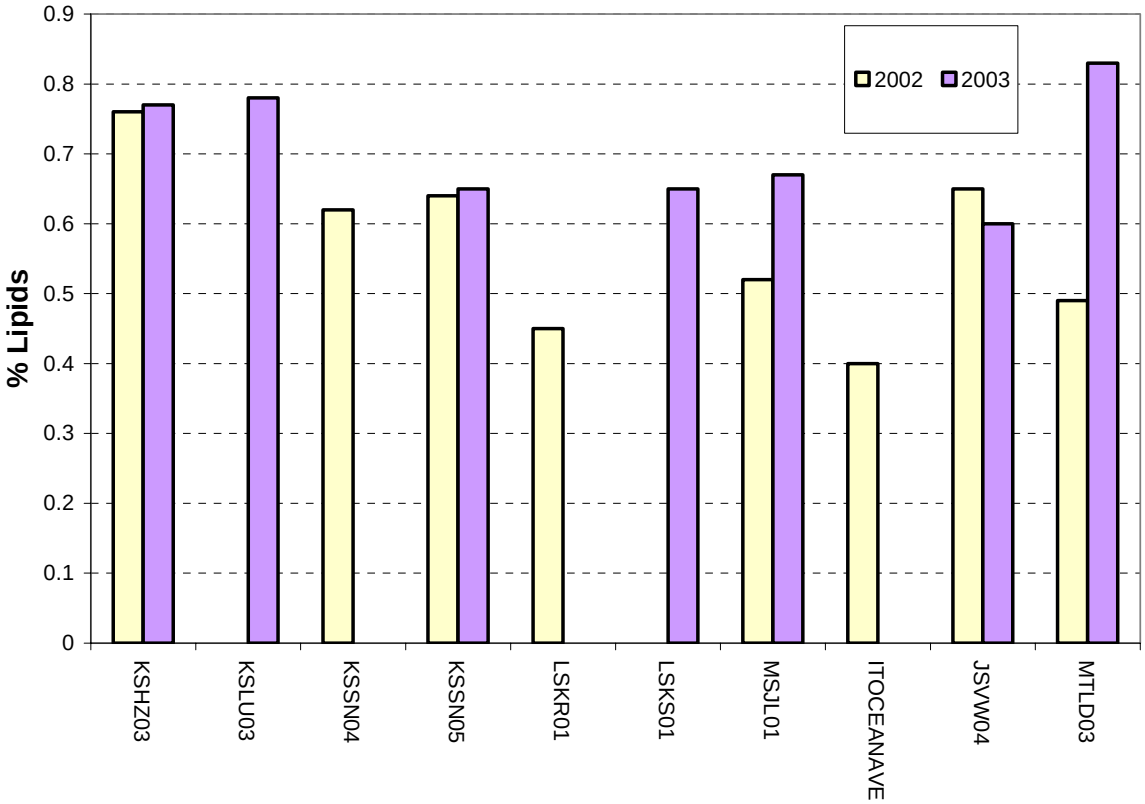

Figure 3-54. Percent Lipids in Butter Clams Collected in 2002 and 2003 Reported by Station

3.4.2 Metals

Washington State criteria do not exist for acceptable levels of metals in shellfish tissues. The U.S. Food and Drug Administration (FDA), however, has established guidance values termed Levels of Concern for five metals in molluscs: arsenic, cadmium, chromium, lead, and nickel. These guidance values are risk-based and differ for children and adults. For comparative purposes, the lower of the two values was chosen. Table 3-18 shows the Levels of Concern for the five metals listed above (FDA 1993a, b, c, d, e). The FDA has established an Action Level of 1.0 mg/kg for mercury in fish and shellfish tissues (FDA, 1995). Food products exceeding the Action Level can not be commercially traded, an important distinction from Levels of Concern.

Table 3-18. FDA Levels of Concern for Shellfish Tissues

	mg/Kg wet weight
	Level of Concern
Arsenic	55
Cadmium	3
Chromium	11
Lead	0.8
Nickel	80
	Action Level
Mercury	1.0

Shellfish tissue was analyzed for fourteen metals in 2002 and 2003. No results exceeded any of the Levels of Concern or the Action Level for Mercury. As in 2001, beryllium was not detected in any sample. Copper (15.0 mg/Kg-dry weight) and silver (15.4 mg/Kg-dry weight) levels at ITOCEANAVE in 2002 were the highest concentrations found in either year. Arsenic, cadmium, chromium, lead, mercury, nickel, selenium, and zinc concentrations varied only slightly among stations and were similar to previously measured values. A summary of metals in shellfish tissues from 1999-2003 is provided in Table 3-19.

3.4.3 Organics

Of the 98 organic compounds analyzed in shellfish tissue, only two were detected: beta-BHC and benzoic acid. Benzoic acid occurred in all samples at concentrations ranging from 1,200 to 13,100 mg/Kg-wet weight. 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 is commonly found in shellfish samples.

Beta-BHC was detected in two samples in 2002: KSSN04 (1.13 mg/Kg-wet weight) and KSSN05 (1.27 mg/Kg-wet weight). Beta-BHC has not been previously detected in shellfish samples at these sites. Beta-BHC was formerly used in the U.S. as an insecticide and is toxic to aquatic organisms when it bioaccumulates.

3.4.4 Bacteria

Fecal coliforms and enterococci were measured in shellfish tissues collected from seven ambient and four outfall stations in 2002, and from four ambient and five outfall stations in 2003. Shellfish bacteria results are reported in Appendix C.

Fecal coliform counts varied among stations and months. During the five month sampling period, counts at all monitoring stations ranged from less than the MDL (20) to 54,000 MPN/100g (most probable number per 100 grams) in 2002 (Figure 3-55), and from less than 20

Table 3-19. Summary of Metals in Shellfish Tissue from 1999-2003

Outfall Stations										
Parameter	**KSHZ03**					**KSSN04**				
mg/Kg dry wt.	**2003**	**2002**	**2001**	**2000**	**1999**	**2003**	**2002**	**2001**	**2000**	**1999**
Arsenic	2.83	2.39	2.31	2.39	2.32	-	2.94	2.73	3.48	3.00
Cadmium	0.057	0.057	0.057	0.062	0.048	-	0.052	0.059	0.050	0.054
Chromium	0.200	0.280	0.322	0.336	0.411	-	0.438	0.556	0.815	0.565
Copper	2.49	1.72	1.97	1.48	1.48	-	2.05	1.94	1.89	1.66
Lead	0.153	0.240	0.135	0.144	0.176	-	0.121	0.081	0.109	0.138
Nickel	0.684	0.752	0.820	0.956	0.796	-	0.847	0.904	1.05	0.859
Zinc	13.8	12.7	16.0	12.7	12.9	-	12.9	17.6	13.8	11.5
	KSSN05					**LSKR01**				
	2003	**2002**	**2001**	**2000**	**1999**	**2003**	**2002**	**2001**	**2000**	**1999**
Arsenic	2.38	2.38	2.45	2.68	2.85	-	2.66	3.19	3.32	3.74
Cadmium	0.046	0.059	0.058	0.056	0.054	-	0.054	0.059	0.054	0.054
Chromium	0.265	0.359	0.519	0.822	0.587	-	0.200	0.419	0.640	0.420
Copper	2.60	1.67	1.71	1.85	1.69	-	1.84	2.20	1.69	1.62
Lead	0.106	0.101	0.088	0.110	0.107	-	0.096	0.099	0.092	0.089
Nickel	0.961	1.06	1.14	1.31	0.995	-	0.822	0.937	0.988	0.987
Zinc	15.0	14.5	17.3	14.1	12.3	-	13.4	16.9	14.1	13.2
	LSKS01					**MSJL01**				
	2003	**2002**	**2001**	**2000**	**1999**	**2003**	**2002**	**2001**	**2000**	**1999**
Arsenic	3.82	-	-	-	-	3.54	2.91	-	-	-
Cadmium	0.063	-	-	-	-	0.068	0.066	-	-	-
Chromium	0.255	-	-	-	-	0.251	0.270	-	-	-
Copper	1.91	-	-	-	-	1.56	1.54	-	-	-
Lead	0.116	-	-	-	-	0.067	0.056	-	-	-
Nickel	0.918	-	-	-	-	0.887	0.934	-	-	-
Zinc	15.1	-	-	-	-	14.5	11.6	-	-	-
Ambient Stations										
Parameter	**ITOCEANAVE**					**JSVW04**				
mg/Kg dry wt.	**2003**	**2002**	**2001**	**2000**	**1999**	**2003**	**2002**	**2001**	**2000**	**1999**
Arsenic	-	3.14	-	-	-	3.66	3.20	3.42	2.69	2.93
Cadmium	-	0.058	-	-	-	0.074	0.064	0.059	0.082	0.063
Chromium	-	0.382	-	-	-	0.264	0.345	0.465	0.291	0.406
Copper	-	2.34	-	-	-	2.79	2.00	4.05	1.24	3.58
Lead	-	0.069	-	-	-	0.220	0.152	0.137	0.141	0.161
Nickel	-	0.986	-	-	-	0.874	0.925	0.798	1.02	0.754
Zinc	-	12.2	-	-	-	15.6	13.7	14.2	13.8	12.0
	KSLU03					**MTLD03**				
	2003	**2002**	**2001**	**2000**	**1999**	**2003**	**2002**	**2001**	**2000**	**1999**
Arsenic	2.74	-	-	-	-	4.07	3.47	3.30	4.11	3.68
Cadmium	0.060	-	-	-	-	0.080	0.079	0.070	0.063	0.059
Chromium	0.200	-	-	-	-	0.282	0.302	0.372	0.671	0.418
Copper	1.84	-	-	-	-	1.69	1.49	1.41	1.76	1.22
Lead	0.121	-	-	-	-	0.122	0.076	0.060	0.132	0.094
Nickel	0.860	-	-	-	-	0.755	0.819	0.722	0.808	0.807
Zinc	14.2	-	-	-	-	14.6	12.6	14.4	13.3	12.8

to 3,500 MPN/100 g in 2003 (Figure 3-56). The highest counts in each year were detected at the TrampHarbor station (MSSM05) in May 2002 and September 2003. This station was also highest in fecal coliform counts in June (5,600 MPN/100 g) and September (7,900 MPN/100 g) of 2002, and in June 2003 (2,300 MPN/100 g). Richmond Beach (JSVW04) had the highest fecal counts (3,300 MPN/100 g) in August 2002.

Enterococci counts also varied between stations and months. Concentrations ranged from less than the MDL (20) to 35,000 MPN/100 g in 2002 (Figure 3-57), and from less than 20 to 17,000 MPN/100 g in 2003 (Figure 3-58). The maximum counts in 2002 and 2003 occurred in samples taken from Tramp Harbor (MSSM05) during the month of June.

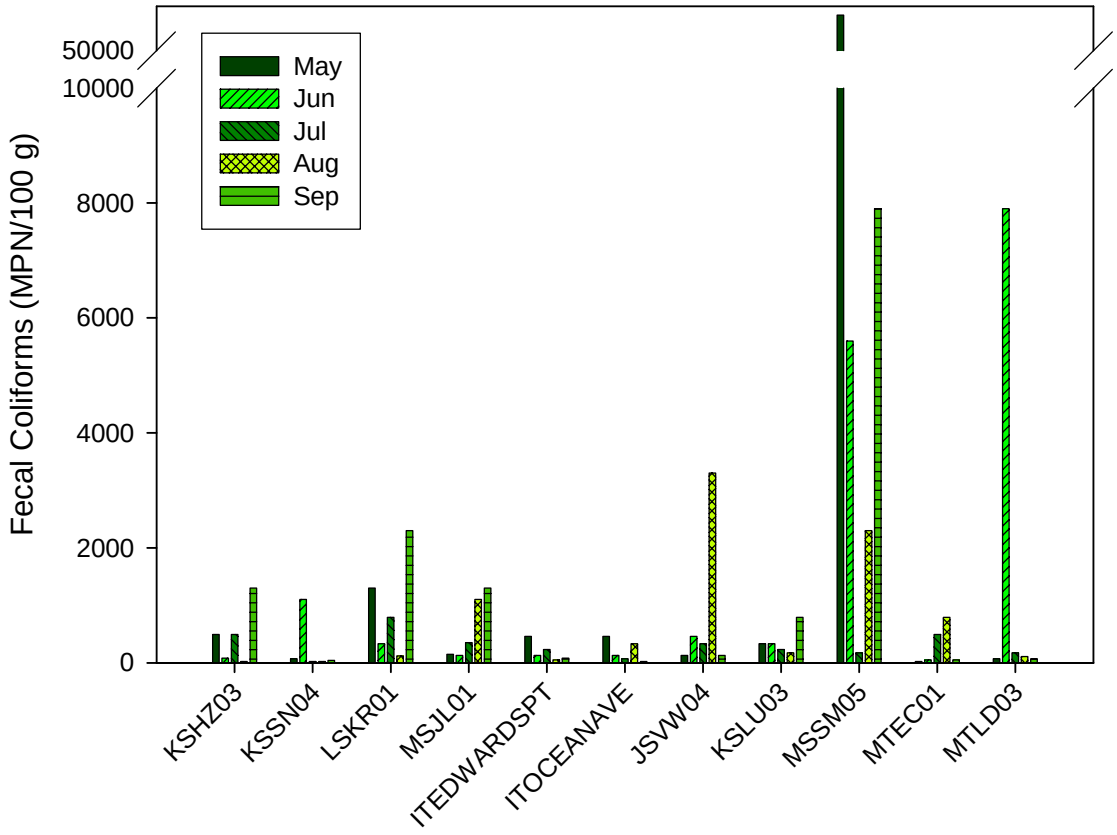

Figure 3-55. Fecal Coliforms in Shellfish in 2002

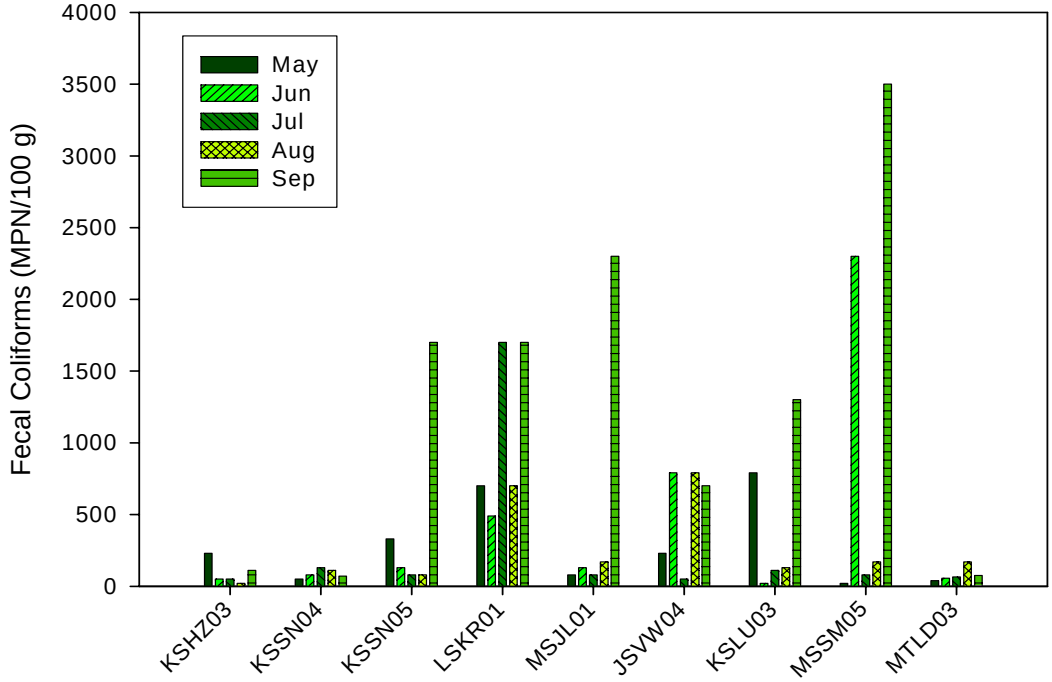

Figure 3-56. Fecal Coliforms in Shellfish in 2003

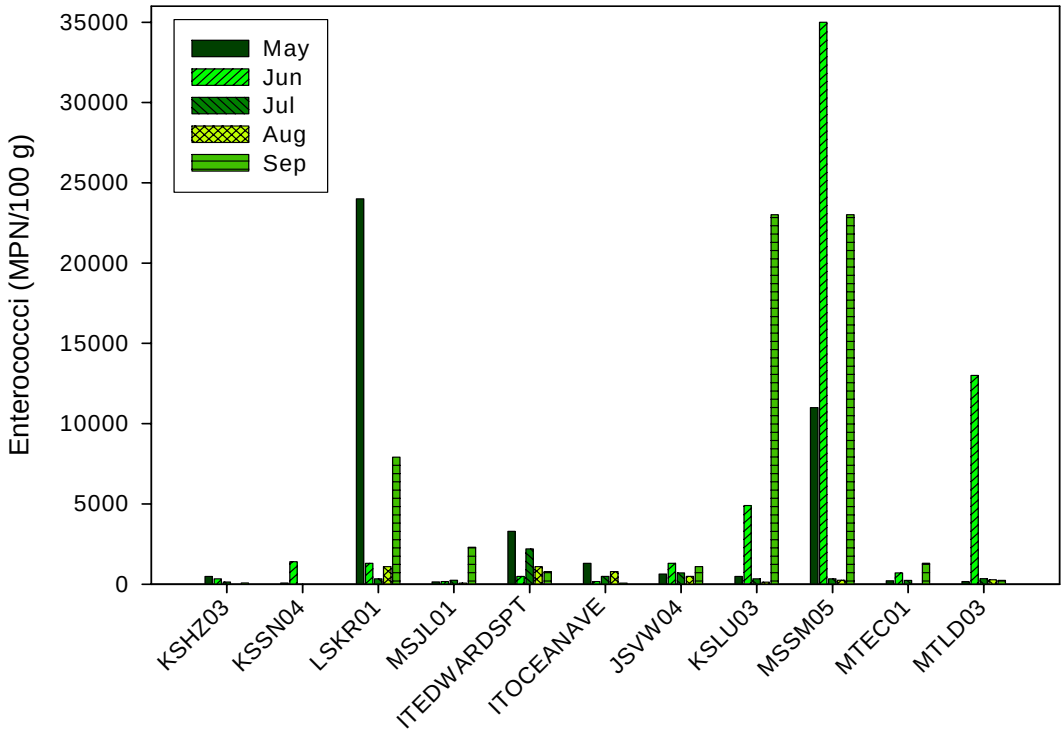

Figure 3-57. Enterococci in Shellfish in 2002

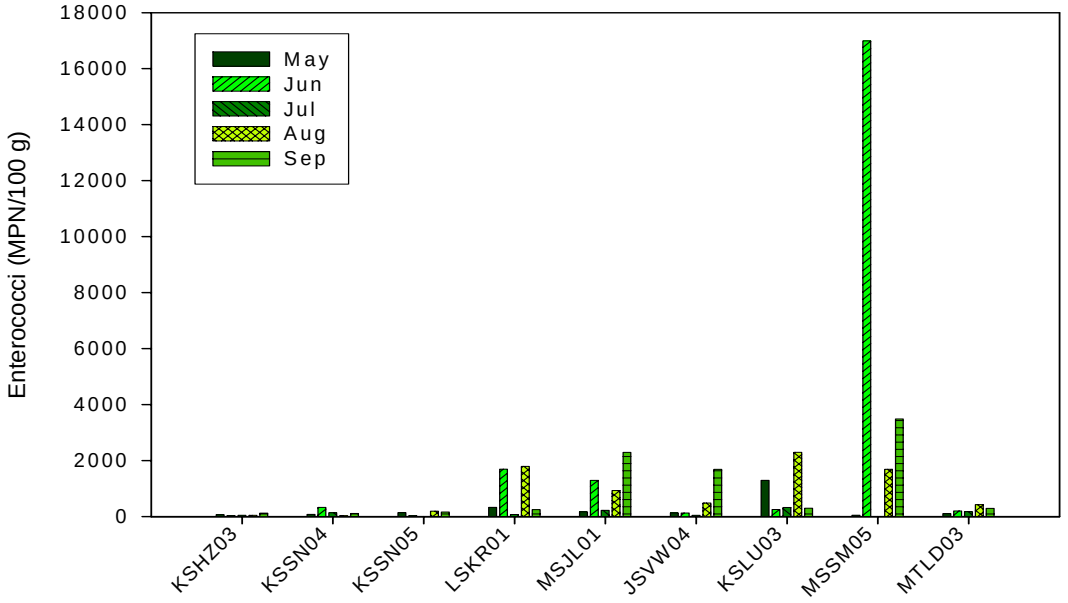

Figure 3-58. Enterococci in Shellfish in 2003

3.5 Macroalgae Data Results

Macroalgae samples were collected from five outfall and five ambient beaches in 2002, and from five outfall and three ambient beaches in 2003. Samples consisted entirely of the most prevalent edible algae *Ulva fenestrata*, known as sea lettuce, and were analyzed for 14 metals. Macroalgae tissues were not analyzed for organic compounds. All macroalgae data discussed below are presented on a dry weight basis and are provided in Appendix D.

In 2002, the point source stations KSHZ03 (Carkeek Park), KSSN04 and KSSN05 (north and south side of West Point, respectively), LSKR01 (Alki Point), and MSJL01 (Vashon Island) were sampled. Ambient stations included ITOCEANAVE (Edmonds), JSVW04 (Richmond Beach), KSLU03 (Golden Gardens), KSYV02 (Magnolia), and MTLD03 (Normandy Park). In 2003, stations ITOCEANAVE and KSYV02 were excluded from sampling. Stations were sampled in August of both years.

Selenium, beryllium and mercury were not detected in any of the macroalgae samples collected in 2002 and 2003. This is consistent with previous years' results (Table 3-20). Silver was found (at a level slightly above the detection limit) in one sample only, from the Richmond Beach station in 2002. Aluminum, arsenic, cadmium, copper, iron, manganese, and zinc were detected in all samples. Chromium was detected in all samples except for ITOCEANAVE in 2002, and KSHZ03, LSKR01, and KSLU03 in 2003. Lead was detected in all samples except for ITOCEANAVE in 2002. Nickel was detected in all samples except for ITOCEANAVE in 2002, and KSLU03 in 2003.

Table 3-20. Metal Concentrations in Algae Over the Past Five Years

Outfall Stations

Parameter	KSHZ03					KSSN04				
mg/Kg dry wt.	2003	2002	2001	2000	1999	2003	2002	2001	2000	1999
Arsenic	9.18	4.95	3.85	5.83	5.53	9.08	7.1	5.32	5.95	4.63
Cadmium	0.940	0.281	0.292	0.690	0.340	0.830	0.431	0.425	0.300	<0.16
Chromium	<0.05	0.78	1.60	2.99	2.77	1.14	1.30	2.10	3.18	1.49
Copper	6.35	9.08	10.6	17.5	7.19	6.55	8.87	33.2	17.0	8.11
Lead	0.300	0.230	0.829	1.25	1.81	0.700	0.840	0.834	0.859	<1.6
Nickel	2.66	2.80	2.01	4.51	4.42	3.19	2.80	2.96	3.92	3.79
Zinc	16.1	8.58	11.4	14.3	14.1	18.2	15.4	15.8	14.2	16.7
	KSSN05					LSKR01				
	2003	2002	2001	2000	1999	2003	2002	2001	2000	1999
Arsenic	6.29	8.17	6.56	4.57	4.39	7.73	5.16	4.95	5.09	4.27
Cadmium	0.570	0.567	0.262	0.222	0.240	0.890	0.238	0.557	0.295	0.290
Chromium	2.14	4.04	6.62	4.57	4.71	<0.05	0.39	0.87	1.37	0.71
Copper	8.30	18.3	29.4	24.2	8.46	4.97	10.2	7.50	22.1	3.23
Lead	0.400	0.896	1.51	0.727	<1.3	0.190	0.240	0.140	0.307	<2.3
Nickel	3.81	5.70	9.17	6.10	6.24	2.68	2.80	2.20	2.70	2.14
Zinc	13.0	19.0	18.9	13.4	18.7	11.8	10.7	9.90	19.6	9.62
	MSJL01									
	2003	2002	2001	2000	1999					
Arsenic	8.09	6.46	-	-	-					
Cadmium	0.670	0.780	-	-	-					
Chromium	1.79	1.10	-	-	-					
Copper	5.95	11.6	-	-	-					
Lead	0.520	0.320	-	-	-					
Nickel	6.92	6.20	-	-	-					
Zinc	13.6	18.2	-	-	-					

Ambient Stations

Parameter	ITOCEANAVE					JSVW04				
mg/Kg dry wt.	2003	2002	2001	2000	1999	2003	2002	2001	2000	1999
Arsenic	-	6.96	-	-	-	6.27	6.12	3.75	4.49	5.56
Cadmium	-	1.19	-	-	-	0.600	0.718	0.212	0.458	0.340
Chromium	-	<0.05	-	-	-	1.20	0.890	0.900	1.66	1.63
Copper	-	4.41	-	-	-	6.10	11.0	7.60	14.0	4.51
Lead	-	<0.008	-	-	-	0.630	0.290	0.604	1.11	<1.8
Nickel	-	<0.2	-	-	-	4.82	4.00	3.03	2.44	4.15
Zinc	-	6.38	-	-	-	13.9	14.0	9.00	7.21	11.5
	KSLU03					KSYV02				
	2003	2002	2001	2000	1999	2003	2002	2001	2000	1999
Arsenic	6.35	5.40	4.04	5.79	4.50	-	5.27	6.12	5.46	4.52
Cadmium	0.420	0.681	0.274	0.371	0.400	-	0.160	0.201	0.098	<0.16
Chromium	<0.05	3.60	0.930	2.74	2.11	-	0.920	1.34	3.06	2.68
Copper	6.11	24.8	13.6	14.9	9.50	-	17.0	30.9	5.46	10.7
Lead	0.360	1.91	0.287	0.938	<1.6	-	0.820	0.625	0.956	2.05
Nickel	<0.2	5.00	1.71	3.93	3.17	-	2.00	2.35	3.51	10.9
Zinc	8.32	19.2	10.5	11.4	20.4	-	19.1	18.5	9.23	76.7
	MTLD03									
	2003	2002	2001	2000	1999					
Arsenic	11.4	5.05	4.73	3.86	<7.2					
Cadmium	1.24	0.218	0.661	0.603	<0.42					
Chromium	1.15	0.590	5.20	3.12	2.19					
Copper	6.77	10.6	53.0	18.3	9.24					
Lead	1.41	1.19	1.93	0.805	<4.2					
Nickel	3.87	3.70	5.61	3.6	<2.9					
Zinc	15.2	9.16	14.7	9.02	19.2					

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SECTION 4
Glossary

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.

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.

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.

Enterococci: Any *Streptococcus* bacteria that inhabit the intestines of warm-blooded animals. In the intestines, e*nterococci* 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 (algae): Plants that float in the water or attach to larger plants, rocks, and other substrates. They are a normal component of aquatic ecosystems.

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). Can make the water appear cloudy or colored.

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.

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

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

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 (offshore) 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.

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SECTION 5
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CTD Water Column Profiles (Temperature, Salinity, Oxygen, and Density) from Select Stations

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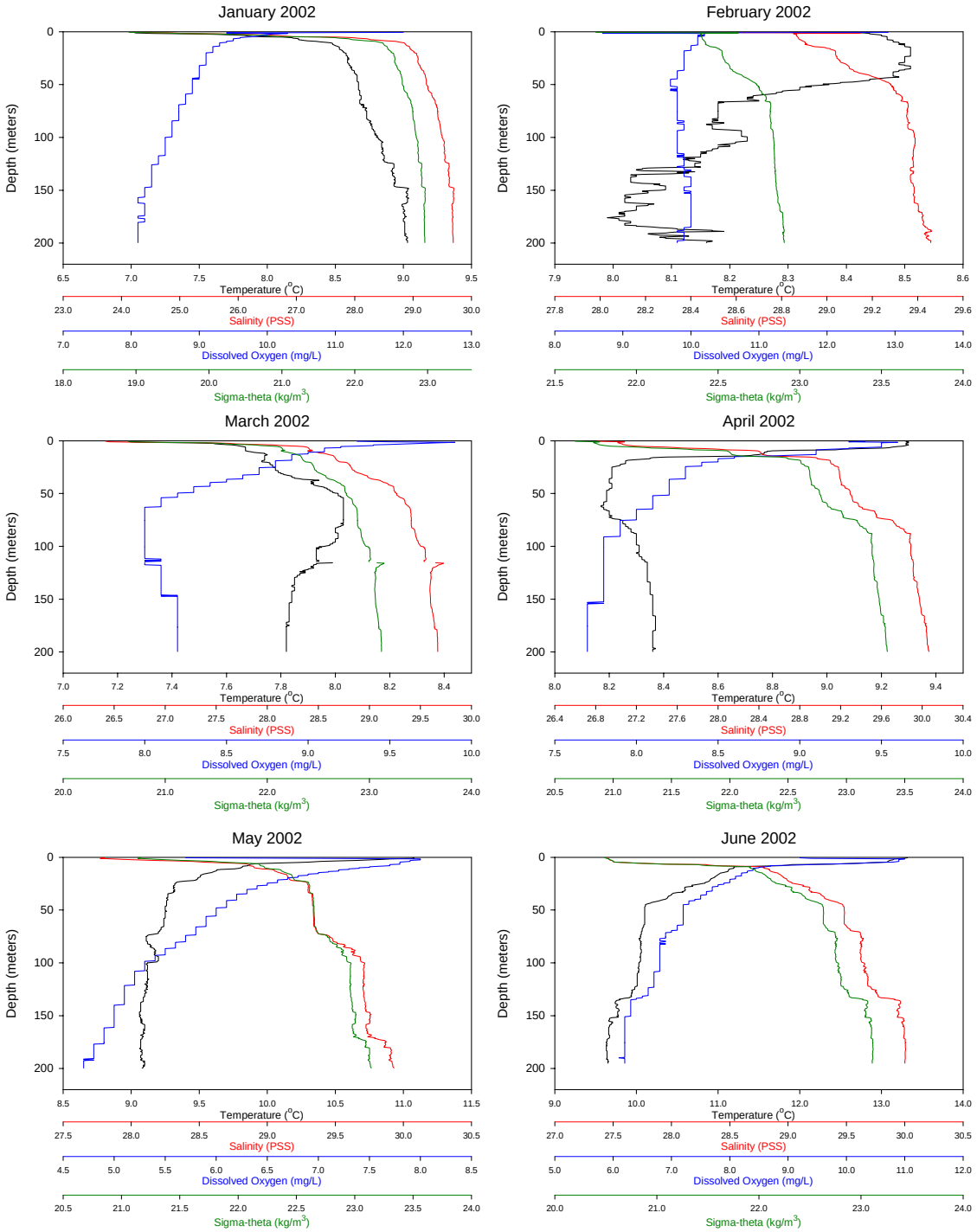

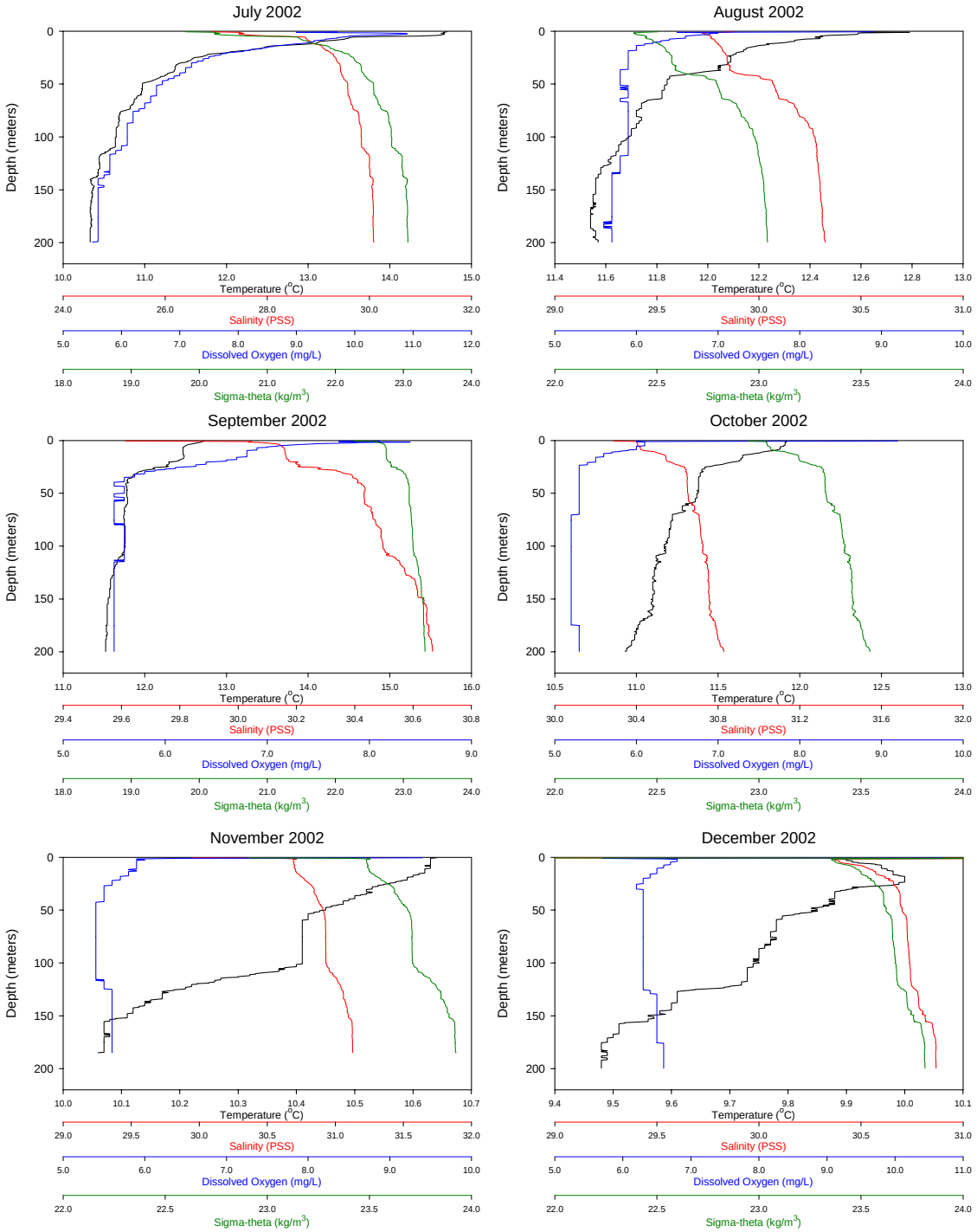
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August 2002
September 2002
October 2002
November 2002
December 2002
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Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

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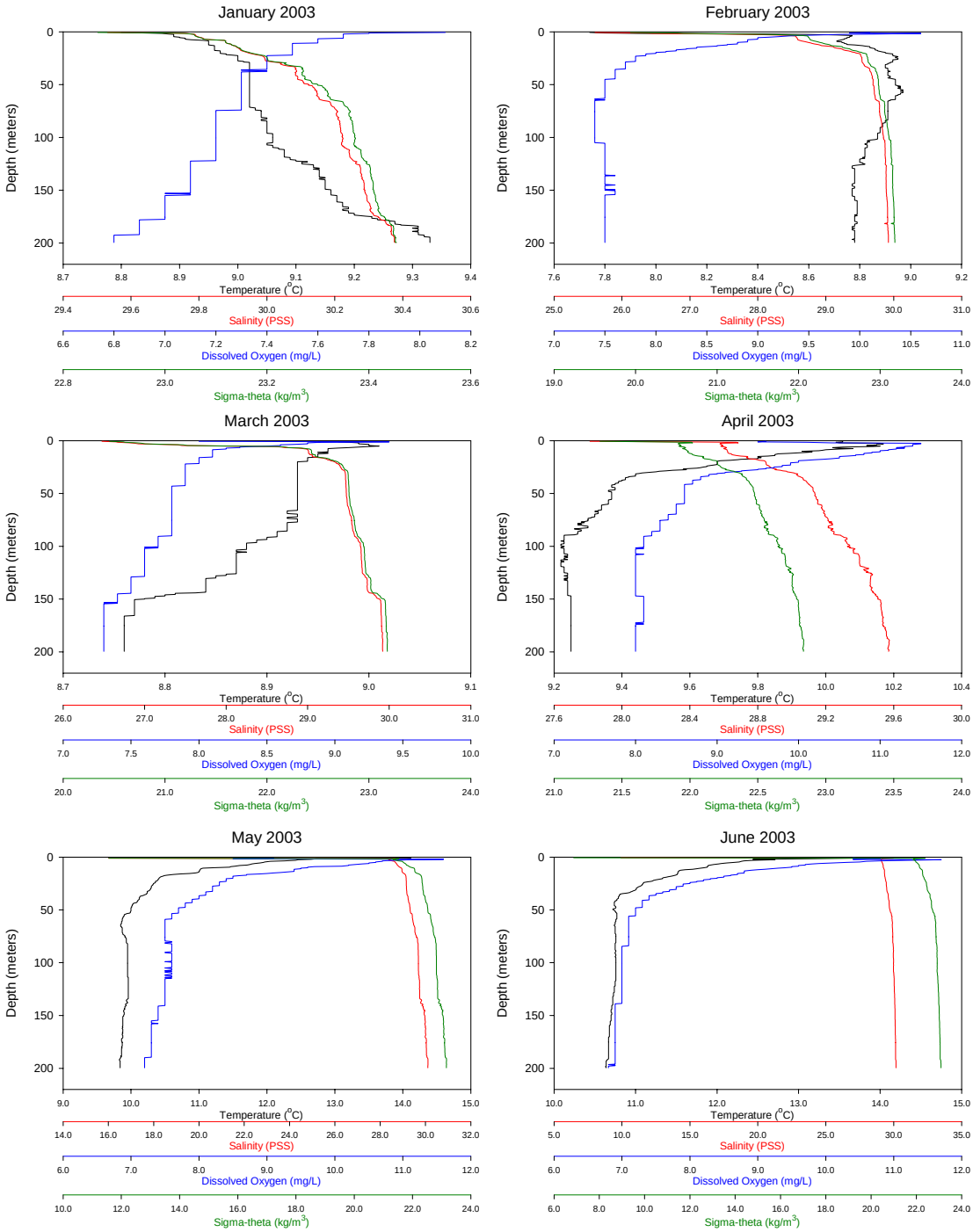

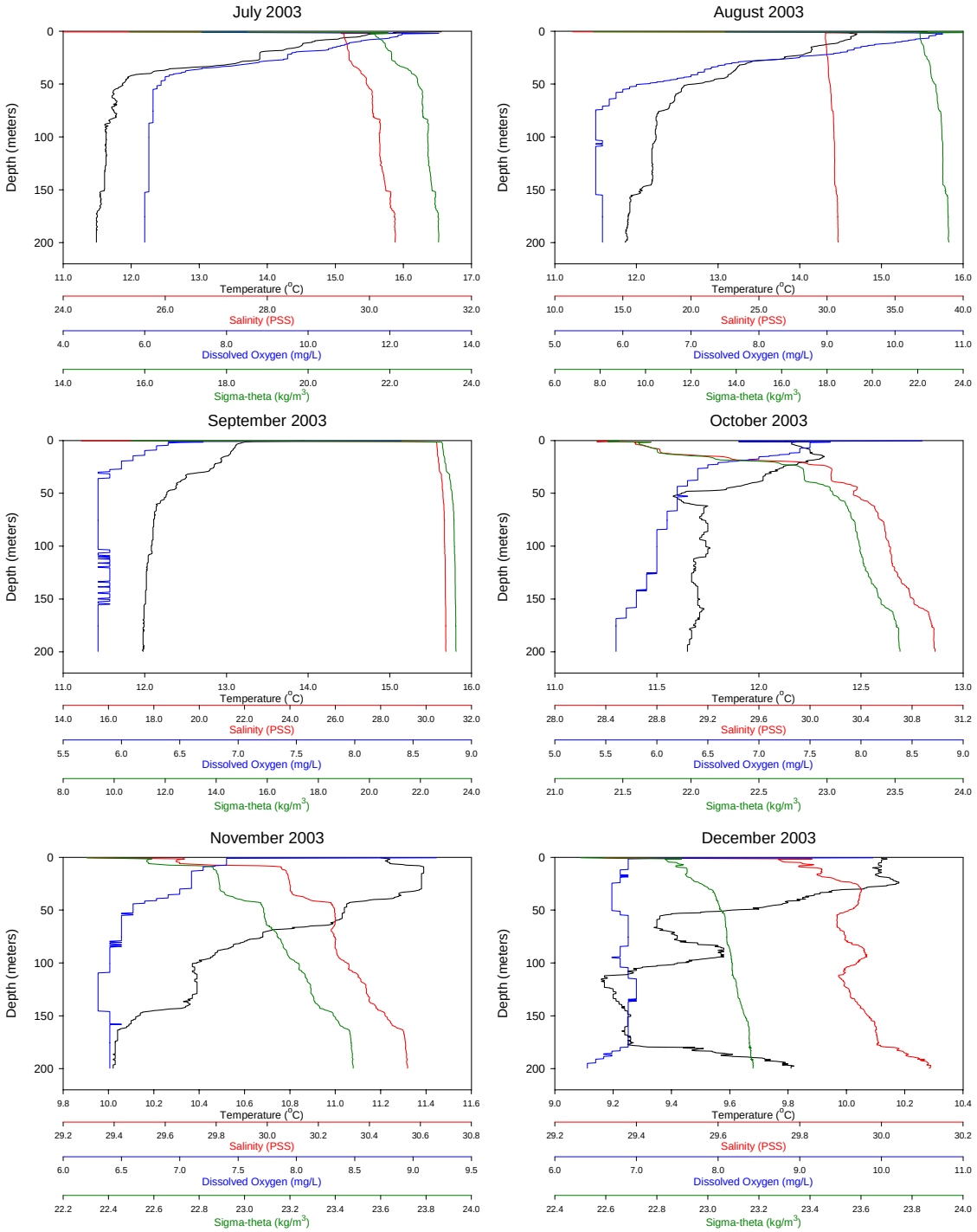
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August 2003
September 2003
October 2003
November 2003
December 2003
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Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

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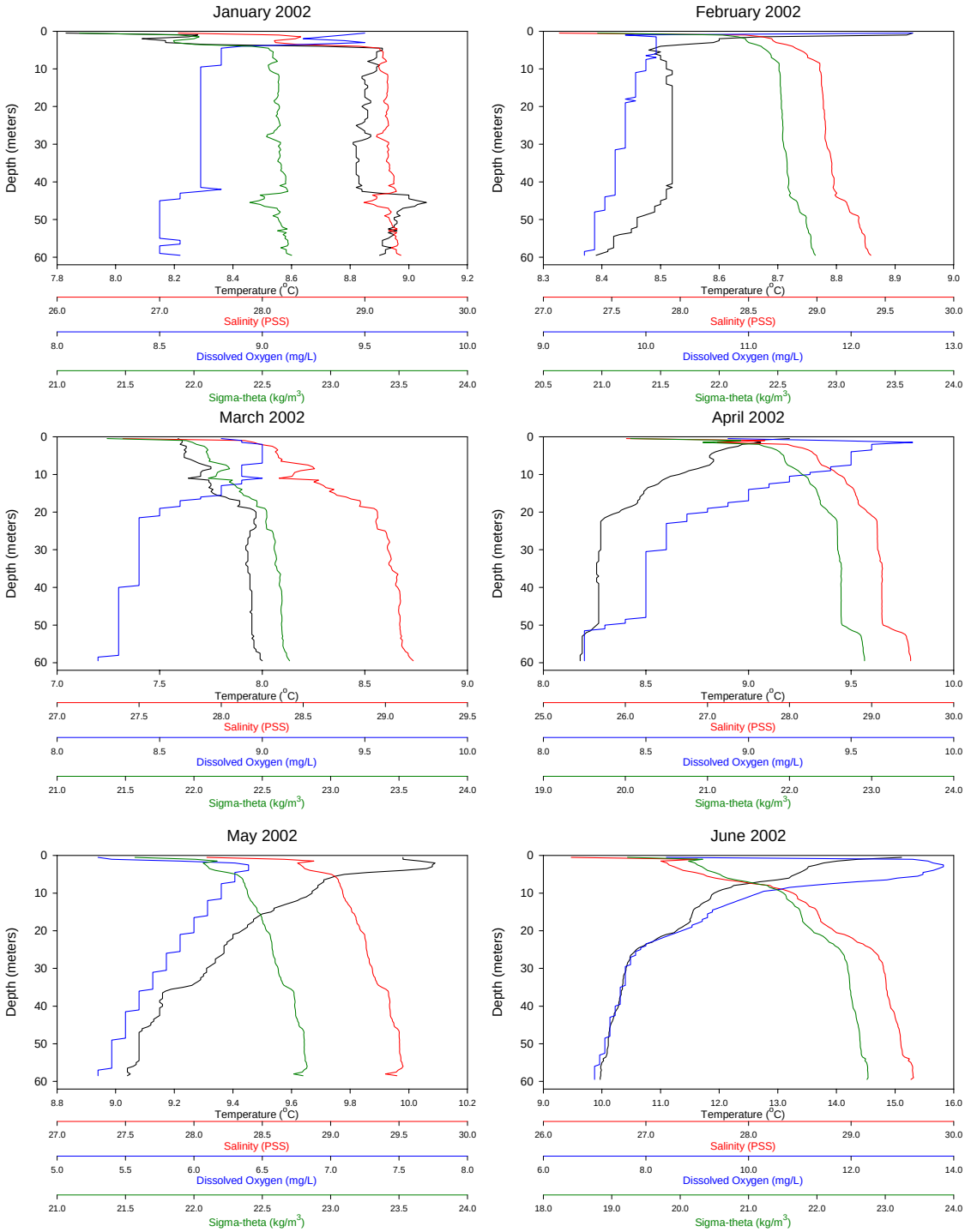

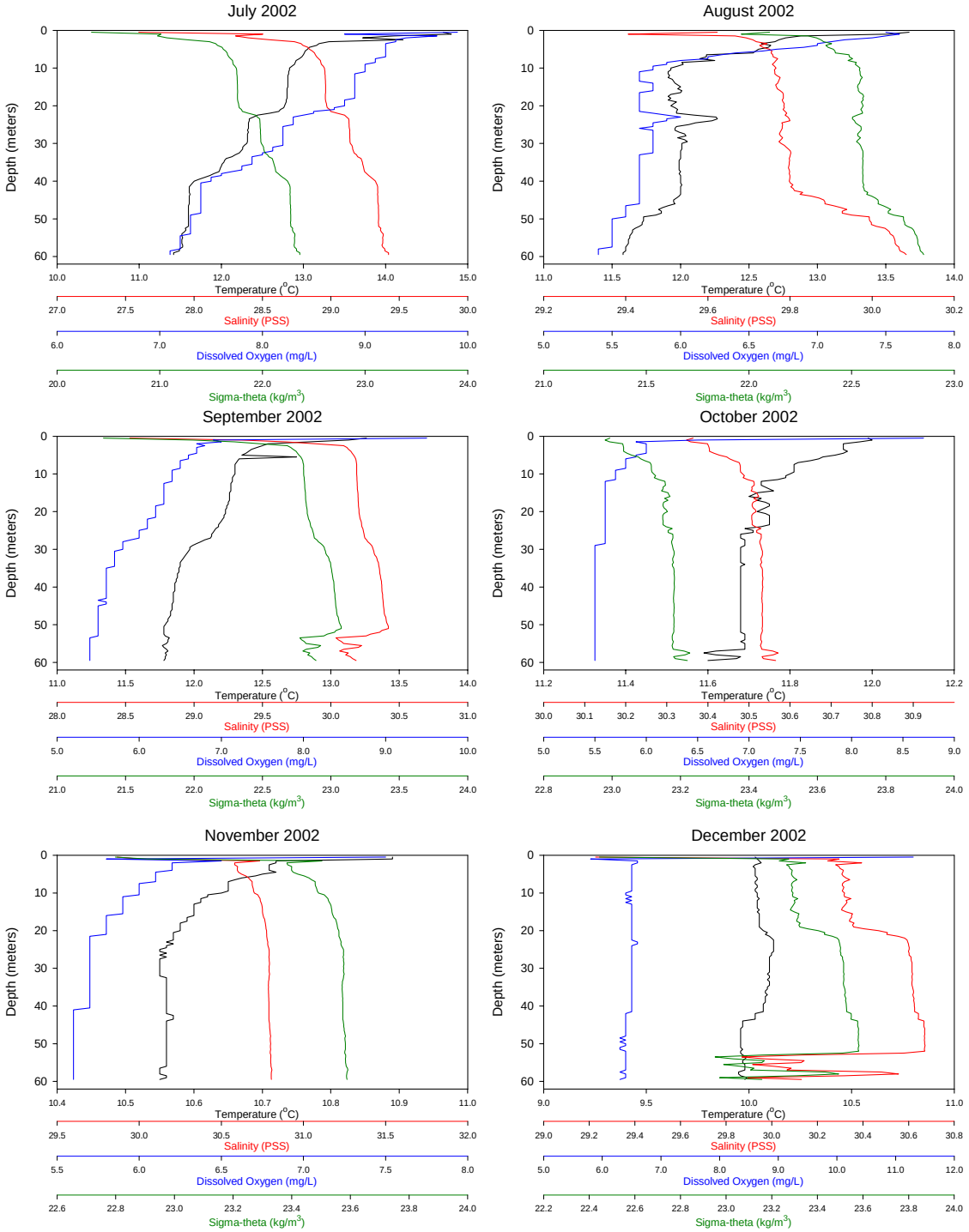
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September 2002
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December 2002
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Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

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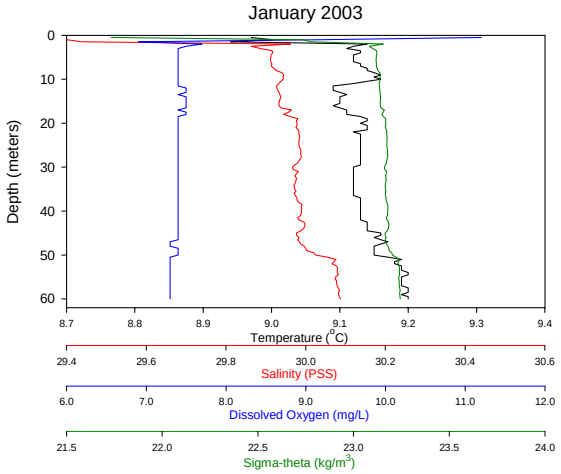
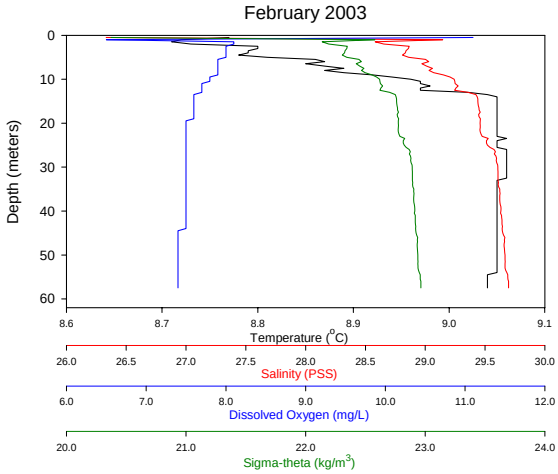
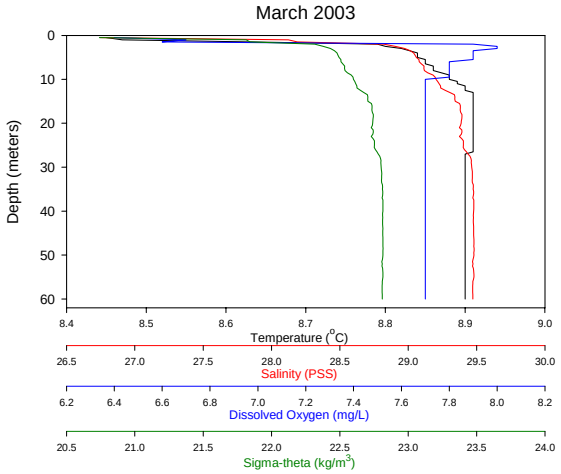
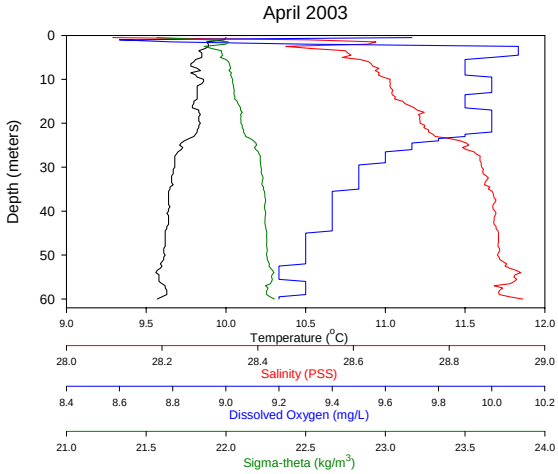
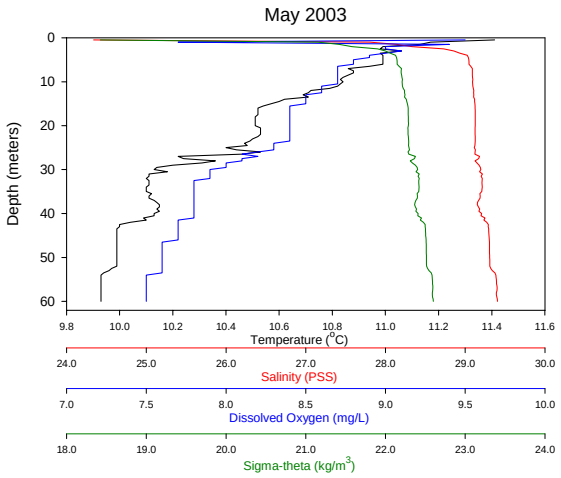
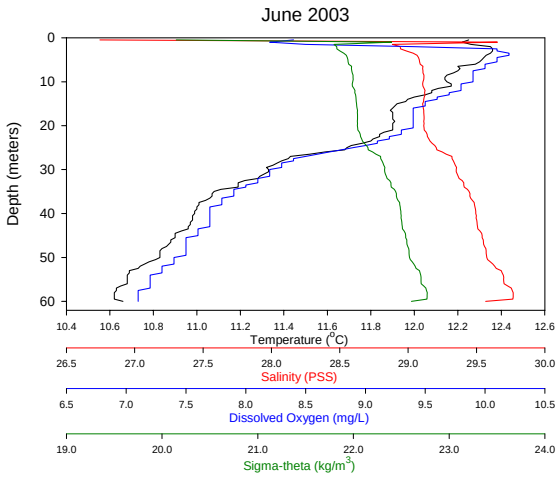


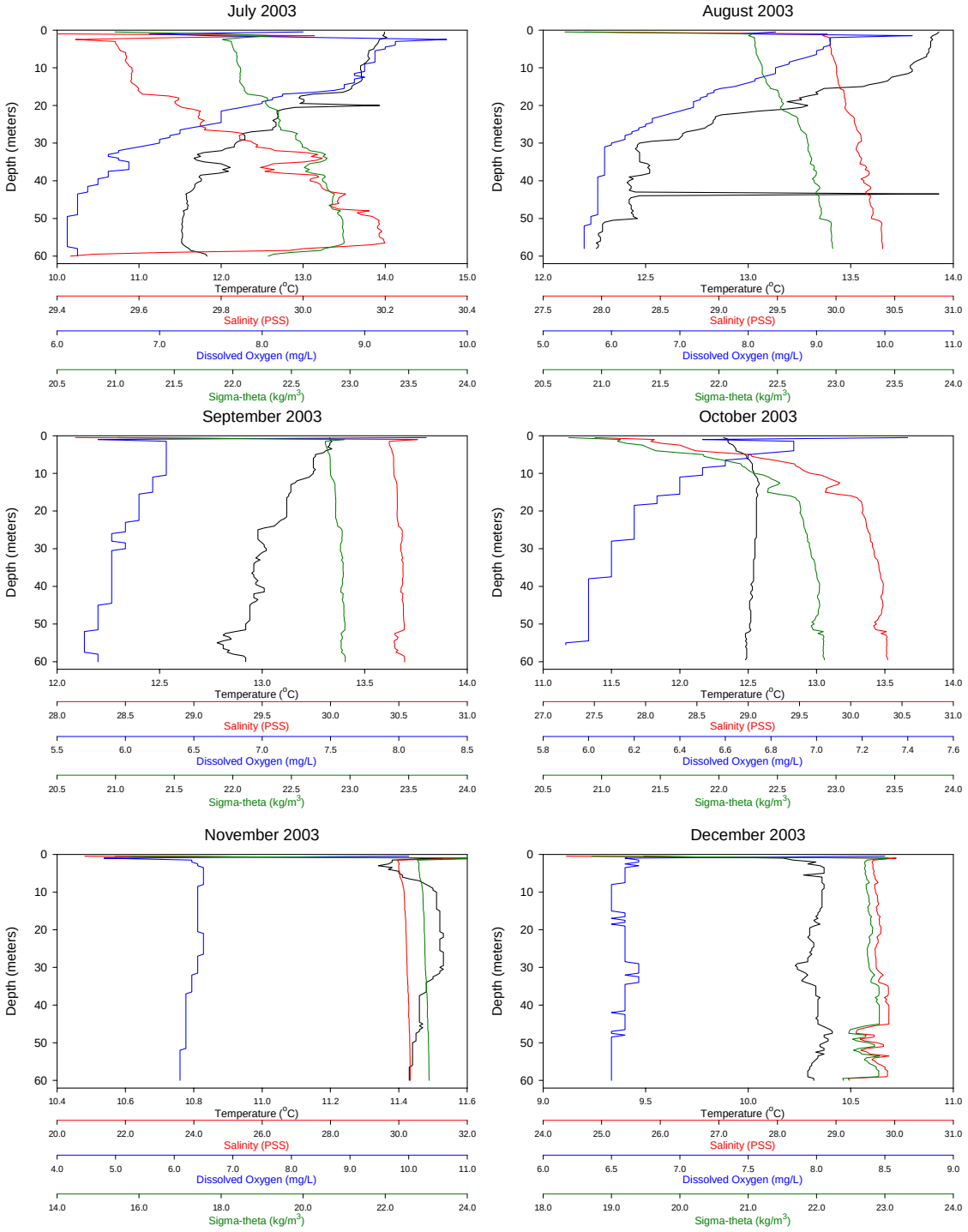




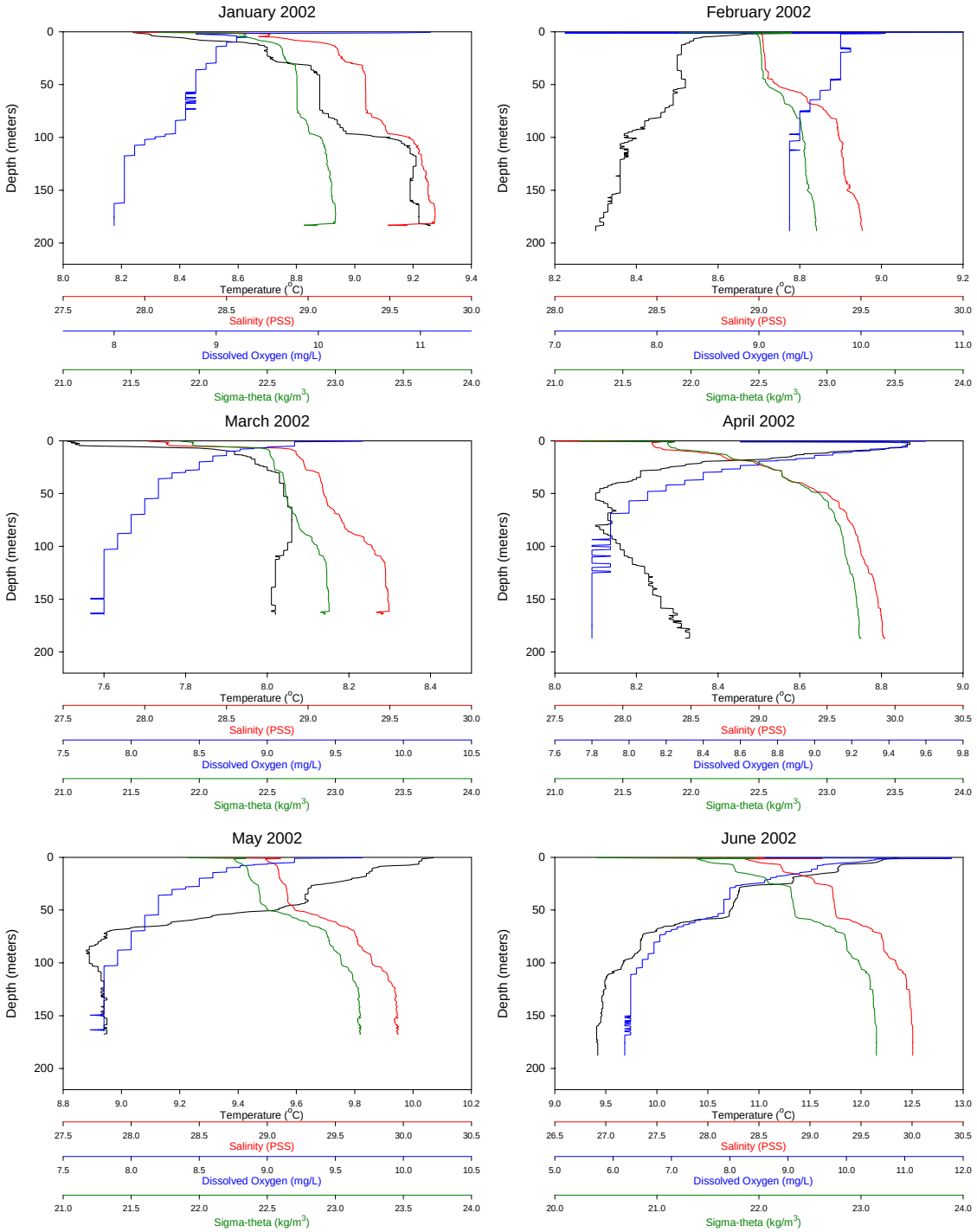


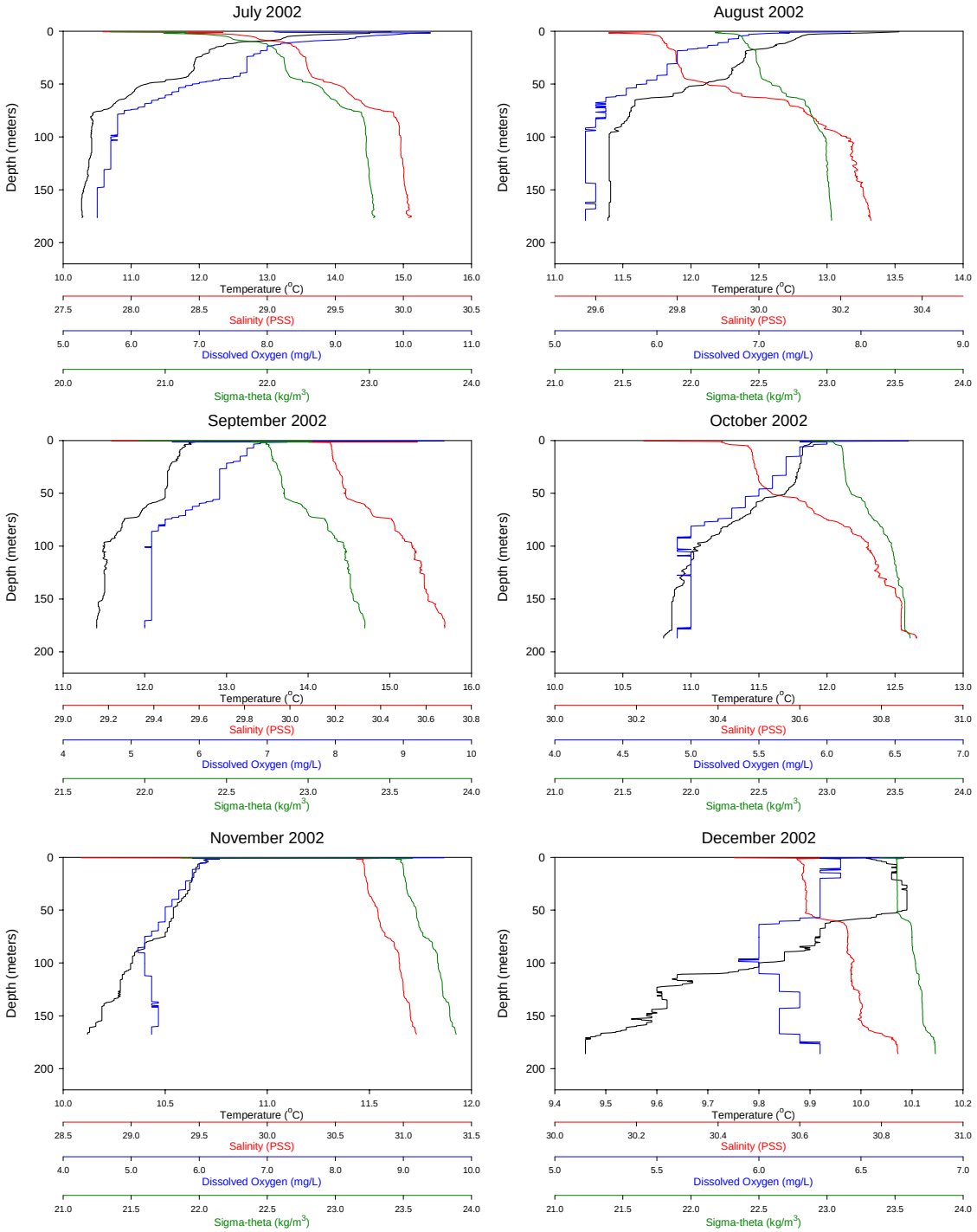




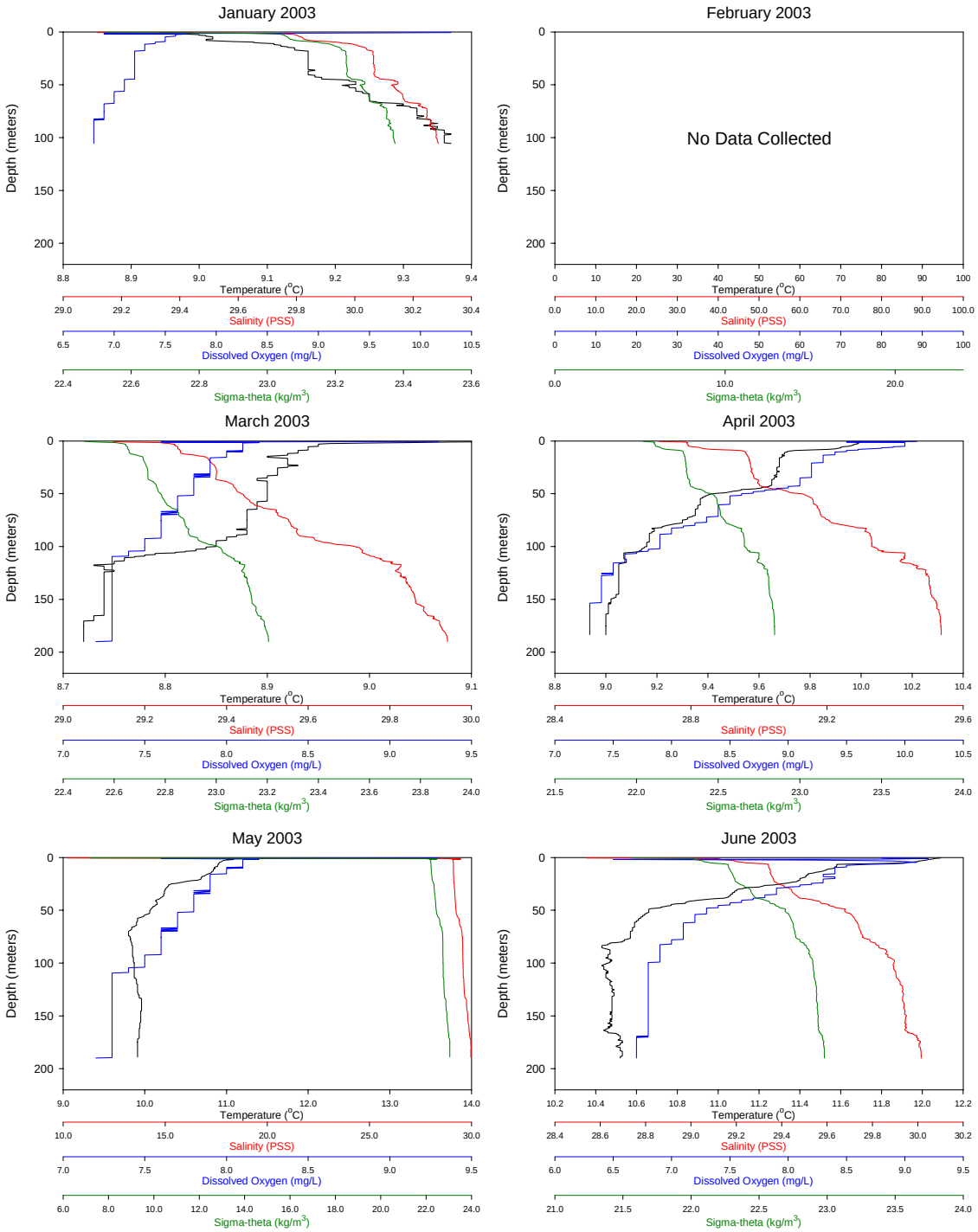

July 2003
August 2003
September 2003
October 2003
November 2003
December 2003
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

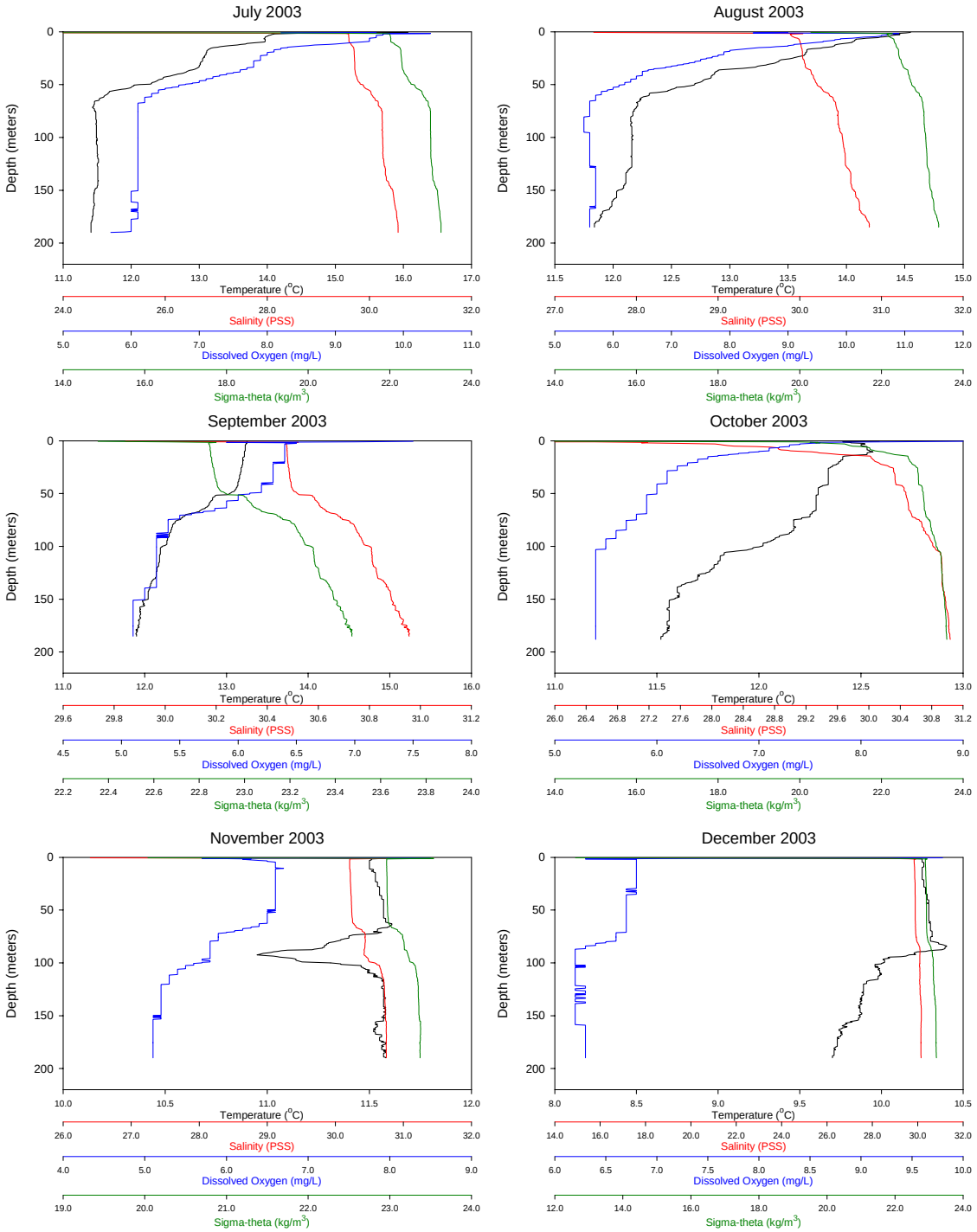
Station LSEP01:2002



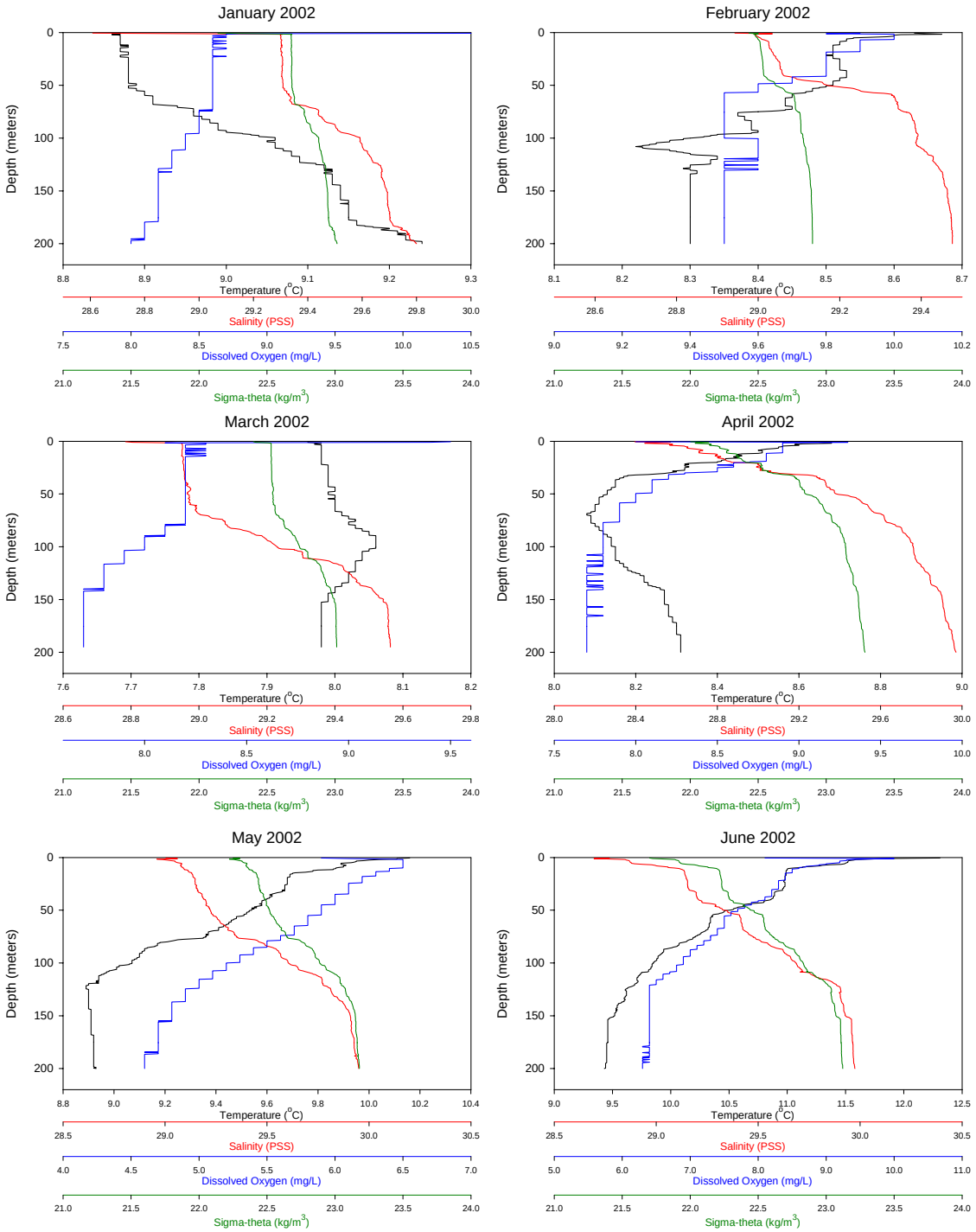

July 2002
August 2002
September 2002
October 2002
November 2002
December 2002
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

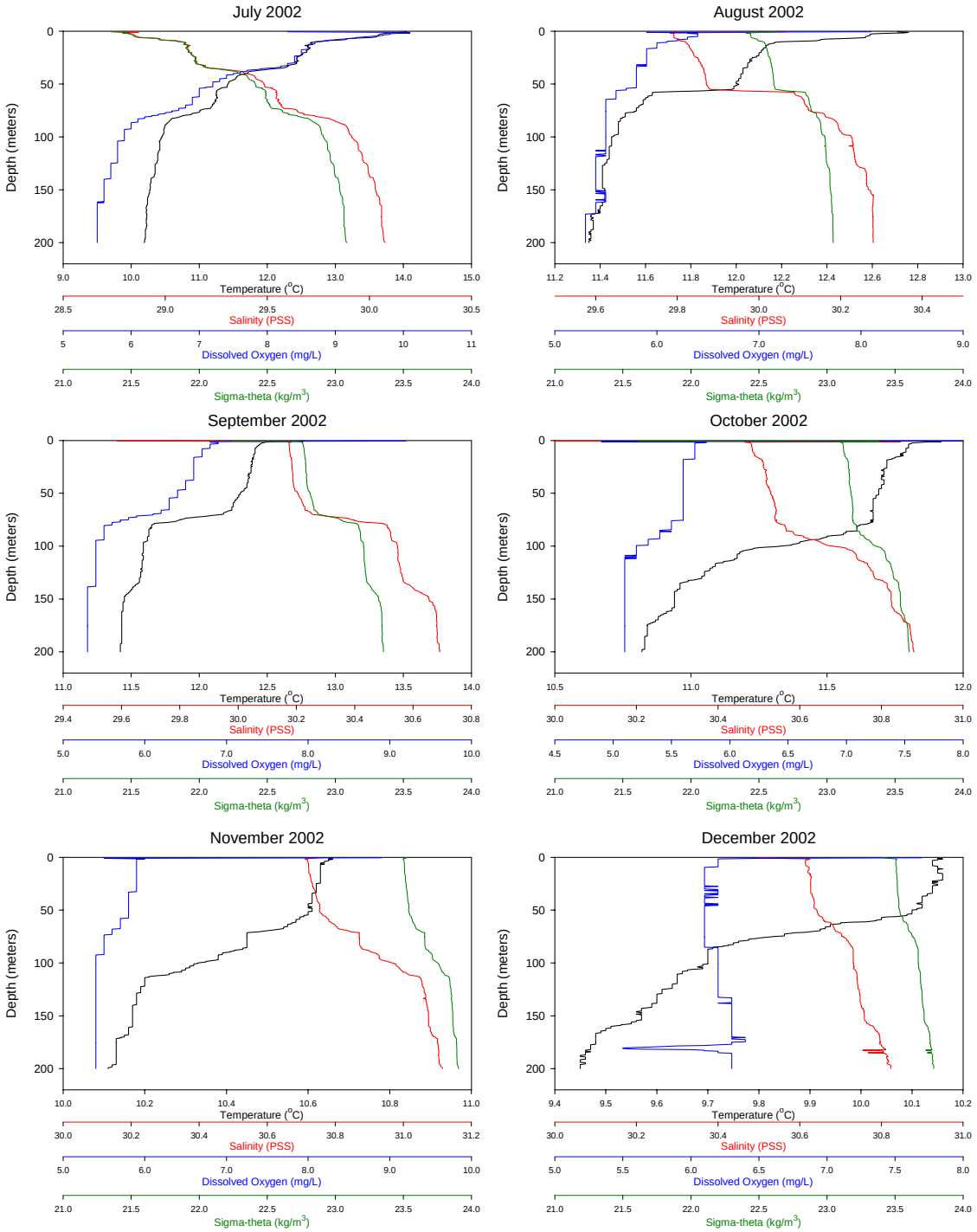
Station LSEP01:2003



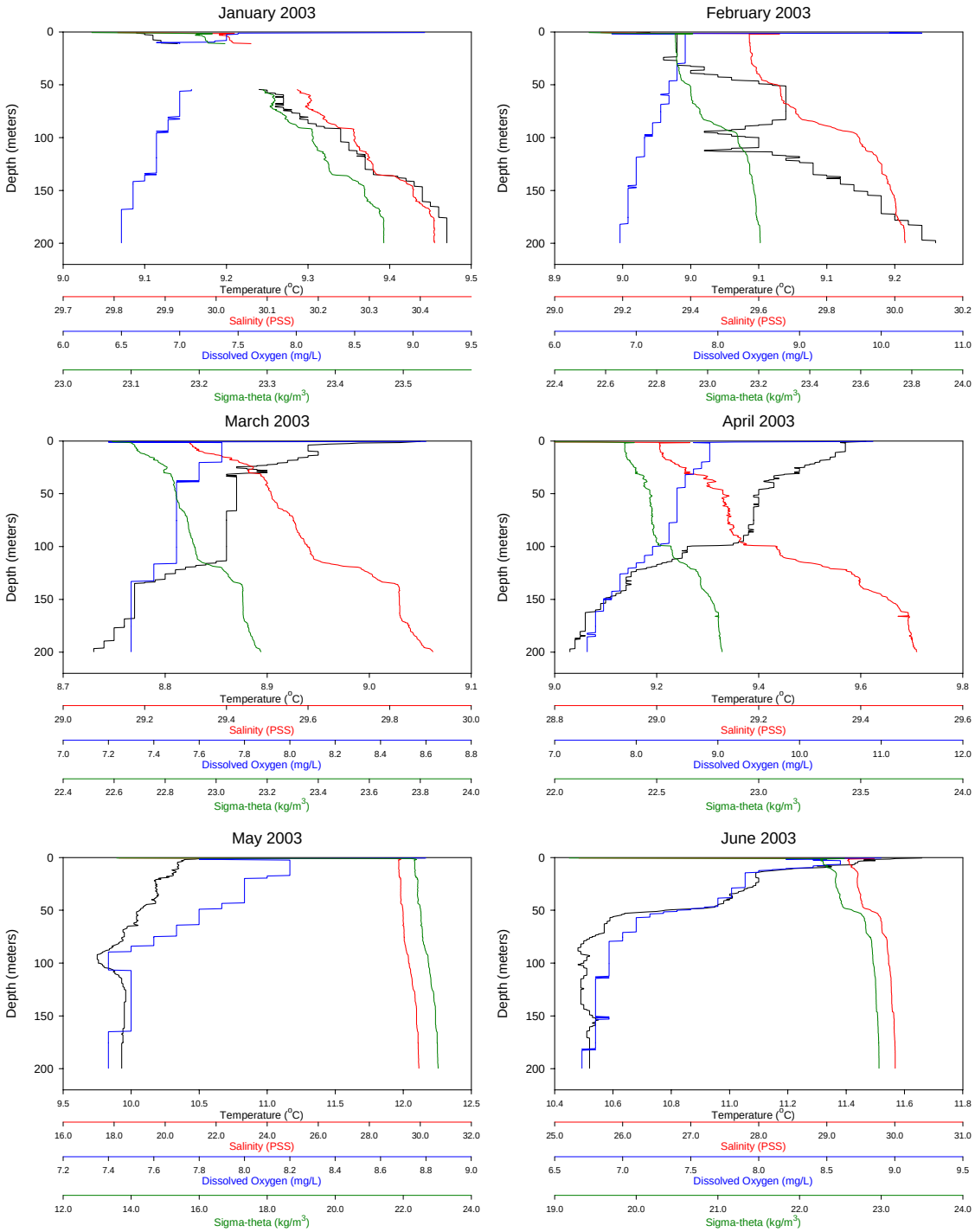

July 2003
August 2003
September 2003
October 2003
November 2003
December 2003
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

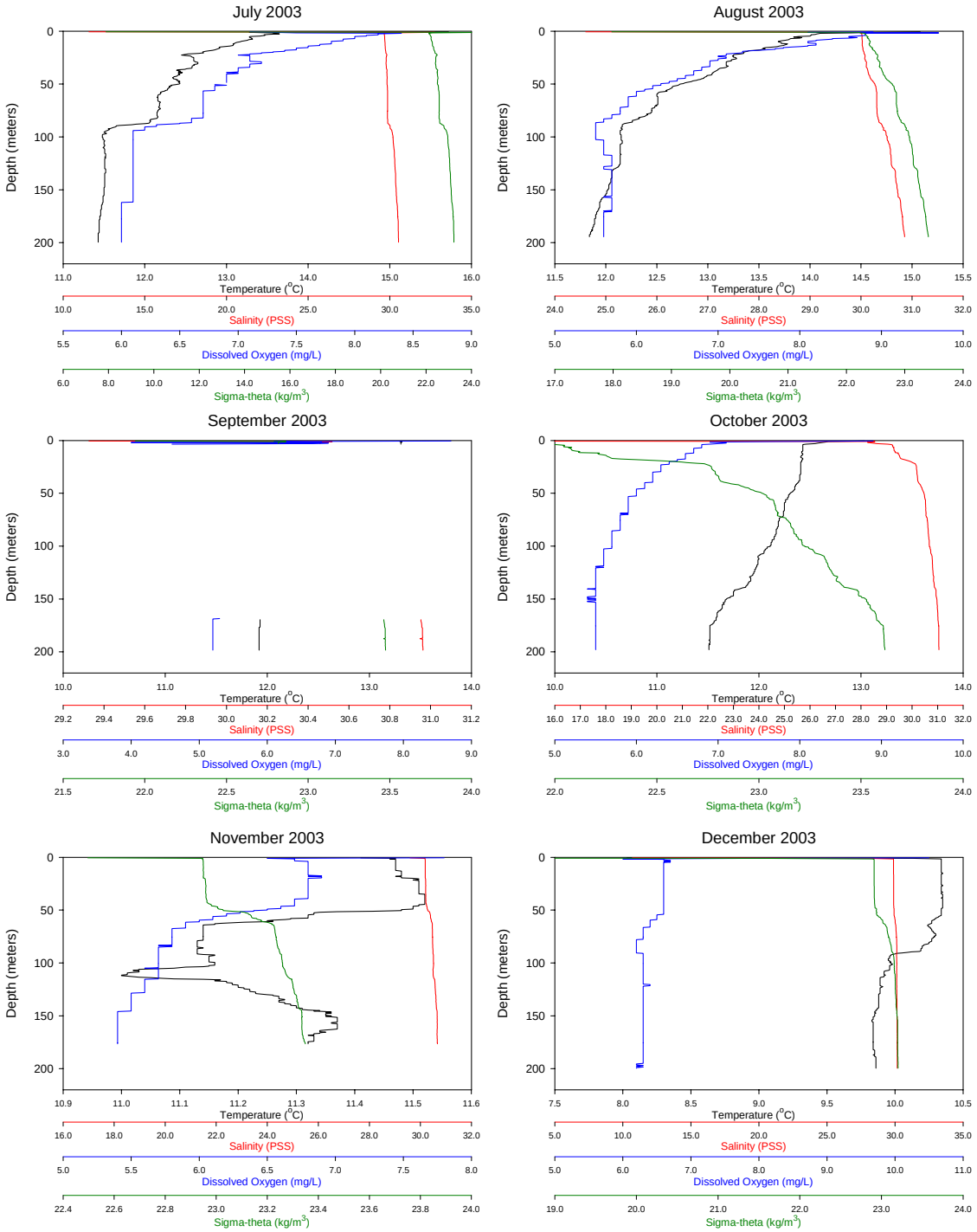
Station LSNT01: 2002



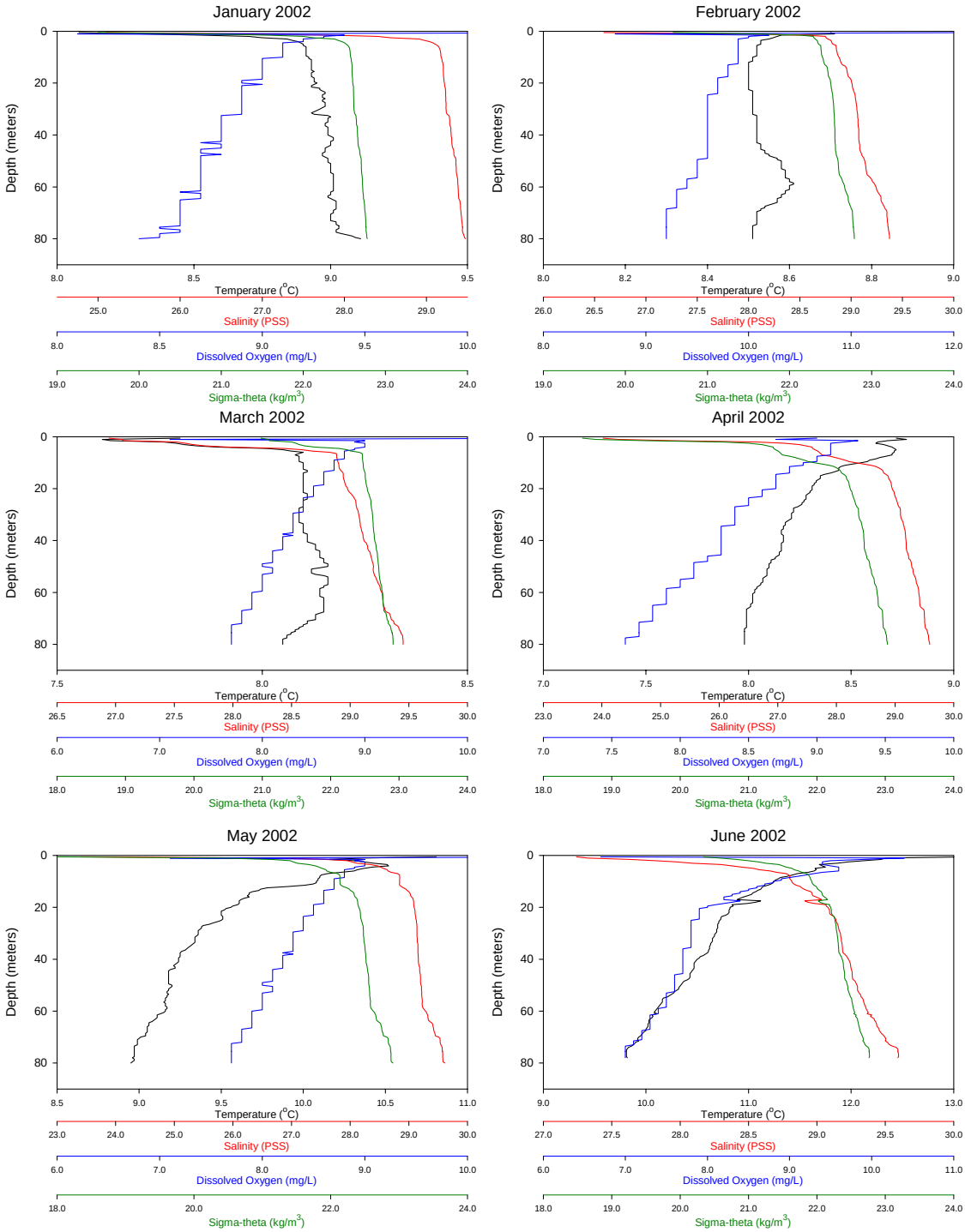

July 2002
August 2002
September 2002
October 2002
November 2002
December 2002
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

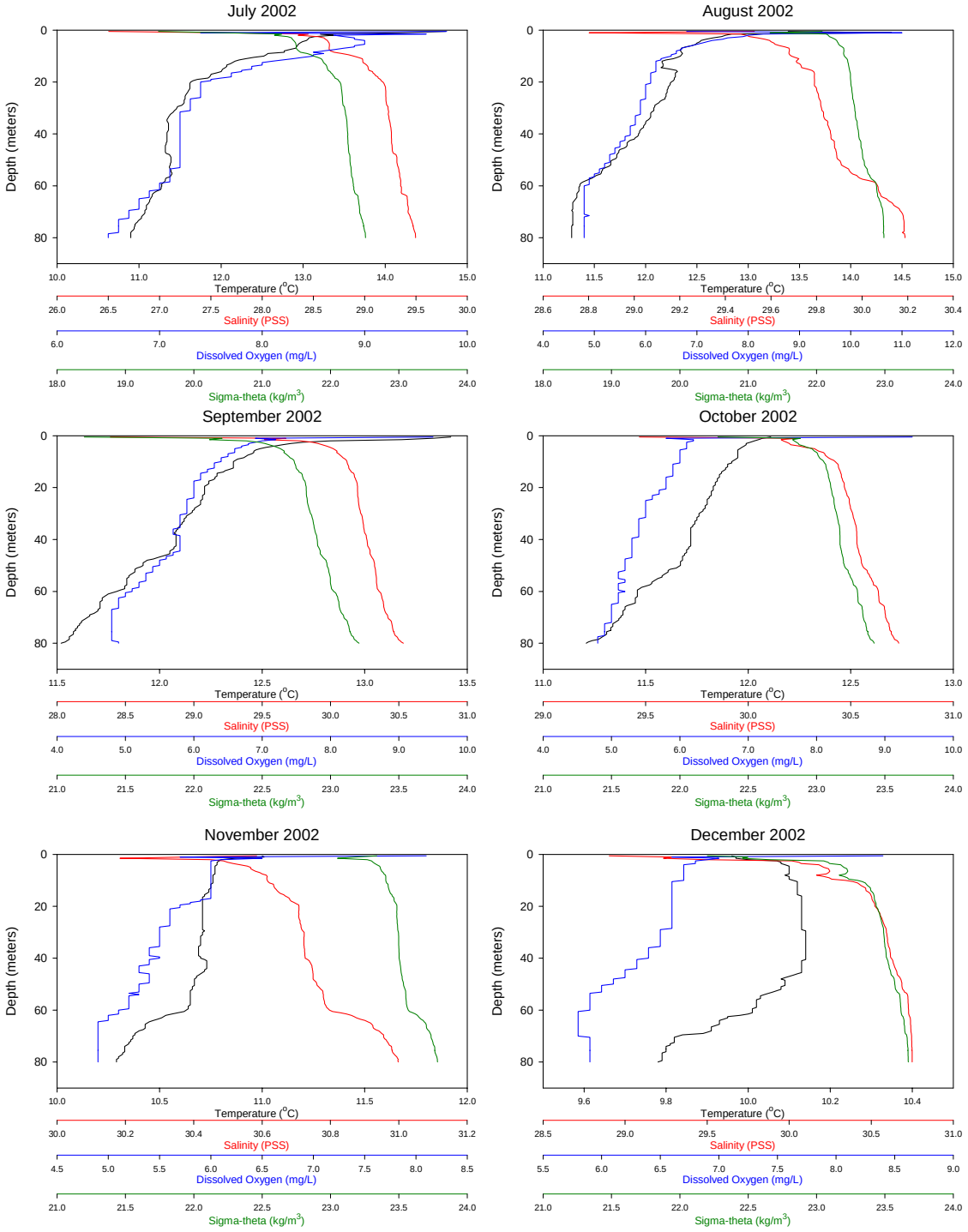
Station LSNT01: 2003



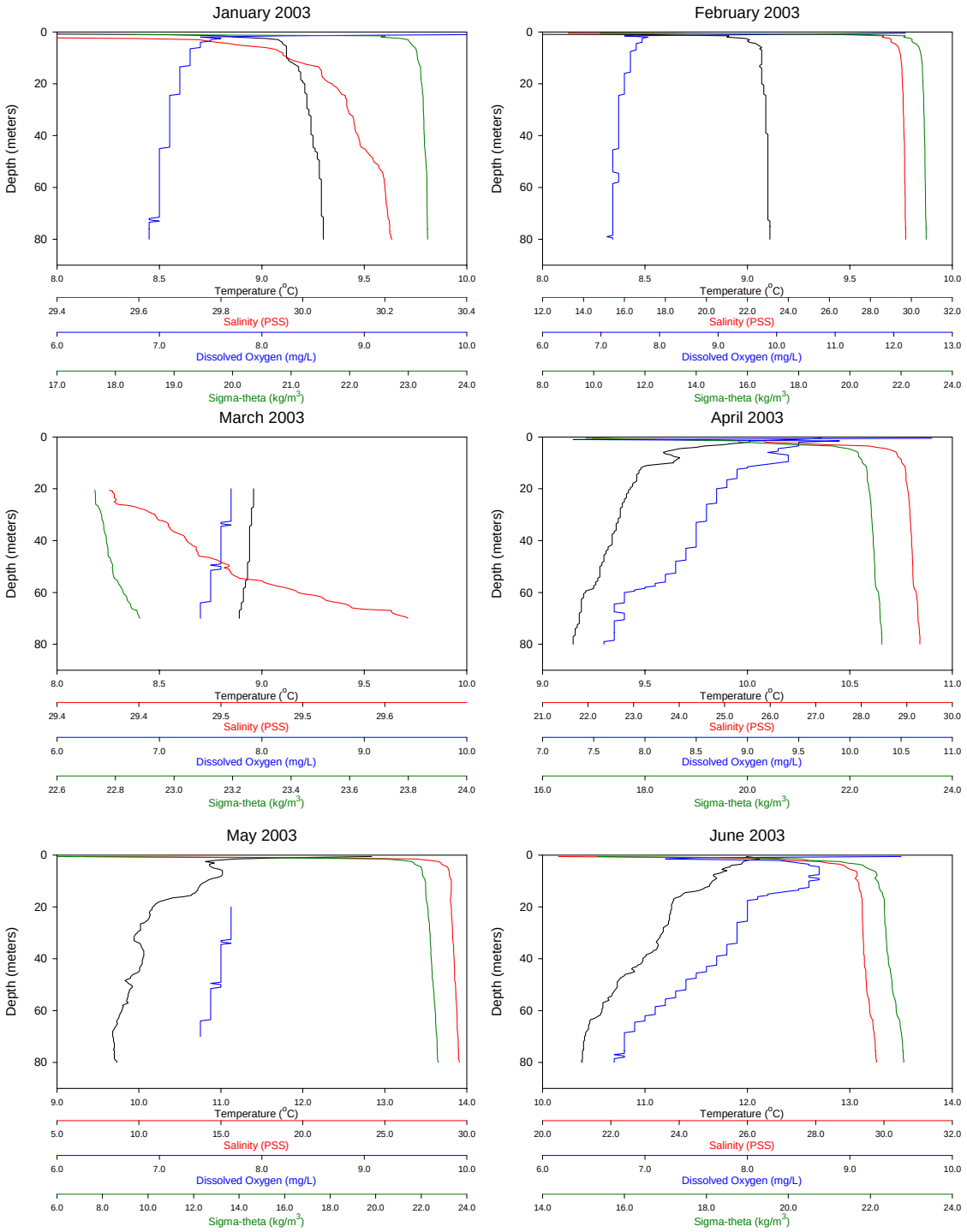

July 2003
August 2003
September 2003
October 2003
November 2003
December 2003
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

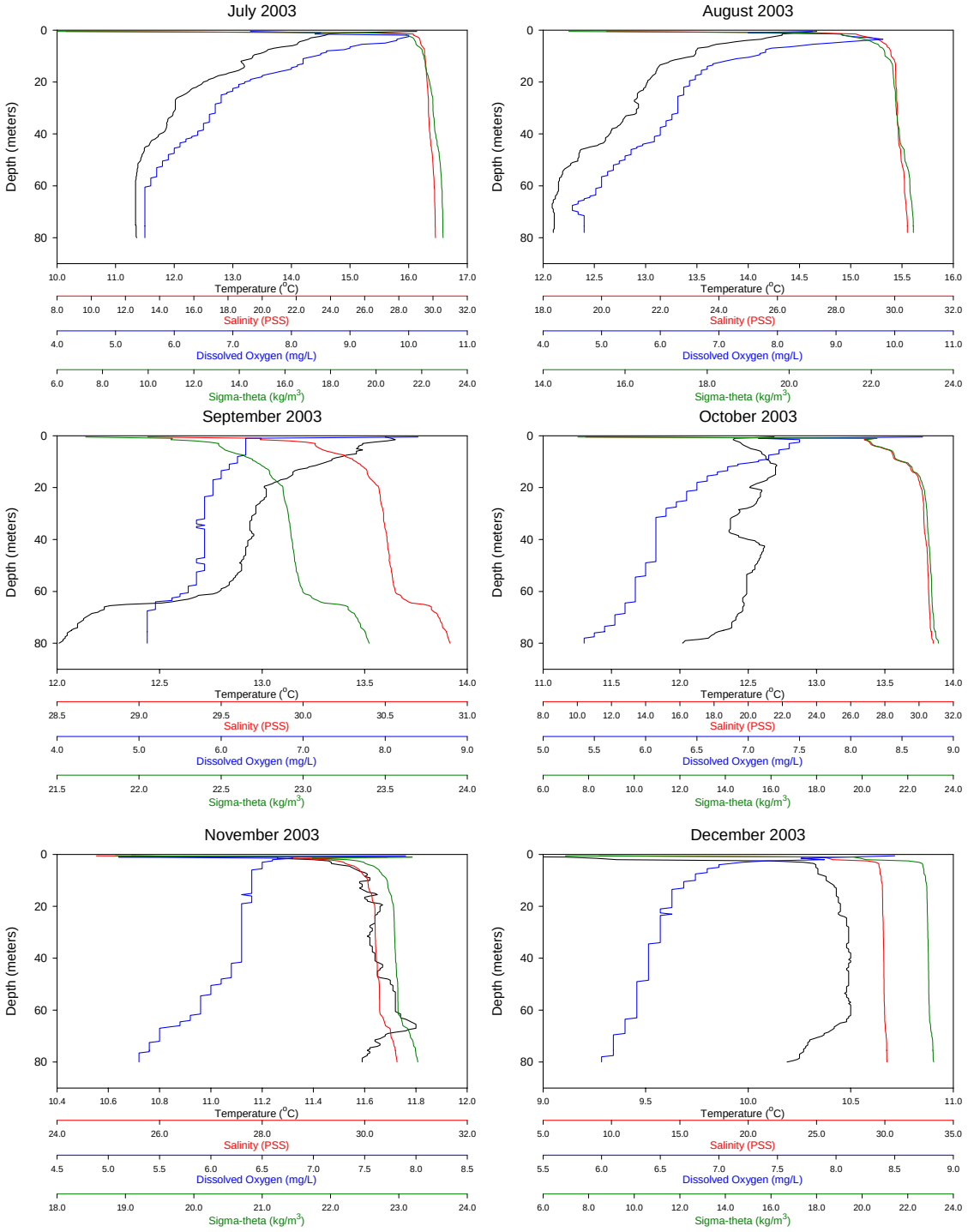
Station LTED04:2002



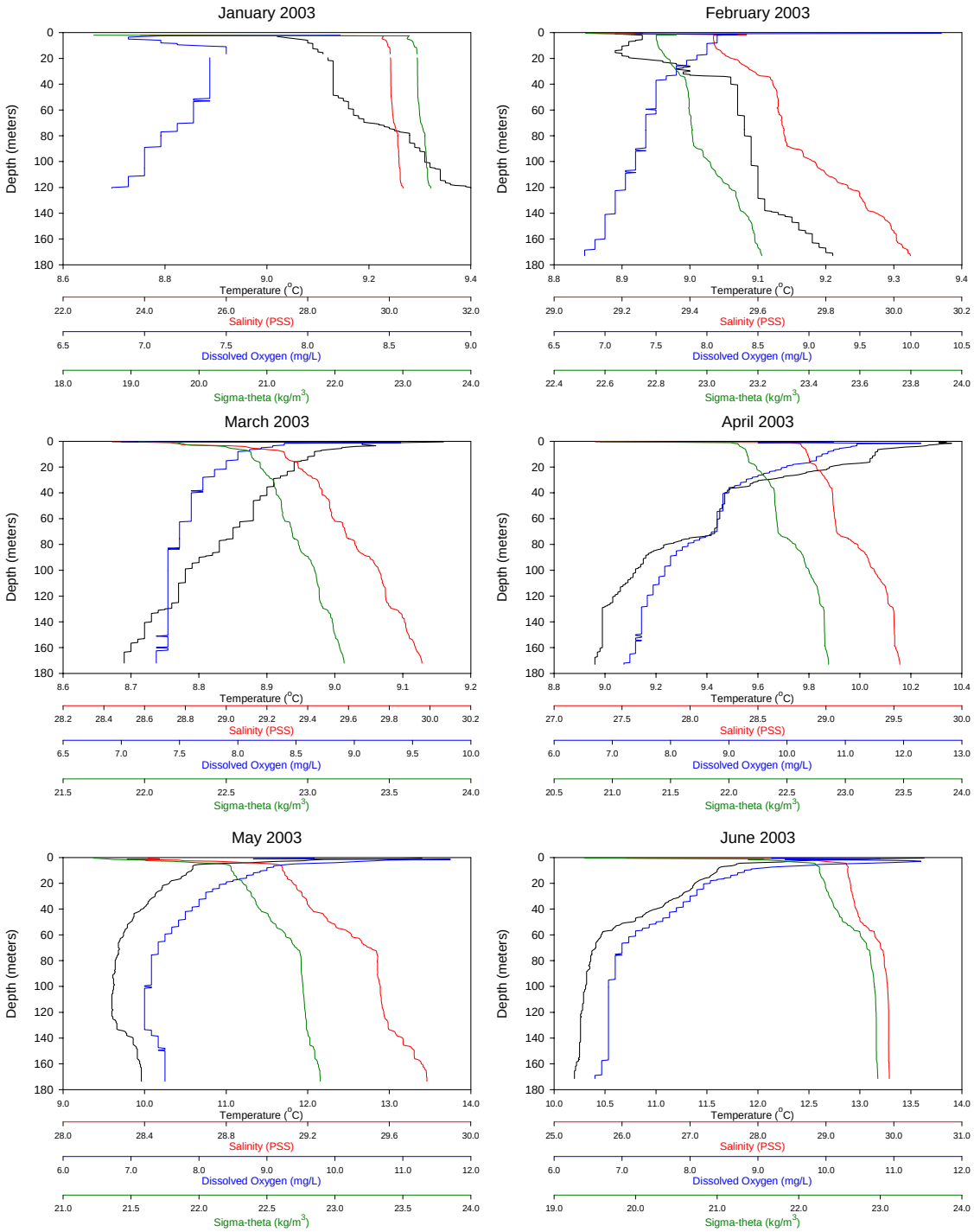

July 2002
August 2002
September 2002
October 2002
November 2002
December 2002
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

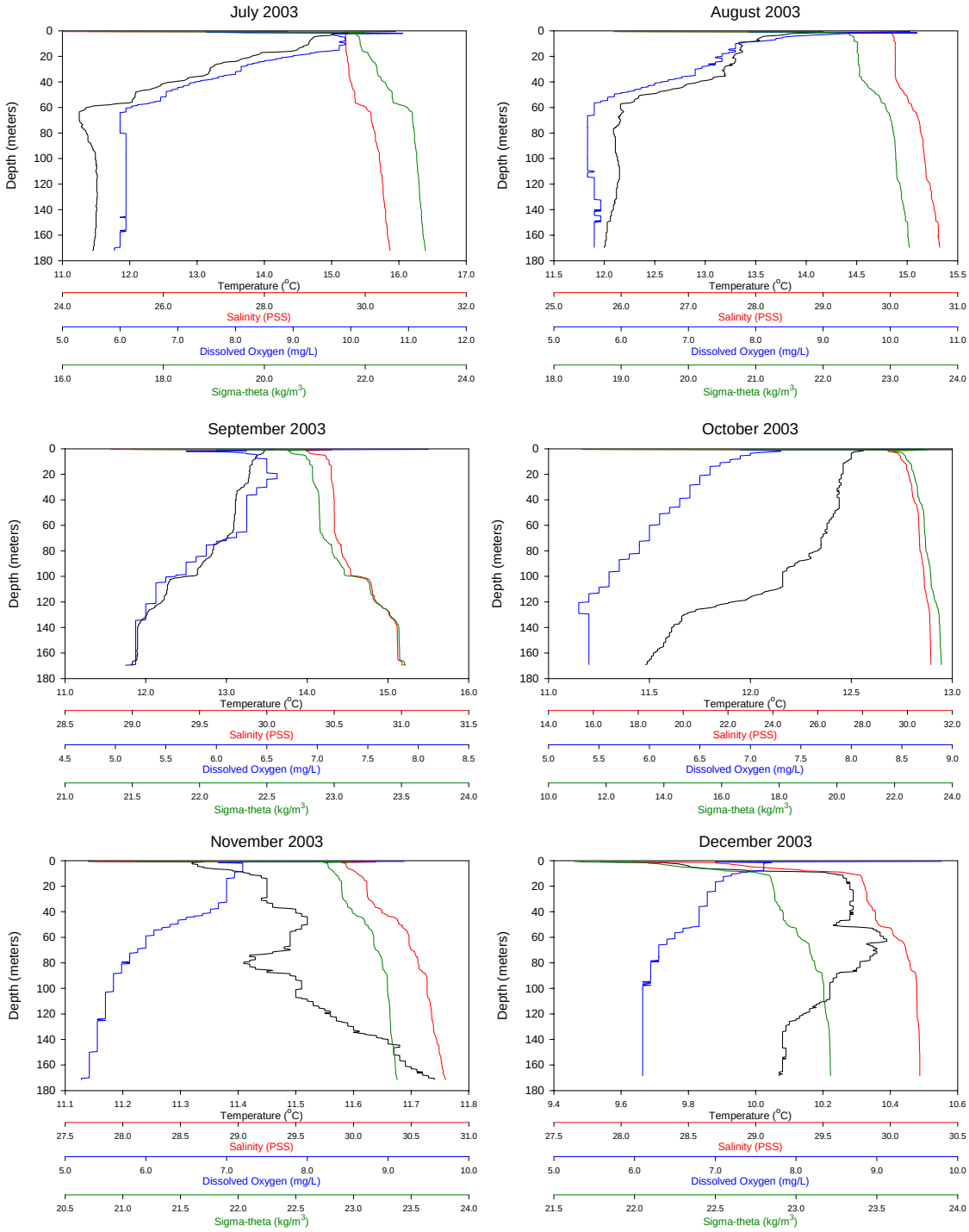
Station LTED04:2003




July 2003
August 2003
September 2003
October 2003
November 2003
December 2003
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

Station NSEX01: 2003




July 2003
August 2003
September 2003
October 2003
November 2003
December 2003
Depth (meters)
Temperature (°C)
Salinity (PSS)
Dissolved Oxygen (mg/L)
Sigma-theta (kg/m3)

APPENDIX A

WATER COLUMN MONITORING DATA

A-1 2002 Offshore outfall general water quality parameters
A-2 2002 Offshore ambient general water quality parameters
A-3 2002 Beach outfall general water quality parameters
A-4 2002 Beach ambient and MOSS general water quality parameters
A-5 2002 Offshore outfall bacteria
A-6 2002 Offshore ambient bacteria
A-7 2002 Beach outfall bacteria
A-8 2002 Beach ambient and MOSS bacteria
A-9 2002 Beach dissolved metals
A-10 2003 Offshore outfall general water quality parameters
A-11 2003 Offshore ambient general water quality parameters
A-12 2003 Beach outfall general water quality parameters
A-13 2003 Beach ambient and MOSS general water quality parameters
A-14 2003 Offshore outfall bacteria
A-15 2003 Offshore ambient bacteria
A-16 2003 Beach outfall bacteria
A-17 2003 Beach ambient and MOSS bacteria

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
CK200P	29-Jan-02	1	8.3	28.466	22.115	6.2	1.2	2.3	71
		15	8.7	29.147	22.653	-	1.1	1.2	2
		25	8.7	29.145	22.698	-	1	1.7	0
		35	8.7	29.177	22.767	-	1	1.2	0
		55	8.7	29.210	22.874	-	1	1.4	0
	20-Feb-02	1	8.2	27.244	21.174	7.5	0.62	2.8	92
		15	8.5	29.044	22.596	-	0.63	3.6	3
		25	8.5	29.098	22.686	-	0.64	2.83	0
		35	8.5	29.118	22.748	-	0.68	3.1	0
		55	8.5	29.248	22.948	-	0.77	2.8	0
	21-Mar-02	12	7.8	28.873	22.548	9.0	0.61	3	8
		24	7.8	28.897	22.621	-	0.59	1.5	1
		32	7.8	28.903	22.666	-	0.8	2.83	0
		43	7.9	29.074	22.834	-	0.58	2.9	0
		60	8.1	29.267	23.050	-	0.69	2.8	0
	22-Apr-02	1	9.3	25.629	19.753	6.0	0.99	2.83	63
		15	8.4	28.800	22.418	-	<0.5	3	2
		25	8.3	28.964	22.607	-	<0.5	2.53	0
		35	8.2	29.260	22.903	-	<0.5	2.32	0
		55	8.2	29.534	23.210	-	0.57	2.3	0
	28-May-02	1	11.2	26.892	20.451	4.1	0.97	6.7	No Data
		15	10.0	28.773	22.169	-	0.67	5.3	No Data
		25	9.5	29.154	22.586	-	<0.5	2.7	No Data
		35	9.3	29.274	22.750	-	<0.5	2.37	No Data
		55	9.2	29.448	23.003	-	0.58	2.8	No Data
	24-Jun-02	1	12.1	27.668	20.888	3.8	1.3	4.2	48
		15	10.7	29.136	22.337	-	<0.5	4.5	0
		25	10.6	29.201	22.450	-	<0.5	5.9	0
		35	10.5	29.222	22.519	-	<0.5	5	0
		55	10.1	29.510	22.898	-	<0.5	5.6	0
	22-Jul-02	1	13.7	28.355	21.117	7.0	0.53	3.9	36
		15	11.9	29.233	22.203	-	<0.5	1.7	1
		25	11.7	29.282	22.321	-	<0.5	2.9	0
		35	11.6	29.312	22.406	-	<0.5	1.5	0
		55	10.8	29.722	22.960	-	<0.5	2.9	0
	27-Aug-02	1	12.8	29.686	22.317	6.7	0.51	3.7	40
		15	12.5	29.736	22.478	-	<0.5	2.5	0
		25	12.2	29.818	22.647	-	<0.5	2.24	0
		35	12.0	29.874	22.766	-	<0.5	2	0
		55	11.6	30.133	23.134	-	0.56	2.83	0
	23-Sep-02	1	12.4	30.182	22.786	13.0	<0.5	0.9	45
		15	12.3	30.189	22.863	-	<0.5	1.1	2
		25	12.3	30.191	22.910	-	<0.5	1.2	0
		35	12.2	30.240	23.015	-	<0.5	1.1	0
		55	12.0	30.308	23.190	-	<0.5	1.9	0
	21-Oct-02	1	11.9	30.412	23.057	-	<0.5	1.7	61
		15	11.8	30.451	23.162	-	<0.5	1.3	3
		25	11.8	30.464	23.221	-	<0.5	1.2	1
		35	11.7	30.513	23.322	-	<0.5	2.3	0
		55	11.6	30.537	23.440	-	<0.5	3.6	0

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
CK200P	18-Nov-02	1	10.7	30.553	23.380	11.0	<0.5	<0.5	63
		15	10.7	30.671	23.524	-	<0.5	1.9	4
		25	10.7	30.696	23.591	-	<0.5	1.8	1
		35	10.7	30.707	23.645	-	<0.5	0.6	0
		55	10.6	30.801	23.824	-	<0.5	2.1	0
	17-Dec-02	1	9.9	29.944	23.026	8.0	<0.5	1.92	55
		15	10.0	30.507	23.513	-	<0.5	2.4	3
		25	10.0	30.562	23.598	-	<0.5	2.29	1
		35	10.1	30.605	23.675	-	<0.5	0.9	0
		55	10.0	30.602	23.763	-	<0.5	2.7	0
KSSK02	29-Jan-02	1	8.4	28.470	22.110	7.8	1.2	0.7	49
		15	8.8	29.167	22.657	-	1.3	5.3	1
		25	8.8	29.239	22.761	-	1.2	0.5	0
		35	8.8	29.247	22.811	-	1.2	3.7	0
		55	9.0	29.111	22.767	-	1.7	2.1	0
	20-Feb-02	1	8.6	28.729	22.278	8.1	0.66	2.6	85
		15	8.5	29.033	22.590	-	0.67	3.3	1
		25	8.5	29.056	22.653	-	0.62	3.88	0
		35	8.5	29.092	22.728	-	0.64	3.5	0
		55	8.4	29.350	23.034	-	0.89	3.1	0
	21-Mar-02	1	7.6	28.001	21.839	8.0	<0.5	3.9	89
		15	7.9	28.854	22.542	-	0.64	3.1	3
		25	7.9	28.981	22.678	-	0.7	2.3	0
		35	7.9	29.057	22.783	-	0.69	2.8	0
		55	8.0	29.121	22.920	-	0.74	3.43	0
	22-Apr-02	1	9.1	26.906	20.782	5.5	0.96	3.3	75
		15	8.4	28.898	22.501	-	0.52	2.8	1
		25	8.3	29.050	22.681	-	<0.5	2	0
		35	8.3	29.109	22.777	-	<0.5	2.7	0
		55	8.2	29.471	23.163	-	0.54	3.5	0
	28-May-02	1	10.0	28.837	22.151	5.6	0.68	5.1	No Data
		15	9.6	29.127	22.508	-	0.54	3	No Data
		25	9.4	29.250	22.678	-	<0.5	1.15	No Data
		35	9.2	29.416	22.886	-	0.55	2.37	No Data
		55	9.1	29.527	23.079	-	0.76	3.5	No Data
	25-Jun-02	1	13.8	27.182	20.200	1.7	2.1	7	No Data
		15	11.5	28.671	21.829	-	0.6	4.8	No Data
		25	10.5	29.271	22.522	-	<0.5	4.2	No Data
		35	10.3	29.349	22.653	-	<0.5	3.5	No Data
		55	10.0	29.548	22.946	-	<0.5	1.9	No Data
	22-Jul-02	1	13.2	28.776	21.555	6.9	<0.5	3	38
		15	12.3	29.140	22.063	-	<0.5	2.9	2
		25	11.7	29.314	22.345	-	<0.5	2.3	0
		35	11.6	29.334	22.418	-	<0.5	1.6	0
		55	11.2	29.333	22.576	-	0.53	1.3	0
	27-Aug-02	1	12.7	29.713	22.360	7.5	<0.5	2.3	54
		15	12.3	29.792	22.567	-	<0.5	3.43	1
		25	12.0	29.800	22.660	-	<0.5	1.31	0
		35	12.0	29.810	22.729	-	<0.5	2.2	0
		55	11.6	30.046	23.060	-	0.64	2	0

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
KSSK02	23-Sep-02	1	12.7	29.922	22.519	12.0	<0.5	1.7	83
		15	12.3	30.193	22.880	-	<0.5	2	2
		25	12.2	30.212	22.951	-	0.55	2.42	0
		35	11.9	30.320	23.127	-	<0.5	2.6	0
		55	11.8	30.388	23.297	-	0.84	2.3	0
	21-Oct-02	1	12.0	30.375	23.014	9.5	<0.5	0.7	64
		15	11.7	30.510	23.221	-	<0.5	<0.5	4
		25	11.7	30.526	23.286	-	<0.5	0.8	1
		35	11.7	30.526	23.332	-	<0.5	0.9	0
		55	11.7	30.531	23.427	-	<0.5	1.5	0
	20-Nov-02	1	10.8	30.484	23.304	11.0	<0.5	1.24	53
		15	10.6	30.764	23.620	-	<0.5	<0.5	4
		25	10.6	30.780	23.680	-	<0.5	2	1
		35	10.6	30.787	23.731	-	<0.5	1.41	0
		55	10.5	30.674	23.742	-	<0.5	0.67	0
	16-Dec-02	1	10.0	30.306	23.292	6.5	0.55	2.55	63
		15	10.0	30.326	23.370	-	0.52	1.63	2
		25	10.1	30.618	23.636	-	<0.5	1.29	0
		35	10.0	30.597	23.665	-	<0.5	1.8	0
		55	10.0	29.693	23.062	-	0.8	2.5	0
LTBC41	29-Jan-02	1	8.4	27.770	21.558	7.0	1.1	1.3	61
		15	8.9	29.172	22.646	-	0.83	1	2
		23	8.9	29.210	22.705	-	0.85	1.2	0
	20-Feb-02	1	8.6	28.624	22.197	7.8	<0.5	3.2	96
		15	8.5	28.909	22.493	-	0.69	2.5	3
		23	8.5	28.959	22.571	-	0.64	2.6	0
	18-Mar-02	1	7.1	24.756	19.361	5.0	1.1	4.6	75
		15	8.0	28.781	22.465	-	<0.5	1.65	2
		23	8.1	28.989	22.648	-	0.75	3.2	1
	22-Apr-02	1	8.8	24.182	18.698	3.2	1.4	3.3	64
		15	8.4	28.839	22.456	-	<0.5	4.1	1
		23	8.3	29.024	22.653	-	0.63	2.55	0
	28-May-02	1	10.6	25.526	19.487	5.0	1.1	2.68	No Data
		15	9.5	29.061	22.463	-	0.52	2.18	No Data
		23	9.5	29.110	22.545	-	<0.5	2.4	No Data
	25-Jun-02	1	13.3	25.540	19.019	4.8	1	7	31
		15	10.9	29.020	22.208	-	<0.5	3.9	1
		23	10.8	29.078	22.306	-	0.53	1.8	0
	22-Jul-02	1	13.5	28.501	21.272	4.0	0.66	3.4	36
		15	12.3	28.999	21.957	-	<0.5	2.5	1
		23	11.6	29.124	22.197	-	<0.5	1.9	0
	27-Aug-02	1	13.6	29.280	21.847	2.8	<0.5	4.8	97
		15	12.2	29.732	22.541	-	<0.5	1.9	0
		23	12.1	29.770	22.608	-	<0.5	1.31	0
	23-Sep-02	1	12.7	29.946	22.537	9.9	<0.5	1.5	62
		15	12.2	30.207	22.906	-	<0.5	1.2	1
		23	12.1	30.246	22.988	-	<0.5	1.3	0

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LTBC41	21-Oct-02	1	12.0	30.363	23.000	8.0	<0.5	1.43	59
		15	11.8	30.460	23.162	-	<0.5	1.4	3
		23	11.8	30.494	23.233	-	<0.5	1.5	1
	20-Nov-02	1	11.0	30.224	23.057	11.0	<0.5	0.81	35
		15	10.7	30.692	23.546	-	<0.5	0.62	4
		23	10.7	30.700	23.589	-	<0.5	1.1	1
	17-Dec-02	1	9.8	29.448	22.650	5.8	0.61	2.22	58
		15	10.1	30.508	23.503	-	<0.5	0.9	2
		23	10.2	30.605	23.603	-	<0.5	<0.5	1
LSEP01	29-Jan-02	1	8.2	28.739	22.335	8.5	1	1	70
		15	8.7	29.189	22.691	-	0.94	0.7	2
		25	8.7	29.233	22.764	-	1	0.9	0
		35	8.9	29.335	22.876	-	1.1	1.11	0
		55	8.9	29.348	22.974	-	1.1	1.7	0
		100	9.1	29.626	23.359	-	1.4	1.1	0
		150	9.2	29.736	23.661	-	2.2	2.65	0
	20-Feb-02	1	8.7	28.997	22.474	9.4	0.56	2.4	46
		15	8.5	29.022	22.583	-	0.51	3.7	1
		25	8.5	29.030	22.635	-	0.57	3.1	0
		35	8.5	29.042	22.692	-	0.61	2.6	0
		55	8.5	29.130	22.852	-	0.67	3.8	0
		100	8.4	29.398	23.288	-	1.4	3.9	0
		150	8.4	29.428	23.539	-	1.3	4.0	0
	18-Mar-02	61	8.1	29.131	22.942	5.5	0.68	3.5	0
		78	8.1	29.248	23.111	-	0.74	2.6	0
		89	8.1	29.338	23.235	-	0.78	2.73	0
		106	8.0	29.408	23.372	-	0.86	2.9	0
		108	8.0	29.414	23.385	-	0.89	4.09	0
		144	8.0	29.488	23.614	-	1.3	3.2	0
		154	8.0	29.493	23.666	-	1.2	3.1	0
		160	8.0	29.494	23.691	-	1	3.27	0
	22-Apr-02	1	8.9	28.237	21.857	7.5	0.55	3.1	56
		15	8.5	28.753	22.368	-	0.55	3.6	1
		25	8.3	29.053	22.684	-	0.5	1.9	0
		35	8.2	29.170	22.834	-	<0.5	2	0
		55	8.1	29.574	23.256	-	0.51	2.1	0
		100	8.2	29.751	23.592	-	0.6	2.6	0
		150	8.3	29.875	23.903	-	0.8	2.85	0
	28-May-02	1	10.0	29.001	22.271	6.8	0.71	4.8	No Data
		15	9.9	29.082	22.430	-	0.79	4.8	No Data
		25	9.7	29.122	22.533	-	0.68	3.02	No Data
		35	9.6	29.156	22.616	-	0.7	5.91	No Data
		55	9.3	29.390	22.938	-	0.69	1.67	No Data
		100	8.9	29.781	23.509	-	<0.5	2.5	No Data
		150	8.9	29.954	23.867	-	1.00	3.3	No Data
	25-Jun-02	1	12.2	28.434	21.466	3.4	1	7.5	35
		15	11.4	28.982	22.097	-	0.63	5.6	0
		25	10.9	29.204	22.405	-	<0.5	3.1	0
		35	10.8	29.228	22.484	-	<0.5	4.1	0
		55	10.4	29.385	22.765	-	<0.5	2.6	0
		100	9.7	29.850	23.447	-	0.64	3	0
		150	9.5	29.991	23.814	-	0.96	3.4	0

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSEP01	22-Jul-02	1	14.5	28.365	20.980	7.0	<0.5	3.4	74
		15	12.2	29.218	22.142	-	<0.5	3.7	1
		25	11.9	29.288	22.287	-	<0.5	1.6	0
		35	11.9	29.296	22.340	-	<0.5	1.4	0
		55	11.0	29.606	22.836	-	<0.5	2.2	0
		100	10.4	29.979	23.422	-	13.5	2.2	0
		150	10.3	30.013	23.693	-	0.9	3.6	0
	27-Aug-02	1	13.4	29.604	22.153	10.0	<0.5	1.8	41
		15	12.4	29.792	22.540	-	<0.5	2.1	2
		25	12.4	29.797	22.598	-	<0.5	1.2	1
		35	12.3	29.810	22.671	-	<0.5	0.9	0
		55	11.9	29.940	22.928	-	<0.5	1.4	0
		100	11.4	30.212	23.435	-	0.81	2	0
		150	11.4	30.241	23.680	-	0.98	1.8	0
	23-Sep-02	1	12.6	30.179	22.748	13.0	<0.5	2	42
		15	12.4	30.185	22.845	-	<0.5	2.6	2
		25	12.3	30.200	22.920	-	<0.5	2	0
		35	12.3	30.214	22.982	-	<0.5	1.7	0
		55	12.2	30.270	23.136	-	<0.5	1.5	0
		100	11.6	30.566	23.682	-	<0.5	2.2	0
		150	11.5	30.609	23.959	-	0.81	3.9	0
	21-Oct-02	1	11.8	30.459	23.101	9.8	<0.5	1.1	60
		15	11.8	30.485	23.189	-	<0.5	1.5	3
		25	11.8	30.488	23.240	-	<0.5	2.3	1
		35	11.8	30.499	23.299	-	<0.5	1.6	0
		55	11.5	30.587	23.497	-	<0.5	1.5	0
		100	11.1	30.761	23.912	-	0.54	1.96	0
		150	10.9	30.841	24.240	-	0.78	2.05	0
	20-Nov-02	1	10.7	30.703	23.486	13.0	<0.5	<0.5	19
		15	10.6	30.718	23.575	-	<0.5	2	5
		25	10.6	30.732	23.634	-	<0.5	0.6	1
		35	10.6	30.763	23.710	-	<0.5	0.9	0
		55	10.5	30.816	23.850	-	<0.5	1.3	0
		100	10.3	30.966	24.203	-	<0.5	<0.5	0
		150	10.2	31.052	24.521	-	0.54	1.71	0
	17-Dec-02	1	10.1	30.610	23.522	8.0	<0.5	2.8	56
		15	10.1	30.608	23.585	-	<0.5	1.22	3
		25	10.1	30.606	23.629	-	<0.5	2.35	1
		35	10.1	30.609	23.676	-	<0.5	1.1	0
		55	10.1	30.626	23.781	-	<0.5	1.21	0
		100	9.8	30.726	24.106	-	0.56	2.74	0
		150	9.5	30.739	24.383	-	1.0	2.7	0
LSKQ06	29-Jan-02	1	8.6	29.172	22.616	8.2	0.99	2	67
		15	8.7	29.204	22.700	-	0.98	1.31	3
		25	8.7	29.225	22.760	-	1.1	2	0
		35	8.7	29.243	22.817	-	1.1	0.8	0
	20-Feb-02	1	8.5	28.951	22.460	11.0	<0.5	3	109
		15	8.5	29.023	22.583	-	0.51	2.8	2
		25	8.5	29.111	22.697	-	0.65	3.2	0
		35	8.5	29.156	22.780	-	0.79	2.9	0

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSKQ06	18-Mar-02	1	7.8	28.868	22.491	8.0	<0.5	3.27	97
		15	7.8	28.873	22.558	-	0.63	2.78	4
		25	7.9	28.913	22.634	-	0.58	2.83	1
		35	7.8	28.953	22.713	-	0.62	3.5	0
	22-Apr-02	1	8.9	28.054	21.706	6.8	0.52	4.1	62
		15	8.4	28.883	22.485	-	0.54	3	2
		25	8.4	28.927	22.570	-	0.57	1.3	0
		35	8.2	29.144	22.808	-	0.59	4.1	0
	28-May-02	1	9.7	29.134	22.429	7.0	0.67	3.7	No Data
		15	9.6	29.201	22.562	-	0.88	2.9	No Data
		25	9.6	29.207	22.613	-	0.91	4.29	No Data
		35	9.6	29.217	22.668	-	1	3.6	No Data
	25-Jun-02	1	11.7	28.858	21.875	5.2	0.98	4.3	10
		15	11.2	29.068	22.193	-	0.56	4.4	0
		25	11.1	29.113	22.298	-	<0.5	3.6	0
		35	10.7	29.257	22.518	-	<0.5	3.15	0
	22-Jul-02	1	13.2	28.906	21.641	6.9	0.69	4.4	30
		15	12.3	29.179	22.089	-	<0.5	2.8	1
		25	11.6	29.372	22.408	-	<0.5	2.4	0
		35	11.5	29.424	22.512	-	<0.5	1.7	0
	27-Aug-02	1	13.2	29.734	22.289	13.0	<0.5	1.9	108
		15	12.3	29.786	22.557	-	<0.5	2.7	2
		25	12.2	29.813	22.644	-	<0.5	2.2	1
		35	12.1	29.826	22.711	-	<0.5	1.83	0
	23-Sep-02	1	12.6	30.189	22.744	13.0	<0.5	2.2	93
		15	12.3	30.220	22.899	-	<0.5	1.4	3
		25	12.3	30.225	22.950	-	<0.5	2.2	0
		35	12.3	30.226	22.996	-	<0.5	0.91	0
	21-Oct-02	1	11.8	30.496	23.137	9.8	<0.5	1.3	65
		15	11.7	30.514	23.227	-	<0.5	1	3
		25	11.7	30.515	23.274	-	<0.5	1.7	1
		35	11.7	30.516	23.323	-	<0.5	1.8	0
	20-Nov-02	1	10.7	30.693	23.481	13.0	<0.5	1.3	64
		15	10.6	30.728	23.584	-	<0.5	0.7	4
		25	10.6	30.734	23.635	-	<0.5	1.5	1
		35	10.6	30.736	23.681	-	<0.5	1.4	0
	17-Dec-02	1	10.0	30.553	23.487	8.8	<0.5	3.3	60
		15	10.1	30.612	23.587	-	<0.5	2.4	3
		25	10.1	30.633	23.643	-	<0.5	3.65	1
		35	10.1	30.643	23.703	-	0.53	3.67	0
VO50E	29-Jan-02	1	8.8	29.286	22.680	8.2	0.98	1.6	74
		5	8.8	29.298	22.704	-	1	1.3	24
		10	8.9	29.318	22.738	-	1.1	1.9	8
	20-Feb-02	1	8.5	28.956	22.471	11.0	0.58	3	214
		5	8.5	28.973	22.505	-	<0.5	3.1	34
		10	8.4	28.977	22.532	-	<0.5	2.7	23
	18-Mar-02	1	7.9	28.979	22.569	7.5	0.63	3.2	89
		5	7.9	29.037	22.628	-	0.61	3.51	32
		10	8.0	29.058	22.659	-	0.66	3.1	11

Table A-1
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General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
VO50E	22-Apr-02	1	8.6	28.662	22.220	7.5	<0.5	3.8	110
		5	8.5	28.758	22.331	-	<0.5	3.2	34
		10	8.5	28.788	22.380	-	<0.5	2.4	10
	28-May-02	1	10.3	29.040	22.267	7.0	<0.5	3.03	No Data
		5	10.1	29.057	22.324	-	0.71	4.33	No Data
		10	9.7	29.130	22.463	-	0.59	3.92	No Data
	25-Jun-02	1	11.8	28.893	21.885	4.7	1.1	6.6	55
		5	11.6	28.946	21.982	-	0.73	6.1	11
		10	11.5	28.990	22.066	-	0.64	6.9	2
	22-Jul-02	1	13.8	28.974	21.571	4.1	<0.5	3.4	65
		5	13.7	28.989	21.625	-	0.88	3.8	8
		13	13.6	29.009	21.693	-	0.98	4.7	1
	27-Aug-02	1	13.1	29.694	22.271	11.0	<0.5	1.6	87
		5	12.5	29.764	22.452	-	<0.5	1.21	6
		10	12.5	29.770	22.486	-	<0.5	1.6	3
	23-Sep-02	1	12.5	30.164	22.744	11.0	<0.5	3.5	90
		5	12.5	30.182	22.790	-	<0.5	2.4	24
		10	12.4	30.183	22.818	-	<0.5	3.2	4
	21-Oct-02	1	11.9	30.460	23.096	11.0	<0.5	1.6	61
		5	11.8	30.466	23.121	-	<0.5	1.6	23
		10	11.8	30.467	23.145	-	<0.5	1.9	9
	20-Nov-02	1	10.6	30.705	23.498	-	<0.5	1	52
		11	10.6	30.718	23.552	-	<0.5	<0.5	5
		12	10.6	30.720	23.559	-	<0.5	1.33	4
	16-Dec-02	1	10.0	30.398	23.369	8.5	<0.5	2.16	62
		5	10.1	30.566	23.507	-	<0.5	1.65	20
		10	10.1	30.569	23.537	-	<0.5	5.51	6

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
CK200P	29-Jan-02	1	8.7	0.461	<0.30	<0.010	0.414	0.0816	3.68
		15	8.5	0.325	<0.30	<0.010	0.418	0.0807	3.50
		25	8.5	0.3	<0.30	<0.010	0.420	0.0826	3.55
		35	8.5	0.26	<0.30	<0.010	0.422	0.0838	3.55
		55	8.5			<0.010	0.419	0.0834	3.41
	20-Feb-02	1	10.3	0.931	0.335	<0.010	0.399	0.0746	3.82
		15	9.9	0.573	0.178	<0.010	0.421	0.0831	3.85
		25	9.8	0.521	0.176	<0.010	0.421	0.0839	3.81
		35	9.8	0.354	0.112	<0.010	0.424	0.0835	3.78
		55	9.7			<0.010	0.423	0.0835	3.73
	21-Mar-02	12	8.6	1.01	0.221	0.010	0.399	0.0750	3.24
		24	8.5	0.831	0.241	0.010	0.411	0.0733	3.44
		32	8.5	0.805	0.249	0.011	0.409	0.0748	3.46
		43	8.2	0.837	0.261	0.011	0.417	0.0750	3.60
		60	8.1			<0.010	0.408	0.0731	3.47
	22-Apr-02	1	9.4	2.44	0.454	0.0263	0.289	0.0574	2.93
		15	8.5	2.93	0.493	0.0241	0.338	0.0717	2.80
		25	8.2	1.91	0.492	0.0274	0.353	0.0653	2.81
		35	8.2	0.822	0.341	0.0336	0.357	0.0683	2.80
		55	8.0			0.0354	0.352	0.0671	2.70
	28-May-02	1	8.1	21.6	2.24	0.014	0.0667	0.0379	1.20
		15	6.5	19.9	1.62	0.0220	0.148	0.0499	1.40
		25	6.2	4.22	0.684	0.0519	0.237	0.0563	1.90
		35	6.0	3.86	0.692	0.0557	0.248	0.0616	2.01
		55	5.9			0.0578	0.255	0.0655	2.11
	24-Jun-02	1	9.6	19.5	2.21	0.012	0.0612	0.0386	1.07
		15	7.8	1.2	0.481	0.0674	0.210	0.0537	1.72
		25	7.7	0.914	0.579	0.0726	0.217	0.0533	1.76
		35	7.6	0.877	0.738	0.0741	0.222	0.0521	1.83
		55	7.1			0.0764	0.238	0.0540	1.81
	22-Jul-02	1	9.8	7.05	0.268	<0.010	0.105	0.0394	1.38
		15	7.6	2.38	0.353	0.018	0.232	0.0527	1.78
		25	7.5	2.15	0.326	0.0237	0.241	0.0485	1.87
		35	7.3	1.51	0.279	0.0250	0.247	0.0533	1.88
		55	6.4			0.0281	0.306	0.0603	2.06
	27-Aug-02	1	7.5	12.9	0.29	0.011	0.199	0.0572	1.81
		15	6.6	6.98	0.401	0.0215	0.241	0.0626	2.10
		25	6.1	1.64	0.39	0.0329	0.269	0.0660	2.19
		35	5.9	0.731	0.27	0.0358	0.277	0.0636	2.21
		55	5.6			0.0401	0.281	0.0633	2.20
	23-Sep-02	1	6.5	0.643	0.465	0.0470	0.251	0.0623	2.09
		15	6.4	0.849	0.522	0.0458	0.256	0.0633	2.13
		25	6.3	0.595	0.463	0.0442	0.257	0.0639	2.13
		35	6.0	0.616	0.624	0.0435	0.266	0.0638	2.19
		55	5.8			0.0429	0.279	0.0631	2.24
	21-Oct-02	1	6.1	0.837	0.235	0.0427	0.297	0.0660	2.32
		15	5.9	0.72	0.272	0.0388	0.301	0.0716	2.40
		25	5.8	0.63	0.246	0.0392	0.303	0.0725	2.49
		35	5.7	0.485	0.204	0.0370	0.310	0.0697	2.52
		55	5.6			0.0347	0.313	0.0697	2.49

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
CK200P	18-Nov-02	1	6.0	0.328	0.14	<0.010	0.382	0.0766	2.84
		15	5.7	0.218	0.105	<0.010	0.381	0.0780	2.70
		25	5.6	0.209	0.107	<0.010	0.383	0.0781	2.87
		35	5.6	0.184	0.104	<0.010	0.383	0.0789	2.82
		55	5.4			<0.010	0.383	0.0765	2.77
	17-Dec-02	1	6.8	0.293	0.268	<0.010	0.399	0.0798	2.99
		15	6.5	0.244	0.155	<0.010	0.407	0.0815	3.11
		25	6.4	0.205	0.124	<0.010	0.407	0.0765	3.14
		35	6.4	0.166	0.13	<0.010	0.407	0.0799	3.12
		55	6.4			<0.010	0.407	0.0781	3.14
KSSK02	29-Jan-02	1	8.7	0.82	<0.30	<0.010	0.409	0.0784	3.52
		15	8.6	0.304	<0.30	0.0690	0.420	0.0858	3.43
		25	8.6	0.28	<0.30	0.018	0.414	0.0828	3.38
		35	8.6	0.18	<0.30	0.0293	0.431	0.0851	3.41
		55	8.5			0.219	0.431	0.106	3.51
	20-Feb-02	1	10.1	0.915	0.239	<0.010	0.414	0.0769	3.82
		15	9.8	0.747	0.198	<0.010	0.416	0.0799	3.82
		25	9.7	0.493	0.162	<0.010	0.427	0.0808	3.82
		35	9.6	0.517	0.165	<0.010	0.415	0.0813	3.85
		55	9.4			<0.010	0.413	0.0791	3.65
	21-Mar-02	1	8.7	1.99	0.308	0.017	0.378	0.0724	3.36
		15	8.4	0.868	0.245	0.0389	0.412	0.0767	3.46
		25	8.3	0.648	0.201	0.0402	0.418	0.0773	3.57
		35	8.3	0.674	0.209	0.015	0.402	0.0749	3.39
		55	8.1			0.016	0.402	0.0738	3.33
	22-Apr-02	1	9.4	5.06	1.26	0.016	0.293	0.0568	3.15
		15	8.5	5.34	0.531	0.020	0.338	0.0690	2.80
		25	8.4	3.1	0.468	0.0207	0.349	0.0668	2.86
		35	8.3	2.95	0.687	0.0290	0.356	0.0739	2.89
		55	8.1			0.0826	0.365	0.0732	2.85
	28-May-02	1	5.9	13.3	1.63	0.0333	0.180	0.0501	1.65
		15	5.5	6.85	0.916	0.0448	0.220	0.0517	1.79
		25	5.4	3.88	0.853	0.0534	0.230	0.0550	1.94
		35	5.3	2.92	0.818	0.0643	0.262	0.0590	2.11
		55	5.2			0.0722	0.265	0.0598	2.22
	25-Jun-02	1	13.7	25.5	3.4	<0.010	<0.020	0.0332	0.217
		15	8.7	9.03	1.13	0.0285	0.147	0.0464	1.48
		25	7.5	0.969	0.29	0.0739	0.209	0.0537	1.85
		35	7.3	0.71	0.51	0.0864	0.230	0.0558	1.90
		55	6.8			0.0866	0.242	0.0586	2.06
	22-Jul-02	1	8.8	5.08	0.514	<0.010	0.126	0.0496	1.59
		15	7.9	3.11	0.493	0.0208	0.204	0.0555	2.03
		25	7.3	1.2	0.287	0.0273	0.232	0.0578	2.07
		35	7.3	0.79	0.339	0.0279	0.245	0.0663	2.12
		55	6.6			0.158	0.269	0.0738	2.29
	27-Aug-02	1	7.0	9.29	0.0843	0.018	0.224	0.0642	1.97
		15	6.0	0.72	0.55	0.0312	0.269	0.0613	2.14
		25	5.7	0.56	0.496	0.0960	0.280	0.0737	2.21
		35	5.7	0.47	0.479	0.145	0.285	0.0758	2.14
		55	5.4			0.0552	0.291	0.0688	2.22

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
KSSK02	23-Sep-02	1	6.8	4.54	<0.020	0.0308	0.240	0.0628	2.00
		15	6.2	4.41	0.573	0.0391	0.257	0.0646	2.08
		25	5.9	3.13	0.583	0.0435	0.261	0.0614	2.08
		35	5.6	1.65	0.671	0.0587	0.278	0.0732	2.03
		55	5.4			0.0831	0.290	0.0695	2.13
	21-Oct-02	1	5.9	1.13	0.225	0.0359	0.294	0.0678	2.28
		15	5.6	0.67	0.268	0.0333	0.305	0.0720	2.29
		25	5.5	0.58	0.375	0.0330	0.306	0.0680	2.25
		35	5.5	0.58	0.274	0.0338	0.310	0.0742	2.32
		55	5.5			0.0341	0.311	0.0721	2.35
	20-Nov-02	1	6.1	0.38	0.135	<0.010	0.380	0.0752	2.71
		15	5.7	0.26	0.13	<0.010	0.385	0.0765	2.64
		25	5.7	0.26	0.145	<0.010	0.386	0.0710	2.70
		35	5.6	0.23	0.134	<0.010	0.386	0.0782	2.69
		55	5.6			0.0776	0.390	0.0850	2.73
	16-Dec-02	1	6.4	0.207	0.188	0.0500	0.420	0.0851	3.06
		15	6.4	0.206	0.153	0.0452	0.412	0.0834	3.01
		25	6.5	0.209	0.155	<0.010	0.408	0.0763	3.03
		35	6.4	0.171	0.142	<0.010	0.394	0.0798	2.95
		55	6.4			0.0800	0.413	0.0931	3.02
LTBC41	29-Jan-02	1	9.0	0.379	<0.30	<0.010	0.436	0.0847	3.91
		15	8.8	0.3	<0.30	<0.010	0.421	0.0804	3.61
		23	8.8	0.26	<0.30	<0.010	0.419	0.0833	3.64
	20-Feb-02	1	9.9	0.526	0.172	<0.010	0.427	0.0788	4.10
		15	9.8	0.719	0.219	<0.010	0.417	0.0800	3.82
		23	9.7	0.431	0.157	<0.010	0.419	0.0808	3.78
	18-Mar-02	1	8.8	0.669	0.183	0.012	0.420	0.0692	4.72
		15	8.4	0.808	0.131	<0.010	0.416	0.0766	3.56
		23	8.2	0.581	0.125	<0.010	0.412	0.0766	3.44
	22-Apr-02	1	9.4	1.87	0.255	0.0234	0.320	0.0548	4.19
		15	8.7	4.02	0.326	0.019	0.340	0.0646	2.65
		23	8.4	1.88	0.361	0.0230	0.360	0.0672	2.82
	28-May-02	1	6.5	4.24	0.837	0.0418	0.173	0.0463	3.34
		15	5.9	6.39	1.03	0.0502	0.215	0.0515	1.84
		23	5.9	5.53	0.821	0.0539	0.226	0.0532	1.93
	25-Jun-02	1	10.3	8	0.775	0.017	0.141	0.0438	3.20
		15	7.9	1.99	0.468	0.0585	0.178	0.0499	1.72
		23	7.8	1.62	0.424	0.0703	0.202	0.0534	1.78
	22-Jul-02	1	9.7	7.59	1.57	<0.010	0.167	0.0560	2.38
		15	7.8	2.72	0.821	0.011	0.205	0.0555	1.93
		23	7.2	1.18	0.461	0.0266	0.226	0.0644	2.06
	27-Aug-02	1	9.1	30.7	1.08	<0.010	0.039	0.0460	1.41
		15	5.9	0.451	0.303	0.0347	0.267	0.0642	2.16
		23	5.9	0.238	0.408	0.0360	0.272	0.0593	2.17
	23-Sep-02	1	6.9	8.46	0.542	0.017	0.225	0.0618	1.94
		15	5.8	0.988	0.194	0.0386	0.267	0.0665	2.09
		23	5.7	0.902	0.245	0.0391	0.281	0.0651	2.06

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
LTBC41	21-Oct-02	1	5.6	0.28	0.126	0.0337	0.310	0.0678	2.52
		15	5.4	0.46	0.113	0.0344	0.305	0.0634	2.39
		23	5.3	0.29	0.129	0.0323	0.310	0.0726	2.34
	20-Nov-02	1	6.3	0.33	0.105	<0.010	0.383	0.0794	2.79
		15	6.1	0.26	0.127	<0.010	0.380	0.0782	2.62
		23	6.1	0.3	0.0997	<0.010	0.380	0.0732	2.60
	17-Dec-02	1	6.8	0.412	0.171	0.012	0.416	0.0727	3.51
		15	6.6	0.221	0.112	<0.010	0.398	0.0753	3.02
		23	6.4	0.186	0.0816	<0.010	0.400	0.0755	3.02
LSEP01	29-Jan-02	1	8.8	1.07	<0.30	<0.010	0.418	0.0819	3.51
		15	8.7	0.32	<0.30	<0.010	0.421	0.0794	3.28
		25	8.6	0.384	<0.30	<0.010	0.415	0.0908	3.27
		35	8.5	0.2	<0.30	<0.010	0.418	0.0822	3.34
		55	8.5			<0.010	0.415	0.0819	3.35
		100	8.0			0.015	0.416	0.0849	3.38
		150	8.0			0.010	0.413	0.0869	3.31
	20-Feb-02	1	10.0	1.36	0.201	<0.010	0.409	0.0809	3.78
		15	9.8	0.568	0.176	<0.010	0.415	0.0803	3.84
		25	9.7	0.74	0.183	<0.010	0.400	0.0802	3.73
		35	9.7	0.522	0.164	<0.010	0.414	0.0798	3.70
		55	9.5			<0.010	0.416	0.0811	3.47
		100	9.3			0.0683	0.409	0.0834	3.27
		150	9.3			0.0433	0.407	0.0832	3.31
	18-Mar-02	61	8.0	5.59	0.384	<0.010	0.368	0.0696	3.39
		78	7.8	0.477	0.143	<0.010	0.400	0.0742	3.53
		89	7.8	0.699	0.157	<0.010	0.405	0.0728	3.56
		106	7.9			0.0332	0.402	0.0760	3.18
		108	7.8			0.0352	0.402	0.0760	3.30
		144	7.8			0.0230	0.398	0.0838	3.26
		154	7.8			0.0231	0.399	0.0780	3.27
		160	7.8	0.324	0.235	0.0695	0.397	0.0803	3.29
	22-Apr-02	1	9.2	6.37	0.648	0.013	0.292	0.0605	2.75
		15	8.5	6.53	1.05	0.016	0.325	0.0649	2.80
		25	8.1	3.86	0.519	0.019	0.340	0.0697	2.78
		35	8.0	2.06	0.555	0.0220	0.351	0.0653	2.82
		55	7.8			0.0321	0.359	0.0664	2.62
		100	7.8			0.0422	0.343	0.119	2.53
		150	7.8			0.0357	0.343	0.0676	2.44
	28-May-02	1	6.0	10.3	1.03	0.0312	0.183	0.0500	1.60
		15	5.7	8.2	1.21	0.0371	0.209	0.0502	1.66
		25	5.6	7.63	1.09	0.0384	0.215	0.0493	1.74
		35	5.4	6.3	1.04	0.0456	0.219	0.0543	1.75
		55	5.0			0.0512	0.240	0.0573	2.03
		100	4.7			0.0618	0.278	0.0571	2.21
		150	4.6			0.0713	0.282	0.0618	2.21
	25-Jun-02	1	10.0	19.2	3.66	0.015	0.0669	0.0401	1.29
		15	8.4	11.7	1.44	0.0342	0.145	0.0467	1.61
		25	7.9	4.18	0.543	0.0576	0.196	0.0521	1.85
		35	7.8	4.02	0.489	0.0609	0.205	0.0516	1.90
		55	7.1			0.0693	0.226	0.0534	1.93
		100	6.3			0.0715	0.283	0.0599	2.18
		150	6.2			0.0764	0.290	0.0643	2.36

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
LSEP01	22-Jul-02	1	9.7	5.66	0.514	<0.010	0.141	0.0449	1.94
		15	7.8	4.49	0.45	0.0206	0.221	0.0535	1.85
		25	7.6	4.24	0.347	0.0208	0.235	0.0540	1.94
		35	7.6	2.57	0.45	0.0201	0.239	0.0548	1.87
		55	6.3			0.0211	0.303	0.0664	2.07
		100	5.7			0.0208	0.333	0.0640	2.49
		150	5.5			0.0510	0.349	0.0706	2.58
	27-Aug-02	1	7.2	6.79	<0.020	0.016	0.227	0.0600	2.03
		15	6.1	2.25	0.216	0.0237	0.268	0.0646	2.16
		25	6.1	1.82	0.27	0.0256	0.269	0.0651	2.17
		35	6.0	1.44	0.176	0.0258	0.271	0.0614	2.19
		55	5.6			0.0326	0.285	0.0647	2.11
		100	5.3			0.0882	0.290	0.0601	2.13
		150	5.3			0.0786	0.287	0.0654	2.29
	23-Sep-02	1	6.8	6.33	0.0716	0.0299	0.232	0.0605	2.16
		15	6.4	6.35	0.0619	0.0334	0.233	0.0625	2.18
		25	6.3	3.51	0.19	0.0360	0.239	0.0644	2.22
		35	6.2	4.97	0.263	0.0380	0.243	0.0636	2.27
		55	5.9			0.0367	0.251	0.0637	2.18
		100	5.3			0.0394	0.298	0.0652	2.03
		150	5.2			0.117	0.294	0.0692	2.18
	21-Oct-02	1	5.8	0.92	0.209	0.0363	0.292	0.0723	2.34
		15	5.7	0.99	0.239	0.0378	0.295	0.0672	2.39
		25	5.6	0.93	0.249	0.0374	0.296	0.0705	2.30
		35	5.5	0.71	0.228	0.0367	0.296	0.0718	2.37
		55	5.3			0.0315	0.299	0.0705	2.30
		100	4.9			0.0282	0.345	0.0734	2.56
		150	5.0			0.0536	0.337	0.0763	2.58
	20-Nov-02	1	6.1	0.43	0.121	<0.010	0.380	0.0790	2.80
		15	5.8	0.39	0.145	<0.010	0.379	0.0764	2.55
		25	5.7	0.51	0.164	<0.010	0.379	0.0786	2.73
		35	5.6	0.31	0.154	<0.010	0.382	0.111	2.74
		55	5.4			<0.010	0.384	0.0779	2.74
		100	5.2			0.013	0.395	0.0781	2.54
		150	5.4			0.018	0.393	0.0787	2.71
	17-Dec-02	1	6.3	0.235	0.1	<0.010	0.407	0.0788	3.13
		15	6.3	0.235	0.11	<0.010	0.403	0.0786	3.16
		25	6.3	0.2	0.101	<0.010	0.403	0.0770	3.16
		35	6.2	0.207	0.118	<0.010	0.403	0.0769	3.14
		55	6.2			<0.010	0.416	0.0754	3.09
		100	6.1			0.0214	0.411	0.0772	3.02
		150	6.1			0.0344	0.402	0.0796	2.98
LSKQ06	29-Jan-02	1	8.9	0.482	<0.30	<0.010	0.418	0.0809	3.60
		15	8.9	0.401	<0.30	<0.010	0.424	0.0837	3.65
		25	8.9	0.331	<0.30	<0.010	0.421	0.0831	3.66
		35	8.8	0.42	<0.30	0.013	0.425	0.0846	3.63
	20-Feb-02	1	10.0	1.62	0.267	<0.010	0.410	0.0793	3.71
		15	9.8	0.565	0.13	<0.010	0.414	0.0819	3.60
		25	9.6	0.437	0.176	<0.010	0.417	0.0833	3.82
		35	9.5	0.451	0.192	<0.010	0.416	0.0836	3.76

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
LSKQ06	18-Mar-02	1	8.5	1.19	0.214	<0.010	0.430	0.0725	3.33
		15	8.5	1.14	0.216	<0.010	0.406	0.0776	3.19
		25	8.5	0.878	0.158	<0.010	0.410	0.0766	3.29
		35	8.5	0.831	0.238	<0.010	0.408	0.0761	3.33
	22-Apr-02	1	9.2	4.41	0.956	0.015	0.313	0.0607	2.98
		15	8.6	6.44	0.484	0.016	0.323	0.0648	2.72
		25	8.5	5.85	0.399	0.018	0.327	0.0633	2.75
		35	8.2	2.96	0.638	0.0225	0.351	0.0650	2.81
	28-May-02	1	5.8	8.09	1.34	0.0347	0.209	0.0514	1.74
		15	5.7	6.69	1.14	0.0413	0.223	0.0546	1.82
		25	5.7	6.45	1.05	0.0388	0.226	0.0551	1.85
		35	5.7	6.78	1.21	0.0421	0.231	0.0600	1.85
	25-Jun-02	1	9.6	18.1	3.66	0.017	0.121	0.0518	1.42
		15	8.5	8.62	1.58	0.0357	0.170	0.0494	1.56
		25	8.2	6.83	0.768	0.0587	0.215	0.0517	1.77
		35	7.8	3.55	0.634	0.0588	0.209	0.0514	1.77
	22-Jul-02	1	9.1	7.68	1.09	0.011	0.169	0.0506	1.71
		15	7.9	3.17	0.541	0.020	0.222	0.0558	1.82
		25	7.3	1.95	0.415	0.0229	0.247	0.0570	1.88
		35	7.2	1.68	0.561	0.0214	0.261	0.0588	1.94
	27-Aug-02	1	6.7	2.18	0.174	0.0211	0.252	0.0649	2.09
		15	6.0	1.57	0.197	0.0241	0.271	0.0627	2.24
		25	5.9	1.35	0.162	0.0262	0.276	0.0644	2.20
		35	5.9	1.17	0.545	0.0269	0.279	0.0626	2.23
	23-Sep-02	1	6.8	5.04	0.226	0.0292	0.235	0.0602	2.08
		15	6.4	4.82	<0.020	0.0322	0.246	0.0632	2.10
		25	6.3	4.32	0.196	0.0327	0.248	0.0633	2.18
		35	6.3	4.58	0.36	0.0341	0.261	0.0662	2.16
	21-Oct-02	1	5.7	0.924	0.3	0.0332	0.294	0.0724	2.17
		15	5.5	0.856	0.202	0.0343	0.299	0.0679	2.27
		25	5.5	0.81	0.225	0.0345	0.300	0.0697	2.34
		35	5.5	0.66	0.286	0.0340	0.301	0.0711	2.36
	20-Nov-02	1	5.9	0.49	0.134	<0.010	0.381	0.0782	2.70
		15	5.7	0.32	0.172	<0.010	0.383	0.0774	2.88
		25	5.7	0.34	0.239	<0.010	0.409	0.0759	2.83
		35	5.6	0.38	0.192	<0.010	0.381	0.0821	2.82
	17-Dec-02	1	6.6	0.251	0.132	<0.010	0.399	0.0814	3.10
		15	6.3	0.202	0.109	<0.010	0.404	0.0785	3.15
		25	6.2	0.167	0.113	<0.010	0.405	0.0715	3.11
		35	6.2	0.189	0.111	<0.010	0.402	0.0799	3.02
VO50E	29-Jan-02	1	8.8	0.331	<0.30	<0.010	0.421	0.0840	3.65
		5	8.8	0.311	<0.30	<0.010	0.420	0.0835	3.64
		10	8.8	0.3	<0.30	<0.010	0.413	0.0841	3.59
	20-Feb-02	1	10.2	1.51	0.249	<0.010	0.413	0.0861	3.83
		5	10.1	1.27	0.345	<0.010	0.417	0.0830	3.83
		10	10.1	0.621	0.203	<0.010	0.415	0.0796	3.88
	18-Mar-02	1	8.2	0.75	0.214	<0.010	0.407	0.0757	3.35
		5	8.2	0.675	0.225	<0.010	0.407	0.0746	3.40
		10	8.2	0.699	0.192	<0.010	0.409	0.0770	3.38

Table A-1
2002 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
VO50E	22-Apr-02	1	8.9	5.04	0.386	0.016	0.322	0.0624	2.82
		5	8.7	5.05	0.443	0.015	0.326	0.0630	2.73
		10	8.7	5.09	0.568	0.016	0.335	0.0613	2.84
	28-May-02	1	6.2	8.22	1.11	0.0259	0.183	0.0528	1.57
		5	6.1	8.81	1.25	0.0249	0.189	0.0510	1.59
		10	6.0	8.64	1.18	0.0301	0.210	0.0503	1.64
	25-Jun-02	1	9.4	13.1	3.94	0.018	0.106	0.0504	1.37
		5	9.0	11	3.1	0.019	0.127	0.0470	1.39
		10	8.6	9.42	1.84	0.0288	0.146	0.0490	1.47
	22-Jul-02	1	9.8	10.6	1.58	<0.010	0.145	0.0576	1.70
		5	9.7	12.7	1.27	0.012	0.148	0.0556	1.70
		13	9.7	13.2	1.47	0.010	0.155	0.0604	1.70
	27-Aug-02	1	6.9	3.02	0.321	0.0224	0.231	0.0617	2.01
		5	6.4	1.42	0.342	0.0261	0.256	0.0655	2.19
		10	6.3	1.25	0.237	0.0262	0.257	0.0646	2.11
	23-Sep-02	1	7.0	7.06	0.651	0.0233	0.232	0.0600	2.06
		5	7.0	7.94	0.411	0.0230	0.223	0.0608	2.04
		10	7.0	8.65	0.666	0.0241	0.226	0.0607	2.04
	21-Oct-02	1	6.0	1.07	0.177	0.0362	0.290	0.0707	2.32
		5	6.0	1.02	0.203	0.0357	0.286	0.0700	2.27
		10	6.0	0.993	0.209	0.0337	0.291	0.0717	2.14
	20-Nov-02	1	6.0	0.41	0.301	<0.010	0.377	0.0802	2.82
		11	6.0	0.34	0.161	<0.010	0.378	0.0749	2.76
		12	6.0	0.35	0.185	<0.010	0.378	0.077	2.79
	16-Dec-02	1	6.8	0.342	0.334	<0.010	0.402	0.0794	3.01
		5	6.7	0.238	0.177	<0.010	0.402	0.0828	2.98
		10	6.7	0.238	0.164	<0.010	0.398	0.0775	2.95

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
PTWELLS1	29-Jan-02	1	7.5	26.221	20.453	6.5	1.6	1.3	73
		15	8.6	29.159	22.677	-	1.1	0.9	1
		25	8.6	29.177	22.735	-	1.1	0.9	0
		35	8.6	29.219	22.812	-	1.1	1	0
		55	8.7	29.384	23.021	-	1.3	1.2	0
		100	8.6	29.450	23.289	-	1.3	1.8	0
		130	9.0	29.675	23.549	-	2.2	2.9	0
	20-Feb-02	1	8.4	28.745	22.315	7.6	0.63	4.4	60
		15	8.5	28.916	22.508	-	0.64	2	2
		25	8.5	28.979	22.598	-	0.69	2.6	0
		35	8.5	29.110	22.743	-	0.61	2.3	0
		55	8.4	29.245	22.959	-	0.65	2.7	0
		100	8.2	29.366	23.280	-	0.78	2.3	0
		130	8.3	29.441	23.472	-	1.3	3.03	0
	21-Mar-02	1	7.7	27.639	21.545	9.0	0.76	3.6	166
		15	8.0	29.121	22.730	-	0.56	2.9	8
		25	8.0	29.232	22.859	-	0.58	2.6	2
		35	8.0	29.237	22.911	-	0.63	2.9	0
		55	8.0	29.253	23.015	-	0.62	3.6	0
		100	8.0	29.465	23.389	-	0.81	3.3	0
		130	8.0	29.538	23.589	-	1.3	2.04	0
	22-Apr-02	1	9.5	26.019	20.026	7.5	<0.5	3.1	69
		15	8.3	29.005	22.596	-	<0.5	1.3	2
		25	8.2	29.149	22.768	-	<0.5	2.8	0
		35	8.2	29.242	22.894	-	<0.5	2.5	0
		55	8.2	29.402	23.111	-	<0.5	3.7	0
		100	8.3	29.714	23.550	-	0.53	3.6	0
		130	8.3	29.752	23.715	-	0.79	3	0
	28-May-02	1	11.4	27.744	21.069	3.8	1.3	6.63	0
		15	9.8	28.955	22.346	-	0.59	6.06	0
		25	9.4	29.187	22.620	-	<0.5	4.4	0
		35	9.4	29.240	22.714	-	<0.5	5.4	0
		55	9.1	29.513	23.064	-	<0.5	2.9	0
		100	9.0	29.766	23.477	-	0.75	3.2	0
		130	9.0	29.998	23.802	-	2.6	4.1	0
	24-Jun-02	1	13.1	27.263	20.404	2.9	1.7	7.2	52
		15	10.5	29.238	22.446	-	<0.5	6.9	0
		25	10.3	29.324	22.583	-	<0.5	6.5	0
		35	10.2	29.403	22.710	-	<0.5	5.9	0
		55	10.1	29.542	22.931	-	<0.5	7.08	0
		100	9.9	29.794	23.363	-	0.64	3.84	0
		130	9.8	29.958	23.617	-	1.3	6.4	0
	22-Jul-02	1	13.3	28.603	21.395	7.1	0.56	4.1	69
		15	11.6	29.340	22.339	-	<0.5	1.4	2
		25	11.4	29.384	22.448	-	<0.5	2.2	0
		35	11.0	29.546	22.689	-	<0.5	2.1	0
		55	10.7	29.812	23.044	-	<0.5	1.2	0
		100	10.6	29.910	23.345	-	0.75	2.4	0
		130	10.5	29.987	23.557	-	1.1	3.4	0

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
PTWELLS1	27-Aug-02	1	12.7	29.702	22.354	7.8	<0.5	4.9	45
		15	12.2	29.812	22.596	-	<0.5	1.1	1
		25	12.0	29.859	22.706	-	<0.5	1.8	0
		35	11.9	29.933	22.832	-	<0.5	2.04	0
		55	11.8	30.018	23.008	-	<0.5	0.8	0
		100	11.6	30.168	23.359	-	0.66	1.3	0
		130	11.5	30.273	23.602	-	1.3	1.7	0
	23-Sep-02	1	12.6	30.130	22.697	13.0	<0.5	1.8	54
		15	12.1	30.270	22.977	-	<0.5	1.5	2
		25	12.0	30.291	23.041	-	<0.5	1.2	1
		35	11.8	30.386	23.196	-	<0.5	1.4	0
		55	11.7	30.477	23.381	-	<0.5	2.6	0
		100	11.5	30.620	23.724	-	0.65	1.5	0
		130	11.5	30.672	23.911	-	0.95	2.9	0
	21-Oct-02	1	11.9	30.433	23.074	9.5	<0.5	1.4	62
		15	11.8	30.444	23.153	-	<0.5	1	3
		25	11.8	30.482	23.239	-	<0.5	1.3	1
		35	11.7	30.505	23.314	-	<0.5	1.2	0
		55	11.3	30.675	23.611	-	<0.5	1.32	0
		100	11.1	30.759	23.917	-	0.61	1.94	0
		130	10.8	30.880	24.189	-	2.4	5.5	0
	18-Nov-02	1	10.6	30.548	23.380	10.0	<0.5	2.1	83
		15	10.7	30.693	23.553	-	<0.5	2.1	5
		25	10.6	30.733	23.630	-	<0.5	<0.5	1
		35	10.6	30.760	23.706	-	<0.5	3.8	0
		55	10.6	30.784	23.817	-	<0.5	1.8	0
		100	10.4	30.920	24.154	-	<0.5	2.1	0
		130	10.3	30.990	24.364	-	<0.5	2.1	0
	17-Dec-02	1	9.9	30.277	23.293	8.0	<0.5	2.3	62
		15	10.0	30.564	23.554	-	<0.5	2.12	3
		25	10.0	30.609	23.639	-	<0.5	<0.5	1
		35	10.0	30.612	23.689	-	<0.5	<0.5	0
		55	10.0	30.617	23.786	-	<0.5	3.03	0
		100	9.7	30.735	24.127	-	<0.5	2.2	0
		130	9.7	30.748	24.277	-	<0.5	2.3	0
KSBP01	29-Jan-02	1	7.0	24.619	19.263	6.0	2.1	1.6	76
		15	8.6	29.038	22.589	-	1	1.8	1
		25	8.6	29.139	22.707	-	1	0.9	0
		35	8.7	29.255	22.837	-	1.1	1.7	0
		55	8.7	29.326	22.980	-	1.1	0.61	0
		100	8.7	29.453	23.276	-	1.5	1.31	0
		195	9.0	29.680	23.845	-	2	1.6	0
	20-Feb-02	1	8.5	28.794	22.348	8.1	0.6	2.1	59
		15	8.5	28.925	22.511	-	0.56	2.1	2
		25	8.5	29.034	22.640	-	0.61	2.1	0
		35	8.5	29.099	22.736	-	0.64	2.5	0
		55	8.3	29.305	23.020	-	0.76	3.3	0
		100	8.2	29.382	23.303	-	0.80	2.5	0
		195	8.3	29.474	23.799	-	1.4	3.7	0

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
KSBP01	21-Mar-02	61	8.0	29.383	23.143	6.3	0.63	3.8	0
		72	8.0	29.401	23.214	-	0.69	3.2	0
		87	8.0	29.454	23.323	-	0.74	2.7	0
		96	8.0	29.490	23.396	-	0.73	2.9	0
		114	7.9	29.568	23.554	-	0.88	1.7	0
		156	7.8	29.602	23.783	-	0.88	2.5	0
		248	7.8	29.700	24.287	-	1.6	3.6	0
		252	7.8	29.709	24.315	-	1.7	3.1	0
	22-Apr-02	1	9.3	27.040	20.856	6.2	0.63	4.2	62
		15	8.4	28.948	22.545	-	<0.5	3.3	1
		25	8.2	29.192	22.804	-	<0.5	3.1	0
		35	8.2	29.199	22.857	-	<0.5	3.1	0
		55	8.2	29.342	23.064	-	<0.5	1.5	0
		100	8.3	29.857	23.657	-	1.1	2.4	0
		195	8.4	30.050	24.232	-	1.6	3.8	0
	28-May-02	1	11.0	27.722	21.122	4.6	0.98	5.7	No Data
		15	9.7	28.993	22.382	-	0.57	5.13	No Data
		25	9.3	29.299	22.728	-	<0.5	4.6	No Data
		35	9.3	29.329	22.804	-	<0.5	2.42	No Data
		55	9.2	29.335	22.903	-	<0.5	3.8	No Data
		100	9.1	29.703	23.416	-	0.64	3.165	No Data
		195	9.0	29.947	24.050	-	1.3	3.84	No Data
	24-Jun-02	1	13.3	27.349	20.418	3.0	1.5	11.7	32
		15	11.1	28.881	22.072	-	<0.5	7.6	0
		25	10.6	29.146	22.392	-	<0.5	7.6	0
		35	10.4	29.289	22.589	-	<0.5	1.6	0
		55	10.1	29.485	22.882	-	<0.5	3.5	0
		100	10.0	29.677	23.249	-	<0.5	3.6	0
		195	9.7	29.999	23.985	-	3.1	7.5	0
	22-Jul-02	1	14.5	27.800	20.530	6.0	0.7	3.1	52
		15	12.3	29.152	22.075	-	<0.5	1.6	1
		25	11.6	29.343	22.393	-	<0.5	1.8	0
		35	11.3	29.457	22.580	-	<0.5	1.5	0
		55	11.0	29.584	22.822	-	<0.5	1.3	0
		100	10.7	29.845	23.278	-	<0.5	1.95	0
		195	10.3	30.081	23.947	-	2.5	5.8	0
	27-Aug-02	1	12.9	29.645	22.269	8.9	<0.5	4.1	75
		15	12.2	29.816	22.609	-	<0.5	0.9	1
		25	12.1	29.846	22.693	-	<0.5	2	0
		35	12.0	29.854	22.751	-	<0.5	0.8	0
		55	11.8	30.067	23.042	-	<0.5	1.83	0
		100	11.7	30.254	23.412	-	0.69	1.21	0
		195	11.6	30.321	23.918	-	1	1.17	0
	23-Sep-02	1	12.6	30.097	22.676	9.0	<0.5	1.7	52
		15	12.4	30.163	22.824	-	<0.5	0.9	2
		25	12.0	30.298	23.047	-	<0.5	1.1	0
		35	11.9	30.368	23.174	-	<0.5	2	0
		55	11.8	30.438	23.341	-	<0.5	0.7	0
		100	11.7	30.516	23.612	-	<0.5	2.2	0
		195	11.5	30.654	24.182	-	0.65	1.8	0

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
KSBP01	21-Oct-02	1	11.9	30.403	23.042	9.5	<0.5	3.3	60
		15	11.7	30.513	23.227	-	<0.5	3.2	4
		25	11.4	30.631	23.418	-	<0.5	2.1	1
		35	11.4	30.653	23.490	-	<0.5	2.2	0
		55	11.4	30.655	23.584	-	<0.5	2.3	0
		100	11.2	30.728	23.876	-	<0.5	1.6	0
		195	11.0	30.806	24.400	-	0.59	2.3	0
	18-Nov-02	1	10.6	30.695	23.495	8.5	<0.5	1.3	78
		15	10.6	30.752	23.609	-	<0.5	2	4
		25	10.5	30.814	23.710	-	<0.5	1.4	1
		35	10.5	30.853	23.792	-	<0.5	2.4	0
		55	10.4	30.920	23.951	-	<0.5	0.5	0
		100	10.4	30.940	24.173	-	<0.5	1.95	0
		182	10.1	31.128	24.755	-	0.76	1.52	0
	17-Dec-02	1	9.9	30.424	23.398	9.0	<0.5	2.3	60
		15	10.0	30.602	23.592	-	0.53	1.8	3
		25	10.0	30.657	23.684	-	<0.5	2.22	1
		35	9.9	30.691	23.772	-	<0.5	1.63	0
		55	9.8	30.703	23.878	-	<0.5	1.1	0
		100	9.7	30.739	24.127	-	<0.5	1.635	0
		195	9.5	30.863	24.694	-	0.61	1.52	0
LTED04	29-Jan-02	1	8.2	26.007	20.206	8.2	1.5	1.6	75
		15	8.9	29.208	22.670	-	0.85	0.7	2
		25	9.0	29.237	22.732	-	0.83	1.4	0
		35	9.0	29.296	22.820	-	1.0	1.4	0
		55	9.0	29.376	22.971	-	0.98	2	0
		75	9.0	29.439	23.109	-	2.7	5	0
	20-Feb-02	1	8.6	28.609	22.183	7.7	<0.5	2.7	140
		15	8.5	28.939	22.519	-	0.61	2.6	2
		25	8.5	29.039	22.642	-	0.64	2.7	0
		35	8.5	29.071	22.711	-	0.66	2.2	0
		55	8.6	29.177	22.875	-	0.95	2.63	0
		75	8.5	29.365	23.125	-	2.3	5.7	0
	18-Mar-02	21	8.1	29.014	22.661	7.5	0.53	3.27	1
		35	8.1	29.098	22.792	-	0.57	2.42	0
		63	8.1	29.278	23.056	-	0.91	3.7	0
		67	8.1	29.339	23.124	-	1.1	2.92	0
		69	8.1	29.344	23.138	-	1.6	3.03	0
		81	8.1	29.453	23.289	-	1.7		0
		81	8.1	29.453	23.290	-	1.8	3	0
	22-Apr-02	1	8.7	25.770	19.953	4.2	1.6	3.2	67
		15	8.3	28.906	22.518	-	<0.5	2.1	1
		25	8.3	29.037	22.676	-	<0.5	2.4	0
		35	8.2	29.151	22.822	-	<0.5	1.85	0
		55	8.1	29.368	23.101	-	0.51	2.8	0
		75	8.0	29.558	23.352	-	1.1	3.4	0
	28-May-02	1	10.5	25.524	19.496	5.5	0.94	3.8	No Data
		15	9.7	29.027	22.415	-	<0.5	3.13	No Data
		25	9.5	29.127	22.573	-	<0.5	1.9	No Data
		35	9.3	29.157	22.670	-	<0.5	2.06	No Data
		55	9.2	29.226	22.831	-	<0.5	1.3	No Data
		75	9.0	29.575	23.224	-	1.2	3.1	No Data

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LTED04	25-Jun-02	1	11.8	28.257	21.396	6.2	0.79	6.5	38
		15	11.0	28.979	22.166	-	<0.5	3.1	1
		25	10.7	29.146	22.386	-	<0.5	4.4	0
		35	10.6	29.184	22.476	-	<0.5	4.6	0
		55	10.2	29.339	22.764	-	0.58	3.3	0
		75	9.8	29.594	23.109	-	0.62	2.5	0
	22-Jul-02	1	13.3	28.316	21.167	5.0	0.55	3.4	73
		15	11.6	29.176	22.204	-	<0.5	3	1
		25	11.5	29.208	22.295	-	<0.5	1.5	0
		35	11.4	29.254	22.405	-	<0.5	1.4	0
		55	11.4	29.334	22.556	-	<0.5	2.6	0
		75	10.9	29.471	22.825	-	0.56	1	0
	27-Aug-02	1	14.2	28.867	21.414	3.1	<0.5	3.05	69
		15	12.2	29.728	22.539	-	<0.5	1.3	1
		25	12.2	29.802	22.633	-	<0.5	1.7	0
		35	12.0	29.832	22.730	-	<0.5	0.98	0
		55	11.5	29.954	23.005	-	0.59	1.3	0
		75	11.3	30.181	23.318	-	1	2	0
	23-Sep-02	1	13.2	29.488	22.092	9.0	<0.5	1.93	77
		15	12.3	30.181	22.870	-	<0.5	1.1	3
		25	12.2	30.207	22.949	-	<0.5	1.3	1
		35	12.1	30.246	23.043	-	<0.5	1.6	0
		55	11.9	30.331	23.242	-	<0.5	1.5	0
		75	11.6	30.462	23.482	-	0.74	1.5	0
	21-Oct-02	1	12.1	30.145	22.813	10.0	<0.5	1.8	60
		15	11.8	30.460	23.164	-	<0.5	2	4
		25	11.8	30.496	23.248	-	<0.5	0.5	1
		35	11.7	30.524	23.324	-	<0.5	1.45	0
		55	11.6	30.595	23.501	-	<0.5	1.3	0
		75	11.3	30.703	23.722	-	0.74	1.7	0
	20-Nov-02	1	10.9	30.345	23.184	12.0	<0.5	2	57
		15	10.7	30.630	23.487	-	<0.5	0.7	3
		25	10.7	30.698	23.590	-	<0.5	<1.0	1
		35	10.7	30.724	23.660	-	<0.5	1.3	0
		55	10.6	30.786	23.808	-	0.57	0.7	0
		75	10.3	30.976	24.099	-	0.93	1.92	0
	16-Dec-02	1	10.0	29.805	22.898	7.0	0.51	1.7	44
		15	10.1	30.509	23.498	-	<0.5	2.73	2
		25	10.1	30.592	23.607	-	<0.5	1.6	0
		35	10.1	30.617	23.669	-	<0.5	1.2	0
		55	10.0	30.724	23.863	-	0.96	2.2	0
		75	9.8	30.747	24.008	-	1.1	2.5	0
LSNT01	29-Jan-02	1	8.8	29.248	22.651	9.1	1.2	1.3	70
		15	8.8	29.270	22.727	-	1.3	1.7	2
		25	8.9	29.278	22.779	-	1.3	1.6	0
		35	8.9	29.303	22.843	-	1.3	2.3	0
		55	8.9	29.325	22.947	-	1.4	2	0
		100	9.1	29.600	23.343	-	1.5	1.6	0
		200	9.3	29.809	23.932	-	2.4	1.9	0

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSNT01	20-Feb-02	1	8.6	28.999	22.487	11.0	<0.5	2.1	41
		15	8.5	29.028	22.588	-	0.52	2.9	1
		25	8.5	29.044	22.645	-	0.58	2.8	0
		35	8.5	29.064	22.705	-	0.59	2.5	0
		55	8.5	29.226	22.930	-	0.69	3.33	0
		100	8.3	29.387	23.287	-	0.8	5.4	0
		200	8.3	29.476	23.815	-	1.7	3.23	0
	18-Mar-02	93	8.1	29.187	23.134	7.0	0.69	6.6	0
		109	8.0	29.308	23.308	-	0.98	2.95	0
		120	8.0	29.429	23.453	-	1	3.74	0
		127	8.0	29.466	23.517	-	1.2	2.9	0
		143	8.0	29.516	23.635	-	1.5	3.5	0
		172	8.0	29.555	23.802	-	1.7	2.9	0
		184	8.0	29.559	23.858	-	1.8	2.7	0
	22-Apr-02	1	8.7	28.425	22.025	7.8	<0.5	3.7	65
		15	8.5	28.714	22.342	-	0.53	3.9	2
		25	8.3	28.998	22.636	-	0.56	3.3	0
		35	8.2	29.261	22.908	-	0.6	1.73	0
		55	8.1	29.509	23.205	-	0.61	2.83	0
		100	8.1	29.751	23.595	-	0.81	2.5	0
		200	8.3	29.968	24.198	-	3.1	4.5	0
	28-May-02	1	10.0	29.014	22.288	5.8	0.69	4.3	No Data
		15	9.7	29.136	22.494	-	0.77	4	No Data
		25	9.7	29.149	22.555	-	0.79	3.2	No Data
		35	9.6	29.187	22.640	-	0.94	4.48	No Data
		55	9.5	29.259	22.808	-	1.4	4.6	No Data
		100	9.1	29.565	23.310	-	0.65	3.67	No Data
		200	8.9	29.949	24.092	-	1	3.38	No Data
	25-Jun-02	1	11.6	28.802	21.853	5.8	0.85	6	21
		15	11.0	29.115	22.269	-	<0.5	5.9	1
		25	11.0	29.136	22.335	-	0.51	6.1	0
		35	10.9	29.192	22.443	-	0.55	7.3	0
		55	10.6	29.256	22.619	-	<0.5	5	0
		100	9.8	29.666	23.273	-	<0.5	3.3	0
		200	9.4	29.974	24.034	-	0.78	2.2	0
	22-Jul-02	1	13.6	28.846	21.516	6.5	<0.5	4.4	90
		15	12.6	29.110	21.979	-	<0.5	3.9	1
		25	12.5	29.123	22.048	-	0.53	2.5	0
		35	11.9	29.309	22.348	-	0.5	4.1	0
		55	11.4	29.491	22.679	-	0.58	1.5	0
		100	10.5	29.905	23.357	-	<0.5	0.6	0
		200	10.2	30.072	23.985	-	0.67	3.5	0
	27-Aug-02	1	12.7	29.753	22.394	11.0	<0.5	2.55	50
		15	12.0	29.859	22.661	-	<0.5	1.2	2
		25	12.0	29.864	22.713	-	<0.5	1.94	0
		35	12.0	29.864	22.758	-	<0.5	1.5	0
		55	11.8	29.951	22.951	-	<0.5	1.4	0
		100	11.5	30.227	23.437	-	0.64	2.3	0
		200	11.4	30.278	23.944	-	1.1	3.3	0

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSNT01	23-Sep-02	1	12.5	30.172	22.761	11.0	<0.5	1.5	64
		15	12.4	30.182	22.848	-	<0.5	2.5	1
		25	12.4	30.185	22.898	-	<0.5	2.8	0
		35	12.4	30.187	22.948	-	<0.5	1.4	0
		55	12.3	30.213	23.075	-	<0.5	2.7	0
		100	11.6	30.531	23.644	-	<0.5	1.5	0
		200	11.4	30.694	24.256	-	1.2	3.4	0
	21-Oct-02	1	11.9	30.471	23.107	10.0	<0.5	1.5	62
		15	11.7	30.503	23.217	-	<0.5	1.5	3
		25	11.7	30.522	23.285	-	<0.5	2.1	0
		35	11.7	30.524	23.332	-	<0.5	2.1	0
		55	11.6	30.546	23.448	-	<0.5	1.7	0
		100	11.2	30.734	23.880	-	<0.5	0.6	0
		200	10.8	30.879	24.505	-	1.2	2.8	0
	20-Nov-02	1	10.6	30.720	23.512	11.0	<0.5	1.1	35
		15	10.6	30.725	23.582	-	<0.5	2.14	3
		25	10.6	30.727	23.629	-	<0.5	1.3	1
		35	10.6	30.742	23.686	-	<0.5	1.01	0
		55	10.6	30.784	23.819	-	<0.5	0.9	0
		100	10.4	30.938	24.177	-	<0.5	1	0
		200	10.1	31.105	24.800	-	1.5	2.6	0
	16-Dec-02	1	10.1	30.614	23.512	7.0	0.55	2.22	64
		15	10.2	30.623	23.583	-	<0.5	2.21	1
		25	10.2	30.629	23.634	-	<0.5	1.34	0
		35	10.2	30.630	23.679	-	<0.5	2.27	0
		55	10.1	30.641	23.788	-	<0.5	1.1	0
		100	9.7	30.729	24.124	-	<0.5	0.6	0
		200	9.4	30.822	24.690	-	3.6	9.15	0
KSRU02	29-Jan-02	Surface	7.4	-	-	-	-	-	-
	20-Feb-02	Surface	7.8	-	-	-	-	-	-
	18-Mar-02	Surface	7.2	-	-	-	-	-	-
	22-Apr-02	Surface	9.1	-	-	-	-	-	-
	28-May-02	Surface	11.6	-	-	-	-	-	-
	24-Jun-02	Surface	14.7	-	-	-	-	-	-
	22-Jul-02	Surface	15.5	-	-	-	-	-	-
	27-Aug-02	Surface	15.6	-	-	-	-	-	-
	23-Sep-02	Surface	13.5	-	-	-	-	-	-
	21-Oct-02	Surface	13.8	-	-	-	-	-	-
	18-Nov-02	Surface	10.9	-	-	-	-	-	-
	16-Dec-02	Surface	9.7	-	-	-	-	-	-

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
PTWELLS1	29-Jan-02	1	9.1	0.955	<0.30	<0.010	0.407	0.0757	3.78
		15	8.6	0.371	<0.30	<0.010	0.416	0.0814	3.51
		25	8.6	0.28	<0.30	<0.010	0.417	0.0822	3.54
		35	8.5	0.35	<0.30	<0.010	0.416	0.0819	3.52
		55	8.5	-	-	<0.010	0.413	0.0817	3.48
		100	8.4	-	-	<0.010	0.413	0.0796	3.43
		130	8.1	-	-	<0.010	0.413	0.0889	3.55
	20-Feb-02	1	10.1	0.888	0.3	<0.010	0.420	0.0839	3.67
		15	10.0	0.608	0.255	<0.010	0.424	0.0810	3.67
		25	9.9	0.702	0.19	<0.010	0.421	0.0809	3.63
		35	9.8	0.41	0.184	<0.010	0.425	0.0826	3.58
		55	9.7	-	-	<0.010	0.414	0.0805	3.50
		100	9.7	-	-	<0.010	0.403	0.0777	3.35
		130	9.6	-	-	<0.010	0.400	0.0805	3.51
	21-Mar-02	1	8.8	2.65	0.716	0.012	0.369	0.0663	3.38
		15	8.0	0.437	0.136	0.010	0.405	0.0716	3.26
		25	7.9	0.383	0.138	<0.010	0.408	0.0728	3.27
		35	7.9	0.371	0.141	<0.010	0.414	0.0737	3.32
		55	7.9	-	-	<0.010	0.407	0.0724	3.27
		100	7.9	-	-	<0.010	0.396	0.0754	3.16
		130	7.9	-	-	<0.010	0.396	0.0757	3.17
	22-Apr-02	1	9.3	1.86	0.588	0.0281	0.281	0.0575	2.92
		15	8.2	3.05	0.743	0.0260	0.343	0.0609	2.84
		25	8.1	1.68	0.734	0.0305	0.362	0.0654	2.84
		35	8.0	1.41	0.311	0.0284	0.358	0.0683	2.77
		55	7.9	-	-	0.0308	0.356	0.0662	2.61
		100	7.8	-	-	0.0346	0.346	0.0650	2.49
		130	7.8	-	-	0.0466	0.348	0.0752	2.57
	28-May-02	1	7.3	32.7	1.37	0.014	<0.020	0.0332	0.64
		15	5.7	10.8	1.54	0.0427	0.204	0.0485	1.67
		25	5.5	5.04	0.865	0.0550	0.231	0.0551	1.84
		35	5.4	3.54	0.726	0.0555	0.238	0.0555	1.94
		55	5.0	-	-	0.0628	0.266	0.0619	2.10
		100	4.8	-	-	0.0600	0.272	0.0603	2.14
		130	4.7	-	-	0.0595	0.274	0.0647	2.22
	24-Jun-02	1	10.6	24.7	3.67	<0.010	<0.020	0.0322	0.36
		15	7.4	0.604	0.631	0.0746	0.213	0.0527	1.67
		25	7.3	0.319	0.601	0.0776	0.223	0.0526	1.76
		35	7.1	0.248	0.247	0.0757	0.233	0.0533	1.80
		55	6.8	-	-	0.0694	0.246	0.0581	1.79
		100	6.3	-	-	0.0566	0.267	0.0592	1.88
		130	6.1	-	-	0.0554	0.282	0.0627	2.08
	22-Jul-02	1	8.5	8.15	1.03	<0.010	0.118	0.0419	1.42
		15	7.2	0.782	0.337	0.0292	0.255	0.0547	1.91
		25	7.0	0.326	0.284	0.0312	0.261	0.0553	1.93
		35	6.6	0.214	0.312	0.0316	0.285	0.0630	1.98
		55	6.0	-	-	0.0262	0.296	0.0600	2.11
		100	5.8	-	-	0.0235	0.311	0.0609	2.12
		130	5.7	-	-	0.0204	0.312	0.0663	2.17

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
PTWELLS1	27-Aug-02	1	6.9	6.71	1.47	0.019	0.219	0.0576	1.81
		15	6.0	1.08	0.525	0.0355	0.269	0.0674	1.97
		25	5.8	0.443	0.553	0.0411	0.276	0.0634	2.12
		35	5.7	0.339	0.628	0.0404	0.280	0.0657	2.21
		55	5.7	-	-	0.0401	0.276	0.0606	2.17
		100	5.6	-	-	0.0421	0.274	0.0633	2.20
		130	5.5	-	-	0.0459	0.275	0.0668	2.20
	23-Sep-02	1	7.0	5.69	0.826	0.0270	0.213	0.0591	2.01
		15	5.7	0.395	1.35	0.0464	0.280	0.0659	2.23
		25	5.6	0.356	0.898	0.0439	0.293	0.0673	2.13
		35	5.4	0.315	0.988	0.0407	0.295	0.0685	2.15
		55	5.4	-	-	0.0413	0.298	0.0671	2.20
		100	5.4	-	-	0.0433	0.294	0.0660	2.25
		130	5.4	-	-	0.0469	0.293	0.0614	2.24
	21-Oct-02	1	6.0	0.737	0.247	0.0404	0.306	0.0700	2.36
		15	5.8	0.637	0.218	0.0405	0.297	0.0718	2.33
		25	5.6	0.398	0.299	0.0367	0.299	0.0696	2.15
		35	5.6	0.379	0.257	0.0352	0.305	0.0684	2.28
		55	5.2	-	-	0.0265	0.328	0.0705	2.37
		100	5.1	-	-	0.0270	0.299	0.0676	2.25
		130	5.1	-	-	0.0289	0.329	0.0750	2.48
	18-Nov-02	1	6.2	0.35	0.145	<0.010	0.383	0.0794	2.71
		15	5.8	0.24	0.0962	<0.010	0.382	0.0960	2.71
		25	5.7	0.235	0.0896	<0.010	0.381	0.0789	2.53
		35	5.8	0.258	0.0943	<0.010	0.379	0.0834	2.53
		55	5.7	-	-	<0.010	0.381	0.0779	2.64
		100	5.5	-	-	<0.010	0.385	0.0777	2.66
		130	5.5	-	-	<0.010	0.388	0.0785	2.71
	17-Dec-02	1	6.8	0.379	0.198	<0.010	0.399	0.0821	2.98
		15	6.4	0.186	0.089	<0.010	0.402	0.0744	3.09
		25	6.4	0.252	0.0912	<0.010	0.402	0.0958	3.13
		35	6.4	0.162	0.0976	<0.010	0.408	0.0787	2.97
		55	6.4	-	-	<0.010	0.399	0.0781	2.99
		100	6.3	-	-	<0.010	0.398	0.0762	2.89
		130	6.3	-	-	<0.010	0.396	0.0775	2.91
KSBP01	29-Jan-02	1	9.5	0.845	<0.30	<0.010	0.404	0.0747	3.65
		15	8.7	0.372	<0.30	<0.010	0.416	0.0847	3.49
		25	8.7	0.441	<0.30	<0.010	0.419	0.0782	3.50
		35	8.6	0.27	<0.30	<0.010	0.420	0.0799	3.49
		55	8.5	-	-	<0.010	0.435	0.0813	3.62
		100	8.4	-	-	<0.010	0.410	0.0823	3.35
		195	8.1	-	-	<0.010	0.404	0.0828	3.21
	20-Feb-02	1	10.1	0.785	0.246	<0.010	0.423	0.0772	3.94
		15	10.0	0.728	0.198	<0.010	0.419	0.0936	3.91
		25	9.9	0.539	0.196	<0.010	0.418	0.0803	3.91
		35	9.8	0.49	0.173	<0.010	0.420	0.0796	3.84
		55	9.8	-	-	<0.010	0.408	0.0769	3.56
		100	9.8	-	-	0.0328	0.395	0.0757	3.44
		195	9.6	-	-	<0.010	0.385	0.0765	3.44

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
KSBP01	21-Mar-02	61	7.9	4.84	0.586	0.013	0.335	0.0649	3.03
		72	8.0	1.54	0.292	<0.010	0.393	0.0730	3.36
		87	8.0	0.955	0.364	0.011	0.394	0.0740	3.30
		96	8.0	0.843	0.414	<0.010	0.401	0.0709	3.27
		114	8.1	-	-	<0.010	0.408	0.0722	3.31
		156	8.1	-	-	<0.010	0.395	0.0731	3.26
		248	8.1	-	-	0.012	0.377	0.0718	3.09
		252	8.1	-	-	<0.010	0.379	0.0702	3.07
	22-Apr-02	1	9.3	4.04	0.285	0.0224	0.283	0.0602	2.85
		15	8.1	4.69	1.4	0.017	0.324	0.0633	2.76
		25	8.0	1.4	0.581	0.0242	0.361	0.0644	2.85
		35	8.0	2.1	0.902	0.0254	0.370	0.0682	2.95
		55	7.9	-	-	0.0339	0.363	0.0683	2.85
		100	7.7	-	-	0.0313	0.347	0.0666	2.58
		195	7.7	-	-	0.0289	0.342	0.0657	2.52
	28-May-02	1	6.1	17.8	1.46	0.013	0.0954	0.0405	1.25
		15	5.2	9.36	1.84	0.0445	0.207	0.0541	1.75
		25	5.0	4.01	0.654	0.0549	0.250	0.0578	2.07
		35	5.0	3.06	0.474	0.0572	0.246	0.0607	2.12
		55	4.8	-	-	0.0608	0.246	0.0573	2.17
		100	4.6	-	-	0.0576	0.261	0.0573	2.08
		195	4.5	-	-	0.0560	0.279	0.0588	2.11
	24-Jun-02	1	10.7	24.4	3.38	<0.010	<0.020	0.0364	0.75
		15	7.9	2.58	1.26	0.0587	0.186	0.0494	1.64
		25	7.5	1.21	0.963	0.0748	0.220	0.0533	1.67
		35	7.3	0.472	0.672	0.0700	0.205	0.0548	1.86
		55	7.0	-	-	0.0759	0.237	0.0560	1.77
		100	6.6	-	-	0.0673	0.257	0.0563	1.81
		195	6.2	-	-	0.0602	0.287	0.0618	2.00
	22-Jul-02	1	10.4	7.52	1.11	<0.010	0.116	0.0412	1.43
		15	7.9	1.86	0.378	0.0207	0.219	0.0498	1.79
		25	7.1	1.33	0.479	0.0341	0.251	0.0525	1.88
		35	6.8	0.423	0.406	0.0319	0.261	0.0558	1.98
		55	6.5	-	-	0.0321	0.294	0.0593	1.90
		100	6.0	-	-	0.0276	0.312	0.0625	2.15
		195	5.5	-	-	0.014	0.335	0.0653	2.36
	27-Aug-02	1	7.0	12.7	0.42	0.011	0.182	0.0564	1.86
		15	5.9	0.588	0.683	0.0337	0.276	0.0643	2.23
		25	5.8	0.453	0.615	0.0366	0.279	0.0631	2.23
		35	5.8	0.38	0.447	0.0376	0.282	0.0642	2.17
		55	5.8	-	-	0.0386	0.272	0.0603	2.10
		100	5.9	-	-	0.0378	0.263	0.0584	2.06
		195	5.7	-	-	0.0416	0.265	0.0617	2.13
	23-Sep-02	1	7.2	10.6	0.468	0.0223	0.207	0.0606	1.94
		15	6.3	0.762	0.768	0.0427	0.249	0.0631	2.04
		25	5.7	0.725	1.64	0.0446	0.267	0.0617	2.19
		35	5.5	0.73	1.92	0.0437	0.286	0.0631	2.20
		55	5.4	-	-	0.0391	0.296	0.0651	2.28
		100	5.6	-	-	0.0408	0.287	0.0676	2.22
		195	5.5	-	-	0.0430	0.291	0.0632	2.10

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
KSBP01	21-Oct-02	1	6.0	0.658	0.196	0.0413	0.292	0.0685	2.48
		15	5.4	0.306	0.31	0.0363	0.307	0.0745	2.52
		25	5.2	0.277	0.365	0.0311	0.314	0.0639	2.41
		35	5.2	0.222	0.362	0.0274	0.327	0.0716	2.31
		55	5.2	-	-	0.0275	0.326	0.0700	2.39
		100	5.2	-	-	0.0262	0.330	0.0739	2.25
		195	5.3	-	-	0.0272	0.328	0.0720	2.34
	18-Nov-02	1	5.9	0.242	0.0903	<0.010	0.380	0.0767	2.77
		15	5.7	0.231	0.116	<0.010	0.380	0.0800	2.80
		25	5.5	0.178	0.108	<0.010	0.384	0.0753	2.80
		35	5.4	0.167	0.126	<0.010	0.391	0.0765	2.81
		55	5.4	-	-	<0.010	0.387	0.0788	2.87
		100	5.4	-	-	<0.010	0.390	0.0760	2.68
		182	5.6	-	-	<0.010	0.397	0.0840	2.69
	17-Dec-02	1	6.6	0.275	0.105	<0.010	0.403	0.0758	3.17
		15	6.3	0.212	0.116	<0.010	0.401	0.0830	3.08
		25	6.2	0.182	0.132	<0.010	0.404	0.0746	3.10
		35	6.2	0.163	0.131	<0.010	0.403	0.0759	3.01
		55	6.3	-	-	<0.010	0.404	0.0766	2.99
		100	6.3	-	-	<0.010	0.397	0.0743	2.94
		195	6.6	-	-	<0.010	0.400	0.0718	2.84
LTED04	29-Jan-02	1	9.0	0.356	<0.30	<0.010	0.439	0.0821	4.61
		15	8.7	0.25	<0.30	<0.010	0.419	0.0837	3.61
		25	8.7	0.27	<0.30	<0.010	0.415	0.0836	3.58
		35	8.6	0.23	<0.30	<0.010	0.422	0.0842	3.52
		55	8.5	-	-	<0.010	0.418	0.0846	3.44
		75	8.4	-	-	<0.010	0.423	0.0848	3.47
	20-Feb-02	1	9.9	0.656	0.243	<0.010	0.421	0.0796	4.03
		15	9.7	0.668	0.236	<0.010	0.417	0.0830	3.89
		25	9.5	0.306	0.135	<0.010	0.417	0.0807	3.92
		35	9.5	0.364	0.145	<0.010	0.419	0.0818	3.91
		55	9.3	-	-	<0.010	0.421	0.0884	3.92
		75	9.1	-	-	<0.010	0.421	0.0855	3.77
	18-Mar-02	21	8.2	0.629	0.139	<0.010	0.417	0.0759	3.89
		35	8.0	0.523	0.112	<0.010	0.418	0.0753	3.58
		63	7.9	-	-	<0.010	0.404	0.0760	2.94
		67	7.7	0.438	0.146	<0.010	0.410	0.0726	3.38
		69	7.9	-	-	<0.010	0.409	0.0757	2.83
		81	7.7	0.412	0.141	<0.010	0.404	0.0759	2.65
		81	7.7	0.41	0.108	<0.010	0.403	0.0751	2.73
	22-Apr-02	1	9.0	3.24	0.237	0.0221	0.328	0.0624	3.67
		15	8.4	2.83	0.569	0.0214	0.345	0.0641	2.85
		25	8.2	2.20	0.604	0.0226	0.364	0.0662	2.95
		35	8.1	1.43	0.346	0.0222	0.368	0.0657	2.98
		55	7.7	-	-	0.0241	0.383	0.0722	2.97
		75	7.5	-	-	0.0270	0.392	0.0740	2.99
	28-May-02	1	6.2	4.05	0.567	0.0391	0.184	0.0467	3.20
		15	5.7	9.74	1.21	0.0372	0.210	0.0510	1.77
		25	5.6	4.35	0.562	0.0488	0.230	0.0562	1.93
		35	5.5	3.72	0.689	0.0520	0.234	0.0548	1.91
		55	5.2	-	-	0.0539	0.255	0.0571	2.06
		75	5.1	-	-	0.0600	0.281	0.0632	2.33

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
LTED04	25-Jun-02	1	9.7	13.6	1.5	0.011	0.136	0.0452	1.62
		15	7.9	2.9	0.537	0.0517	0.193	0.0487	1.66
		25	7.8	0.55	0.245	0.0691	0.208	0.0501	1.76
		35	7.7	0.60	0.484	0.0715	0.212	0.0507	1.82
		55	7.4	-	-	0.0806	0.237	0.0552	1.95
		75	7.0	-	-	0.0791	0.259	0.0590	2.06
	22-Jul-02	1	9.1	5.86	2.58	<0.010	0.178	0.0538	2.39
		15	7.4	0.9	0.388	0.0284	0.228	0.0573	1.97
		25	7.2	0.32	0.231	0.0348	0.233	0.0596	1.93
		35	7.2	0.17	0.184	0.0318	0.244	0.0587	2.03
		55	7.0	-	-	0.0285	0.246	0.0560	2.05
		75	6.5	-	-	0.018	0.286	0.0595	2.25
	27-Aug-02	1	8.1	17	<0.020	0.011	0.116	0.0542	1.76
		15	5.9	0.261	0.286	0.0332	0.272	0.0621	2.18
		25	5.9	0.342	0.455	0.0320	0.274	0.0637	2.24
		35	5.7	0.236	0.498	0.0325	0.278	0.0655	2.10
		55	4.8	-	-	0.0307	0.323	0.0717	2.24
		75	4.8	-	-	0.0384	0.321	0.0705	2.34
	23-Sep-02	1	7.1	5.54	<0.020	0.0214	0.230	0.0572	2.04
		15	5.9	1.52	0.195	0.0378	0.255	0.0654	2.05
		25	5.8	0.987	0.226	0.0376	0.263	0.0624	2.13
		35	5.7	0.776	0.257	0.0375	0.271	0.0613	2.02
		55	5.0	-	-	0.0346	0.303	0.0663	2.18
		75	4.8	-	-	0.0345	0.328	0.0713	2.36
	21-Oct-02	1	6.0	1.12	0.149	0.0356	0.292	0.0711	2.52
		15	5.6	0.5	0.167	0.0365	0.296	0.0711	2.40
		25	5.4	0.2	0.111	0.0331	0.305	0.0706	2.43
		35	5.3	0.16	0.114	0.0315	0.312	0.0701	2.45
		55	5.1	-	-	0.0254	0.325	0.0705	2.52
		75	4.8	-	-	0.0244	0.340	0.0777	2.61
	20-Nov-02	1	6.0	0.37	0.105	<0.010	0.379	0.0768	2.78
		15	6.0	0.29	0.109	<0.010	0.362	0.0737	2.64
		25	5.5	0.29	0.105	0.011	0.377	0.0757	2.65
		35	5.4	0.21	0.131	<0.010	0.379	0.0782	2.63
		55	5.1	-	-	<0.010	0.383	0.0788	2.73
		75	4.9	-	-	<0.010	0.396	0.0847	2.77
	16-Dec-02	1	6.6	0.282	0.119	<0.010	0.413	0.0774	3.08
		15	6.5	0.251	0.0969	<0.010	0.406	0.0735	2.93
		25	6.4	0.178	0.1	<0.010	0.411	0.0762	2.94
		35	6.2	0.221	0.123	<0.010	0.407	0.0785	3.01
		55	5.8	-	-	<0.010	0.409	0.0789	3.10
		75	5.9	-	-	<0.010	0.412	0.0899	3.09
LSNT01	29-Jan-02	1	8.6	0.304	<0.30	0.0305	0.433	0.0801	3.62
		15	8.6	0.314	<0.30	<0.010	0.442	0.0806	3.67
		25	8.5	0.328	<0.30	<0.010	0.418	0.0834	3.57
		35	8.5	0.26	<0.30	<0.010	0.418	0.0837	3.51
		55	8.5	-	-	<0.010	0.421	0.0830	3.54
		100	8.2	-	-	<0.010	0.422	0.0815	3.49
		200	8.0	-	-	<0.010	0.420	0.0855	3.45

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
LSNT01	20-Feb-02	1	10.0	1.48	0.217	<0.010	0.411	0.0849	3.66
		15	9.8	0.637	0.156	<0.010	0.417	0.0829	3.72
		25	9.7	0.53	0.17	<0.010	0.413	0.0827	3.50
		35	9.7	0.567	0.156	<0.010	0.412	0.0814	3.46
		55	9.5	-	-	<0.010	0.408	0.0809	3.40
		100	9.6	-	-	<0.010	0.404	0.0745	3.31
		200	9.5	-	-	<0.010	0.401	0.0831	3.45
	18-Mar-02	93	7.8	0.648	0.228	<0.010	0.405	0.0761	3.32
		109	7.7	0.644	0.174	<0.010	0.405	0.0754	3.44
		120	7.7	0.646	0.232	<0.010	0.407	0.0754	3.51
		127	7.7	0.497	0.197	<0.010	0.407	0.0754	3.52
		143	7.8	-	-	<0.010	0.402	0.0728	3.28
		172	7.7	-	-	<0.010	0.410	0.0754	3.55
		184	7.7	-	-	<0.010	0.408	0.0705	3.40
	22-Apr-02	1	9.0	5.39	0.403	0.016	0.314	0.0619	2.93
		15	8.6	6.5	0.72	0.015	0.320	0.0613	2.79
		25	8.2	5.68	0.499	0.019	0.326	0.0646	2.73
		35	7.9	2	0.457	0.0240	0.356	0.0663	2.67
		55	7.8	-	-	0.0312	0.355	0.0673	2.68
		100	7.7	-	-	0.0540	0.344	0.0656	2.62
		200	7.7	-	-	0.0340	0.340	0.0669	2.61
	28-May-02	1	6.1	12.2	1.21	0.0251	0.179	0.0505	1.54
		15	5.7	7.46	0.918	0.0410	0.208	0.0779	1.68
		25	5.6	7.26	1.2	0.0418	0.219	0.0526	1.76
		35	5.5	6.94	1.38	0.0445	0.230	0.0552	1.81
		55	5.4	-	-	0.0483	0.233	0.0541	1.94
		100	4.9	-	-	0.0563	0.268	0.0569	2.16
		200	4.5	-	-	0.0711	0.286	0.0742	2.23
	25-Jun-02	1	9.0	13.1	2.66	0.0337	0.126	0.0511	1.55
		15	8.1	2.88	0.435	0.0545	0.188	0.0512	1.74
		25	8.1	4.51	0.635	0.0566	0.190	0.0530	1.75
		35	7.9	4.64	0.912	0.0581	0.190	0.0506	1.77
		55	7.6	-	-	0.0612	0.201	0.0542	1.86
		100	6.7	-	-	0.0701	0.258	0.0593	2.11
		200	6.3	-	-	0.0758	0.291	0.0610	2.40
	22-Jul-02	1	9.4	11.1	0.712	0.013	0.134	0.0471	1.61
		15	8.4	7.2	1.01	0.018	0.190	0.0544	1.81
		25	8.3	6.1	0.805	0.0239	0.195	0.0511	1.77
		35	7.5	5.9	0.735	0.019	0.227	0.0577	1.85
		55	6.8	-	-	0.0223	0.270	0.0633	1.95
		100	5.8	-	-	0.016	0.338	0.0671	2.11
		200	5.4	-	-	<0.010	0.379	0.0685	2.28
	27-Aug-02	1	6.1	1.88	0.212	0.0245	0.275	0.0668	2.18
		15	5.8	1.37	0.264	0.0281	0.283	0.0653	2.19
		25	5.8	1.44	0.369	0.0285	0.285	0.0662	2.32
		35	5.7	1.13	0.347	0.0288	0.280	0.0650	2.23
		55	5.5	-	-	0.0404	0.282	0.0653	2.04
		100	5.4	-	-	0.0296	0.281	0.0777	2.10
		200	5.3	-	-	0.0485	0.283	0.0653	2.22

Table A-2
2002 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Phaeophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
LSNT01	23-Sep-02	1	6.8	6.48	<0.020	0.0299	0.229	0.0614	2.14
		15	6.5	7.22	0.0872	0.0319	0.238	0.0607	1.98
		25	6.5	5.42	0.13	0.0315	0.241	0.0611	2.09
		35	6.4	6.35	0.033	0.0312	0.241	0.0643	2.15
		55	6.2	-	-	0.0356	0.248	0.0636	2.16
		100	5.3	-	-	0.0404	0.296	0.0611	2.26
		200	5.3	-	-	0.0462	0.296	0.0707	2.36
	21-Oct-02	1	5.6	0.915	0.167	0.0380	0.292	0.0712	2.27
		15	5.5	0.953	0.23	0.0381	0.297	0.0728	2.35
		25	5.5	0.727	0.269	0.0362	0.299	0.0714	2.28
		35	5.5	0.766	0.281	0.0360	0.299	0.0737	2.36
		55	5.5	-	-	0.0332	0.294	0.0714	2.31
		100	5.1	-	-	0.0260	0.326	0.0660	2.38
		200	5.1	-	-	0.0306	0.331	0.0771	2.49
	20-Nov-02	1	5.9	0.4	0.135	<0.010	0.382	0.0748	2.75
		15	5.9	0.49	0.133	<0.010	0.380	0.0748	2.79
		25	5.9	0.31	0.168	<0.010	0.380	0.0747	2.81
		35	5.8	0.27	0.128	<0.010	0.379	0.0767	2.78
		55	5.6	-	-	<0.010	0.383	0.0773	2.86
		100	5.3	-	-	<0.010	0.390	0.0759	2.74
		200	5.4	-	-	<0.010	0.398	0.0844	2.84
	16-Dec-02	1	6.1	0.188	0.136	<0.010	0.410	0.0788	2.97
		15	6.1	0.195	0.117	<0.010	0.391	0.0788	2.99
		25	6.1	0.176	0.129	<0.010	0.405	0.0762	3.01
		35	6.1	0.189	0.146	<0.010	0.411	0.0790	3.02
		55	6.1	-	-	<0.010	0.405	0.0792	3.00
		100	6.1	-	-	<0.010	0.402	0.0744	2.82
		200	6.3	-	-	<0.010	0.395	0.0857	2.91
KSRU02	29-Jan-02	Surface	-	-	-	-	-	-	-
	20-Feb-02	Surface	-	-	-	-	-	-	-
	18-Mar-02	Surface	-	-	-	-	-	-	-
	22-Apr-02	Surface	-	-	-	-	-	-	-
	28-May-02	Surface	-	-	-	-	-	-	-
	24-Jun-02	Surface	-	-	-	-	-	-	-
	22-Jul-02	Surface	-	-	-	-	-	-	-
	27-Aug-02	Surface	-	-	-	-	-	-	-
	23-Sep-02	Surface	-	-	-	-	-	-	-
	21-Oct-02	Surface	-	-	-	-	-	-	-
	18-Nov-02	Surface	-	-	-	-	-	-	-
	16-Dec-02	Surface	-	-	-	-	-	-	-

Table A-3
2002 Outfall Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
KSHZ03	23-Jan-02	0.011	0.409	3.39	0.0882	27.599	7.5
	27-Feb-02	<0.010	0.447	4.71	0.0748	24.731	7.6
	25-Mar-02	0.010	0.379	5.20	0.0507	15.567	8.4
	29-Apr-02	0.0234	0.178	2.26	0.0629	28.070	9.9
	20-May-02	0.047	0.149	1.64	0.0527	28.839	10.1
	26-Jun-02	0.010	0.0513	3.60	0.0566	25.441	15.0
	29-Jul-02	0.0306	0.155	2.24	0.0585	28.904	13.5
	21-Aug-02	0.0269	0.161	2.29	0.0590	29.151	13.4
	30-Sep-02	0.0296	0.194	2.29	0.0628	29.559	12.7
	28-Oct-02	0.0347	0.332	2.71	0.0792	29.969	11.4
	20-Nov-02	0.018	0.390	3.62	0.0821	28.298	10.7
	17-Dec-02	0.0206	0.431	3.54	0.0786	25.569	9.7
KSSN04	23-Jan-02	-	-	-	-	-	8.3
	27-Feb-02	-	-	-	-	-	8.0
	25-Mar-02	-	-	-	-	-	8.1
	29-Apr-02	-	-	-	-	-	9.0
	20-May-02	-	-	-	-	-	10.3
	26-Jun-02	-	-	-	-	-	12.8
	29-Jul-02	-	-	-	-	-	12.7
	21-Aug-02	-	-	-	-	-	13.2
	30-Sep-02	-	-	-	-	-	13.2
	28-Oct-02	-	-	-	-	-	10.6
	20-Nov-02	-	-	-	-	-	11.1
	17-Dec-02	-	-	-	-	-	9.7
KSSN05	23-Jan-02	0.0203	0.436	4.78	0.221	25.984	7.3
	27-Feb-02	<0.010	0.391	4.29	0.0727	24.432	7.6
	25-Mar-02	0.016	0.435	3.65	0.0909	24.742	8.2
	29-Apr-02	0.019	0.182	2.40	0.0591	28.086	9.6
	20-May-02	0.0436	0.140	2.20	0.258	27.119	10.4
	26-Jun-02	0.0278	0.043	1.37	0.0489	28.671	13.0
	29-Jul-02	0.0375	0.120	2.48	0.0819	28.615	14.7
	21-Aug-02	0.0515	0.105	2.17	0.0844	29.224	14.0
	30-Sep-02	0.019	0.0444	1.47	0.0652	29.624	12.8
	28-Oct-02	0.0447	0.294	2.75	0.0822	29.949	10.4
	20-Nov-02	<0.010	0.392	2.68	0.0878	30.596	11.0
	17-Dec-02	0.0279	0.413	3.40	0.236	29.155	8.7
LSKR01	23-Jan-02	-	-	-	-	-	7.6
	27-Feb-02	-	-	-	-	-	7.9
	25-Mar-02	-	-	-	-	-	8.7
	29-Apr-02	-	-	-	-	-	9.6
	20-May-02	-	-	-	-	-	10.3
	26-Jun-02	-	-	-	-	-	15.1
	29-Jul-02	-	-	-	-	-	13.2
	21-Aug-02	-	-	-	-	-	14.0
	30-Sep-02	-	-	-	-	-	11.8
	28-Oct-02	-	-	-	-	-	11.4
	20-Nov-02	-	-	-	-	-	11.3
	17-Dec-02	-	-	-	-	-	8.7
LSKS01	23-Jan-02	-	-	-	-	-	7.6
	27-Feb-02	-	-	-	-	-	7.7
	25-Mar-02	-	-	-	-	-	11.5
	29-Apr-02	-	-	-	-	-	9.5
	20-May-02	-	-	-	-	-	10.2
	26-Jun-02	-	-	-	-	-	14.4
	29-Jul-02	-	-	-	-	-	13.5
	21-Aug-02	-	-	-	-	-	14.2

Table A-3
2002 Outfall Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
LSKS01	30-Sep-02	-	-	-	-	-	11.8
	28-Oct-02	-	-	-	-	-	11.4
	20-Nov-02	-	-	-	-	-	11.5
	17-Dec-02	-	-	-	-	-	9.0
MSJL01	23-Jan-02	0.017	0.458	4.14	0.0824	28.258	7.9
	27-Feb-02	<0.010	0.394	3.62	0.0817	28.172	8.0
	25-Mar-02	0.0353	0.436	4.30	0.0727	24.179	10.0
	29-Apr-02	0.019	0.159	2.42	0.0612	28.745	12.1
	20-May-02	0.0645	0.107	1.93	0.0547	28.458	11.6
	26-Jun-02	0.0582	0.0748	1.35	0.0503	28.466	12.8
	29-Jul-02	0.0810	0.155	3.54	0.0763	28.281	13.2
	21-Aug-02	0.017	0.025	1.49	0.0548	29.486	14.9
	30-Sep-02	0.0224	0.141	1.38	0.105	30.217	11.2
	28-Oct-02	0.0497	0.245	2.32	0.0759	30.487	10.7
	20-Nov-02	0.0523	0.386	3.48	0.0846	30.047	10.5
	17-Dec-02	0.0291	0.420	3.01	0.0855	29.821	9.3

Table A-4
2002 MOSS and Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
ITMUKILTSP	23-Jan-02	0.0206	0.372	4.20	0.0702	21.350	5.9
	27-Feb-02	0.016	0.341	3.97	0.0677	20.196	7.6
ITPICNICPT	23-Jan-02	0.016	0.475	5.16	0.0712	21.374	5.6
	27-Feb-02	0.015	0.424	4.28	0.0655	22.464	7.4
ITMEADOWBP	23-Jan-02	<0.010	0.409	3.70	0.0802	27.777	7.8
	27-Feb-02	0.012	0.371	3.35	0.0759	26.505	8.0
ITOCEANAVE	23-Jan-02	<0.010	0.437	3.85	0.0899	28.049	8.1
	27-Feb-02	0.013	0.369	3.67	0.0787	23.927	7.4
	25-Mar-02	<0.010	0.143	2.79	0.0400	24.824	8.8
	29-Apr-02	0.012	0.158	3.15	0.0726	26.894	11.3
	20-May-02	0.020	0.0786	1.18	0.0333	26.921	10.5
	26-Jun-02	<0.010	<0.020	0.799	0.0322	23.666	19.2
	29-Jul-02	0.0235	0.158	2.55	0.0526	28.232	13.2
	21-Aug-02	0.0205	0.191	4.60	0.0781	26.365	15.2
	30-Sep-02	0.0304	0.157	1.84	0.0631	30.067	12.1
	28-Oct-02	0.0468	0.347	3.52	0.0735	29.371	11.4
	20-Nov-02	0.020	0.362	2.61	0.0812	30.697	10.6
	17-Dec-02	0.011	0.411	2.97	0.0784	30.095	9.6
ITBRACKETT	23-Jan-02	<0.010	0.418	3.67	0.0819	28.575	8.5
	27-Feb-02	0.013	0.377	3.72	0.0723	24.586	-
	25-Mar-02	<0.010	<0.020	0.484	0.0325	26.702	9.2
	29-Apr-02	0.0303	0.165	2.26	0.115	28.047	10.8
	20-May-02	0.0673	0.170	1.69	0.0618	28.686	9.8
	26-Jun-02	0.0231	<0.020	0.930	0.0900	27.554	19.2
	29-Jul-02	0.0337	0.181	2.06	0.0559	29.172	12.8
	21-Aug-02	0.0328	0.115	1.88	0.0592	29.498	14.2
	30-Sep-02	0.0409	0.210	1.93	0.0613	30.187	12.3
	28-Oct-02	0.0387	0.322	2.46	0.0751	30.524	11.6
	20-Nov-02	0.0234	0.389	2.50	0.0825	30.696	10.7
	17-Dec-02	0.012	0.401	3.01	0.0781	30.300	9.6
ITEDWARDSPT	23-Jan-02	0.013	0.421	3.80	0.0902	28.353	7.9
	27-Feb-02	0.014	0.386	3.69	0.0774	25.821	7.6
	25-Mar-02	<0.010	<0.020	0.850	0.0362	25.858	8.8
	29-Apr-02	0.014	0.105	2.19	0.0615	27.891	11.3
	20-May-02	0.0341	0.0475	0.962	0.0358	26.407	10.5
	26-Jun-02	0.014	<0.020	0.870	0.0425	27.534	14.0
	29-Jul-02	0.0268	0.0676	2.15	0.0727	29.093	13.6
	21-Aug-02	0.029	0.170	2.08	0.0624	29.538	13.4
	30-Sep-02	0.0300	0.168	1.86	0.0647	30.169	12.3
	28-Oct-02	0.0535	0.312	2.60	0.0797	30.384	11.3
	20-Nov-02	0.018	0.390	2.73	0.0806	30.618	10.7
	17-Dec-02	0.016	0.409	3.07	0.0836	29.808	9.2
JSVW04	23-Jan-02	<0.010	0.422	3.88	0.0852	28.442	7.9
	27-Feb-02	<0.010	0.377	3.86	0.0712	24.633	7.6
	27-Mar-02	0.012	0.290	2.62	0.0690	27.967	-
	29-Apr-02	<0.010	0.176	2.24	0.0581	28.407	10.4
	20-May-02	0.0226	0.040	0.931	0.0336	26.365	10.4
	26-Jun-02	0.013	0.0280	0.925	0.0378	28.410	14.5
	29-Jul-02	0.0247	0.134	2.56	0.0641	28.547	13.4
	21-Aug-02	0.0237	0.129	2.11	0.0648	29.483	13.6
	30-Sep-02	0.0387	0.200	2.08	0.0620	29.910	11.9
	28-Oct-02	0.0390	0.316	2.53	0.0703	30.317	11.3
	20-Nov-02	0.013	0.398	3.55	0.0789	28.690	10.9
	17-Dec-02	0.015	0.411	3.32	0.0806	29.618	9.7

Table A-4
2002 MOSS and Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
ITBOEINGCR	23-Jan-02	0.010	0.489	5.81	0.0807	25.415	7.7
	27-Feb-02	<0.010	0.404	4.10	0.0763	25.829	7.8
ITCARKEEKP	23-Jan-02	0.010	0.437	4.39	0.0838	27.083	7.6
	27-Feb-02	<0.010	0.388	3.81	0.0860	26.274	7.8
KSJX02	23-Jan-02	<0.010	0.476	4.63	0.0836	27.686	8.3
	27-Feb-02	0.016	0.416	4.28	0.0764	25.525	7.7
KSLU03	23-Jan-02	0.011	0.433	4.39	0.0744	25.435	7.6
	27-Feb-02	0.011	0.428	4.87	0.0680	19.602	7.5
	25-Mar-02	-	-	-	-	-	8.1
	29-Apr-02	-	-	-	-	-	8.9
	20-May-02	-	-	-	-	-	10.2
	26-Jun-02	-	-	-	-	-	13.8
	29-Jul-02	-	-	-	-	-	13.4
	21-Aug-02	-	-	-	-	-	15.5
	30-Sep-02	-	-	-	-	-	12.7
	28-Oct-02	-	-	-	-	-	11.6
	20-Nov-02	-	-	-	-	-	10.8
	17-Dec-02	-	-	-	-	-	9.2
KSQU01	23-Jan-02	0.013	0.378	4.28	0.0655	22.684	8.3
	27-Feb-02	<0.010	0.354	4.45	0.0585	18.519	7.7
	25-Mar-02	-	-	-	-	-	7.7
	29-Apr-02	-	-	-	-	-	9.4
	20-May-02	-	-	-	-	-	10.2
	26-Jun-02	-	-	-	-	-	14.8
	29-Jul-02	-	-	-	-	-	14.7
	21-Aug-02	-	-	-	-	-	14.8
	30-Sep-02	-	-	-	-	-	14.2
	28-Oct-02	-	-	-	-	-	12.2
	20-Nov-02	-	-	-	-	-	11.1
	17-Dec-02	-	-	-	-	-	9.6
KSYV02	23-Jan-02	-	-	-	-	-	7.5
	27-Feb-02	-	-	-	-	-	7.8
	25-Mar-02	-	-	-	-	-	8.3
	29-Apr-02	-	-	-	-	-	9.3
	20-May-02	-	-	-	-	-	10.1
	26-Jun-02	-	-	-	-	-	13.6
	29-Jul-02	-	-	-	-	-	14.9
	21-Aug-02	-	-	-	-	-	14.2
	30-Sep-02	-	-	-	-	-	13.4
	28-Oct-02	-	-	-	-	-	10.8
	20-Nov-02	-	-	-	-	-	11.4
	17-Dec-02	-	-	-	-	-	9.1
LTAB01	23-Jan-02	-	-	-	-	-	7.5
	27-Feb-02	-	-	-	-	-	6.7
	25-Mar-02	-	-	-	-	-	9.4
	29-Apr-02	-	-	-	-	-	10.3
	20-May-02	-	-	-	-	-	9.8
	26-Jun-02	-	-	-	-	-	13.3
	29-Jul-02	-	-	-	-	-	13.4
	21-Aug-02	-	-	-	-	-	13.5
	30-Sep-02	-	-	-	-	-	13.1
	28-Oct-02	-	-	-	-	-	11.1
	20-Nov-02	-	-	-	-	-	11.0
	17-Dec-02	-	-	-	-	-	9.1

Table A-4
2002 MOSS and Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
LTEH02	23-Jan-02	-	-	-	-	-	7.6
	27-Feb-02	-	-	-	-	-	6.5
	25-Mar-02	-	-	-	-	-	8.1
	29-Apr-02	-	-	-	-	-	9.2
	20-May-02	-	-	-	-	-	10.1
	26-Jun-02	-	-	-	-	-	14.2
	29-Jul-02	-	-	-	-	-	12.9
	21-Aug-02	-	-	-	-	-	14.0
	30-Sep-02	-	-	-	-	-	12.1
	28-Oct-02	-	-	-	-	-	11.3
	20-Nov-02	-	-	-	-	-	10.8
	17-Dec-02	-	-	-	-	-	9.2
LSGY01	23-Jan-02	-	-	-	-	-	8.7
	27-Feb-02	-	-	-	-	-	7.6
	25-Mar-02	-	-	-	-	-	8.2
	29-Apr-02	-	-	-	-	-	8.6
	20-May-02	-	-	-	-	-	9.6
	26-Jun-02	-	-	-	-	-	12.7
	29-Jul-02	-	-	-	-	-	12.5
	21-Aug-02	-	-	-	-	-	12.8
	30-Sep-02	-	-	-	-	-	12.3
	28-Oct-02	-	-	-	-	-	11.6
	20-Nov-02	-	-	-	-	-	10.7
	17-Dec-02	-	-	-	-	-	9.5
LSFX01	23-Jan-02	-	-	-	-	-	8.2
	27-Feb-02	-	-	-	-	-	7.8
	25-Mar-02	-	-	-	-	-	8.4
	29-Apr-02	-	-	-	-	-	9.2
	20-May-02	-	-	-	-	-	10.0
	26-Jun-02	-	-	-	-	-	14.7
	29-Jul-02	-	-	-	-	-	12.7
	21-Aug-02	-	-	-	-	-	13.1
	30-Sep-02	-	-	-	-	-	12.2
	28-Oct-02	-	-	-	-	-	11.6
	20-Nov-02	-	-	-	-	-	11.0
	17-Dec-02	-	-	-	-	-	9.5
LSHV01	23-Jan-02	-	-	-	-	-	8.0
	27-Feb-02	-	-	-	-	-	7.7
	25-Mar-02	-	-	-	-	-	8.6
	29-Apr-02	-	-	-	-	-	9.3
	20-May-02	-	-	-	-	-	10.2
	26-Jun-02	-	-	-	-	-	14.9
	29-Jul-02	-	-	-	-	-	12.6
	21-Aug-02	-	-	-	-	-	13.2
	30-Sep-02	-	-	-	-	-	11.8
	28-Oct-02	-	-	-	-	-	11.6
	20-Nov-02	-	-	-	-	-	10.9
	17-Dec-02	-	-	-	-	-	9.5
LSTU01	23-Jan-02	-	-	-	-	-	8.0
	27-Feb-02	-	-	-	-	-	7.9
	25-Mar-02	-	-	-	-	-	10.0
	29-Apr-02	-	-	-	-	-	9.4
	20-May-02	-	-	-	-	-	-
	26-Jun-02	-	-	-	-	-	14.6
	29-Jul-02	-	-	-	-	-	12.9
	21-Aug-02	-	-	-	-	-	14.1

Table A-4
2002 MOSS and Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
LSTU01	30-Sep-02	-	-	-	-	-	11.9
	28-Oct-02	-	-	-	-	-	11.8
	20-Nov-02	-	-	-	-	-	10.7
	17-Dec-02	-	-	-	-	-	9.5
LSVW01	23-Jan-02	<0.010	0.431	4.03	0.0861	28.632	8.0
	27-Feb-02	-	-	-	-	-	7.9
	25-Mar-02	0.012	0.407	3.31	0.0712	28.261	10.1
	29-Apr-02	0.017	0.258	2.93	0.0881	28.558	9.8
	20-May-02	0.0240	0.192	2.93	0.0610	28.327	10.0
	26-Jun-02	0.0847	0.031	2.24	0.0773	28.719	14.7
	29-Jul-02	0.0292	0.195	2.53	0.0634	28.975	13.1
	21-Aug-02	0.0268	0.219	2.43	0.0643	29.011	14.3
	30-Sep-02	0.0315	0.174	2.74	0.0731	29.700	12.4
	28-Oct-02	0.0423	0.298	2.60	0.0937	30.477	11.7
	20-Nov-02	<0.010	0.323	2.79	0.0866	30.646	11.3
	17-Dec-02	0.011	0.409	3.28	0.0853	29.988	9.3
MTEC01	14-May-02	-	-	-	-	-	14.6
	11-Jun-02	-	-	-	-	-	13.6
	8-Jul-02	-	-	-	-	-	12.0
	5-Aug-02	-	-	-	-	-	14.0
	16-Sep-02	-	-	-	-	-	13.5
	28-Oct-02	-	-	-	-	-	11.4
MTLD03	13-May-02	-	-	-	-	-	10.2
	11-Jun-02	-	-	-	-	-	13.2
	8-Jul-02	-	-	-	-	-	10.0
	5-Aug-02	-	-	-	-	-	15.4
	16-Sep-02	-	-	-	-	-	13.1
	28-Oct-02	-	-	-	-	-	11.6
MSSM05	14-May-02	-	-	-	-	-	11.6
	10-Jun-02	-	-	-	-	-	12.6
	8-Jul-02	-	-	-	-	-	13.5
	6-Aug-02	-	-	-	-	-	14.3
	16-Sep-02	-	-	-	-	-	13.2
	28-Oct-02	-	-	-	-	-	11.1
KTHA01	23-Jan-02	0.015	1.66	33.2	0.0594	-	7.6
	27-Feb-02	<0.010	1.76	24.1	0.0595	-	7.7
	25-Mar-02	<0.010	1.52	22.8	0.0690	-	9.4
	29-Apr-02	<0.010	1.39	28.2	0.0963	-	11.4
	20-May-02	0.014	1.37	25.9	0.0640	-	11.5
	26-Jun-02	0.016	1.43	34.5	0.109	-	14.1
	29-Jul-02	0.013	1.39	37.5	0.111	-	13.8
	21-Aug-02	0.013	1.34	26.8	0.0999	-	13.2
	30-Sep-02	<0.010	1.37	35.7	0.103	-	12.1
	28-Oct-02	<0.010	1.34	24.1	0.0861	-	11.2
	20-Nov-02	<0.010	1.22	32.8	0.0955	-	11.6
	17-Dec-02	0.0756	1.05	14.1	0.0788	-	8.1
0305 (Surface)	23-Jan-02	0.0381	0.540	11.2	0.0440	6.121	5.4
	27-Feb-02	0.0264	0.431	8.95	0.0437	7.711	5.1
	26-Mar-02	0.0342	0.599	7.16	0.0401	8.115	7.6
	30-Apr-02	0.0361	0.309	7.45	0.0332	9.176	-
	20-May-02	0.0383	0.176	8.98	0.0335	9.081	10.2
	26-Jun-02	0.0586	0.174	7.03	0.0459	12.420	15.7
	29-Jul-02	0.0471	0.242	6.76	0.0328	20.443	14.3
	20-Aug-02	0.0323	0.237	2.35	0.0573	29.225	13.6

Table A-4
2002 MOSS and Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
0305 (Surface)	30-Sep-02	0.0724	0.262	6.49	0.0552	19.463	12.7
	28-Oct-02	0.0616	0.342	7.04	0.0691	20.468	10.8
	20-Nov-02	0.0394	0.383	5.13	0.0748	25.082	10.8
	17-Dec-02	0.0636	0.531	8.06	0.0731	13.585	8.2
0305 (Depth)	23-Jan-02	<0.010	0.418	3.75	0.0852	29.080	8.0
	27-Feb-02	0.0244	0.431	8.61	0.0595	8.421	7.3
	26-Mar-02	0.012	0.402	3.22	0.0730	28.617	8.0
	30-Apr-02	0.0316	0.292	2.74	0.0698	28.531	-
	20-May-02	0.0502	0.210	2.20	0.0581	28.095	9.6
	26-Jun-02	0.0503	0.175	2.30	0.0536	27.351	12.3
	29-Jul-02	0.0320	0.223	2.40	0.0605	28.800	12.6
	20-Aug-02	0.0308	0.239	2.18	0.0618	29.497	13.2
	30-Sep-02	0.0416	0.246	2.15	0.0657	30.134	12.3
	28-Oct-02	0.0235	0.328	2.68	0.0771	30.417	11.6
	20-Nov-02	0.014	0.382	3.09	0.0768	29.842	11.0
	17-Dec-02	0.019	0.410	3.36	0.0821	30.233	9.6
0307 (Surface)	23-Jan-02	0.0252	0.528	13.3	0.0410	<2.0	4.8
	27-Feb-02	0.013	0.430	12.4	0.0339	<2.0	5.1
	26-Mar-02	0.0209	0.564	10.8	0.0323	2.107	7.9
	30-Apr-02	0.017	0.301	12.2	0.0257	2.074	11.2
	20-May-02	0.015	0.175	9.79	0.0204	<2.0	11.0
	26-Jun-02	0.0434	0.183	9.13	0.0492	4.741	16.3
	29-Jul-02	0.0601	0.334	13.9	0.0342	4.481	15.6
	20-Aug-02	0.0407	0.263	7.60	0.0648	10.619	17.2
	30-Sep-02	0.0671	0.284	12.2	0.0556	6.864	13.1
	28-Oct-02	0.0785	0.351	10.1	0.0582	13.798	10.3
	20-Nov-02	0.0734	0.388	9.44	0.0730	13.763	10.6
	17-Dec-02	0.0579	0.610	9.93	0.0742	3.326	7.8
0307 (Depth)	23-Jan-02	0.0246	0.425	3.91	0.0962	28.764	8.1
	27-Feb-02	0.0385	0.422	5.02	0.0904	24.819	7.4
	26-Mar-02	0.0389	0.422	3.86	0.0811	26.884	8.0
	30-Apr-02	0.0660	0.288	4.43	0.419	23.126	9.5
	20-May-02	0.0832	0.176	2.27	0.0673	27.698	10.2
	26-Jun-02	0.112	0.166	3.20	0.103	25.321	13.2
	29-Jul-02	0.0562	0.212	2.92	0.0850	28.096	13.1
	20-Aug-02	0.0541	0.235	3.00	0.0794	27.886	13.8
	30-Sep-02	0.0645	0.240	2.53	0.0846	29.513	12.8
	28-Oct-02	0.0399	0.325	2.98	0.0985	29.834	11.6
	20-Nov-02	0.0304	0.382	3.47	0.113	29.236	11.0
	17-Dec-02	0.0423	0.401	3.59	0.114	29.595	10.0

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
CK200P	29-Jan-02	1	4	1	-	1
		15	0	2	-	-
		25	0	1	-	-
		35	2	2	-	-
		55	1	0	-	-
	20-Feb-02	1	4	6	-	1
		15	0	0	-	-
		25	0	1	-	-
		35	2	0	-	-
		55	0	3	-	-
	21-Mar-02	12	0	0	-	-
		24	1	0	-	-
		32	0	0	-	-
		43	0	1	-	-
		60	0	0	-	-
	22-Apr-02	1	1	2	-	1
		15	0	0	-	-
		25	0	0	-	-
		35	1	0	-	-
		55	1	0	-	-
	28-May-02	1	0	0	-	1
		15	0	0	-	-
		25	0	0	-	-
		35	0	0	-	-
		55	0	0	-	-
	24-Jun-02	1	5	0	-	1
		15	0	0	-	-
		25	0	0	-	-
		35	0	0	-	-
		55	0	0	-	-
	22-Jul-02	1	0	0	-	1
		15	0	0	-	-
		25	0	0	-	-
		35	0	0	-	-
		55	0	0	-	-
	27-Aug-02	1	0	0	-	1
		15	0	0	-	-
		25	0	0	-	-
		35	0	0	-	-
		55	0	0	-	-
	23-Sep-02	1	0	0	-	1
		15	0	0	-	-
		25	0	0	-	-
		35	0	0	-	-
		55	0	0	-	-
	21-Oct-02	1	0	0	-	1
		15	1	0	-	-
		25	0	0	-	-
		35	0	0	-	-
		55	0	0	-	-

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
CK200P	18-Nov-02	1	3	3	-	1
		15	2	4	-	-
		25	1	4	-	-
		35	0	3	-	-
		55	0	5	-	-
	17-Dec-02	1	6	17	-	1
		15	1	7	-	-
		25	3	1	-	-
		35	1	2	-	-
		55	1	1	-	-
KSSK02	29-Jan-02	1	0	1	0	2
		15	1	2	0	-
		25	1	1	1	-
		35	0	2	0	-
		55	0	3	1	-
	20-Feb-02	1	1	0	2	2
		15	0	0	0	-
		25	0	1	0	-
		35	0	1	0	-
		55	0	1	0	-
	21-Mar-02	1	1	0	0	2
		15	0	1	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	0	0	-
	22-Apr-02	1	1	0	0	2
		15	0	1	0	-
		25	0	0	0	-
		35	2	0	0	-
		55	0	0	2	-
	28-May-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	3	0	-
	25-Jun-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	0	0	-
	22-Jul-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	1	-
		35	0	0	0	-
		55	1	1	4	-
	27-Aug-02	1	0	0	0	1
		15	0	0	0	-
		25	1	0	0	-
		35	0	2	0	-
		55	0	0	0	-

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
KSSK02	23-Sep-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	1	0	0	-
	21-Oct-02	1	0	4	2	1
		15	0	1	0	-
		25	1	0	0	-
		35	0	2	0	-
		55	1	0	0	-
	20-Nov-02	1	4	0	2	1
		15	0	0	0	-
		25	1	0	0	-
		35	0	0	0	-
		55	0	0	1	-
	16-Dec-02	1	0	13	0	1
		15	1	21	0	-
		25	0	0	2	-
		35	0	6	1	-
		55	1	24	1	-
LTBC41	29-Jan-02	1	9	11	-	5
		15	0	6	-	-
		23	0	0	-	-
	20-Feb-02	1	11	10	-	5
		15	6	13	-	-
		23	1	1	-	-
	18-Mar-02	1	14	14	-	5
		15	4	3	-	-
		23	0	6	-	-
	22-Apr-02	1	11	1	-	6
		15	0	0	-	-
		23	0	2	-	-
	28-May-02	1	4	3	-	6
		15	0	0	-	-
		23	0	0	-	-
	25-Jun-02	1	3	0	-	5
		15	0	0	-	-
		23	0	1	-	-
	22-Jul-02	1	0	0	-	5
		15	0	2	-	-
		23	1	3	-	-
	27-Aug-02	1	2	0	-	5
		15	0	0	-	-
		23	0	0	-	-
	23-Sep-02	1	0	0	-	4
		15	0	0	-	-
		23	0	0	-	-

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
LTBC41	21-Oct-02	1	5	5	-	4
		15	1	0	-	-
		23	0	0	-	-
	20-Nov-02	1	7	4	-	4
		15	4	1	-	-
		23	2	1	-	-
	17-Dec-02	1	230	71	-	5
		15	5	19	-	-
		23	5	5	-	-
LSEP01	29-Jan-02	1	1	0	1	1
		15	1	4	2	-
		25	0	1	1	-
		35	0	1	0	-
		55	1	0	0	-
		100	0	1	0	-
		150	0	1	0	-
	20-Feb-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	2	1	-
		150	0	0	1	-
	18-Mar-02	61	0	0	1	-
		78	0	0	1	-
		89	0	0	0	-
		106	0	0	0	-
		108	0	0	1	-
		144	0	0	0	-
		154	0	0	0	-
		160	0	0	0	-
	22-Apr-02	1	0	1	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	1	0	0	-
	28-May-02	1	0	0	1	1
		15	1	0	0	-
		25	0	0	1	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	0	0	0	-
	25-Jun-02	1	1	0	0	1
		15	0	0	0	-
		25	0	1	0	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	0	0	0	-

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
LSEP01	22-Jul-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	0	1	0	-
	27-Aug-02	1	0	0	0	1
		15	0	0	0	-
		25	0	1	0	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	0	0	0	-
	23-Sep-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	1	0	0	-
		55	0	1	0	-
		100	0	0	0	-
		150	0	0	1	-
	21-Oct-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	1	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	0	0	0	-
	20-Nov-02	1	0	0	0	1
		15	0	0	0	-
		25	0	0	0	-
		35	0	0	0	-
		55	0	0	0	-
		100	0	0	0	-
		150	0	0	0	-
	17-Dec-02	1	0	2	0	1
		15	0	0	0	-
		25	0	3	1	-
		35	1	1	0	-
		55	0	0	0	-
		100	0	3	0	-
		150	0	0	0	-
LSKQ06	29-Jan-02	1	0	2	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	20-Feb-02	1	0	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
LSKQ06	18-Mar-02	1	0	1	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	22-Apr-02	1	0	1	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	28-May-02	1	0	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	25-Jun-02	1	0	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	22-Jul-02	1	0	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	27-Aug-02	1	1	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	23-Sep-02	1	0	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	21-Oct-02	1	1	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	20-Nov-02	1	0	0	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
	17-Dec-02	1	1	1	-	1
		15	-	-	-	-
		25	-	-	-	-
		35	-	-	-	-
VO50E	29-Jan-02	1	0	0	-	1
		5	0	0	-	-
		10	0	0	-	-
	20-Feb-02	1	0	0	-	1
		5	0	0	-	-
		10	0	0	-	-

Table A-5
2002 Offshore Outfall Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
VO50E	18-Mar-02	1	7	0	-	1
		5	0	1	-	-
		10	0	0	-	-
	22-Apr-02	1	0	1	-	1
		5	0	1	-	-
		10	0	0	-	-
	28-May-02	1	0	0	-	1
		5	0	0	-	-
		10	0	1	-	-
	25-Jun-02	1	0	0	-	1
		5	0	1	-	-
		10	4	1	-	-
	22-Jul-02	1	0	0	-	1
		5	0	0	-	-
		10	0	0	-	-
	27-Aug-02	1	0	0	-	1
		5	0	0	-	-
		10	0	0	-	-
	23-Sep-02	1	0	0	-	1
		5	0	0	-	-
		10	0	0	-	-
	21-Oct-02	1	0	0	-	1
		5	0	0	-	-
		10	1	0	-	-
	20-Nov-02	1	0	2	-	1
		5	0	0	-	-
		10	0	0	-	-
	16-Dec-02	1	2	2	-	1
		5	0	0	-	-
		10	0	0	-	-

*The moving geometric mean value is for fecal coliform only.

Table A-6
2002 Offshore Ambient Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
PTWELLS1	29-Jan-02	1	2	1	0	1
	20-Feb-02	1	2	0	0	1
	21-Mar-02	1	1	0	0	1
	22-Apr-02	1	0	0	0	1
	28-May-02	1	0	1	0	1
	24-Jun-02	1	0	0	0	1
	22-Jul-02	1	0	0	0	1
	27-Aug-02	1	0	0	1	1
	23-Sep-02	1	0	1	0	1
	21-Oct-02	1	0	0	0	1
	18-Nov-02	1	2	1	1	1
	17-Dec-02	1	6	10	6	1
KSBP01	29-Jan-02	1	0	1	0	1
	20-Feb-02	1	1	0	1	1
	21-Mar-02	1	-	-	-	1
	22-Apr-02	1	0	0	0	1
	28-May-02	1	0	0	0	1
	24-Jun-02	1	0	0	0	1
	22-Jul-02	1	0	0	0	1
	27-Aug-02	1	0	0	0	1
	23-Sep-02	1	0	0	0	1
	21-Oct-02	1	0	0	0	1
	18-Nov-02	1	1	0	1	1
	17-Dec-02	1	11	17	11	1
LTED04	29-Jan-02	1	0	6	-	4
	20-Feb-02	1	1	2	-	4
	18-Mar-02	1	-	-	-	4
	22-Apr-02	1	7	2	-	4
	28-May-02	1	3	1	-	4
	25-Jun-02	1	0	1	-	3
	22-Jul-02	1	0	0	-	3
	27-Aug-02	1	0	0	-	3
	23-Sep-02	1	0	0	-	3
	21-Oct-02	1	0	0	-	3
	20-Nov-02	1	6	6	-	3
	16-Dec-02	1	57	56	-	3
LSNT01	29-Jan-02	1	0	0	0	1
	20-Feb-02	1	0	0	0	1
	18-Mar-02	1	-	-	-	1
	22-Apr-02	1	0	0	0	1
	28-May-02	1	0	0	0	1
	25-Jun-02	1	0	0	0	1
	22-Jul-02	1	0	0	0	1
	27-Aug-02	1	0	0	0	1
	23-Sep-02	1	0	0	0	1
	21-Oct-02	1	0	0	0	1
	20-Nov-02	1	0	0	-	1
	16-Dec-02	1	0	0	0	1
KSRU02	29-Jan-02	Surface	0	10	-	24
	20-Feb-02	Surface	28	16	-	23
	18-Mar-02	Surface	20	7	-	22
	22-Apr-02	Surface	10	13	-	20
	28-May-02	Surface	4	3	-	19
	24-Jun-02	Surface	20	5	-	19
	22-Jul-02	Surface	14	14	-	19

Table A-6
2002 Offshore Ambient Water Column Monitoring
Bacteria

Station	Date	Depth (m)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
KSRU02	27-Aug-02	Surface	130	0	-	20
	23-Sep-02	Surface	38	2	-	21
	21-Oct-02	Surface	99	15	-	22
	18-Nov-02	Surface	70	31	-	22
	16-Dec-02	Surface	180	58	-	24

*The moving geometric mean value is for fecal coliform only.

Table A-7
2002 Outfall Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
KSHZ03	23-Jan-02	26	47	43	17
	27-Feb-02	4	3	4	19
	25-Mar-02	4	4	-	18
	29-Apr-02	1	1	-	16
	20-May-02	3	0	-	15
	26-Jun-02	26	5	-	15
	29-Jul-02	4	8	-	15
	21-Aug-02	4	26	-	15
	30-Sep-02	33	15	-	15
	28-Oct-02	14	4	-	15
	20-Nov-02	12	11	-	16
	17-Dec-02	60	75	-	17
KSSN04	23-Jan-02	65	9	-	9
	27-Feb-02	1	4	-	9
	25-Mar-02	1	0	-	8
	29-Apr-02	0	0	-	7
	20-May-02	0	3	-	6
	26-Jun-02	2	1	-	6
	29-Jul-02	0	1	-	5
	21-Aug-02	3	1	-	5
	30-Sep-02	30	5	-	5
	28-Oct-02	4	0	-	5
	20-Nov-02	11	8	-	5
	17-Dec-02	9	23	-	5
KSSN05	23-Jan-02	28	8	-	12
	27-Feb-02	4	1	-	12
	25-Mar-02	12	7	-	12
	29-Apr-02	2	1	-	12
	20-May-02	16	4	-	11
	26-Jun-02	10	1	-	10
	29-Jul-02	1	1	-	10
	21-Aug-02	4	1	-	10
	30-Sep-02	8	4	-	10
	28-Oct-02	4	7	-	10
	20-Nov-02	8	12	-	10
	17-Dec-02	55	60	-	9
LSKR01	23-Jan-02	130	120	-	18
	27-Feb-02	1	3	-	17
	25-Mar-02	3	1	-	16
	29-Apr-02	1	5	-	15
	20-May-02	37	4	-	15
	26-Jun-02	2	0	-	13
	29-Jul-02	65	36	-	13
	21-Aug-02	12	3	-	14
	30-Sep-02	130	32	-	16
	28-Oct-02	9	4	-	17
	20-Nov-02	45	19	-	18
	17-Dec-02	21	85	-	18
LSKS01	23-Jan-02	70	7	-	42
	27-Feb-02	2	5	-	40
	25-Mar-02	2	1	-	35
	29-Apr-02	19	2	-	32
	20-May-02	41	9	-	31
	26-Jun-02	38	4	-	27
	29-Jul-02	220	66	-	33

Table A-7
2002 Outfall Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean*
LSKS01	21-Aug-02	8	4	-	33
	30-Sep-02	53	29	-	35
	28-Oct-02	1100	160	-	44
	20-Nov-02	5	2	-	38
	17-Dec-02	21	16	-	36
MSJL01	23-Jan-02	4	12	-	-
	27-Feb-02	0	0	-	-
	25-Mar-02	75	2	-	-
	29-Apr-02	0	0	-	-
	20-May-02	2	0	-	-
	26-Jun-02	14	29	-	-
	29-Jul-02	24	16	-	-
	21-Aug-02	1	0	-	-
	30-Sep-02	9	19	-	-
	28-Oct-02	9	9	-	-
	20-Nov-02	5	10	-	-
	17-Dec-02	4	9	-	5

*The moving geometric mean value is for fecal coliform only.

Table A-8
2002 Ambient and MOSS Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean#
ITMUKILTSP **	23-Jan-02	69 *	11	74 *	22
	27-Feb-02	120	61	90	30
ITPICNICPT **	23-Jan-02	280 *	80	290 *	15
	27-Feb-02	19	8	14	16
ITMEADOWBP **	23-Jan-02	11 *	12	9 *	4
	27-Feb-02	4	2	3	4
ITOCEANAVE	23-Jan-02	1 *	0	3 *	7
	27-Feb-02	3	1	1	7
	25-Mar-02	1	1	-	6
	29-Apr-02	0	0	-	6
	20-May-02	1	1	-	5
	26-Jun-02	100	2	-	6
	29-Jul-02	21	24	-	6
	21-Aug-02	9	9	-	6
	30-Sep-02	7	1	-	7
	28-Oct-02	21	8	-	7
	20-Nov-02	7	2	-	7
	17-Dec-02	6	14	-	7
ITBRACKETT	23-Jan-02	20 *	40	16 *	45
	27-Feb-02	5	1	3	41
	25-Mar-02	0	0	-	36
	29-Apr-02	63	14	-	36
	20-May-02	130	19	-	38
	26-Jun-02	47	4	-	38
	29-Jul-02	19	130	-	37
	21-Aug-02	6	10	-	35
	30-Sep-02	8	2	-	31
	28-Oct-02	490	150	-	35
	20-Nov-02	48	22	-	35
	17-Dec-02	9	13	-	33
ITEDWARDSPT	23-Jan-02	18 *	21	17 *	8
	27-Feb-02	16	110	15	8
	25-Mar-02	0	2	-	7
	29-Apr-02	4	1	-	7
	20-May-02	1	0	-	7
	26-Jun-02	4	0	-	6
	29-Jul-02	85	55	-	7
	21-Aug-02	0	3	-	7
	30-Sep-02	4	4	-	7
	28-Oct-02	9	9	-	7
	20-Nov-02	10	17	-	8
	17-Dec-02	9	29	-	8
JSVW04	23-Jan-02	6	18	1	8
	27-Feb-02	1	1	0	7
	27-Mar-02	4	6	-	7
	29-Apr-02	0	0	-	6
	20-May-02	1	1	-	5
	26-Jun-02	4	0	-	5
	29-Jul-02	5	5	-	5
	21-Aug-02	2	2	-	5
	30-Sep-02	7	29	-	5
	28-Oct-02	36	13	-	5
	20-Nov-02	2	4	-	5
	17-Dec-02	7	14	-	5

Table A-8
2002 Ambient and MOSS Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean#
ITBOEINGCR **	23-Jan-02	3 *	3	3 *	4
	27-Feb-02	19	17	19	5
ITCARKEEKP **	23-Jan-02	6 *	26	10 *	6
	27-Feb-02	1	1	1	6
KSJX02 **	23-Jan-02	19 *	21	14 *	8
	27-Feb-02	5	1	4	8
KSLU03	23-Jan-02	32	35	39	18
	27-Feb-02	50	27	31	18
	25-Mar-02	3	7	-	17
	29-Apr-02	0	0	-	16
	20-May-02	15	8	-	16
	26-Jun-02	1	0	-	13
	29-Jul-02	20	16	-	13
	21-Aug-02	27	24	-	14
	30-Sep-02	2	4	-	12
	28-Oct-02	52	43	-	13
	20-Nov-02	1	2	-	12
	17-Dec-02	120	67	-	12
KSQU01	23-Jan-02	13	6	10	23
	27-Feb-02	13	4	11	25
	25-Mar-02	15	11	-	25
	29-Apr-02	59	4	-	27
	20-May-02	350	8	-	28
	26-Jun-02	26	1	-	26
	29-Jul-02	21	11	-	27
	21-Aug-02	18	6	-	26
	30-Sep-02	27	3	-	26
	28-Oct-02	120	9	-	28
	20-Nov-02	44	21	-	29
	17-Dec-02	110	53	-	30
KSYV02	23-Jan-02	16	4	-	17
	27-Feb-02	6	3	-	16
	25-Mar-02	9	0	-	16
	29-Apr-02	56	6	-	17
	20-May-02	15	4	-	16
	26-Jun-02	5	9	-	15
	29-Jul-02	8	23	-	13
	21-Aug-02	1	0	-	12
	30-Sep-02	26	1	-	12
	28-Oct-02	22	23	-	13
	20-Nov-02	44	4	-	13
	17-Dec-02	150	150	-	13
LTAB01	23-Jan-02	34	18	-	11
	27-Feb-02	10	16	-	11
	25-Mar-02	1	1	-	10
	29-Apr-02	1	4	-	9
	20-May-02	10	3	-	8
	26-Jun-02	3	1	-	8
	29-Jul-02	6	1	-	8
	21-Aug-02	0	1	-	8
	30-Sep-02	0	1	-	7
	28-Oct-02	14	6	-	7
	20-Nov-02	17	14	-	7
	17-Dec-02	320	200	-	8

Table A-8
2002 Ambient and MOSS Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean#
LTEH02	23-Jan-02	79	31	-	31
	27-Feb-02	24	22	-	31
	25-Mar-02	10	12	-	31
	29-Apr-02	18	8	-	32
	20-May-02	38	29	-	31
	26-Jun-02	13	4	-	27
	29-Jul-02	18	16	-	28
	21-Aug-02	6	4	-	28
	30-Sep-02	26	17	-	27
	28-Oct-02	20	8	-	27
	20-Nov-02	21	32	-	26
	17-Dec-02	1000	510	-	29
LSGY01	23-Jan-02	1	1	-	4
	27-Feb-02	12	2	-	4
	25-Mar-02	4	1	-	4
	29-Apr-02	3	3	-	4
	20-May-02	0	0	-	3
	26-Jun-02	0	1	-	3
	29-Jul-02	1	1	-	3
	21-Aug-02	9	0	-	2
	30-Sep-02	6	2	-	3
	28-Oct-02	9	1	-	3
	20-Nov-02	6	14	-	3
	17-Dec-02	42	55	-	3
LSFX01	23-Jan-02	7	2	-	4
	27-Feb-02	4	4	-	4
	25-Mar-02	1	0	-	4
	29-Apr-02	4	0	-	4
	20-May-02	2	1	-	4
	26-Jun-02	9	0	-	4
	29-Jul-02	3	1	-	4
	21-Aug-02	7	1	-	4
	30-Sep-02	11	4	-	4
	28-Oct-02	3	13	-	4
	20-Nov-02	24	3	-	5
	17-Dec-02	12	130	-	5
LSHV01	23-Jan-02	16	2	-	4
	27-Feb-02	4	1	-	4
	25-Mar-02	3	1	-	4
	29-Apr-02	8	4	-	4
	20-May-02	1	0	-	4
	26-Jun-02	6	5	-	4
	29-Jul-02	4	1	-	4
	21-Aug-02	13	1	-	4
	30-Sep-02	2	4	-	4
	28-Oct-02	2	2	-	4
	20-Nov-02	2	36	-	4
	17-Dec-02	4	39	-	4
LSTU01	23-Jan-02	31	31	-	4
	27-Feb-02	2	1	-	3
	25-Mar-02	1	1	-	3
	29-Apr-02	1	0	-	3
	20-May-02	5	1	-	3
	26-Jun-02	4	1	-	3
	29-Jul-02	6	12	-	3

Table A-8
2002 Ambient and MOSS Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean#
LSTU01	21-Aug-02	29	1	-	4
	30-Sep-02	9	4	-	4
	28-Oct-02	4	1	-	3
	20-Nov-02	1	1	-	3
	17-Dec-02	1	15	-	3
LSVW01	23-Jan-02	14	29	-	52
	27-Feb-02	3	3	-	45
	25-Mar-02	1	3	-	38
	29-Apr-02	19	34	-	38
	20-May-02	260	140	-	39
	26-Jun-02	230	1	-	36
	29-Jul-02	140	53	-	40
	21-Aug-02	3000	350	-	50
	30-Sep-02	80	13	-	58
	28-Oct-02	47	19	-	56
	20-Nov-02	26	21	-	53
	17-Dec-02	9	34	-	51
MTEC01	14-May-02	110	0	-	7
	11-Jun-02	20	1	-	7
	8-Jul-02	4	0	-	6
	5-Aug-02	5	3	-	6
	16-Sep-02	79	7	-	6
	28-Oct-02	190	100	-	6
MTLD03	13-May-02	16	1	-	11
	11-Jun-02	9	0	-	12
	8-Jul-02	9	2	-	12
	5-Aug-02	13	4	-	13
	16-Sep-02	43	4	-	16
	28-Oct-02	64	40	-	15
MSSM05	14-May-02	21	1	-	51
	10-Jun-02	0	0	-	46
	8-Jul-02	96	40	-	51
	6-Aug-02	77	4	-	54
	16-Sep-02	8	4	-	54
	28-Oct-02	940	8	-	54
KTHA01	23-Jan-02	46	54	39	106
	27-Feb-02	50	82	59	111
	25-Mar-02	56	190	-	114
	29-Apr-02	56	40	-	120
	20-May-02	680	700,E	-	123
	26-Jun-02	160	210	-	125
	29-Jul-02	210	470	-	127
	21-Aug-02	110	530	-	115
	30-Sep-02	170	230	-	114
	28-Oct-02	44	230	-	109
	20-Nov-02	39	77	-	106
	17-Dec-02	1000	2100	-	117
0305 (Surface)	23-Jan-02	39	46	26	41
	27-Feb-02	27	17	13	40
	26-Mar-02	13	10	15	38
	30-Apr-02	18	6	13	39
	20-May-02	51	-	56	41
	26-Jun-02	64	29	61	41

Table A-8
2002 Ambient and MOSS Beach Monitoring
Bacteria

Station	Date	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	*Escherichia coli* (CFU/100 ml)	Moving Geometric Mean#
0305 (Surface)	29-Jul-02	36	34	56	41
	20-Aug-02	8	1	4	40
	30-Sep-02	160	31	190	41
	28-Oct-02	200	16	200	43
	20-Nov-02	21	51	27	39
	17-Dec-02	190	360	150	40
0305 (Depth)	23-Jan-02	17	9	16	5
	27-Feb-02	20	11	11	6
	26-Mar-02	1	1	0	5
	30-Apr-02	1	0	1	5
	20-May-02	3	1	1	5
	26-Jun-02	10	4	7	5
	29-Jul-02	3	8	1	5
	20-Aug-02	1	0	2	5
	30-Sep-02	10	1	6	5
	28-Oct-02	10	4	6	5
	20-Nov-02	8	19	10	5
	17-Dec-02	31	32	33	5
0307 (Surface)	23-Jan-02	34	28	28	42
	27-Feb-02	21	7	14	41
	26-Mar-02	11	9	14	37
	30-Apr-02	26	10	11	37
	20-May-02	61	-	38	38
	26-Jun-02	61	21	73	38
	29-Jul-02	130	42	110	41
	20-Aug-02	120	33	130	43
	30-Sep-02	230	44	260	48
	28-Oct-02	47	21	49	48
	20-Nov-02	95	77	95	49
	17-Dec-02	590	420	660	53
0307 (Depth)	23-Jan-02	4	10	4	11
	27-Feb-02	9	10	7	11
	26-Mar-02	2	5	3	10
	30-Apr-02	8	11	11	10
	20-May-02	4	4	6	10
	26-Jun-02	26	6	26	9
	29-Jul-02	11	5	14	9
	20-Aug-02	10	4	15	9
	30-Sep-02	6	3	7	8
	28-Oct-02	2	6	4	8
	20-Nov-02	70	72	61	9
	17-Dec-02	22	170	28	9

#The moving geometric mean value is for fecal coliform only.

* Indicates estimated value.

** Less than 30 samples used to calculate the geometric mean.

Table A-9
Beach Monitoring
Intertidal Water Dissolved Metals (mg/L)

Station	Date	Antimony	Arsenic	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc*
KSHZ03	8-Aug-02	0.0000801	0.00123	0.0000558	0.00018	0.0000339	0.000433	0.0000075	0.000435	<0.00015	<0.000060	0.0000092	0.00123	0.00062
KSSN04	8-Aug-02	0.0000887	0.00118	0.0000582	0.00014	0.0000422	0.000546	<0.0000070	0.000460	<0.00015	<0.000061	0.0000090	0.00119	0.00107
KSSN05	8-Aug-02	0.0000873	0.00131	0.0000630	0.00016	0.0000520	0.000374	<0.0000070	0.000441	<0.00015	<0.000060	0.0000092	0.00129	0.00074
LSKR01	8-Aug-02	0.0000837	0.00129	0.0000615	0.00014	0.0000339	0.000448	0.000011	0.000373	<0.00015	<0.000060	0.000012	0.00147	0.00068
MSJL01	8-Aug-02	0.0000942	0.00116	0.0000361	0.00012	0.0000270	0.000362	<0.0000070	0.000301	<0.00015	<0.000060	0.0000094	0.00152	0.00039
ITOCEANAVE	8-Aug-02	0.0000808	0.00121	0.0000460	0.00013	0.0000259	0.000322	<0.0000070	0.000372	<0.00015	<0.000060	0.0000091	0.00124	0.00046
JSVW04	8-Aug-02	0.0000875	0.00133	0.0000637	0.00013	0.0000365	0.000408	0.000018	0.000392	<0.00015	<0.000060	0.0000092	0.00137	0.00068
KSLU03	8-Aug-02	0.0000732	0.00160	0.0000441	0.00015	0.0000421	0.000912	0.000015	0.000439	<0.00015	<0.000060	0.000013	0.00216	0.000842
KSYV02	8-Aug-02	0.0000804	0.00135	0.0000562	0.00014	0.0000426	0.00123	0.000013	0.000413	<0.00015	<0.000060	0.0000095	0.00144	0.00151
MTLD03	8-Aug-02	0.0000645	0.00156	0.0000471	0.00014	0.0000455	0.000677	0.000016	0.000514	<0.00015	<0.000060	0.000015	0.00178	0.000901

mg/L - Milligrams per liter.
* - Zinc results should be considered compromised by laboratory contamination. All sample results are less than 5 times the concentration detected in an associated laboratory method blank.
Station Name - Outfall monitoring station.

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
CK200P	22-Jan-03	1	9.0	29.879	23.13	3.5	0.6	4.1	100
		15	9.1	30.090	23.32	-	<0.5	4.6	3
		25	9.2	30.114	23.38	-	<0.5	2.6	0
		35	9.2	30.129	23.44	-	<0.5	3.7	0
		55	9.3	30.210	23.58	-	0.6	2.8	0
	25-Feb-03	1	9.0	29.576	22.89	1.4	<0.5	4.0	94
		15	9.0	29.637	22.99	-	0.8	4.1	2
		25	9.0	29.662	23.05	-	0.8	2.5	0
		35	9.0	29.690	23.12	-	0.9	3.8	0
		55	9.0	29.718	23.24	-	1.0	2.4	0
	25-Mar-03	1	9.0	25.992	20.09	1.3	1.3	3.8	54
		15	8.9	29.219	22.68	-	0.7	4.8	1
		25	8.9	29.383	22.85	-	0.8	2.4	0
		35	8.9	29.439	22.94	-	0.8	2.4	0
		55	8.9	29.518	23.10	-	0.9	1.9	0
	28-Apr-03	1	9.6	28.833	22.21	1.2	<0.5	1.2	78
		15	9.4	29.059	22.49	-	0.6	2.8	2
		25	9.3	29.117	22.58	-	0.7	0.7	0
		35	9.3	29.116	22.63	-	0.7	1.1	0
		55	9.3	29.186	22.78	-	0.8	1.4	0
	28-May-03	1	11.2	28.850	21.97	1.2	0.6	3.1	100
		15	10.2	29.190	22.45	-	0.5	0.7	3
		25	10.2	29.200	22.51	-	0.6	2.6	0
		35	10.1	29.246	22.60	-	0.6	2.6	0
		55	9.9	29.481	22.91	-	0.8	0.9	0
	24-Jun-03	1	12.7	28.778	21.64	1.0	0.5	4.4	58
		15	11.6	29.249	22.27	-	0.6	1.4	0
		25	11.3	29.351	22.44	-	<0.5	0.5	0
		35	10.9	29.570	22.73	-	0.5	1.3	0
		55	10.7	29.712	22.95	-	0.7	1.8	0
	29-Jul-03	1	13.6	29.632	22.13	1.2	2.1	3.8	-
		15	13.1	29.681	22.33	-	0.8	1.5	-
		25	12.4	29.779	22.58	-	<0.5	0.9	-
		35	12.3	29.819	22.68	-	<0.5	1.6	-
		55	12.2	29.839	22.80	-	<0.5	1.2	-
	26-Aug-03	1	14.0	29.746	22.14	1.1	0.6	3.2	74
		15	13.7	29.969	22.43	-	0.6	5.3	1
		25	13.0	30.118	22.73	-	<0.5	2.2	0
		35	12.7	30.209	22.90	-	<0.5	0.6	0
		55	12.4	30.370	23.17	-	0.6	<0.5	0
	30-Sep-03	1	13.4	30.380	22.75	1.2	<0.5	3.4	67
		15	13.1	30.471	22.94	-	<0.5	3.0	3
		25	12.6	30.640	23.21	-	<0.5	3.1	1
		35	12.4	30.721	23.36	-	0.6	2.9	0
		55	12.1	30.835	23.59	-	0.9	4.0	0
	29-Oct-03	1	12.1	28.689	21.68	1.2	<0.5	2.7	73
		15	12.2	29.018	21.98	-	<0.5	2.9	2
		25	12.2	29.308	22.25	-	<0.5	2.7	0
		35	12.4	30.329	23.05	-	<0.5	2.5	0
		55	12.2	30.641	23.42	-	0.7	2.7	0

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
CK200P	19-Nov-03	1	11.4	30.052	22.87	1.3	<0.5	1.1	63
		15	11.4	30.118	22.97	-	<0.5	1.4	4
		25	11.4	30.140	23.04	-	<0.5	2.2	1
		35	11.4	30.163	23.10	-	<0.5	2.1	0
		55	11.4	30.172	23.20	-	<0.5	1.8	0
	16-Dec-03	1	10.0	29.518	22.69	1.1	<0.5	4.6	71
		15	10.3	29.855	22.96	-	<0.5	2.7	3
		25	10.3	29.919	23.06	-	<0.5	2.9	1
		35	10.2	29.971	23.16	-	0.6	2.4	0
		55	9.9	30.012	23.32	-	0.9	2.9	0
KSSK02	21-Jan-03	1	9.1	29.805	23.05	-	0.6	3.5	100
		15	9.2	29.953	23.21	-	0.6	3.5	4
		25	9.2	29.974	23.28	-	<0.5	3.0	0
		35	9.2	29.986	23.33	-	0.5	<1.1	0
		55	9.2	30.067	23.48	-	0.6	2.5	0
	24-Feb-03	1	8.8	28.771	22.29	8.0	1.2	3.8	41
		15	9.0	29.448	22.84	-	1.2	4.2	2
		25	9.1	29.590	22.99	-	0.9	2.5	0
		35	9.1	29.618	23.06	-	0.9	3.8	0
		55	9.0	29.695	23.21	-	0.9	4.0	0
	24-Mar-03	1	8.8	28.887	22.38	9.0	1.6	2.7	36
		15	8.9	29.389	22.81	-	0.9	2.2	1
		25	8.9	29.382	22.85	-	0.8	3.2	0
		35	8.9	29.438	22.94	-	0.8	1.7	0
		55	8.9	29.249	22.88	-	0.9	1.8	0
	29-Apr-03	1	9.8	28.581	21.98	5.7	0.6	4.4	63
		15	9.8	28.752	22.18	-	0.7	4.0	1
		25	9.7	28.881	22.35	-	0.6	1.6	0
		35	9.6	28.897	22.41	-	0.7	3.4	0
		55	9.6	28.939	22.54	-	0.6	3.3	0
	27-May-03	1	10.9	28.939	22.09	7.8	<0.5	3.0	67
		15	10.5	29.121	22.35	-	0.6	0.6	1
		25	10.1	29.210	22.53	-	0.6	1.1	0
		35	10.1	29.210	22.58	-	0.7	3.2	0
		55	9.9	29.399	22.85	-	0.8	1.4	0
	23-Jun-03	1	12.3	29.058	21.93	4.5	0.7	6.2	-
		15	12.0	29.091	22.07	-	0.9	4.0	-
		25	11.4	29.313	22.40	-	0.6	0.7	-
		35	11.0	29.466	22.63	-	<0.5	2.4	-
		55	10.7	29.680	22.94	-	0.6	1.1	-
	28-Jul-03	1	13.9	29.538	22.00	5.7	0.9	3.3	-
		15	13.4	29.615	22.22	-	0.6	4.2	-
		25	12.2	29.837	22.66	-	<0.5	1.3	-
		35	11.7	29.948	22.88	-	0.6	1.4	-
		55	11.7	29.724	22.80	-	0.8	2.3	-

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
KSSK02	25-Aug-03	1	13.9	29.925	22.29	4.5	1.0	5.2	61
		15	13.7	30.002	22.46	-	<0.5	4.8	0
		25	12.4	30.155	22.86	-	0.6	0.7	0
		35	12.4	30.304	23.02	-	0.5	1.0	0
		55	12.3	30.382	23.20	-	0.6	0.9	0
	29-Sep-03	1	13.3	30.426	22.79	11.0	<0.5	3.4	66
		15	13.1	30.486	22.94	-	<0.5	2.7	4
		25	13.0	30.510	23.03	-	<0.5	2.6	1
		35	13.0	30.517	23.08	-	<0.5	1.4	0
		55	12.9	30.535	23.20	-	<0.5	2.5	0
	27-Oct-03	1	12.3	27.937	21.06	6.5	0.6	2.5	-
		15	12.5	29.596	22.37	-	<0.5	2.1	-
		25	12.6	30.124	22.82	-	<0.5	2.1	-
		35	12.6	30.139	22.87	-	<0.5	4.0	-
		55	12.5	30.348	23.14	-	<0.5	2.5	-
	17-Nov-03	1	11.4	30.009	22.83	9.5	<0.5	4.1	73
		15	11.5	30.188	23.01		<0.5	2.4	5
		25	11.5	30.230	23.09		<0.5	3.4	1
		35	11.5	30.261	23.16		<0.5	5.8	0
		55	11.4	30.329	23.31		<0.5	2.4	0
	15-Dec-03	1	10.3	29.645	22.73	9.0	0.6	3.0	76
		15	10.2	29.689	22.85		0.6	2.9	2
		25	10.3	29.639	22.84		0.6	4.3	0
		35	10.3	29.766	22.98		0.5	2.9	0
		55	10.3	29.770	23.08		0.6	5.3	0
LTBC42	21-Jan-03	1	9.0	29.631	22.92	8.8	<0.5	1.8	58
		3	9.0	29.583	22.89	-	<0.5	3.5	33
	24-Feb-03	1	9.1	29.484	22.79	8.5	<0.5	3.9	104
		5	9.1	29.567	22.88	-	1.2	3.1	31
	27-May-03	1	10.9	28.405	21.67	8.0	0.6	2.7	48
		6	10.6	28.752	22.01	-	0.6	2.0	12
	23-Jun-03	1	11.9	28.049	21.22	7.0	0.6	2.7	-
		2	12.0	27.233	20.58	-	0.6	3.5	-
	28-Jul-03	1	14.4	29.050	21.52	4.5	<0.5	4.5	-
		2	14.5	29.028	21.49	-	0.9	2.5	-
	25-Aug-03	1	14.2	29.309	21.77	4.2	1.0	5.8	51
		2	13.9	29.515	21.99	-	<0.5	2.7	58
	29-Sep-03	1	13.7	29.186	21.76	8.0	<0.5	1.4	59
		11	13.3	30.319	22.77	-	<0.5	3.4	6
	27-Oct-03	1	12.6	27.865	20.95	6.0	0.6	2.8	-
		2	12.6	27.779	20.89	-	0.6	2.1	-
	17-Nov-03	1	11.2	29.188	22.23	9.5	0.5	3.1	70
		2	10.9	28.776	21.96	-	0.6	5.0	44
	15-Dec-03	1	9.7	27.482	21.15	6.5	0.9	2.9	74
		3	10.0	28.509	21.91	-	0.8	3.2	24

Table A-10
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General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSEP01	21-Jan-03	1	8.9	29.627	22.94	10.0	<0.5	1.6	87
		15	9.1	30.031	23.28	-	<0.5	2.4	60
		25	9.2	30.061	23.35	-	0.5	2.5	No Data
		35	9.2	30.076	23.40	-	0.6	1.3	4
		55	9.2	30.151	23.54	-	0.7	2.8	4
		100	9.4	30.281	23.83	-	0.7	1.7	0
		190	9.5	30.415	24.33	-	1.8	3.4	0
	24-Feb-03	1	9.0	No Data	No Data	6.0	2.0	3.1	No Data
		15	9.0	No Data	No Data	-	0.8	2.5	No Data
		25	9.1	No Data	No Data	-	0.8	1.8	No Data
		35	9.1	No Data	No Data	-	0.8	6.6	No Data
		55	9.1	No Data	No Data	-	0.8	1.4	No Data
		100	9.1	No Data	No Data	-	1.6	6.2	No Data
		190	9.1	No Data	No Data	-	2.1	5.7	No Data
	24-Mar-03	1	9.0	29.252	22.63	11.0	<0.5	3.8	77
		15	8.9	29.355	22.78	-	0.7	3.2	2
		25	8.9	29.377	22.85	-	0.8	3.4	0
		35	8.9	29.411	22.92	-	0.8	2.2	0
		55	8.9	29.455	23.05	-	0.8	2.0	No Data
		100	8.8	29.734	23.48	-	0.8	2.6	No Data
		185	8.7	29.940	24.06	-	2.7	2.6	No Data
	29-Apr-03	1	10.0	28.808	22.14	7.8	<0.5	2.1	61
		15	9.7	28.964	22.36	-	0.6	1.7	0
		25	9.7	28.971	22.41	-	<0.5	3.3	0
		35	9.7	28.976	22.47	-	0.5	1.0	0
		55	9.4	29.150	22.74	-	0.6	1.9	0
		100	9.1	29.389	23.17	-	0.8	1.8	0
		180	9.0	29.534	23.68	-	4.8	8.5	0
	27-May-03	1	11.1	29.093	22.16	9.0	0.6	3.7	76
		15	10.7	29.118	22.32	-	0.5	1.4	2
		25	10.2	29.166	22.48	-	<0.5	1.9	0
		35	10.1	29.210	22.58	-	0.5	2.0	0
		55	9.9	29.417	22.87	-	0.7	1.4	0
		100	9.8	29.571	23.20	-	0.9	1.3	0
		190	9.9	29.970	23.90	-	3.9	6.0	0
	23-Jun-03	1	11.9	29.203	22.12	5.0	0.6	6.7	No Data
		15	11.4	29.359	22.39	-	<0.5	2.4	No Data
		25	11.1	29.442	22.55	-	<0.5	3.6	No Data
		35	11.0	29.474	22.63	-	<0.5	1.4	No Data
		55	10.7	29.693	22.96	-	0.5	1.7	No Data
		100	10.4	29.894	23.35	-	0.8	0.8	No Data
		185	10.5	30.014	23.82	-	2.7	3.6	No Data
	28-Jul-03	1	14.4	29.543	21.89	7.8	0.8	5.0	No Data
		15	13.1	29.677	22.32	-	<0.5	2.5	No Data
		25	13.1	29.673	22.37	-	0.5	1.5	No Data
		35	12.8	29.691	22.48	-	<0.5	3.2	No Data
		55	11.8	29.961	22.97	-	<0.5	2.7	No Data
		100	11.5	30.273	23.46	-	0.7	1.4	No Data
		185	11.4	30.551	24.08	-	2.0	4.5	No Data

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General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSEP01	25-Aug-03	1	14.3	29.915	22.20	3.6	0.8	4.7	55
		15	13.6	30.035	22.51	-	<0.5	0.5	1
		25	13.4	30.056	22.61	-	<0.5	2.5	0
		35	13.0	30.099	22.76	-	<0.5	1.6	0
		55	12.4	30.291	23.10	-	<0.5	<0.5	0
		100	12.2	30.525	23.54	-	0.6	1.1	0
		185	11.8	30.849	24.22	-	1.5	1.6	0
	29-Sep-03	1	13.3	30.472	22.84	12.0	<0.5	2.7	70
		15	13.2	30.484	22.93	-	<0.5	3.3	4
		25	13.2	30.486	22.98	-	<0.5	3.0	1
		35	13.2	30.487	23.03	-	<0.5	2.0	0
		55	12.9	30.572	23.24	-	<0.5	1.2	0
		100	12.2	30.791	23.73	-	0.6	2.9	0
		185	11.9	30.953	24.30	-	1.6	3.8	0
	27-Oct-03	1	12.5	28.078	21.13	7.5	0.5	5.8	No Data
		15	12.5	29.386	22.21	-	<0.5	2.9	No Data
		25	12.4	30.278	22.98	-	0.6	2.5	No Data
		35	12.3	30.332	23.06	-	0.6	1.9	No Data
		55	12.3	30.496	23.29	-	0.6	2.4	No Data
		100	11.9	30.863	23.85	-	0.6	2.0	No Data
		185	11.5	31.041	24.45	-	1.3	4.1	No Data
	17-Nov-03	1	11.5	30.213	22.97	14.0	<0.5	2.5	68
		15	11.5	30.219	23.03	-	<0.5	4.2	5
		25	11.5	30.225	23.08	-	<0.5	2.4	1
		35	11.6	30.233	23.13	-	<0.5	2.4	0
		55	11.6	30.247	23.23	-	<0.5	3.7	0
		100	11.4	30.614	23.75	-	1.0	6.0	0
		185	11.6	30.750	24.21	-	1.9	4.7	0
	15-Dec-03	1	10.2	29.841	22.89	9.0	0.5	3.0	70
		15	10.3	29.868	22.98	-	0.5	2.9	3
		25	10.3	29.875	23.03	-	0.5	3.2	1
		35	10.3	29.889	23.08	-	0.5	3.0	0
		55	10.3	29.898	23.18	-	0.6	3.1	0
		100	10.0	30.082	23.58	-	1.1	4.2	0
		185	9.7	30.144	24.07	-	1.8	5.0	0
LSKQ06	21-Jan-03	1	9.1	30.057	23.23	8.3	0.6	2.0	98
		15	9.2	30.082	23.31	-	0.6	1.6	10
		25	9.2	30.140	23.40	-	0.6	1.7	12
		35	9.2	30.157	23.45	-	0.7	2.5	No Data
	24-Feb-03	1	9.0	29.534	22.85	9.5	<0.5	2.9	90
		15	8.9	29.546	22.93	-	0.8	3.2	3
		25	9.0	29.564	22.98	-	0.8	1.2	0
		35	9.0	29.576	23.03	-	0.9	2.9	0
	24-Mar-03	1	9.3	29.163	22.51	11.0	0.6	2.7	48
		15	8.9	29.421	22.84	-	0.8	1.7	2
		25	8.9	29.464	22.92	-	1.0	3.6	0
		35	8.9	29.495	22.99	-	0.9	2.6	0
	29-Apr-03	1	9.9	28.892	22.21	7.8	<0.5	2.0	69
		15	9.7	28.951	22.35	-	0.6	1.4	1
		25	9.6	29.001	22.45	-	0.5	1.1	0
		35	9.5	29.029	22.53	-	0.5	1.6	0

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Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSKQ06	27-May-03	1	11.4	28.998	22.05	6.5	<0.5	3.3	43
		15	10.4	29.137	22.38	-	0.6	<1	1
		25	10.3	29.158	22.46	-	0.5	1.4	0
		35	10.3	29.168	22.52	-	<0.5	1.0	0
	23-Jun-03	1	12.1	28.967	21.90	4.5	1.0	2.3	No Data
		15	11.6	29.280	22.30	-	<0.5	1.5	No Data
		25	11.5	29.334	22.40	-	<0.5	2.6	No Data
		35	11.2	29.412	22.55	-	<0.5	1.1	No Data
	28-Jul-03	1	13.7	29.621	22.10	9.9	<0.5	2.7	No Data
		15	13.2	29.666	22.30	-	<0.5	4.0	No Data
		25	13.0	29.681	22.39	-	<0.5	1.4	No Data
		35	13.0	29.690	22.45	-	<0.5	2.5	No Data
	25-Aug-03	1	14.1	30.009	22.32	11.0	<0.5	1.4	52
		15	13.5	30.042	22.54	-	<0.5	2.5	2
		25	13.2	30.065	22.65	-	<0.5	1.9	0
		35	13.2	30.076	22.70	-	<0.5	3.5	0
	29-Sep-03	1	13.2	30.480	22.86	14.0	<0.5	2.4	68
		15	13.1	30.508	22.97	-	<0.5	3.7	4
		25	13.0	30.513	23.03	-	<0.5	3.1	1
		35	13.0	30.522	23.08	-	<0.5	2.9	0
	27-Oct-03	1	12.5	28.907	21.78	7.5	<0.5	3.3	No Data
		15	12.5	29.567	22.36	-	<0.5	2.7	No Data
		25	12.4	30.191	22.90	-	0.5	3.2	No Data
		35	12.4	30.273	23.01	-	0.5	3.0	No Data
	17-Nov-03	1	11.4	30.156	22.95	13.0	<0.5	5.5	62
		15	11.4	30.182	23.02	-	<0.5	2.3	4
		25	11.5	30.205	23.07	-	<0.5	2.4	1
		35	11.5	30.221	23.12	-	<0.5	2.1	0
	15-Dec-03	1	10.3	29.884	22.92	9.5	0.6	3.1	66
		15	10.3	29.886	22.98	-	0.6	3.0	3
		25	10.3	29.893	23.03	-	0.6	3.1	0
		35	10.3	29.907	23.09	-	0.6	3.1	0
VO50E	21-Jan-03	1	9.1	30.020	23.21	8.2	<0.5	2.1	86
		5	9.1	30.041	23.25	-	<0.5	1.9	47
		10	9.1	30.055	23.28	-	<0.5	1.4	37
	24-Feb-03	1	8.8	29.478	22.83	11.0	<0.5	1.0	83
		5	8.8	29.482	22.85	-	0.7	2.3	20
		10	8.8	29.482	22.87	-	0.7	0.9	7
	24-Mar-03	1	9.2	29.123	22.49	9.5	0.6	3.9	48
		5	8.9	29.378	22.76	-	0.8	1.4	17
		10	8.9	29.405	22.80	-	0.9	2.0	6
	29-Apr-03	1	9.7	29.001	22.32	8.7	<0.5	2.9	55
		5	9.7	29.005	22.35	-	0.5	0.8	18
		10	9.7	29.009	22.38	-	<0.5	0.7	6
	27-May-03	1	12.4	28.810	21.71	4.8	<0.5	2.7	122
		5	11.3	28.995	22.07	-	0.8	2.0	29
		10	11.0	29.063	22.20	-	0.6	2.9	6

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2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
VO50E	23-Jun-03	1	12.8	28.563	21.46	3.5	0.9	5.2	No Data
		5	11.7	29.285	22.24	-	0.5	3.9	No Data
		10	11.6	29.319	22.30	-	0.6	5.5	No Data
	28-Jul-03	1	15.0	29.593	21.81	10.0	<0.5	4.7	No Data
		5	13.7	29.644	22.13	-	0.7	4.3	No Data
		13	13.6	29.654	22.19	-	0.5	3.5	No Data
	25-Aug-03	1	14.7	29.957	22.15	12.0	<0.5	5.1	112
		5	13.7	30.039	22.44	-	<0.5	2.4	27
		10	13.4	30.069	22.54	-	<0.5	1.5	8
	29-Sep-03	1	13.2	30.487	22.87	13.0	<0.5	3.4	72
		5	13.1	30.493	22.90	-	<0.5	3.7	26
		10	13.1	30.500	22.94	-	<0.5	3.6	8
	27-Oct-03	1	12.5	29.566	22.28	9.5	<0.5	2.9	No Data
		5	12.5	29.597	22.33	-	<0.5	3.0	No Data
		10	12.5	29.653	22.39	-	<0.5	2.7	No Data
	17-Nov-03	1	11.3	30.238	23.03	12.0	<0.5	3.3	75
		11	11.4	30.213	23.00	-	<0.5	3.2	25
		12	11.5	30.217	23.02	-	<0.5	3.0	10
	15-Dec-03	1	10.2	29.837	22.90	12.0	<0.5	2.3	66
		5	10.2	29.836	22.92	-	<0.5	2.6	20
		10	10.2	29.849	22.94	-	<0.5	2.2	8

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
CK200P	22-Jan-03	1	7.3	0.79	0.19	<0.01	0.42	0.079	3.00
		15	7.2	0.59	0.07	<0.01	0.42	0.082	3.10
		25	7.1	0.36	0.17	<0.01	0.42	0.083	3.07
		35	7.1	0.53	0.24	<0.01	0.42	0.080	3.04
		55	7.0	-	-	<0.01	0.42	0.080	3.09
	25-Feb-03	1	7.5	0.58	0.16	<0.01	0.43	0.077	3.16
		15	7.5	0.26	0.12	<0.01	0.43	0.078	3.33
		25	7.4	0.23	0.13	<0.01	0.43	0.078	3.31
		35	7.4	0.19,B	0.15	<0.01	0.43	0.079	3.36
		55	7.4	-	-	<0.01	0.42	0.076	3.34
	25-Mar-03	1	8.5	1.38	0.47	0.02	0.35	0.062	2.95
		15	7.9	0.53	0.22	0.02	0.41	0.072	3.33
		25	7.8	0.38	0.23	0.02	0.41	0.071	3.27
		35	7.8	0.39	0.22	0.02	0.41	0.082	3.23
		55	7.7	-	-	0.02	0.40	0.070	3.16
	28-Apr-03	1	9.2	8.16	0.95	0.04	0.25	0.059	2.39
		15	8.6	1.62	0.93	0.04	0.32	0.068	2.68
		25	8.4	1.09	1.05	0.04	0.33	0.067	2.68
		35	8.4	1.00	0.90	0.04	0.33	0.067	2.74
		55	8.1	-	-	0.04	0.33	0.067	2.73
	28-May-03	1	9.1	6.13	1.95	0.02	0.23	0.060	2.34
		15	8.0	1.88	1.41	0.03	0.28	0.064	2.57
		25	8.0	1.96	1.2	0.03	0.28	0.065	2.58
		35	7.8	1.63	1.23	0.03	0.29	0.062	2.57
		55	7.6	-	-	0.03	0.29	0.063	2.40
	24-Jun-03	1	10.6	14.6	2.62	0.01	0.05	0.038	0.97
		15	8.3	6.19	2.16	0.04	0.19	0.052	1.57
		25	7.9	1.35	0.99	0.05	0.22	0.054	1.78
		35	7.3	0.39	0.75	0.05	0.25	0.056	1.92
		55	7.1	-	-	0.05	0.27	0.058	1.93
	29-Jul-03	1	8.9	13.2	4.65	0.02	0.11	0.055	0.99
		15	7.6	7.38	1.37	<0.01	0.19	0.070	1.46
		25	6.9	1.71	0.94	0.01	0.26	0.057	1.82
		35	6.7	0.98	0.72	0.01	0.27	0.059	1.89
		55	6.7	-	-	0.01	0.28	0.059	1.90
	26-Aug-03	1	8.6	6.56	2.25	0.02	0.13	0.052	1.78
		15	8.1	4.69	4.27	0.02	0.15	0.054	1.76
		25	6.3	2.26	1.44	0.01	0.24	0.061	1.87
		35	6.0	0.69	0.85	0.01	0.29	0.062	1.92
		55	5.7	-	-	<0.01	0.31	0.064	1.98
	30-Sep-03	1	6.8	2.09	0.45	<0.01	0.24	0.068	2.00
		15	6.1	1.31	0.42	<0.01	0.27	0.067	2.13
		25	5.6	0.92	<0.1	<0.01	0.27	0.071	2.04
		35	5.5	0.36	0.41	<0.01	0.29	0.070	2.17
		55	5.4	-	-	<0.01	0.30	0.070	2.28
	29-Oct-03	1	7.3	1.62	0.48	0.01	0.46	0.070	2.69
		15	6.9	0.88	0.37	<0.01	0.34	0.069	2.68
		25	6.5	0.68	0.34	<0.01	0.34	0.069	2.58
		35	5.9	0.33	0.25	<0.01	0.35	0.072	2.57
		55	5.7	-	-	<0.01	0.37	0.072	2.68

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
CK200P	19-Nov-03	1	7.1	0.64	0.12	0.02	0.33	0.077	2.69
		15	7.1	0.68	0.15	0.01	0.32	0.074	2.56
		25	7.0	0.42	0.15	0.02	0.34	0.075	2.64
		35	7.0	0.76	0.23	0.02	0.32	0.076	2.56
		55	7.0	-	-	0.01	0.33	0.076	2.66
	16-Dec-03	1	7.0	0.26	0.11	<0.01	0.38	0.076	3.11
		15	6.6	0.15	<0.1	<0.01	0.38	0.072	3.05
		25	6.6	0.16	0.11	<0.01	0.38	0.073	2.98
		35	6.5	0.15	0.15	<0.01	0.37	0.076	2.92
		55	6.5	-	-	<0.01	0.36	0.070	2.89
KSSK02	21-Jan-03	1	7.4	0.40	0.24	0.06	0.42	0.086	2.95
		15	7.3	0.34	0.17	0.06	0.43	0.086	3.01
		25	7.3	0.32	0.17	0.04	0.43	0.085	3.16
		35	7.3	0.31	0.15	0.04	0.43	0.089	3.20
		55	7.3	-	-	-	0.44	0.084	3.12
	24-Feb-03	1	7.7	0.42	0.13	0.05	0.43	0.081	2.91
		15	7.5	0.30	0.13	0.11	0.43	0.086	2.76
		25	7.5	0.19,B	0.13	0.07	0.43	0.083	2.76
		35	7.4	0.19,B	0.14	0.02	0.43	0.080	2.94
		55	7.4	-	-	0.01	0.43	0.080	2.99
	24-Mar-03	1	7.8	0.67	0.15	0.02	0.41	0.072	3.64
		15	7.7	0.44	0.20	0.06	0.41	0.077	3.29
		25	7.7	0.37	0.17	0.05	0.41	0.076	3.25
		35	7.7	0.42	0.16	0.02	0.41	0.077	3.35
		55	7.7	-	-	0.11	0.42	0.084	3.35
	29-Apr-03	1	9.7	10.6	0.56	0.02	0.23	0.057	2.21
		15	9.8	10.1	0.77	0.02	0.25	0.061	2.39
		25	9.4	6.77	0.45	0.03	0.28	0.060	2.51
		35	9.3	6.15	0.19	0.03	0.29	0.062	2.50
		55	9.2	-	-	0.03	0.30	0.062	2.45
	27-May-03	1	8.7	5.51	1.01	0.02	0.24	0.0577,B	2.34
		15	8.3	4.03	0.78	0.02	0.26	0.0557,B	2.26
		25	7.8	1.71	0.68	0.10	0.28	0.0642,B	2.28
		35	7.8	1.66	0.65	0.11	0.28	0.0683,B	2.25
		55	7.5	-	-	0.06	0.29	0.0662,B	2.16
	23-Jun-03	1	10.2	8.67	2.04	0.02	0.10	0.048	1.48
		15	9.2	8.51	1.47	0.03	0.13	0.056	1.56
		25	8.0	3.02	1.12	0.04	0.20	0.057	1.83
		35	7.7	1.43	0.97	0.05	0.24	0.057	2.04
		55	7.1	-	-	0.05	0.27	0.059	2.10
	28-Jul-03	1	9.1	5.78	2.63	-	0.12	0.042	1.51
		15	8.3	5.34	0.79	0.02	0.17	0.049	1.77
		25	6.6	1.42	0.41	0.03	0.24	0.056	2.08
		35	6.2	0.43	0.37	0.17	0.29	0.073	2.27
		55	6.1	-	-	0.41	0.30	0.108	2.54

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
KSSK02	25-Aug-03	1	9.2	14.8	10.3	0.02	0.06	0.057	1.55
		15	7.3	4.62	2.63	0.02	0.15	0.053	1.91
		25	5.6	0.79	0.75	0.13	0.29	0.076	2.11
		35	5.7	0.48	0.59	0.04	0.30	0.071	2.08
		55	5.6	-	-	0.02	0.32	0.067	2.02
	29-Sep-03	1	6.3	1.7	0.26	0.02	0.24	0.066	2.32
		15	6.0	0.75	0.36	0.02	0.26	0.064	2.34
		25	5.9	0.88	0.23	0.02	0.26	0.067	2.31
		35	5.9	0.64	0.22	0.02	0.27	0.069	2.34
		55	5.8	-	-	0.02	0.28	0.070	2.34
	27-Oct-03	1	6.8	1.44	0.41	0.02	0.33	0.071	2.74
		15	6.3	0.87	0.27	-	0.34	0.076	2.59
		25	6.1	0.76	0.23	-	0.34	0.074	2.55
		35	6.1	0.59	0.26	-	0.34	0.074	2.57
		55	5.9	-	-	-	0.34	0.075	2.55
	17-Nov-03	1	6.4	0.65	0.16	0.02	0.36	0.073	2.56
		15	6.3	0.38	0.22	0.01	0.35	0.072	2.41
		25	6.3	0.73	0.15	0.01	0.36	0.075	2.49
		35	6.1	0.33	0.14	0.01	0.37	0.076	2.57
		55	6.0	-	-	-	0.36	0.073	2.40
	15-Dec-03	1	6.7	0.176	<0.1	0.07	0.41	0.087	3.05
		15	6.8	0.248	<0.1	0.02	0.39	0.081	3.14
		25	6.7	0.236	0.14	0.09	0.45	0.088	3.42
		35	6.7	0.162	<0.1	0.03	0.41	0.079	3.22
		55	6.6	-	-	0.03	0.40	0.078	3.24
LTBC42	21-Jan-03	1	7.5	0.62	0.22	<0.01	0.42	0.081	3.07
		3	7.6	0.58	0.23	<0.01	0.42	0.081	2.94
	24-Feb-03	1	7.5	0.26	0.10	<0.01	0.43	0.080	3.40
		5	7.6	0.24	0.12	<0.01	0.44	0.082	2.95
	27-May-03	1	8.9	5.08	0.74	0.02	0.25	0.055	2.43
		6	8.8	4.72	0.51	0.02	0.25	0.060	2.36
	23-Jun-03	1	8.2	1.15	0.54	0.04	0.20	0.051	2.89
		2	7.2	2.18	0.67	0.04	0.20	0.050	2.92
	28-Jul-03	1	9.3	4.68	1.58	<0.01	0.15	0.048	2.00
		2	9.7	9.61	2.65	<0.01	0.07	0.042	1.71
	25-Aug-03	1	8.5	14	6.15	0.01	0.11	0.055	1.90
		2	8.5	11.7	4.54	<0.01	0.13	0.055	1.93
	29-Sep-03	1	6.3	1.11	0.31	0.02	0.26	0.068	2.74
		11	5.9	1.26	0.27	0.01	0.28	0.067	2.52
	27-Oct-03	1	7.0	2.02	0.48	<0.01	0.33	0.074	2.92
		2	7.2	1.79	0.45	<0.01	0.34	0.072	3.18
	17-Nov-03	1	6.4	0.34	0.17	0.02	0.36	0.072	2.88
		2	7.1	0.44	0.3	0.02	0.36	0.072	2.96
	15-Dec-03	1	6.7	0.35	0.16	0.01	0.39	0.075	3.42
		3	7.7	0.34	0.15	<0.01	0.38	0.075	3.47

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
LSEP01	21-Jan-03	1	7.6	0.75	0.22	<0.01	0.42	0.077	2.99
		15	7.2	0.40	0.18	<0.01	0.43	0.082	3.23
		25	7.1	0.36	0.19	<0.01	0.43	0.085	3.20
		35	7.1	0.36	0.17	<0.01	0.43	0.083	3.33
		55	7.0	-	-	<0.01	0.43	0.086	3.24
		100	6.8	-	-	0.02	0.44	0.082	3.29
		190	6.6	-	-	<0.01	0.44	0.090	3.13
	24-Feb-03	1	No Data	0.40	0.09	<0.01	0.44	0.078	3.89
		15	No Data	0.35	0.12	<0.01	0.44	0.080	3.56
		25	No Data	0.30	0.09	<0.01	0.44	0.078	3.57
		35	No Data	0.24	0.10	<0.01	0.44	0.076	3.40
		55	No Data	-	-	<0.01	0.43	0.076	3.30
		100	No Data	-	-	0.06	0.42	0.076	3.08
		190	No Data	-	-	<0.01	0.41	0.076	3.23
	24-Mar-03	1	8.0	1.39	0.34	0.01	0.41	0.071	3.29
		15	7.8	0.86	0.21	0.01	0.41	0.072	3.33
		25	7.8	0.71	0.20	0.01	0.41	0.071	3.30
		35	7.7	0.58	0.27	0.01	0.41	0.071	3.26
		55	7.6	-	-	0.01	0.41	0.072	3.17
		100	7.3	-	-	0.02	0.39	0.070	2.95
		185	7.3	-	-	0.03	0.38	0.070	2.92
	29-Apr-03	1	9.9	7.68	0.07	0.02	0.26	0.060	2.50
		15	9.1	3.93	0.46	0.03	0.30	0.062	2.58
		25	9.1	2.99	0.62	0.03	0.30	0.061	2.62
		35	9.0	4.07	0.61	0.03	0.30	0.062	2.66
		55	8.3	-	-	0.03	0.33	0.063	2.66
		100	7.6	-	-	0.03	0.37	0.066	2.64
		180	7.2	-	-	<0.01	0.40	0.077	2.85
	27-May-03	1	8.8	4.44	0.60	0.02	0.25	0.059	2.21
		15	8.4	4.72	<0.29	0.02	0.25	0.057	2.15
		25	8.0	2.94	0.79	0.02	0.27	0.060	2.20
		35	7.8	2.20	0.62	0.02	0.28	0.059	2.23
		55	7.5	-	-	0.03	0.29	0.057	2.14
		100	7.4	-	-	0.04	0.28	0.055	2.05
		190	7.4	-	-	0.05	0.26	0.061	1.96
	23-Jun-03	1	8.6	12.0	2.30	0.02	0.14	0.051	1.60
		15	8.2	4.62	1.59	0.04	0.21	0.054	1.90
		25	7.8	1.7	0.97	0.04	0.23	0.059	2.02
		35	7.6	2.32	1.05	0.04	0.24	0.058	2.02
		55	7.1	-	-	0.03	0.27	0.059	2.05
		100	6.8	-	-	0.06	0.29	0.065	2.12
		185	6.7	-	-	0.05	0.27	0.064	2.16
	28-Jul-03	1	9.7	7.86	1.84	<0.01	0.11	0.054	1.42
		15	7.9	4.24	0.63	0.01	0.20	0.050	1.92
		25	7.8	2.80	0.54	0.01	0.21	0.051	1.90
		35	7.2	2.86	0.93	0.01	0.22	0.051	2.05
		55	6.2	-	-	<0.01	0.29	0.052	2.22
		100	6.1	-	-	0.03	0.29	0.064	2.21
		185	5.9	-	-	0.04	0.28	0.062	2.39

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
LSEP01	25-Aug-03	1	10.0	14.2	3.63	0.01	0.07	0.059	1.78
		15	7.5	2.20	1.18	0.02	0.19	0.058	2.04
		25	7.1	1.37	0.83	0.02	0.21	0.060	2.05
		35	6.2	1.06	0.32	0.01	0.25	0.064	2.10
		55	5.5	-	-	<0.01	0.30	0.075	2.13
		100	5.6	-	-	0.01	0.30	0.065	2.11
		185	5.6	-	-	0.04	0.29	0.069	2.10
	29-Sep-03	1	6.5	3.17	0.87	0.01	0.23	0.067	2.10
		15	6.3	3.33	0.58	0.02	0.24	0.068	1.99
		25	6.2	1.78	0.3	0.02	0.25	0.068	2.10
		35	6.2	1.7	0.29	0.02	0.25	0.066	2.06
		55	5.8	-	-	0.02	0.28	0.067	2.28
		100	5.3	-	-	0.01	0.32	0.069	2.35
		185	5.1	-	-	0.03	0.33	0.074	2.59
	27-Oct-03	1	7.0	1.68	0.44	<0.01	0.32	0.071	2.78
		15	6.3	1.89	0.36	<0.01	0.33	0.074	2.59
		25	5.9	1.22	0.32	0.01	0.34	0.074	2.66
		35	5.8	0.93	0.28	<0.01	0.34	0.078	2.62
		55	5.7	-	-	<0.01	0.35	0.075	2.66
		100	5.3	-	-	<0.01	0.37	0.076	2.62
		185	5.4	-	-	0.01	0.39	0.079	2.73
	17-Nov-03	1	6.7	0.92	0.13	0.02	0.34	0.074	2.48
		15	6.6	0.71	0.12	0.01	0.34	0.074	2.45
		25	6.5	0.66	0.18	0.02	0.33	0.076	2.43
		35	6.4	0.88	0.19	0.01	0.35	0.074	2.57
		55	6.2	-	-	0.01	0.34	0.074	2.49
		100	5.1	-	-	0.02	0.37	0.080	2.66
		185	5.1	-	-	<0.01	0.39	0.086	2.86
	15-Dec-03	1	6.8	0.26	<0.01	<0.01	0.40	0.077	3.22
		15	6.8	0.20	0.11	<0.01	0.40	0.077	3.21
		25	6.8	0.21	0.12	<0.01	0.39	0.078	3.07
		35	6.7	0.24	0.12	<0.01	0.39	0.076	3.05
		55	6.6	-	-	<0.01	0.39	0.079	3.14
		100	6.2	-	-	0.04	0.40	0.079	3.15
		185	6.3	-	-	<0.01	0.39	0.075	3.03
LSKQ06	21-Jan-03	1	7.2	0.47	0.21	<0.01	0.43	0.086	3.25
		15	7.1	0.38	0.19	<0.01	0.43	0.085	3.22
		25	7.0	0.34	0.19	<0.01	0.43	0.087	3.18
		35	7.0	0.32	0.18	<0.01	0.43	0.084	3.19
	24-Feb-03	1	7.7	0.40	0.11	<0.01	0.44	0.080	3.17
		15	7.6	0.43	0.16	<0.01	0.46	0.082	3.23
		25	7.6	0.34	0.11	<0.01	0.44	0.082	3.29
		35	7.6	0.33	0.13	<0.01	0.44	0.080	3.43
	24-Mar-03	1	8.2	1.34	0.22	0.02	0.40	0.073	3.31
		15	7.6	0.50	0.26	0.01	0.41	0.075	3.35
		25	7.6	0.43	0.26	0.01	0.41	0.075	3.32
		35	7.6	0.42	0.22	0.01	0.41	0.073	3.20
	29-Apr-03	1	9.6	7.94	0.22	0.02	0.27	0.063	2.39
		15	9.1	4.72	0.69	0.02	0.30	0.062	2.54
		25	8.9	2.68	0.72	0.03	0.31	0.064	2.61
		35	8.7	2.24	0.66	0.03	0.32	0.065	2.68

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
LSKQ06	27-May-03	1	9.0	5.38	1.11	0.02	0.21	0.064	2.15
		15	8.3	3.82	0.73	0.02	0.26	0.059	2.09
		25	8.2	2.94	0.69	0.02	0.27	0.059	2.13
		35	8.2	2.69	0.57	0.02	0.28	0.058	2.22
	23-Jun-03	1	6.8	14.5	1.99	0.02	0.11	0.049	1.46
		15	8.7	7.17	1.32	0.03	0.18	0.051	1.72
		25	8.5	3.78	0.88	0.04	0.19	0.050	1.76
		35	8.1	2.04	0.92	0.04	0.22	0.059	1.90
	28-Jul-03	1	8.9	6.34	0.88	<0.01	0.16	0.049	1.60
		15	7.8	8.11	1.12	0.01	0.20	0.054	1.88
		25	7.6	4.74	<0.29	0.01	0.21	0.054	1.94
		35	7.6	3.65	1.64	0.01	0.22	0.053	1.95
	25-Aug-03	1	8.5	3.96	0.89	0.01	0.15	0.055	1.92
		15	7.2	2.78	0.71	0.02	0.21	0.059	2.11
		25	6.7	2.92	1.31	0.02	0.23	0.062	2.16
		35	6.8	1.76	0.82	0.02	0.23	0.065	2.14
	29-Sep-03	1	6.5	2.13	0.42	0.01	0.26	0.067	2.20
		15	6.2	1.42	0.24	0.02	0.25	0.069	2.14
		25	6.1	1.37	0.23	0.02	0.25	0.068	2.12
		35	6.1	1.65	0.38	0.01	0.24	0.069	2.06
	27-Oct-03	1	6.7	1.86	0.41	0.01	0.29	0.072	2.27
		15	6.3	1.36	0.29	0.01	0.29	0.072	2.30
		25	6.1	1.13	0.29	0.01	0.33	0.073	2.60
		35	6.1	1.07	0.19	0.01	0.34	0.076	2.66
	17-Nov-03	1	7.1	2.29	0.4	0.01	0.34	0.076	2.37
		15	6.8	1.29	0.23	0.02	0.34	0.074	2.57
		25	6.8	1.15	0.10	0.02	0.36	0.074	2.67
		35	6.7	0.57	0.14	0.02	0.35	0.075	2.58
	15-Dec-03	1	6.7	0.21	0.13	<0.01	0.39	0.077	3.08
		15	6.7	0.17	<0.1	<0.01	0.41	0.075	2.94
		25	6.7	0.18	0.12	<0.01	0.40	0.076	2.92
		35	6.6	0.21	0.13	<0.01	0.38	0.079	3.07
VO50E	21-Jan-03	1	7.5	0.59	0.23	<0.01	0.43	0.083	3.30
		5	7.4	0.47	0.20	<0.01	0.43	0.085	3.22
		10	7.3	0.44	0.25	<0.01	0.43	0.085	3.34
	24-Feb-03	1	8.2	0.63	0.16	<0.01	0.43	0.080	3.37
		5	8.2	0.67	0.18	<0.01	0.43	0.080	3.31
		10	8.2	0.62	0.17	<0.01	0.43	0.082	3.27
	24-Mar-03	1	8.6	1.33	0.91	0.01	0.39	0.074	3.34
		5	7.8	1.13	0.41	0.01	0.40	0.072	3.11
		10	7.8	0.66	0.24	0.01	0.41	0.072	3.21
	29-Apr-03	1	9.2	2.54	0.56	0.03	0.30	0.062	2.61
		5	9.1	2.35	0.54	0.03	0.30	0.074	2.63
		10	9.1	2.74	0.52	0.03	0.30	0.065	2.60
	27-May-03	1	9.9	4.45	0.86	0.03	0.19	0.059	2.17
		5	9.1	3.73	0.75	0.03	0.22	0.064	2.18
		10	8.9	2.95	0.79	0.02	0.23	0.062	2.18

Table A-10
2003 Offshore Outfall Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total Phos. (mg/L)	Silica (mg/L)
VO50E	23-Jun-03	1	7.7	22.5	2.50	0.02	0.03	0.042	1.27
		5	9.0	15.4	1.30	0.02	0.15	0.050	1.65
		10	8.5	12.8	1.70	0.03	0.17	0.052	1.72
	28-Jul-03	1	9.7	5.89	0.55	0.01	0.12	0.051	1.61
		5	8.8	8.48	0.74	0.01	0.14	0.051	1.66
		13	8.6	7.18	1.01	0.01	0.16	0.050	1.79
	25-Aug-03	1	11.5	12.2	2.72	<0.01	0.07	0.050	1.95
		5	8.3	1.35	0.99	0.01	0.17	0.053	2.03
		10	7.7	1.78	0.75	0.01	0.18	0.060	2.03
	29-Sep-03	1	6.4	2.08	0.3	0.01	0.24	0.069	2.20
		5	6.3	3.49	<0.1	0.02	0.26	0.067	2.27
		10	6.3	1.13	0.18	0.01	0.26	0.070	2.26
	27-Oct-03	1	6.8	2.81	0.37	<0.01	0.33	0.073	2.63
		5	6.7	1.82	0.34	<0.01	0.33	0.073	2.65
		10	6.7	2.44	0.42	<0.01	0.33	0.074	2.64
	17-Nov-03	1	6.5	0.56	0.32	0.02	0.35	0.076	2.71
		11	6.8	0.86	0.19	0.01	0.35	0.076	2.60
		12	6.8	0.59	0.45	0.02	0.36	0.078	2.61
	15-Dec-03	1	7.0	0.30	<0.1	<0.01	0.40	0.075	3.08
		5	7.0	0.27	0.11	<0.01	0.40	0.078	3.09
		10	6.9	0.19	0.12	<0.01	0.39	0.075	3.03

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
PTWELLS1	22-Jan-03	1	8.9	29.728	23.020	9.5	<0.5	2.5	53
		15	8.9	29.865	23.184	-	<0.5	4.0	No Data
		25	8.9	29.866	23.230	-	<0.5	3.4	No Data
		35	8.9	29.928	23.322	-	<0.5	2.4	No Data
		55	9.0	30.110	23.543	-	<0.5	3.2	0
		100	9.1	30.271	23.854	-	0.99	5.0	0
		129	9.3	30.373	24.044	-	2.5	6.8	0
	25-Feb-03	1	8.5	27.265	21.143	No Data	1.7	4.3	18
		15	8.9	29.521	22.911	-	0.85	2.6	1
		25	9.0	29.578	22.989	-	0.71	1.4	No Data
		35	9.0	29.628	23.075	-	0.73	3.1	0
		55	9.0	29.696	23.219	-	0.82	1.6	0
		99	8.9	29.824	23.546	-	1.1	1.9	0
		129	8.9	29.861	23.714	-	1.4	1.9	0
	25-Mar-03	1	9.0	25.420	19.635	8.0	<0.5	2.8	65
		15	8.9	29.165	22.630	-	1.0	2.0	2
		25	8.9	29.398	22.862	-	0.87	2.2	0
		35	8.9	29.450	22.949	-	0.82	3.9	0
		55	8.9	29.523	23.099	-	1.0	3.8	0
		100	8.9	29.613	23.382	-	1.0	3.0	0
		130	8.9	29.721	23.610	-	1.3	2.8	0
	28-Apr-03	2	9.6	28.872	22.241	8.0	<0.5	2.5	89
		15	9.4	29.033	22.458	-	<0.5	1.5	4
		25	9.4	29.094	22.558	-	<0.5	0.9	2
		35	9.3	29.113	22.625	-	<0.5	1.5	0
		55	9.3	29.133	22.737	-	<0.5	<0.5	0
		99	9.2	29.342	23.118	-	1.3	1.7	0
		118	9.2	29.434	23.283	-	1.9	1.5	0
	28-May-03	1	12.0	28.718	21.722	4.0	1.2	5.4	65
		15	10.4	29.133	22.384	-	<0.5	3.4	1
		25	10.3	29.153	22.461	-	<0.5	1.7	0
		35	10.2	29.195	22.561	-	<0.5	2.1	0
		55	9.9	29.381	22.837	-	0.59	0.6	0
		100	9.9	29.626	23.230	-	1.0	2.2	0
		129	9.9	29.677	23.403	-	1.3	1.2	0
	24-Jun-03	1	12.8	29.020	21.815	2.4	0.54	5.8	52
		15	11.7	29.251	22.252	-	0.69	4.2	0
		25	11.2	29.389	22.485	-	<0.5	2.1	0
		35	10.9	29.556	22.718	-	<0.5	3.0	0
		55	10.9	29.642	22.875	-	0.54	1.6	0
		99	10.7	29.953	23.352	-	1.0	3.1	0
		129	10.7	29.967	23.499	-	1.2	2.1	0
	29-Jul-03	1	14.7	29.565	21.852	3.1	1.3	4.8	No Data
		15	13.3	29.643	22.261	-	0.61	2.1	No Data
		25	12.8	29.712	22.445	-	0.58	1.9	No Data
		35	12.3	29.786	22.640	-	<0.5	2.6	No Data
		55	11.8	29.974	22.968	-	0.54	0.9	No Data
		99	11.6	30.251	23.432	-	0.81	1.4	No Data
		129	11.6	30.368	23.663	-	1.2	1.9	No Data

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
PTWELLS1	26-Aug-03	1	15.1	29.893	22.017	4.4	1.6	5.0	59
		15	13.5	30.051	22.533	-	<0.5	1.2	0
		25	12.9	30.146	22.778	-	<0.5	<0.5	0
		35	12.6	30.210	22.913	-	<0.5	<0.5	0
		55	12.4	30.373	23.179	-	0.52	0.8	0
		99	12.2	30.590	23.590	-	0.88	1.2	0
		129	12.1	30.624	23.757	-	0.88	1.9	0
	30-Sep-03	1	13.4	30.437	22.781	14.0	<0.5	3.2	83
		15	13.0	30.519	22.986	-	<0.5	3.0	2
		25	13.0	30.529	23.054	-	<0.5	2.5	1
		35	12.5	30.669	23.292	-	<0.5	2.7	0
		55	12.5	30.690	23.410	-	<0.5	3.6	0
		99	12.1	30.815	23.770	-	1.0	3.8	0
		129	12.0	30.901	24.001	-	2.4	4.9	0
	29-Oct-03	1	12.0	28.098	21.236	6.8	0.61	3.0	66
		15	11.9	29.844	22.673	-	0.51	2.5	1
		25	11.7	30.052	22.917	-	0.53	3.7	0
		35	11.6	30.235	23.115	-	0.56	2.5	0
		55	11.6	30.388	23.323	-	0.62	3.0	0
		100	11.6	30.464	23.586	-	0.64	2.8	0
		129	11.6	30.983	24.125	-	2.6	6.0	0
	19-Nov-03	2	11.2	29.727	22.652	11.0	0.67	2.8	57
		15	11.3	29.969	22.884	-	<0.5	3.0	3
		25	11.4	30.141	23.045	-	<0.5	2.3	1
		35	11.4	30.180	23.122	-	<0.5	2.9	0
		55	11.4	30.210	23.233	-	<0.5	1.9	0
		100	10.9	30.277	23.568	-	0.54	2.3	0
		129	10.5	30.377	23.859	-	0.80	3.6	0
	16-Dec-03	1	10.0	29.573	22.732	10.0	<0.5	2.7	68
		15	10.1	29.723	22.889	-	<0.5	3.0	3
		25	10.1	29.802	22.996	-	<0.5	3.1	1
		35	10.1	29.870	23.091	-	0.51	1.9	0
		55	9.9	29.946	23.272	-	0.53	3.9	0
		99	10.1	30.066	23.548	-	0.94	3.5	0
		129	10.0	30.070	23.701	-	0.98	3.7	0
KSBP01	22-Jan-03	1	8.9	29.808	23.076	7.5	<0.5	2.0	56
		15	9.0	29.974	23.257	-	<0.5	4.7	47
		26	9.0	30.005	23.326	-	<0.5	4.0	No Data
		35	9.0	30.096	23.441	-	0.51	2.0	No Data
		55	9.0	30.132	23.560	-	0.54	4.3	No Data
		99	9.1	30.219	23.824	-	0.67	3.6	0
		100	9.1	30.221	23.831	-	0.70	2.0	0
		198	9.3	30.385	24.367	-	1.8	7.0	0
	25-Feb-03	2	8.6	28.129	21.803	No Data	1.5	5.3	16
		16	8.9	29.332	22.774	-	1.0	2.9	0
		25	8.9	29.564	22.994	-	0.94	2.2	0
		35	8.9	29.666	23.119	-	0.98	2.0	0
		55	8.9	29.734	23.261	-	0.98	1.7	0
		99	8.9	29.852	23.565	-	1.2	1.9	0
		100	8.9	29.857	23.577	-	1.2	3.7	0
		198	8.8	29.911	24.089	-	1.5	2.9	0

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
KSBP01	25-Mar-03	1	9.0	26.594	20.552	6.8	1.0	5.1	56
		15	9.0	29.096	22.578	-	0.95	1.7	0
		26	8.9	29.442	22.899	-	0.97	4.7	0
		36	8.9	29.473	22.968	-	0.92	2.0	1
		55	8.9	29.478	23.063	-	0.83	3.6	0
		99	8.9	29.629	23.389	-	1.4	4.0	0
		100	8.9	29.645	23.409	-	1.4	4.0	0
		199	8.8	29.918	24.093	-	2.3	3.8	0
	28-Apr-03	1	10.2	28.555	21.898	7.0	<0.5	4.0	123
		15	9.8	28.635	22.084	-	0.92	5.1	0
		25	9.7	28.804	22.279	-	0.82	2.5	0
		35	9.5	28.934	22.456	-	0.57	2.2	0
		55	9.3	29.157	22.757	-	<0.5	0.6	0
		99	9.2	29.382	23.145	-	1.1	1.6	0
		100	9.2	29.383	23.152	-	1.2	1.2	0
		199	9.3	29.574	23.750	-	4.7	7.0	0
	27-May-03	1	12.8	28.223	21.183	4.5	<0.5	4.9	77
		15	10.6	29.112	22.332	-	0.52	1.9	1
		25	10.2	29.172	22.482	-	<0.5	1.8	0
		35	10.1	29.246	22.610	-	<0.5	1.2	0
		55	10.0	29.335	22.788	-	0.56	1.6	0
		99	9.9	29.685	23.267	-	0.76	1.3	0
		100	9.9	29.685	23.273	-	0.73	1.4	0
		198	9.8	30.108	24.072	-	2.7	4.3	0
	24-Jun-03	1	13.7	28.899	21.539	2.2	<0.5	6.3	93
		16	11.5	29.310	22.332	-	<0.5	2.8	1
		25	11.0	29.470	22.584	-	<0.5	<0.5	0
		35	10.8	29.572	22.743	-	<0.5	1.6	0
		55	10.8	29.759	22.989	-	0.57	1.2	0
		99	10.8	29.961	23.346	-	0.85	0.7	0
		100	10.8	29.963	23.353	-	0.84	1.0	0
		199	10.6	30.174	23.992	-	1.9	2.9	0
	29-Jul-03	1	14.7	29.528	21.820	3.2	1.3	4.2	No Data
		16	13.6	29.621	22.183	-	<0.5	2.0	No Data
		25	12.9	29.731	22.457	-	<0.5	2.7	No Data
		35	12.2	29.822	22.687	-	<0.5	1.5	No Data
		55	11.9	29.942	22.937	-	0.51	1.3	No Data
		99	11.7	30.154	23.337	-	0.60	2.6	No Data
		100	11.7	30.158	23.345	-	0.62	3.4	No Data
		198	11.5	30.511	24.102	-	5.1	5.5	No Data
	26-Aug-03	1	14.9	29.896	22.076	3.5	1.6	6.6	50
		15	14.1	29.975	22.356	-	0.69	5.0	0
		25	13.3	30.090	22.644	-	<0.5	1.9	0
		35	13.1	30.115	22.745	-	<0.5	2.1	0
		55	12.6	30.247	23.044	-	<0.5	2.7	0
		99	12.2	30.498	23.504	-	0.58	2.3	0
		100	12.2	30.501	23.511	-	0.58	1.3	0
		198	11.8	30.831	24.284	-	2.2	3.8	0

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
KSBP01	30-Sep-03	1	13.2	30.461	22.846	14.0	<0.5	3.0	63
		15	13.0	30.503	22.977	-	<0.5	2.6	4
		25	12.8	30.582	23.123	-	<0.5	2.4	1
		35	12.6	30.653	23.268	-	<0.5	2.4	0
		55	12.2	30.763	23.514	-	<0.5	1.7	0
		99	12.1	30.833	23.794	-	0.59	3.0	0
		100	12.1	30.834	23.801	-	0.62	3.3	0
		199	12.0	30.866	24.286	-	0.81	3.3	0
	29-Oct-03	1	12.2	28.707	21.678	8.0	<0.5	2.3	58
		15	12.3	29.413	22.275	-	<0.5	2.9	2
		25	12.1	30.168	22.935	-	<0.5	2.8	0
		35	12.1	30.182	22.999	-	<0.5	2.8	0
		55	11.6	30.405	23.342	-	0.56	2.9	0
		99	11.7	30.619	23.687	-	0.77	2.7	0
		100	11.7	30.617	23.692	-	0.72	3.5	0
		199	11.6	30.979	24.436	-	1.8	4.2	0
	19-Nov-03	2	11.2	29.619	22.558	11.0	<0.5	1.3	57
		15	11.4	30.080	22.947	-	<0.5	1.6	5
		25	11.3	30.089	23.011	-	<0.5	2.3	1
		35	11.3	30.126	23.087	-	<0.5	2.5	0
		55	11.0	30.268	23.339	-	<0.5	2.5	0
		99	10.4	30.317	23.688	-	0.62	3.3	0
		100	10.4	30.317	23.695	-	0.62	2.3	0
		198	10.0	30.541	24.376	-	1.0	3.7	0
	16-Dec-03	2	10.1	29.589	22.725	9.0	<0.5	3.2	65
		15	10.1	29.873	23.001	-	0.51	2.0	3
		25	10.2	29.913	23.073	-	0.53	3.1	1
		35	10.0	29.947	23.170	-	0.54	3.1	0
		55	9.4	29.897	23.314	-	0.62	3.1	0
		99	9.5	29.945	23.543	-	0.68	3.0	0
		100	9.5	29.944	23.545	-	0.65	3.0	0
		199	9.8	30.124	24.086	-	1.5	4.2	0
LTED04	21-Jan-03	2	8.9	29.086	22.519	9.5	<0.5	1.9	79
		15	9.2	30.011	23.261	-	0.67	3.9	4
		25	9.2	30.103	23.369	-	0.69	3.8	2
		35	9.2	30.122	23.425	-	<0.5	3.6	1
		35	9.2	30.121	23.427	-	<0.5	4.2	1
		55	9.3	30.197	23.569	-	0.70	1.8	0
		75	9.3	30.211	23.669	-	1.0	2.8	No Data
	24-Feb-03	1	9.0	29.039	22.458	7.0	1.3	3.1	69
		15	9.1	29.548	22.912	-	0.90	2.8	2
		25	9.1	29.601	22.998	-	0.94	2.6	0
		34	9.1	29.632	23.061	-	0.95	1.7	0
		36	9.1	29.635	23.071	-	0.96	3.5	0
		55	9.1	29.679	23.194	-	1.2	3.6	0
		75	9.1	29.718	23.314	-	1.5	3.3	0
	24-Mar-03	2	9.0	28.860	22.324	7.5	<0.5	2.4	64
		15	9.0	29.363	22.784	-	0.64	3.2	1
		25	9.0	29.397	22.857	-	0.66	2.2	0
		34	8.9	29.421	22.921	-	0.69	1.8	0
		35	8.9	29.424	22.928	-	0.69	3.7	0
		55	8.9	29.473	23.058	-	0.98	3.3	0
		67	8.9	29.555	23.185	-	1.5	3.8	0

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LTED04	29-Apr-03	1	9.8	27.495	21.131	7.5	0.71	2.4	67
		15	9.4	28.998	22.426	-	<0.5	2.4	2
		25	9.4	29.056	22.526	-	<0.5	2.6	0
		34	9.4	29.087	22.598	-	<0.5	1.6	0
		36	9.4	29.091	22.608	-	0.51	1.2	0
		55	9.3	29.139	22.746	-	0.54	1.8	0
		75	9.2	29.262	22.948	-	1.4	1.6	0
	27-May-03	1	11.2	26.125	19.846	7.0	0.72	0.7	47
		15	10.5	29.012	22.266	-	0.56	2.9	2
		25	10.0	29.122	22.480	-	0.59	1.6	0
		34	10.0	29.185	22.569	-	<0.5	1.1	0
		36	10.0	29.202	22.588	-	<0.5	2.4	0
		55	9.9	29.355	22.823	-	0.68	0.8	0
		75	9.7	29.497	23.050	-	1.9	3.1	0
	23-Jun-03	1	12.1	27.409	20.696	6.5	0.72	3.2	No Data
		15	11.3	29.341	22.391	-	<0.5	0.7	No Data
		25	11.2	29.369	22.473	-	<0.5	0.9	No Data
		35	11.1	29.393	22.552	-	<0.5	1.8	No Data
		36	11.1	29.398	22.561	-	<0.5	1.6	No Data
		55	10.6	29.561	22.859	-	<0.5	<0.5	No Data
		75	10.4	29.747	23.131	-	0.90	1.4	No Data
	28-Jul-03	1	14.5	28.776	21.285	4	0.81	4.3	No Data
		16	12.8	29.598	22.323	-	<0.5	1.6	No Data
		25	12.1	29.711	22.590	-	<0.5	0.5	No Data
		34	11.9	29.761	22.703	-	0.53	2.7	No Data
		36	11.9	29.771	22.720	-	0.55	3.1	No Data
		55	11.4	30.023	23.090	-	0.71	2.8	No Data
		75	11.3	30.129	23.266	-	1.2	1.4	No Data
	25-Aug-03	1	14.4	28.621	21.195	4.8	0.94	5.1	63
		15	13.1	30.031	22.597	-	<0.5	0.7	1
		25	12.9	30.067	22.706	-	<0.5	1.7	0
		34	12.8	30.084	22.786	-	<0.5	0.7	0
		35	12.8	30.088	22.797	-	<0.5	<0.5	0
		55	12.2	30.298	23.151	-	0.61	1.6	0
		75	12.1	30.429	23.361	-	1.4	1.8	0
	29-Sep-03	1	13.6	29.674	22.151	9.6	<0.5	2.9	76
		15	13.1	30.417	22.898	-	<0.5	2.4	4
		25	13.0	30.477	23.013	-	<0.5	2.1	1
		35	13.0	30.504	23.077	-	<0.5	2.9	0
		36	13.0	30.506	23.084	-	<0.5	2.2	0
		55	12.9	30.540	23.217	-	<0.5	2.9	0
		75	12.1	30.870	23.712	-	1.4	4.8	0
	27-Oct-03	1	12.4	27.107	20.397	6.2	0.66	2.6	No Data
		15	12.6	30.011	22.675	-	<0.5	2.6	No Data
		25	12.5	30.262	22.930	-	<0.5	1.6	No Data
		34	12.4	30.313	23.039	-	<0.5	1.5	No Data
		36	12.4	30.334	23.058	-	<0.5	2.6	No Data
		55	12.5	30.547	23.292	-	<0.5	1.8	No Data
		75	12.3	30.710	23.550	-	0.79	2.6	No Data

Table A-11
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General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LTED04	17-Nov-03	1	11.5	29.794	22.642	10.0	<0.5	2.3	56
		15	11.6	30.156	22.969	-	<0.5	2.6	4
		25	11.6	30.204	23.047	-	<0.5	3.2	1
		34	11.6	30.226	23.107	-	<0.5	1.8	0
		36	11.6	30.229	23.113	-	<0.5	2.5	0
		55	11.7	30.288	23.232	-	0.69	4.2	0
		75	11.6	30.606	23.589	-	1.2	4.3	0
	15-Dec-03	1	9.7	27.381	21.063	9.0	0.89	3.2	63
		15	10.4	29.834	22.920	-	<0.5	3.4	3
		25	10.5	29.878	22.992	-	<0.5	4.1	0
		34	10.5	29.908	23.058	-	<0.5	2.7	0
		35	10.5	29.909	23.062	-	<0.5	2.8	0
		55	10.5	29.943	23.179	-	0.75	5.0	0
		75	10.3	30.126	23.449	-	1.4	4.2	0
LSNT01	21-Jan-03	9	9.1	30.030	23.252	8.0	0.58	5.0	33
		25	9.2	30.084	23.360	-	0.63	3.9	No Data
		35	9.2	30.100	23.415	-	0.70	2.1	No Data
		45	9.2	30.116	23.470	-	0.64	2.3	No Data
		64	9.2	30.143	23.578	-	0.72	4.9	0
		108	9.4	30.280	23.869	-	0.76	3.6	0
		203	9.5	30.427	24.399	-	2.3	5.4	0
	24-Feb-03	1	9.0	29.574	22.880	8.0	0.85	<1.0	60
		15	9.0	29.578	22.948	-	0.88	2.0	35
		25	9.0	29.597	23.005	-	0.92	3.0	4
		35	9.0	29.603	23.055	-	0.94	3.8	No Data
		55	9.1	29.667	23.188	-	0.92	5.9	No Data
		100	9.1	29.895	23.575	-	1.3	3.4	No Data
		198	9.2	30.029	24.116	-	2.8	4.8	0
	24-Mar-03	1	9.0	29.321	22.687	8.8	<0.5	2.4	65
		15	9.0	29.391	22.803	-	0.87	3.2	3
		25	8.9	29.444	22.900	-	0.93	2.8	0
		35	8.9	29.482	22.983	-	0.97	2.6	0
		55	8.9	29.507	23.094	-	0.98	3.4	0
		100	8.9	29.605	23.377	-	0.88	1.4	0
		197	8.7	29.901	24.079	-	2.1	3.3	0
	29-Apr-03	1	9.6	29.007	22.350	7.8	0.53	3.6	60
		15	9.5	29.013	22.423	-	0.78	1.6	0
		25	9.5	29.016	22.471	-	0.81	3.2	0
		35	9.4	29.095	22.594	-	1.1	2.4	0
		55	9.4	29.172	22.759	-	0.93	1.5	0
		99	9.2	29.268	23.058	-	0.64	0.9	0
		199	9.0	29.511	23.735	-	1.6	2.5	0
	27-May-03	1	10.4	29.141	22.322	9.0	<0.5	1.1	80
		15	10.2	29.201	22.459	-	0.61	1.2	2
		25	10.2	29.215	22.520	-	0.72	1.3	0
		35	10.1	29.259	22.612	-	0.84	1.8	0
		55	10.0	29.326	22.776	-	0.91	1.9	0
		100	9.8	29.548	23.194	-	0.85	1.1	0
		198	9.9	29.945	23.931	-	3.1	3.8	0

Table A-11
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General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
LSNT01	23-Jun-03	1	11.7	29.255	22.195	7.0	<0.5	5.1	No Data
		15	11.1	29.447	22.508	-	0.55	2.0	No Data
		25	11.0	29.499	22.609	-	0.55	2.0	No Data
		35	11.0	29.512	22.669	-	0.63	0.9	No Data
		55	10.7	29.725	22.977	-	0.74	1.6	No Data
		99	10.5	29.924	23.366	-	0.90	3.8	No Data
		198	10.5	30.004	23.877	-	2.5	3.4	No Data
	28-Jul-03	1	13.6	29.653	22.137	8.0	<0.5	2.8	No Data
		15	13.0	29.702	22.354	-	<0.5	4.4	No Data
		25	12.6	29.779	22.545	-	0.54	2.5	No Data
		35	12.4	29.826	22.654	-	0.58	1.9	No Data
		55	12.2	29.877	22.828	-	<0.5	1.7	No Data
		100	11.5	30.199	23.409	-	0.54	2.9	No Data
		199	11.4	30.534	24.130	-	1.3	2.9	No Data
	25-Aug-03	1	14.0	30.014	22.342	11.0	0.51	4.9	43
		15	13.5	30.038	22.523	-	0.51	4.6	1
		25	13.3	30.074	22.636	-	<0.5	1.4	0
		35	13.0	30.144	22.786	-	0.53	3.4	0
		55	12.6	30.295	23.085	-	0.58	0.8	0
		100	12.1	30.505	23.526	-	0.57	1.5	0
		184	11.9	30.821	24.201	-	1.3		0
	29-Sep-03	1	13.3	30.449	22.810	12.0	<0.5	3.4	68
		15	13.3	30.463	22.900	-	<0.5	4.5	4
		25	13.2	30.465	22.949	-	<0.5	3.8	1
		35	13.1	30.492	23.036	-	<0.5	4.1	0
		55	12.9	30.572	23.237	-	<0.5	3.6	0
		99	12.4	30.727	23.644	-	<0.5	3.7	0
		184	11.9	30.962	24.305	-	1.6	5.1	0
	27-Oct-03	1	12.5	28.981	21.837	8.5	<0.5	2.3	No Data
		16	12.4	29.709	22.477	-	0.56	3.7	No Data
		25	12.4	30.191	22.898	-	0.55	3.2	No Data
		35	12.4	30.212	22.960	-	0.55	1.0	No Data
		55	12.3	30.519	23.313	-	0.61	3.3	No Data
		100	12.1	30.695	23.683	-	0.63	3.6	No Data
		184	11.5	31.046	24.444	-	1.1	3.5	No Data
	17-Nov-03	1	11.5	30.192	22.959	12.0	<0.5	2.4	62
		15	11.5	30.199	23.025	-	<0.5	3.4	5
		26	11.5	30.209	23.075	-	<0.5	2.2	1
		35	11.5	30.212	23.121	-	<0.5	3.0	0
		55	11.3	30.392	23.384	-	<0.5	1.3	0
		100	11.0	30.496	23.723	-	0.72	2.0	0
		171	11.3	30.660	24.124	-	1.3	4.9	0
	15-Dec-03	1	10.3	29.891	22.916	8.5	0.67	0.5	76
		15	10.3	29.891	22.981	-	0.60	2.5	3
		25	10.3	29.893	23.027	-	0.64	2.8	0
		35	10.3	29.895	23.073	-	0.64	2.5	0
		55	10.3	30.014	23.270	-	0.63	2.8	0
		99	10.0	30.118	23.607	-	0.79	2.5	0
		179	9.8	30.157	24.018	-	2.5	5.5	0

Table A-11
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General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
NSEX01	21-Jan-03	1	9.0	29.977	23.185	10.0	<0.5	3.0	148
		16	9.1	30.021	23.280	-	<0.5	1.6	3
		26	9.1	30.035	23.334	-	<0.5	3.0	1
		36	9.1	30.036	23.380	-	<0.5	3.9	No Data
		55	9.2	30.073	23.493	-	<0.5	3.4	No Data
		100	9.3	30.238	23.805	-	<0.5	2.3	No Data
		120	9.4	30.337	23.962	-	<0.5	1.8	0
	24-Feb-03	1	8.9	29.470	22.806	10.0	0.63	1.1	77
		16	8.9	29.501	22.903	-	0.67	1.8	3
		25	9.0	29.563	22.983	-	0.70	1.6	0
		35	9.1	29.640	23.078	-	0.76	1.7	0
		55	9.1	29.662	23.184	-	0.79	2.1	0
		100	9.1	29.762	23.465	-	0.87	2.6	0
		169	9.2	30.041	23.984	-	3.0	3.7	0
	24-Mar-03	1	9.1	28.732	22.210	8.0	0.82	3.0	62
		15	8.9	29.339	22.768	-	0.74	3.7	2
		25	8.9	29.432	22.891	-	0.74	1.3	0
		35	8.9	29.468	22.967	-	0.78	2.9	0
		55	8.9	29.520	23.102	-	0.76	2.6	0
		100	8.8	29.755	23.507	-	0.80	1.8	0
		167	8.7	29.957	23.991	-	2.5	4.6	0
	29-Apr-03	1	10.2	28.824	22.109	6.5	<0.5	3.4	77
		15	10.0	28.878	22.242	-	0.59	2.8	1
		25	9.8	28.962	22.391	-	<0.5	3.6	0
		35	9.6	29.020	22.516	-	<0.5	2.9	0
		55	9.5	29.056	22.653	-	<0.5	3.3	0
		99	9.1	29.347	23.136	-	0.56	1.6	0
		169	9.0	29.540	23.631	-	2.6	4.6	0
	27-May-03	1	12.0	28.606	21.636	6.0	0.83	3.3	47
		15	10.3	29.127	22.395	-	<0.5	0.8	1
		25	10.1	29.168	22.498	-	<0.5	1.9	0
		35	10.0	29.207	22.596	-	<0.5	2.3	0
		55	9.7	29.410	22.885	-	0.54	2.0	0
		99	9.6	29.551	23.220	-	0.98	5.2	0
		169	10.0	29.784	23.663	-	3.1	6.4	0
	23-Jun-03	1	13.2	28.251	21.134	3.0	0.78	6.4	No Data
		15	11.4	29.343	22.371	-	<0.5	1.8	No Data
		25	11.3	29.376	22.468	-	<0.5	1.5	No Data
		35	11.1	29.420	22.585	-	<0.5	1.2	No Data
		55	10.5	29.663	22.953	-	<0.5	2.0	No Data
		99	10.3	29.903	23.381	-	0.70	2.0	No Data
		167	10.2	29.931	23.729	-	1.6	1.9	No Data
	28-Jul-03	1	15.5	29.548	21.672	10.0	<0.5	4.8	No Data
		15	14.5	29.608	21.992	-	0.83	3.7	No Data
		25	13.4	29.644	22.289	-	<0.5	2.0	No Data
		35	13.1	29.653	22.396	-	<0.5	1.3	No Data
		55	11.4	30.006	23.077	-	<0.5	2.8	No Data
		99	11.5	30.294	23.480	-	0.56	<0.5	No Data
		167	11.5	30.479	23.938	-	1.2	2.4	No Data

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Temp. (°C)	Salinity (PSS)	Density (Sigma-t)	Secchi (m)	Turbidity (NTU)	TSS (mg/L)	PAR (% of Surf.)
NSEX01	25-Aug-03	1	13.6	30.045	22.436	16.0	0.54	2.8	48
		15	13.4	30.067	22.576	-	<0.5	3.2	2
		25	13.3	30.063	22.634	-	<0.5	0.9	1
		35	13.0	30.085	22.753	-	<0.5	1.7	0
		55	12.2	30.323	23.182	-	0.51	2.0	0
		100	12.1	30.502	23.529	-	0.63	2.1	0
		169	12.0	30.733	24.047	-	2.2	4.0	0
	29-Sep-03	1	13.4	30.360	22.723	11.0	<0.5	3.4	71
		15	13.3	30.473	22.894	-	<0.5	2.5	4
		25	13.3	30.478	22.954	-	<0.5	2.2	1
		35	13.1	30.497	23.041	-	<0.5	3.1	0
		55	13.1	30.499	23.140	-	<0.5	3.0	0
		99	12.3	30.768	23.704	-	<0.5	3.0	0
		169	11.8	31.002	24.285	-	1.2	3.0	0
	27-Oct-03	1	12.8	28.893	21.716	9.5	<0.5	2.9	No Data
		15	12.5	30.021	22.713	-	<0.5	2.5	No Data
		25	12.4	30.128	22.840	-	<0.5	2.4	No Data
		35	12.4	30.222	22.960	-	<0.5	2.2	No Data
		55	12.4	30.494	23.268	-	<0.5	1.3	No Data
		99	12.2	30.752	23.716	-	<0.5	2.2	No Data
		169	11.5	31.054	24.389	-	1.1	4.4	No Data
	17-Nov-03	1	11.3	29.938	22.787	12.0	<0.5	3.9	75
		15	11.5	30.104	22.956	-	<0.5	4.3	5
		25	11.5	30.124	23.019	-	<0.5	3.4	1
		55	11.5	30.455	23.402	-	<0.5	2.9	0
		100	11.5	30.637	23.747	-	0.72	6.8	0
		167	11.7	30.784	24.126	-	0.94	3.6	0
	15-Dec-03	1	9.8	28.869	22.206	5.8	1.4	2.9	71
		15	10.3	29.796	22.918	-	<0.5	2.3	1
		25	10.3	29.820	22.980	-	<0.5	3.2	0
		35	10.3	29.841	23.042	-	<0.5	3.5	0
		55	10.4	30.034	23.269	-	0.53	2.3	0
		99	10.2	30.197	23.624	-	0.81	5.6	0
		165	10.1	30.219	23.969	-	1.6	4.3	0

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
PTWELLS1	22-Jan-03	1	7.6	0.625	0.169	<0.01	0.404	0.0819	3.17
		15	7.5	0.290	0.134	<0.01	0.403	0.0829	3.15
		25	7.5	0.406	0.232	<0.01	0.430	0.0782	3.16
		35	7.4	0.524	0.200	<0.01	0.400	0.0780	3.05
		55	7.2	-	-	<0.01	0.398	0.0776	3.00
		100	6.8	-	-	<0.01	0.397	0.0833	2.96
		129	6.7	-	-	<0.01	0.412	0.0828	3.18
	25-Feb-03	1	8.7	13.4	0.0517	<0.01	0.305	0.0662	2.77
		15	7.6	0.600	0.158	<0.01	0.428	0.0785	3.38
		25	7.5	0.330	0.0948	<0.01	0.435	0.0778	3.46
		35	7.4	0.250	0.0997	<0.01	0.428	0.0768	3.43
		55	7.3	-	-	<0.01	0.419	0.0754	3.31
		99	7.4	-	-	<0.01	0.393	0.0705	3.02
		129	7.3	-	-	<0.01	0.390	0.0706	2.96
	25-Mar-03	1	9.2	1.58	0.436	0.0241	0.344	0.0645	2.80
		15	8.1	0.445	0.322	0.0200	0.369	0.0692	2.77
		25	7.9	0.299	0.304	0.0200	0.385	0.0697	3.09
		35	7.9	0.302	0.184	0.0205	0.366	0.0700	2.88
		55	7.8	-	-	0.0206	0.370	0.0737	2.86
		100	7.6	-	-	0.0190	0.380	0.0692	2.92
		130	7.5	-	-	0.0180	0.383	0.0711	2.92
	28-Apr-03	2	9.1	7.65	1.02	0.0312	0.261	0.0636	2.49
		15	8.6	3.04	0.994	0.0407	0.309	0.0695	2.91
		25	8.4	1.70	0.622	0.0360	0.321	0.0639	2.79
		35	8.3	1.03	0.742	0.0368	0.333	0.0669	2.84
		55	8.2	-	-	0.0438	0.337	0.0663	2.91
		99	7.8	-	-	0.0281	0.323	0.0637	2.54
		118	7.6	-	-	0.0200	0.334	0.0655	2.59
	28-May-03	1	10.4	11.7	1.92	0.0100	0.158	0.0562	2.11
		15	8.2	3.16	1.60	0.0237	0.273	0.0613	2.45
		25	8.1	2.04	1.36	0.0282	0.277	0.0608	2.42
		35	7.9	1.30	0.634	0.0312	0.289	0.0633	2.44
		55	7.5	-	-	0.0328	0.301	0.0622	2.39
		100	7.5	-	-	<0.01	0.273	0.0599	2.24
		129	7.5	-	-	0.142	0.272	0.0587	2.19
	24-Jun-03	1	11.7	26.4	7.89	<0.01	0.032	0.0360	0.653
		15	8.5	6.87	1.76	0.0279	0.166	0.0463	1.49
		25	7.7	1.22	0.584	0.0414	0.220	0.0527	1.76
		35	7.4	0.166	0.512	0.0401	0.254	0.0564	1.91
		55	7.3	-	-	0.0415	0.248	0.0546	1.90
		99	7.0	-	-	0.0398	0.251	0.0531	1.86
		129	7.0	-	-	0.0410	0.251	0.0532	1.84
	29-Jul-03	1	10.9	16.2	2.94	<0.01	0.0330	0.0354	0.560
		15	8.0	5.35	1.89	0.0150	0.174	0.0487	1.50
		25	7.2	3.75	2.09	0.0130	0.217	0.0522	1.64
		35	6.8	1.11	1.04	<0.01	0.260	0.0569	1.82
		55	6.2	-	-	<0.01	0.299	0.0600	1.91
		99	6.0	-	-	0.0238	0.290	0.0602	1.92
		129	6.0	-	-	0.0327	0.283	0.0615	1.96

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
PTWELLS1	26-Aug-03	1	10.6	7.99	7.25	0.0150	<0.020	0.0623	1.39
		15	7.2	1.96	2.28	0.0206	0.178	0.0568	1.77
		25	6.1	0.524	1.49	0.0150	0.273	0.0620	2.05
		35	5.8	0.390	0.890	0.0130	0.299	0.0626	2.03
		55	5.6	-	-	<0.01	0.312	0.0635	2.05
		99	5.6	-	-	0.0239	0.296	0.0630	2.04
		129	5.6	-	-	0.0277	0.294	0.0645	2.02
	30-Sep-03	1	6.6	1.56	1.17	0.0120	0.253	0.0706	2.01
		15	6.1	1.97	0.504	<0.01	0.276	0.0706	2.06
		25	6.0	0.718	0.224	<0.01	0.294	0.0677	2.08
		35	5.6	0.540	0.300	<0.01	0.314	0.0691	2.10
		55	5.6	-	-	<0.01	0.313	0.0691	2.12
		99	5.4	-	-	<0.01	0.323	0.0710	2.23
		129	5.3	-	-	<0.01	0.338	0.0745	2.25
	29-Oct-03	1	7.2	0.950	0.417	<0.01	0.311	0.0683	2.83
		15	6.4	0.427	0.328	<0.01	0.334	0.0716	2.57
		25	6.3	0.362	0.288	<0.01	0.358	0.0683	2.68
		35	6.2	0.253	0.339	<0.01	0.356	0.0709	2.67
		55	6.1	-	-	<0.01	0.371	0.0716	2.46
		100	6.0	-	-	<0.01	0.375	0.0718	2.40
		129	5.6	-	-	<0.01	0.385	0.0753	2.50
	19-Nov-03	2	7.3	1.10	0.268	0.0130	0.325	0.0769	2.54
		15	7.0	0.538	0.120	0.0100	0.325	0.0771	2.49
		25	6.9	0.430	0.130	<0.01	0.286	0.0760	2.58
		35	6.8	0.542	0.110	0.0140	0.291	0.0763	2.52
		55	6.7	-	-	0.0170	0.309	0.0768	2.56
		100	6.4	-	-	0.0120	0.281	0.0773	2.54
		129	6.2	-	-	0.0100	0.302	0.0748	2.58
	16-Dec-03	1	7.2	0.388	0.110	<0.01	0.372	0.0741	3.11
		15	6.9	0.197	0.110	<0.01	0.377	0.0740	3.09
		25	6.9	0.213	0.130	<0.01	0.366	0.0703	2.97
		35	6.8	0.189	0.120	<0.01	0.344	0.0867	2.80
		55	6.6	-	-	<0.01	0.368	0.0703	2.88
		99	6.3	-	-	<0.01	0.353	0.0713	2.70
		129	6.3	-	-	<0.01	0.366	0.0695	2.72
KSBP01	22-Jan-03	1	7.5	0.474	0.191	<0.01	0.402	0.0783	3.03
		15	7.4	0.389	0.178	<0.01	0.402	0.0785	3.08
		26	7.3	0.352	0.179	<0.01	0.402	0.0786	3.15
		35	7.3	0.289	0.126	<0.01	0.399	0.0819	3.10
		55	7.3	-	-	<0.01	0.396	0.0788	3.12
		99	7.2	-	-	<0.01	0.394	0.0751	2.94
		100	7.2	-	-	<0.01	0.395	0.0755	2.97
		198	6.8	-	-	<0.01	0.416	0.0854	3.29
	25-Feb-03	2	8.5	15.2	<0.02	<0.01	0.264	0.0597	2.48
		16	7.6	3.29	0.468	<0.01	0.394	0.0741	2.94
		25	7.5	0.760	0.280	<0.01	0.405	0.0735	2.99
		35	7.4	0.490	0.185	<0.01	0.402	0.0746	2.96
		55	7.4	-	-	<0.01	0.412	0.0743	3.02
		99	7.4	-	-	<0.01	0.392	0.0727	2.81
		100	7.4	-	-	<0.01	0.394	0.0721	2.79
		198	7.6	-	-	<0.01	0.384	0.0686	2.79

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
KSBP01	25-Mar-03	1	8.8	1.38	0.412	0.0270	0.324	0.0579	2.83
		15	8.0	0.741	0.378	0.0208	0.361	0.0644	2.84
		26	7.8	0.407	0.293	0.0206	0.362	0.0687	2.77
		36	7.8	0.374	0.294	0.0204	0.370	0.0664	2.85
		55	7.8	-	-	0.0200	0.380	0.0701	2.91
		99	7.6	-	-	0.0200	0.371	0.0819	2.74
		100	7.6	-	-	0.0200	0.371	0.0677	2.69
		199	7.3	-	-	0.0190	0.389	0.0708	2.83
	28-Apr-03	1	11.4	25.1	0.853	0.0110	0.0825	0.0443	1.93
		15	10.3	15.0	0.740	0.0160	0.176	0.0524	2.31
		25	9.7	12.8	1.38	0.0245	0.224	0.0561	2.52
		35	8.7	6.15	0.917	0.0384	0.289	0.0630	2.77
		55	8.1	-	-	0.0352	0.329	0.0645	2.89
		99	8.0	-	-	0.0307	0.305	0.0588	2.42
		100	8.0	-	-	0.0299	0.303	0.0598	2.42
		199	8.0	-	-	0.0336	0.269	0.0587	2.10
	27-May-03	1	11.3	14.9	3.79	0.0110	0.0542	0.0486	1.62
		15	8.3	4.85	1.38	0.0203	0.241	0.0644	2.43
		25	7.9	2.14	1.15	0.0216	0.277	0.0620	2.44
		35	7.8	0.938	0.818	0.0249	0.288	0.0572	2.52
		55	7.6	-	-	0.0264	0.290	0.0588	2.46
		99	7.5	-	-	0.0392	0.269	0.0564	2.18
		100	7.5	-	-	0.0388	0.269	0.0574	2.19
		198	7.2	-	-	0.0393	0.274	0.0600	2.23
	24-Jun-03	1	12.9	24.0	4.40	0.0110	<0.020	0.0329	0.410
		16	8.2	3.87	0.849	0.0336	0.190	0.0478	1.70
		25	7.6	1.22	0.823	0.0416	0.236	0.0536	1.89
		35	7.3	0.446	0.960	0.0417	0.254	0.0579	1.94
		55	7.1	-	-	0.0416	0.260	0.0562	1.92
		99	7.0	-	-	0.0431	0.247	0.0530	1.72
		100	7.0	-	-	0.0423	0.246	0.0551	1.72
		199	6.8	-	-	0.0425	0.251	0.0546	1.83
	29-Jul-03	1	10.8	18.3	2.98	<0.01	<0.020	0.0358	0.336
		16	8.1	4.46	1.50	0.0180	0.140	0.0452	1.35
		25	7.1	2.38	0.867	0.0150	0.211	0.0532	1.71
		35	6.5	0.998	0.686	0.0130	0.266	0.0572	1.92
		55	6.2	-	-	0.0140	0.294	0.0586	1.98
		99	6.1	-	-	0.0190	0.298	0.0616	1.92
		100	6.1	-	-	0.0203	0.293	0.0610	1.99
		198	5.9	-	-	0.0468	0.276	0.0673	2.12
	26-Aug-03	1	10.8	20.5	5.30	0.0160	<0.020	0.0635	1.53
		15	8.5	4.52	3.77	0.0305	0.0872	0.0502	1.74
		25	7.1	1.91	0.983	0.0190	0.202	0.0556	1.95
		35	6.8	1.37	1.00	0.0201	0.229	0.0643	1.98
		55	5.7	-	-	<0.01	0.289	0.0665	2.05
		99	5.5	-	-	0.0359	0.292	0.0660	1.94
		100	5.5	-	-	0.0130	0.309	0.0658	1.96
		198	5.7	-	-	0.0309	0.286	0.0694	1.98

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
KSBP01	30-Sep-03	1	6.4	1.43	0.382	<0.01	0.258	0.0667	2.07
		15	6.0	0.797	0.282	<0.01	0.274	0.0701	1.99
		25	5.9	0.985	0.423	<0.01	0.277	0.0694	2.08
		35	5.9	0.519	0.374	<0.01	0.277	0.0696	2.12
		55	5.8	-	-	<0.01	0.285	0.0678	2.13
		99	5.9	-	-	0.0130	0.277	0.0668	2.09
		100	5.9	-	-	0.0120	0.279	0.0672	2.14
		199	5.8	-	-	0.0140	0.278	0.0670	2.14
	29-Oct-03	1	7.2	1.18	0.463	<0.01	0.347	0.0663	2.81
		15	6.6	0.575	0.320	<0.01	0.359	0.0686	2.39
		25	6.2	0.277	0.209	<0.01	0.335	0.0713	2.41
		35	6.2	0.282	0.239	<0.01	0.338	0.0705	2.43
		55	6.1	-	-	<0.01	0.352	0.0703	2.58
		99	5.9	-	-	<0.01	0.351	0.0703	2.56
		100	5.9	-	-	<0.01	0.358	0.0705	2.68
		199	5.5	-	-	<0.01	0.366	0.0724	2.84
	19-Nov-03	2	7.3	0.834	0.190	0.0110	0.320	0.0744	2.60
		15	7.0	0.985	0.130	0.0130	0.327	0.0748	2.61
		25	6.9	0.247	0.150	0.0120	0.331	0.0751	2.55
		35	6.8	0.485	0.130	0.0120	0.334	0.0750	2.58
		55	6.5	-	-	0.0130	0.363	0.0747	2.71
		99	6.3	-	-	<0.01	0.354	0.0745	2.54
		100	6.3	-	-	0.0130	0.348	0.0736	2.47
		198	6.4	-	-	0.0120	0.373	0.0727	2.76
	16-Dec-03	2	7.0	0.291	0.100	<0.01	0.379	0.0751	3.14
		15	6.8	0.251	<0.1	<0.01	0.367	0.0777	3.00
		25	6.7	0.053	0.299	<0.01	0.360	0.0731	2.92
		35	6.8	0.128	0.120	<0.01	0.367	0.0731	2.92
		55	7.0	-	-	<0.01	0.362	0.0674	2.86
		99	6.9	-	-	<0.01	0.367	0.0676	2.86
		100	6.9	-	-	<0.01	0.369	0.0653	2.72
		199	6.3	-	-	<0.01	0.368	0.0693	2.95
LTED04	21-Jan-03	2	7.6	0.737	0.191	<0.01	0.433	0.0841	3.32
		15	7.2	0.348	0.135	<0.01	0.430	0.0834	3.26
		25	7.1	0.289	0.126	<0.01	0.428	0.0883	3.32
		35	7.0	0.254	0.112	<0.01	0.428	0.0856	3.27
		35	7.0	0.250	0.100	<0.01	0.428	0.0857	3.20
		55	7.0	-	-	<0.01	0.428	0.0876	3.20
		75	6.9	-	-	<0.01	0.428	0.0865	3.12
	24-Feb-03	1	7.5	0.332	0.0859	<0.01	0.436	0.0841	3.23
		15	7.3	0.220	0.111	<0.01	0.439	0.0813	3.12
		25	7.3	0.17,B	0.0945	<0.01	0.440	0.0819	3.35
		34	7.3	0.15,B	0.0892	<0.01	0.437	0.0807	3.43
		36	7.3	0.200	0.105	<0.01	0.421	0.0761	3.36
		55	7.2	-	-	<0.01	0.433	0.0773	3.30
		75	7.1	-	-	<0.01	0.434	0.0787	3.33
	24-Mar-03	2	7.8	0.766	0.200	0.0120	0.413	0.0789	3.56
		15	7.7	0.557	0.165	0.0130	0.410	0.0776	3.34
		25	7.6	0.475	0.187	0.0140	0.417	0.0728	3.26
		34	7.6	0.412	0.189	<0.01	0.417	0.0830	3.30
		35	7.6	0.412	0.216	0.0170	0.416	0.0752	3.44
		55	7.5	-	-	0.0140	0.416	0.0739	3.55
		67	7.4	-	-	0.0130	0.415	0.0756	3.45

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
LTED04	29-Apr-03	1	9.4	3.02	0.330	0.0345	0.286	0.0561	3.91
		15	8.7	1.51	0.640	0.0441	0.311	0.0666	2.68
		25	8.5	0.616	0.526	0.0431	0.324	0.0610	2.69
		34	8.4	0.380	0.434	0.0477	0.331	0.0686	2.68
		36	8.4	0.478	0.465	0.0455	0.332	0.0654	2.76
		55	7.9		-	0.0425	0.351	0.0677	2.84
		75	7.7		-	0.0317	0.381	0.0717	2.78
	27-May-03	1	9.0	3.79	0.566	0.0190	0.247	0.0573	2.70
		15	8.2	4.53	0.530	0.0180	0.259	0.0591	2.18
		25	7.8	1.18	0.551	0.0391	0.299	0.0634	2.35
		34	7.8	0.730	0.492	0.0234	0.302	0.0649	2.33
		36	7.8	0.755	0.519	0.0225	0.296	0.0613	2.27
		55	7.4	-	-	0.0257	0.304	0.0617	2.20
		75	7.1	-	-	0.0308	0.310	0.0658	2.26
	23-Jun-03	1	8.9	7.25	1.31	0.0290	0.179	0.0537	2.03
		15	8.0	2.09	0.817	0.0400	0.219	0.0539	1.87
		25	7.9	1.61	0.810	0.0406	0.225	0.0550	1.93
		35	7.8	0.845	0.716	0.0429	0.238	0.0553	2.04
		36	7.7	0.845	0.749	0.0420	0.236	0.0573	2.05
		55	7.0	-	-	0.0345	0.278	0.0619	2.19
		75	6.7	-	-	0.0266	0.305	0.0665	2.28
	28-Jul-03	1	10.2	13.3	2.35	<0.01	0.0863	0.0425	2.07
		16	6.9	1.23	1.05	<0.01	0.217	0.0497	1.92
		25	6.5	0.508	0.656	<0.01	0.287	0.0555	2.13
		34	6.2	0.235	0.367	<0.01	0.300	0.0572	2.25
		36	6.2	0.239	0.348	<0.01	0.301	0.0611	2.28
		55	5.5	-	-	<0.01	0.340	0.0643	2.49
		75	5.5	-	-	0.0110	0.334	0.0674	2.59
	25-Aug-03	1	9.2	14.2	2.48	<0.01	0.124	0.0554	2.26
		15	6.4	1.08	1.44	<0.01	0.251	0.0620	2.00
		25	6.2	0.472	1.10	<0.01	0.277	0.0604	2.05
		34	5.9	0.166	0.246	<0.01	0.287	0.0639	2.03
		35	5.8	0.144	0.280	<0.01	0.288	0.0683	2.05
		55	4.7	-	-	<0.01	0.338	0.0719	2.25
		75	4.7	-	-	<0.01	0.347	0.0825	2.40
	29-Sep-03	1	6.3	1.22	0.375	0.0140	0.264	0.0662	2.52
		15	5.8	0.848	0.261	<0.01	0.276	0.0663	2.33
		25	5.6	0.321	0.14,	<0.01	0.281	0.0700	2.23
		35	5.7	0.282	<0.1	0.0390	0.260	0.0695	2.15
		36	5.7	0.501	0.110	<0.01	0.265	0.0665	2.30
		55	5.5	-	-	0.0150	0.269	0.0694	2.32
		75	5.1	-	-	0.0120	0.312	0.0750	2.49
	27-Oct-03	1	7.1	1.48	0.420	0.0100	0.333	0.0714	3.15
		15	6.2	1.55	0.285	<0.01	0.319	0.0735	2.47
		25	6.0	1.56	0.268	<0.01	0.326	0.0745	2.43
		34	5.9	0.502	0.230	<0.01	0.326	0.0744	2.53
		36	5.9	0.796	0.239	<0.01	0.331	0.0778	2.49
		55	5.8	-	-	<0.01	0.310	0.0756	2.32
		75	5.4	-	-	<0.01	0.354	0.0793	2.59

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
LTED04	17-Nov-03	1	6.4	0.306	0.110	0.0150	0.349	0.0723	2.75
		15	6.3	0.645	0.212	0.0120	0.354	0.0736	2.38
		25	6.2	0.464	0.215	0.0200	0.372	0.0741	2.57
		34	6.2	0.427	0.100	0.0130	0.351	0.0720	2.45
		36	6.2	0.402	<0.1	<0.01	0.335	0.0722	2.37
		55	5.7	-	-	<0.01	0.351	0.0753	2.49
		75	5.3	-	-	0.0100	0.375	0.0781	2.56
	15-Dec-03	1	6.7	0.263	0.100	<0.01	0.414	0.0733	3.83
		15	6.5	0.138	<0.1	<0.01	0.415	0.0744	3.39
		25	6.4	0.151	<0.1	<0.01	0.370	0.0748	2.76
		34	6.3	0.126	<0.1	<0.01	0.366	0.0745	2.82
		35	6.4	0.103	<0.1	<0.01	0.372	0.0793	2.81
		55	6.2	-	-	<0.01	0.367	0.0784	2.75
		75	6.0	-	-	<0.01	0.359	0.0788	2.60
LSNT01	21-Jan-03	9	7.2	0.525	0.239	<0.01	0.429	0.0852	3.25
		25	7.1	0.390	0.182	<0.01	0.424	0.0845	3.01
		35	7.1	0.353	0.176	<0.01	0.428	0.0854	3.11
		45	7.0	0.389	0.178	<0.01	0.431	0.0834	3.14
		64	7.0	-	-	<0.01	0.426	0.0822	3.21
		108	6.8	-	-	<0.01	0.429	0.0873	3.14
		203	6.5	-	-	<0.01	0.437	0.0896	3.19
	24-Feb-03	1	7.6	0.340	0.0865	<0.01	0.438	0.0792	3.40
		15	7.5	0.356	0.103	<0.01	0.436	0.0788	3.16
		25	7.4	0.271	0.101	<0.01	0.437	0.0792	3.27
		35	7.4	0.269	0.0666	<0.01	0.436	0.0763	3.30
		55	7.3	-	-	<0.01	0.434	0.0773	3.34
		100	7.1	-	-	<0.01	0.415	0.0744	3.19
		198	6.8	-	-	<0.01	0.429	0.0870	3.31
	24-Mar-03	1	7.7	0.722	0.242	0.0110	0.412	0.0704	3.34
		15	7.6	0.534	0.239	0.0110	0.409	0.0752	3.13
		25	7.3	0.517	0.205	0.0100	0.408	0.0715	3.23
		35	7.5	0.408	0.215	0.0150	0.408	0.0714	3.17
		55	7.5	-	-	0.0140	0.403	0.0723	3.22
		100	7.4	-	-	0.0160	0.402	0.0684	3.16
		197	7.3	-	-	0.0219	0.394	0.0754	2.93
	29-Apr-03	1	8.9	2.37	0.944	0.0266	0.314	0.0663	2.75
		15	8.8	2.22	0.956	0.0268	0.315	0.0651	2.67
		25	8.8	2.51	1.01	0.0266	0.317	0.0635	2.72
		35	8.4	1.59	0.826	0.0250	0.325	0.0653	2.74
		55	8.3	-	-	0.0231	0.333	0.0656	2.68
		99	8.0	-	-	0.0230	0.348	0.0661	2.58
		199	7.4	-	-	<0.01	0.389	0.0674	2.71
	27-May-03	1	8.3	3.51	0.566	0.0234	0.272	0.0588	2.26
		15	8.1	3.03	0.697	0.0267	0.270	0.0596	2.30
		25	8.0	2.75	0.758	0.0237	0.272	0.0590	2.27
		35	7.9	2.39	0.754	0.0247	0.275	0.0563	2.30
		55	7.7	-	-	0.0302	0.313	0.0585	2.09
		100	7.4	-	-	0.0261	0.282	0.0585	2.15
		198	7.4	-	-	0.0446	0.255	0.0587	1.90

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
LSNT01	23-Jun-03	1	9.1	8.51	1.14	0.0310	0.173	0.0494	1.76
		15	7.8	2.74	1.12	0.0349	0.228	0.0586	1.96
		25	7.7	2.59	0.852	0.0354	0.239	0.0594	1.98
		35	7.6	2.25	0.950	0.0346	0.240	0.0599	1.99
		55	7.1	-	-	0.0347	0.266	0.0569	2.01
		99	6.8	-	-	0.0382	0.275	0.0608	1.98
		198	6.7	-	-	0.0452	0.269	0.0615	2.09
	28-Jul-03	1	8.1	5.30	0.925	0.0190	0.181	0.0579	1.91
		15	7.6	3.58	0.746	0.0150	0.209	0.0541	1.95
		25	6.9	2.19	0.337	0.0262	0.229	0.0557	2.07
		35	6.8	1.25	0.406	0.0239	0.250	0.0579	2.16
		55	6.7	-	-	0.0160	0.267	0.0573	2.17
		100	6.0	-	-	0.0170	0.302	0.0592	2.20
		199	6.0	-	-	0.0420	0.303	0.0599	2.30
	25-Aug-03	1	8.7	10.5	2.96	0.0160	0.137	0.0634	2.17
		15	7.4	5.46	1.16	0.0150	0.184	0.0597	2.13
		25	6.9	3.52	1.76	0.0150	0.216	0.0615	2.16
		35	6.5	1.94	0.917	0.0140	0.239	0.0660	2.14
		55	5.8	-	-	<0.01	0.283	0.0642	2.16
		100	5.5	-	-	<0.01	0.313	0.0647	2.12
		184	5.6	-	-	0.0390	0.286	0.0693	2.21
	29-Sep-03	1	6.6	3.14,H	0.406,H	0.0208,B	0.220	0.0664	2.23
		15	6.4	3.29,H	0.456,H	0.0216,B	0.224	0.0647	2.17
		25	6.4	2.89,H	0.36,H	0.018,B	0.248	0.0659	2.30
		35	6.2	1.63,H	0.272,H	0.015,B	0.252	0.0676	2.35
		55	5.9	-	-	0.016,B	0.258	0.0708	2.24
		99	5.4	-	-	<0.01	0.296	0.0689	2.35
		184	5.2	-	-	<0.01	0.324	0.0751	2.55
	27-Oct-03	1	6.5	2.33	0.405	0.0170	0.299	0.0724	2.61
		16	6.2	1.21	0.440	<0.01	0.312	0.0732	2.56
		25	6.0	1.15	0.325	<0.01	0.315	0.0759	2.52
		35	5.9	1.33	0.288	0.0110	0.326	0.0759	2.60
		55	5.7	-	-	<0.01	0.343	0.0757	2.58
		100	5.5	-	-	<0.01	0.346	0.0756	2.57
		184	5.5	-	-	<0.01	0.376	0.0770	2.73
	17-Nov-03	1	6.8	1.64	0.110	0.0150	0.344	0.0760	2.52
		15	6.7	1.37	0.180	0.0150	0.348	0.0727	2.52
		26	6.6	0.682	<0.1	0.0130	0.345	0.0742	2.51
		35	6.5	1.00	0.160	0.0130	0.359	0.0739	2.64
		55	5.8	-	-	0.0110	0.369	0.0742	2.62
		100	5.6	-	-	0.0160	0.372	0.0744	2.63
		171	5.4	-	-	0.0130	0.395	0.0827	2.94
	15-Dec-03	1	6.7	0.224	0.140	0.0130	0.398	0.0758	3.25
		15	6.6	0.217	0.120	<0.01	0.394	0.0770	3.12
		25	6.6	0.218	0.150	<0.01	0.378	0.0775	3.07
		35	6.6	0.200	0.120	<0.01	0.381	0.0760	3.06
		55	6.3	-	-	<0.01	0.395	0.0758	3.01
		99	6.3	-	-	<0.01	0.398	0.0719	2.94
		179	6.2	-	-	<0.01	0.393	0.0769	2.93

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
NSEX01	21-Jan-03	1	7.4	0.937	0.249	<0.01	0.424	0.0839	3.21
		16	7.3	0.389	0.181	<0.01	0.425	0.0817	3.28
		26	7.3	0.379	0.165	<0.01	0.425	0.0840	3.18
		36	7.3	0.389	0.159	<0.01	0.425	0.0833	3.10
		55	7.2	-	-	<0.01	0.427	0.0831	3.25
		100	7.0	-	-	<0.01	0.427	0.0814	3.28
		120	6.8	-	-	<0.01	0.425	0.0820	3.29
	24-Feb-03	1	7.9	0.410	0.127	<0.01	0.433	0.0813	3.25
		16	7.7	0.400	0.136	<0.01	0.432	0.0772	3.33
		25	7.5	0.350	0.0954	<0.01	0.430	0.0796	3.43
		35	7.4	0.200	0.123	<0.01	0.429	0.0770	3.51
		55	7.3	-	-	<0.01	0.430	0.0766	3.38
		100	7.2	-	-	<0.01	0.427	0.0781	3.65
		169	6.8	-	-	<0.01	0.430	0.0809	3.66
	24-Mar-03	1	8.3	2.21	0.301	0.0100	0.400	0.0737	3.50
		15	7.8	0.880	0.227	0.0120	0.407	0.0741	3.43
		25	7.6	0.640	0.273	0.0110	0.408	0.0789	3.35
		35	7.5	0.505	0.202	0.0120	0.407	0.0714	3.43
		55	7.5	-	-	0.0120	0.406	0.0736	3.35
		100	7.4	-	-	0.0110	0.396	0.0711	3.18
		167	7.3	-	-	0.0140	0.373	0.0712	3.01
	29-Apr-03	1	10.9	8.20	0.621	0.0274	0.174	0.0547	2.33
		15	10.1	8.97	0.748	0.0223	0.223	0.0576	2.30
		25	9.4	4.88	0.787	0.0284	0.269	0.0602	2.54
		35	8.9	2.56	0.746	0.0340	0.304	0.0637	2.70
		55	8.7	-	-	0.0344	0.321	0.0647	2.79
		99	7.8	-	-	0.0170	0.380	0.0710	2.80
		169	7.2	-	-	<0.01	0.412	0.0719	3.03
	27-May-03	1	10.7	9.73	1.40	0.0225	0.156	0.0559	2.16
		15	8.1	2.44	0.599	0.0263	0.269	0.0600	2.34
		25	7.9	1.33	0.454	0.0284	0.283	0.0637	2.40
		35	7.7	0.805	0.481	0.0265	0.294	0.0618	2.40
		55	7.4	-	-	0.0236	0.310	0.0659	2.27
		99	7.2	-	-	0.0190	0.316	0.0624	2.23
		169	7.5	-	-	0.0499	0.254	0.0611	2.02
	23-Jun-03	1	13.3	16.9	3.22	<0.01	<0.020	0.0393	1.09
		15	8.3	1.87	0.619	0.0385	0.202	0.0518	1.86
		25	8.0	2.41	0.636	0.0409	0.218	0.0533	1.90
		35	7.7	0.900	0.406	0.0415	0.234	0.0539	2.01
		55	7.1	-	-	0.0298	0.287	0.0575	2.23
		99	6.8	-	-	0.0282	0.303	0.0639	2.27
		167	6.6	-	-	0.0225	0.311	0.0651	2.50
	28-Jul-03	1	10.2	6.20	<0.39	0.0120	0.0795	0.0392	1.37
		15	9.7	5.61	0.570	0.0110	0.115	0.0447	1.54
		25	7.9	5.23	0.949	<0.01	0.182	0.0483	1.85
		35	7.4	1.24	0.437	<0.01	0.234	0.0509	2.12
		55	5.9	-	-	<0.01	0.310	0.0637	2.31
		99	6.1	-	-	0.0363	0.280	0.0609	2.24
		167	5.9	-	-	0.0456	0.273	0.0665	2.37

Table A-11
2003 Offshore Ambient Water Column Monitoring
General Water Quality Parameters

Station	Date	Depth (m)	Diss. O_2 (mg/L)	Chlorophyll (µg/L)	Pheophytin (µg/L)	Ammonia (mg/L)	NO_2 + NO_3 (mg/L)	Total P (mg/L)	Silica (mg/L)
NSEX01	25-Aug-03	1	8.1	5.43	0.763	<0.01	0.135	0.0528	1.83
		15	7.5	0.844	0.379	<0.01	0.195	0.0558	1.94
		25	7.0	0.540	0.429	<0.01	0.214	0.0557	1.94
		35	6.4	0.372	0.238	<0.01	0.259	0.0592	2.00
		55	5.4	-	-	<0.01	0.316	0.0673	2.16
		100	5.5	-	-	<0.01	0.317	0.0741	2.19
		169	5.6	-	-	0.0436	0.281	0.0703	2.23
	29-Sep-03	1	6.9	5.31	0.450	0.0110	0.236	0.0664	1.98
		15	6.6	2.67	0.386	0.0110	0.243	0.0678	2.09
		25	6.5	1.72	0.210	0.0110	0.249	0.0660	2.15
		35	6.3	1.85	0.262	0.0120	0.251	0.0672	2.07
		55	6.2	-	-	0.0130	0.270	0.0680	2.27
		99	5.4	-	-	0.0100	0.299	0.0703	2.35
		169	5.2	-	-	0.0130	0.300	0.0730	2.50
	27-Oct-03	1	6.9	2.63	0.468	<0.01	0.305	0.0736	2.32
		15	6.3	1.15	0.285	<0.01	0.316	0.0721	2.31
		25	6.3	1.37	0.278	<0.01	0.327	0.0723	2.41
		35	6.2	0.852	0.277	<0.01	0.330	0.0739	2.68
		55	5.9	-	-	<0.01	0.485	0.0726	2.55
		99	5.4	-	-	<0.01	0.349	0.0734	2.61
		169	5.4	-	-	<0.01	0.368	0.0776	2.71
	17-Nov-03	1	7.2	1.15	0.170	0.0130	0.339	0.0738	2.24
		15	6.8	0.378	0.110	0.0100	0.344	0.0733	2.24
		25	6.7	0.493	<0.1	<0.01	0.335	0.0732	2.29
		55	5.7	-	-	<0.01	0.358	0.0741	2.46
		100	5.4	-	-	<0.01	0.361	0.0777	2.54
		167	5.2	-	-	<0.01	0.386	0.0772	2.68
	15-Dec-03	1	7.4	0.500	<0.1	<0.01	0.399	0.0752	3.33
		15	6.8	0.260	0.120	<0.01	0.402	0.0764	3.06
		25	6.8	0.200	<0.1	<0.01	0.394	0.0751	3.26
		35	6.7	0.153	<0.1	<0.01	0.399	0.0751	3.29
		55	6.3	-	-	<0.01	0.365	0.0737	2.77
		99	6.1	-	-	<0.01	0.395	0.0739	2.83
		165	6.1	-	-	<0.01	0.385	0.0754	2.84

Table A-12
2003 Outfall Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
KSHZ03	28-Jan-03	0.0140	0.567	6.38	0.0833	21.789	8.9
	26-Feb-03	0.0150	0.387	4.12	0.0673	26.512	8.3
	24-Mar-03	0.0335	0.765	10.0	0.0835	21.367	9.6
	23-Apr-03	0.0525	0.0865	5.12	0.0588	25.306	10.4
	19-May-03	0.0305	0.213	3.44	0.0801	27.596	12.5
	24-Jun-03	0.0170	0.0581	1.74	0.0536	27.779	14.7
	22-Jul-03	<0.010	0.134	1.98	0.0586	29.430	13.6
	27-Aug-03	0.0150	0.0360	1.62	0.0737	29.629	16.6
	22-Sep-03	0.0211	0.261	3.83	0.0830	29.553	14.8
	28-Oct-03	0.0180	0.396	5.02	0.0909	26.069	12.7
	18-Nov-03	0.0245	0.471	2.21	0.166	29.336	10.3
	16-Dec-03	0.0110	0.395	3.53	0.0701	27.013	9.6
KSSN04	28-Jan-03	-	-	-	-	-	9.3
	26-Feb-03	-	-	-	-	-	8.2
	24-Mar-03	-	-	-	-	-	9.1
	23-Apr-03	-	-	-	-	-	10.2
	19-May-03	-	-	-	-	-	10.7
	24-Jun-03	-	-	-	-	-	16.2
	22-Jul-03	-	-	-	-	-	13.5
	27-Aug-03	-	-	-	-	-	14.1
	22-Sep-03	-	-	-	-	-	13.0
	28-Oct-03	-	-	-	-	-	10.8
	18-Nov-03	-	-	-	-	-	10.8
	16-Dec-03	-	-	-	-	-	9.8
KSSN05	28-Jan-03	0.0190	0.493	5.23	0.0837	21.810	8.9
	26-Feb-03	0.0115	0.416	4.37	0.0781	26.094	8.2
	24-Mar-03	0.0180	0.421	4.75	0.0874	24.704	8.0
	23-Apr-03	0.0190	0.206	2.82	0.0795	26.447	10.2
	19-May-03	0.0263	0.215	2.47	0.0651	28.739	11.6
	24-Jun-03	0.0259	0.118	1.48	0.0601	29.189	13.9
	22-Jul-03	0.0237	0.122	1.75	0.0595	29.580	13.6
	27-Aug-03	0.0170	<0.020	1.12	0.0587	29.722	14.5
	22-Sep-03	0.0206	0.173	2.11	0.0961	30.189	13.8
	28-Oct-03	0.0327	0.320	3.06	0.130	27.765	12.1
	18-Nov-03	0.0170	0.288	2.56	0.0829	29.246	11.1
	16-Dec-03	0.0145	0.391	3.88	0.295	26.884	9.1
LSKR01	28-Jan-03	-	-	-	-	-	9.3
	26-Feb-03	-	-	-	-	-	8.8
	24-Mar-03	-	-	-	-	-	9.5
	23-Apr-03	-	-	-	-	-	9.9
	19-May-03	-	-	-	-	-	11.4
	24-Jun-03	-	-	-	-	-	15.3
	22-Jul-03	-	-	-	-	-	15.1
	27-Aug-03						15.7
	22-Sep-03	-	-	-	-	-	14.6
	28-Oct-03	-	-	-	-	-	12.8
	18-Nov-03	-	-	-	-	-	-
	16-Dec-03	-	-	-	-	-	9.5
LSKS01	28-Jan-03	-	-	-	-	-	9.3
	26-Feb-03	0.0241	0.391	3.37	0.0780	28.200	8.8
	24-Mar-03	0.0206	0.416	3.58	0.0741	28.793	9.4

Table A-12
2003 Outfall Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
LSKS01	23-Apr-03	0.0542	0.202	2.37	0.0630	28.644	9.9
	19-May-03	0.0502	0.196	2.56	0.0654	28.878	11.2
	24-Jun-03	0.170	<0.020	1.47	0.0811	28.965	16.6
	22-Jul-03	0.0572	0.126	1.78	0.0603	29.734	16.7
	27-Aug-03	0.0230	0.133	1.93	0.0663	30.054	15.5
	23-Sep-03	0.0398	0.115	2.02	0.0710	30.439	15.3
	28-Oct-03	0.0170	0.318	2.87	0.0785	28.632	12.6
	18-Nov-03	0.0271	0.258	1.97	0.0972	23.899	-
	16-Dec-03	0.0208	0.363	2.96	0.0912	29.606	9.2
MSJL01	28-Jan-03	0.0170	0.483	3.58	0.0902	28.467	9.2
	26-Feb-03	0.0150	0.429	3.58	0.0913	29.171	7.6
	24-Mar-03	0.0220	0.534	4.44	0.0723	22.493	10.9
	23-Apr-03	0.0407	0.287	2.55	0.0742	28.891	9.3
	19-May-03	0.0524	0.243	2.56	0.0720	29.032	9.3
	24-Jun-03	0.0736	<0.020	1.26	0.0682	28.831	13.4
	22-Jul-03	0.0335	0.0973	1.65	0.0716	29.611	13.4
	27-Aug-03	0.0566	0.0380	1.86	0.0698	29.760	14.2
	23-Sep-03	0.0637	0.0961	1.46	0.0910	30.342	13.3
	28-Oct-03	0.0247	0.267	3.03	0.221	28.708	11.5
	18-Nov-03	0.0239	0.592	3.49	0.115	10.252	9.6
	16-Dec-03	0.0243	0.342	2.70	0.144	29.412	9.1

Table A-13
2003 Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
ITEDWARDSPT	28-Jan-03	0.0110	0.449	4.42	0.0764	27.360	9.0
	26-Feb-03	0.0190	0.312	2.76	0.0672	28.429	8.8
	24-Mar-03	0.0296	0.392	5.14	0.0610	22.591	9.9
	23-Apr-03	0.0300	0.0797	1.19	0.0385	27.063	9.9
	19-May-03	0.0425	0.213	2.36	0.0583	28.950	10.6
	24-Jun-03	0.0389	0.0845	1.64	0.0553	29.008	13.7
	22-Jul-03	0.0135	0.0826	1.65	0.0482	29.469	15.6
	27-Aug-03	0.0299	0.0438	1.72	0.0804	29.942	16.0
	23-Sep-03	0.0228	0.192	2.12	0.106	30.363	15.2
	28-Oct-03	0.0200	0.331	2.93	0.0760	28.012	12.2
	18-Nov-03	0.0150	0.293	2.48	0.0786	29.584	11.1
	16-Dec-03	0.0180	0.334	2.63	0.0767	29.378	9.6
JSVW04	28-Jan-03	<0.010	0.424	3.38	0.0861	29.331	9.1
	26-Feb-03	0.0205	0.371	3.17	0.0721	28.802	8.9
	24-Mar-03	0.0268	0.338	3.47	0.0678	23.732	9.7
	23-Apr-03	0.0263	0.0632	1.30	0.0410	26.893	10.0
	19-May-03	0.0258	0.222	2.27	0.0564	28.928	10.9
	24-Jun-03	0.0130	0.0678	1.81	0.0664	28.238	14.4
	22-Jul-03	0.0110	0.148	1.80	0.0552	28.973	15.5
	26-Aug-03	0.0224	0.0725	2.30	0.201	29.439	15.8
	22-Sep-03	0.0341	0.136	2.01	0.0836	30.362	14.2
	28-Oct-03	0.0140	0.348	3.63	0.0695	27.472	11.0
	18-Nov-03	0.0150	0.293	2.44	0.0764	29.407	12.5
	16-Dec-03	<0.010	0.368	3.38	0.0686	28.186	9.3
ITCARKEEKP	28-Jan-03	<0.010	0.411	3.51	0.0865	27.838	9.1
	26-Feb-03	0.0180	0.371	3.39	0.0707	26.990	8.2
	24-Mar-03	0.0205	0.386	3.54	0.0730	27.932	10.0
	23-Apr-03	0.0222	0.0889	1.33	0.0428	26.761	10.4
	19-May-03	0.0283	0.193	2.52	0.0631	28.750	11.9
	24-Jun-03	0.0372	0.0439	1.58	0.0885	28.592	15.1
	22-Jul-03	0.0277	0.107	2.39	0.0714	28.902	14.6
	27-Aug-03	0.0269	0.0365	2.76	0.149	29.100	19.5
	22-Sep-03	0.0265	0.175	2.21	0.0993	30.333	15.4
	28-Oct-03	0.0135	0.323	2.70	0.0773	28.232	12.6
	18-Nov-03	0.0130	0.300	2.57	0.0770	29.417	11.0
	16-Dec-03	<0.010	0.361	2.91	0.0710	29.432	9.9
KSLU03	28-Jan-03	-	-	-	-	-	8.9
	26-Feb-03	-	-	-	-	-	8.2
	24-Mar-03	-	-	-	-	-	8.7
	23-Apr-03	-	-	-	-	-	10.2
	19-May-03	-	-	-	-	-	10.7
	24-Jun-03	-	-	-	-	-	12.1
	22-Jul-03	-	-	-	-	-	13.0
	27-Aug-03	-	-	-	-	-	14.2
	22-Sep-03	-	-	-	-	-	13.6
	28-Oct-03	-	-	-	-	-	12.1
	18-Nov-03	-	-	-	-	-	10.7
	16-Dec-03	-	-	-	-	-	9.3
KSQU01	28-Jan-03	-	-	-	-	-	8.9
	26-Feb-03	-	-	-	-	-	8.3
	24-Mar-03	-	-	-	-	-	9.0
	23-Apr-03	-	-	-	-	-	10.8
	19-May-03	-	-	-	-	-	11.6
	24-Jun-03	-	-	-	-	-	15.0
	22-Jul-03						15.4

Table A-13
2003 Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
KSQU01	27-Aug-03	-	-	-	-	-	17.6
	23-Sep-03	-	-	-	-	-	15.8
	28-Oct-03	-	-	-	-	-	11.5
	18-Nov-03	-	-	-	-	-	10.9
	16-Dec-03	-	-	-	-	-	9.5
KSYV02	28-Jan-03	-	-	-	-	-	9.1
	26-Feb-03	-	-	-	-	-	7.9
	24-Mar-03	-	-	-	-	-	8.6
	23-Apr-03	-	-	-	-	-	10.3
	19-May-03	-	-	-	-	-	11.8
	24-Jun-03	-	-	-	-	-	14.9
	22-Jul-03	-	-	-	-	-	14.7
	27-Aug-03	-	-	-	-	-	14.8
	23-Sep-03	-	-	-	-	-	14.8
	28-Oct-03	-	-	-	-	-	9.3
	18-Nov-03	-	-	-	-	-	10.5
	16-Dec-03	-	-	-	-	-	9.0
LTAB01	28-Jan-03	-	-	-	-	-	8.3
	26-Feb-03	-	-	-	-	-	7.5
	24-Mar-03	-	-	-	-	-	7.6
	23-Apr-03	-	-	-	-	-	9.5
	19-May-03	-	-	-	-	-	11.0
	24-Jun-03	-	-	-	-	-	12.6
	22-Jul-03	-	-	-	-	-	13.6
	27-Aug-03	-	-	-	-	-	14.2
	23-Sep-03	-	-	-	-	-	13.6
	28-Oct-03	-	-	-	-	-	12.7
	18-Nov-03	-	-	-	-	-	10.9
	16-Dec-03	-	-	-	-	-	8.7
LTEH02	28-Jan-03	-	-	-	-	-	8.6
	26-Feb-03	-	-	-	-	-	8.1
	24-Mar-03	-	-	-	-	-	8.1
	23-Apr-03	-	-	-	-	-	9.4
	19-May-03	-	-	-	-	-	11.8
	24-Jun-03	-	-	-	-	-	12.8
	22-Jul-03	-	-	-	-	-	14.9
	27-Aug-03	-	-	-	-	-	13.8
	23-Sep-03						13.7
	28-Oct-03	-	-	-	-	-	12.7
	18-Nov-03	-	-	-	-	-	11.1
	16-Dec-03	-	-	-	-	-	9.0
LSGY01	28-Jan-03	-	-	-	-	-	9.1
	26-Feb-03	-	-	-	-	-	8.7
	24-Mar-03	-	-	-	-	-	9.0
	23-Apr-03	-	-	-	-	-	9.5
	19-May-03	-	-	-	-	-	10.7
	24-Jun-03	-	-	-	-	-	12.8
	22-Jul-03	-	-	-	-	-	13.6
	27-Aug-03	-	-	-	-	-	14.3
	23-Sep-03	-	-	-	-	-	14.6
	28-Oct-03	-	-	-	-	-	12.7
	18-Nov-03	-	-	-	-	-	12.0
	16-Dec-03	-	-	-	-	-	10.1

Table A-13
2003 Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
LSFX01	28-Jan-03	-	-	-	-	-	9.3
	26-Feb-03	-	-	-	-	-	8.6
	24-Mar-03	-	-	-	-	-	9.1
	23-Apr-03	-	-	-	-	-	9.5
	19-May-03	-	-	-	-	-	10.7
	24-Jun-03	-	-	-	-	-	13.2
	22-Jul-03	-	-	-	-	-	13.7
	27-Aug-03	-	-	-	-	-	14.8
	23-Sep-03	-	-	-	-	-	15.8
	28-Oct-03	-	-	-	-	-	12.7
	18-Nov-03	-	-	-	-	-	-
	16-Dec-03	-	-	-	-	-	10.0
LSHV01	28-Jan-03	-	-	-	-	-	9.5
	26-Feb-03	-	-	-	-	-	8.7
	24-Mar-03	-	-	-	-	-	9.5
	23-Apr-03	-	-	-	-	-	9.8
	19-May-03	-	-	-	-	-	11.0
	24-Jun-03	-	-	-	-	-	15.6
	22-Jul-03	-	-	-	-	-	17.0
	27-Aug-03	-	-	-	-	-	15.0
	23-Sep-03	-	-	-	-	-	15.1
	28-Oct-03	-	-	-	-	-	12.8
	18-Nov-03	-	-	-	-	-	-
	16-Dec-03	-	-	-	-	-	9.3
LSTU01	28-Jan-03	-	-	-	-	-	9.6
	26-Feb-03	-	-	-	-	-	8.8
	24-Mar-03	-	-	-	-	-	9.1
	23-Apr-03	-	-	-	-	-	9.7
	19-May-03	-	-	-	-	-	10.9
	24-Jun-03	-	-	-	-	-	13.5
	22-Jul-03	-	-	-	-	-	14.3
	27-Aug-03	-	-	-	-	-	14.6
	23-Sep-03	-	-	-	-	-	14.6
	28-Oct-03	-	-	-	-	-	12.7
	18-Nov-03	-	-	-	-	-	-
	16-Dec-03	-	-	-	-	-	9.8
LSVW01	28-Jan-03	<0.010	0.582	6.76	0.0785	25.540	9.5
	26-Feb-03	<0.010	0.436	4.12	0.0941	28.071	9.0
	24-Mar-03	0.0160	0.379	3.75	0.0744	28.014	10.1
	23-Apr-03	0.0218	0.293	2.93	0.0667	28.235	15.0
	19-May-03	0.0386	0.264	2.53	0.0715	29.038	11.1
	24-Jun-03	0.393	0.0523	1.83	0.2025	28.705	15.4
	22-Jul-03	0.0227	0.188	1.87	0.0584	29.690	14.8
	27-Aug-03	0.0195	0.0628	4.34	0.0704	27.786	15.0
	23-Sep-03	0.0273	0.110	6.94	0.101	25.458	14.6
	28-Oct-03	<0.010	0.313	3.37	0.0814	29.015	12.7
	18-Nov-03	0.0265	0.286	2.21	0.0853	25.573	-
	16-Dec-03	<0.010	0.366	3.04	0.0940	29.779	9.9
MTEC01	19-May-03	-	-	-	-	-	11.4
MTLD03	19-May-03	-	-	-	-	-	12.2
	24-Jun-03	-	-	-	-	-	21.6
	22-Jul-03	-	-	-	-	-	15.1
	27-Aug-03	-	-	-	-	-	17.5
	23-Sep-03	-	-	-	-	-	12.7
	28-Oct-03	-	-	-	-	-	12.2

Table A-13
2003 Ambient Beach Monitoring
General Water Quality Parameters

Station	Date	Ammonia (mg/L)	$NO_2 + NO_3$ (mg/L)	Silica (mg/L)	Total P (mg/L)	Salinity (PSS)	Temperature (°C)
MSSM05	19-May-03	-	-	-	-	-	10.4
	20-May-03	-	-	-	-	-	11.9
	17-Jun-03	-	-	-	-	-	16.2
	24-Jun-03	-	-	-	-	-	13.7
	14-Jul-03	-	-	-	-	-	16.0
	22-Jul-03	-	-	-	-	-	14.7
	25-Aug-03	-	-	-	-	-	20.0
	27-Aug-03	-	-	-	-	-	14.0
	23-Sep-03	-	-	-	-	-	14.7
	28-Oct-03	-	-	-	-	-	10.5
KTHA01	28-Jan-03	0.0180	1.74	30.6	0.0548	-	10.0
	26-Feb-03	0.0150	1.54	28.4	0.0990	-	8.0
	24-Mar-03	0.0170	1.78	27.7	0.0812	-	9.9
	23-Apr-03	<0.010	1.28	30.7	0.0807	-	10.5
	19-May-03	0.0130	1.44	23.8	0.0891	-	10.7
	24-Jun-03	<0.010	1.41	30.3	0.113	-	13.6
	22-Jul-03	0.0130	1.46	29.6	0.0899	-	14.3
	27-Aug-03	<0.010	1.37	31.4	0.0980	-	14.1
	22-Sep-03	0.0120	1.15	19.5	0.115	-	13.1
	28-Oct-03	0.0130	1.24	12.3	0.0779	-	13.1
	18-Nov-03	0.0416	0.849	3.72	0.213	-	12.7
	16-Dec-03	0.0643	1.17	18.9	0.0866	-	9.3

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
CK200P	22-Jan-03	4	3	1	2	4	2	2	-
		15	1	-	-	0	-	-	-
		25	1	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
	25-Feb-03	1	0	1	2	2	2	2	-
		15	0	-	-	0	-	-	-
		25	1	-	-	0	-	-	-
		35	0	-	-	1	-	-	-
		55	0	-	-	1	-	-	-
	25-Mar-03	1	3	1	2	5	2	2	-
		15	0	-	-	1	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	1	-	-	-
		55	0	-	-	0	-	-	-
	28-Apr-03	1	0	1	2	0	2	2	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
	28-May-03	1	1	1	2	-	2	2	-
		15	0	-	-	-	-	-	-
		25	0	-	-	-	-	-	-
		35	0	-	-	-	-	-	-
		55	0	-	-	-	-	-	-
	24-Jun-03	1	0	1	2	0	2	2	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		52	0	-	-	1	-	-	-
	29-Jul-03	1	0	1	2	0	2	2	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
	26-Aug-03	1	1	1	2	0	2	2	-
		15	1	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
	30-Sep-03	1	0	1	2	0	2	2	-
		15	0	-	-	3	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
	29-Oct-03	1	0	1	2	1	2	2	-
		15	2	-	-	0	-	-	-
		25	1	-	-	2	-	-	-
		35	0	-	-	5	-	-	-
		55	0	-	-	0	-	-	-

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
CK200P	19-Nov-03	1	4	2	2	7	2	2	-
		15	1	-	-	4	-	-	-
		25	1	-	-	1	-	-	-
		35	1	-	-	2	-	-	-
		55	1	-	-	2	-	-	-
	16-Dec-03	1	8	2	2	4	2	2	-
		15	3	-	-	3	-	-	-
		25	4	-	-	5	-	-	-
		35	1	-	-	5	-	-	-
		55	0	-	-	0	-	-	-
KSSK02	21-Jan-03	1	2	2	1	2	2	2	-
		15	0	-	-	2	-	-	-
		25	0	-	-	2	-	-	-
		35	1	-	-	1	-	-	-
		55	0	-	-	1	-	-	-
	24-Feb-03	1	0	2	1	0	2	2	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
	18-Mar-03	1	-	2	1	-	2	2	-
		25	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	0
		70	-	-	-	-	-	-	0
	24-Mar-03	1	7	2	1	9	2	2	1
		15	0	-	-	2	-	-	0
		25	0	-	-	0	-	-	1
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	2
	29-Apr-03	1	0	1	1	0	2	2	0
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	-
	27-May-03	1	0	1	1	0	2	2	0
		15	1	-	-	0	-	-	0
		25	1	-	-	1	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	0
	23-Jun-03	1	0	1	1	0	2	2	-
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	1	-	-	0
		55	0	-	-	0	-	-	0
	08-Jul-03	1	-	1	1	-	2	2	2
		25	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	0
		70	-	-	-	-	-	-	0

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
KSSK02	28-Jul-03	1	0	1	1	0	2	2	0
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	0
	25-Aug-03	1	0	1	1	0	2	2	0
		15	0	-	-	0	-	-	0
		25	0	-	-	1	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	-
	29-Sep-03	1	0	1	1	0	2	2	0
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	1
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	4
	06-Oct-03	1	-	1	1	-	2	2	-
		1	-	-	-	-	-	-	0
		25	-	-	-	-	-	-	0
		70	-	-	-	-	-	-	0
								-	
	27-Oct-03	1	1	1	1	1	1	2	0
		15	0	-	-	2	-	-	0
		25	1	-	-	0	-	-	-
		35	0	-	-	2	-	-	0
		55	0	-	-	0	-	-	0
	17-Nov-03	1	-	1	1	-	1	2	0
		15	-	-	-	-	-	-	0
		25	-	-	-	-	-	-	0
		35	-	-	-	-	-	-	-
		55	-	-	-	-	-	-	2
	15-Dec-03	1	1	1	1	4	2	2	0
		15	0	-	-	2	-	-	0
		25	0	-	-	2	-	-	0
		35	1	-	-	1	-	-	0
		55	2	-	-	3	-	-	-
LTBC42	21-Jan-03	1	1	5	5	13	5	4	-
		3	3	-	-	15	-	-	-
	24-Feb-03	1	13	5	5	18	5	4	-
		5	2	-	-	13	-	-	-
	24-Mar-03	1	35	5	6	18	5	5	-
		5	7	-	-	5	-	-	-
	29-Apr-03	1	8	5	6	2	5	4	-
		8	1	-	-	0	-	-	-
	27-May-03	1	0	5	5	0	4	3	-
		6	0	-	-	1	-	-	-
	23-Jun-03	1	23	5	6	3	4	4	-
		2	24	-	-	1	-	-	-
	28-Jul-03	1	2	5	6	2	4	4	-
		2	1	-	-	0	-	-	-
	25-Aug-03	1	0	5	6	2	4	5	-
		2	3	-	-	1	-	-	-

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
LTBC42	29-Sep-03	1	2	5	6	1	4	5	-
		11	0	-	-	1	-	-	-
	27-Oct-03	1	6	5	6	13	4	5	-
		2	10	-	-	12	-	-	-
	17-Nov-03	1	-	5	6	-	4	5	-
		2	-	-	-	-	-	-	-
	15-Dec-03	1	22	6	7	31	4	5	-
		3	22	-	-	26	-	-	-
LSEP01	21-Jan-03	1	3	1	1	1	1	1	0
		15	0	-	-	0	-	-	1
		25	-	-	-	-	-	-	-
		35	-	-	-	-	-	-	-
		55	-	-	-	-	-	-	-
		99	-	-	-	-	-	-	-
		190	0	-	-	1	-	-	0
		190	0	-	-	0	-	-	1
	24-Feb-03	1	4	1	1	1	1	1	3
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	0	-	-	0
		55	1	-	-	0	-	-	0
		100	0	-	-	3	-	-	0
		188	3	-	-	0	-	-	2
		189	0	-	-	0	-	-	2
	24-Mar-03	1	4	1	1	1	1	1	4
		15	1	-	-	1	-	-	1
		25	0	-	-	1	-	-	0
		35	0	-	-	1	-	-	2
		55	0	-	-	0	-	-	0
		100	0	-	-	1	-	-	0
		185	0	-	-	2	-	-	1
		185	1	-	-	0	-	-	0
	29-Apr-03	1	2	1	2	0	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
		100	0	-	-	0	-	-	-
		181	0	-	-	0	-	-	-
		183	0	-	-	0	-	-	-
	27-May-03	1	0	1	2	0	1	1	0
		15	0	-	-	0	-	-	0
		25	0	-	-	1	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	0
		100	0	-	-	0	-	-	0
		187	0	-	-	0	-	-	0
		188	0	-	-	0	-	-	0

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
LSEP01	23-Jun-03	1	0	1	2	0	1	1	0
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	0
		100	0	-	-	0	-	-	0
		185	0	-	-	0	-	-	0
		186	0	-	-	0	-	-	0
	28-Jul-03	1	0	1	2	0	1	1	0
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	0
		100	0	-	-	0	-	-	0
		185	0	-	-	0	-	-	0
		186	0	-	-	0	-	-	0
	25-Aug-03	1	0	1	2	0	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
		100	0	-	-	0	-	-	-
		182	0	-	-	0	-	-	-
		183	0	-	-	0	-	-	-
	29-Sep-03	1	1	1	2	1	1	1	0
		15	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	0
		35	0	-	-	0	-	-	0
		55	0	-	-	0	-	-	0
		99	0	-	-	0	-	-	0
		183	0	-	-	0	-	-	0
		183	0	-	-	0	-	-	0
	27-Oct-03	1	2	1	2	1	1	1	0
		15	0	-	-	0	-	-	2
		25	0	-	-	5	-	-	1
		35	0	-	-	3	-	-	1
		55	0	-	-	1	-	-	0
		100	0	-	-	1	-	-	0
		186	0	-	-	0	-	-	0
		188	0	-	-	0	-	-	0
	17-Nov-03	2	-	1	2	-	1	1	-
		15	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	-
		35	-	-	-	-	-	-	-
		55	-	-	-	-	-	-	-
		100	-	-	-	-	-	-	-
		184	-	-	-	-	-	-	-
		185	-	-	-	-	-	-	-

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
LSEP01	15-Dec-03	1	0	1	2	1	1	1	0
		16	0	-	-	0	-	-	0
		25	0	-	-	0	-	-	1
		35	0	-	-	0	-	-	0
		55	0	-	-	1	-	-	0
		100	0	-	-	0	-	-	0
		187	0	-	-	0	-	-	0
		188	0	-	-	0	-	-	0
LSKQ06	21-Jan-03	1	1	1	1	0	1	1	-
		15	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	-
		35	-	-	-	-	-	-	-
	24-Feb-03	1	0	1	1	1	1	1	-
		15	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	-
		35	-	-	-	-	-	-	-
	24-Mar-03	1	0	1	1	0	1	1	-
		15	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	-
		35	-	-	-	-	-	-	-
	29-Apr-03	1	0	1	1	0	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
	27-May-03	1	0	1	1	1	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
	23-Jun-03	1	0	1	1	0	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
	28-Jul-03	1	1	1	1	0	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
	25-Aug-03	1	0	1	1	0	1	1	-
		15	0	-	-	0	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
	29-Sep-03	1	0	1	1	0	1	1	-
		15	0	-	-	0	-	-	-
		25	1	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
	27-Oct-03	1	0	1	1	1	1	1	-
		15	0	-	-	0	-	-	-
		25	2	-	-	1	-	-	-
		35	1	-	-	1	-	-	-

Table A-14
2003 Offshore Outfall Water Column Monitoring
Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
LSKQ06	17-Nov-03	2	-	1	1	-	1	1	-
		15	-	-	-	-	-	-	-
		25	-	-	-	-	-	-	-
		35	-	-	-	-	-	-	-
	15-Dec-03	1	0	1	1	1	1	1	-
		15	0	-	-	1	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
VO50E	21-Jan-03	1	0	N/A	1	1	N/A	1	-
		5	0	-	-	1	-	-	-
		10	0	-	-	0	-	-	-
	24-Feb-03	1	2	N/A	1	0	N/A	1	-
		5	0	-	-	0	-	-	-
		10	0	-	-	0	-	-	-
	24-Mar-03	1	0	N/A	1	0	N/A	1	-
		5	0	-	-	1	-	-	-
		10	0	-	-	1	-	-	-
	29-Apr-03	1	0	N/A	1	0	N/A	1	-
		5	0	-	-	0	-	-	-
		11	2	-	-	0	-	-	-
	27-May-03	1	0	N/A	1	0	N/A	1	-
		5	0	-	-	0	-	-	-
		10	0	-	-	0	-	-	-
	23-Jun-03	1	0	N/A	1	0	1	1	-
		5	0	-	-	0	-	-	-
		8	0	-	-	0	-	-	-
	28-Jul-03	1	0	N/A	1	0	1	1	-
		5	0	-	-	1	-	-	-
		10	0	-	-	0	-	-	-
	25-Aug-03	1	0	1	1	0	1	1	-
		5	0	-	-	0	-	-	-
		10	0	-	-	0	-	-	-
	29-Sep-03	1	0	1	1	0	1	1	-
		5	0	-	-	0	-	-	-
		11	0	-	-	0	-	-	-
	27-Oct-03	1	0	1	1	0	1	1	-
		5	0	-	-	0	-	-	-
		11	0	-	-	1	-	-	-
	17-Nov-03	1	-	1	1	-	1	1	-
		5	-	-	-	-	-	-	-
		10	-	-	-	-	-	-	-
	15-Dec-03	1	0	1	1	0	1	1	-
		5	0	-	-	1	-	-	-
		10	0	-	-	0	-	-	-

N/A - Not applicable. To-date the required number of samples for the geomean calculation have not been collected at this station.

Table A-15
2003 Offshore Ambient Water Column Monitoring-Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
PTWELLS1	22-Jan-03	1	0	1	1	0	1	1	0
	25-Feb-03	1	0	1	1	0	1	1	0
	25-Mar-04	1	1	1	1	0	1	1	0
	28-Apr-03	1	1	1	1	0	1	1	-
	28-May-03	1	1	1	1	-	1	1	0
	24-Jun-03	1	0	1	1	0	1	1	0
	29-Jul-03	1	0	1	1	0	1	1	0
	26-Aug-03	1	0	1	1	0	1	1	0
	30-Sep-03	1	0	1	1	0	1	1	0
	29-Oct-03	1	3	1	1	2	1	1	3
	19-Nov-03	1	4	1	1	21	1	2	23
	16-Dec-03	1	0	1	1	2	1	2	4
KSBP01	22-Jan-03	1	1	1	1	0	1	1	1
	25-Feb-03	1	0	1	1	0	1	1	0
	25-Mar-03	1	0	1	1	0	1	1	0
	28-Apr-03	1	0	1	1	0	1	1	-
	28-May-03	1	0	1	1	-	1	1	0
	24-Jun-03	1	0	1	1	0	1	1	0
	29-Jul-03	1	0	1	1	0	1	1	0
	26-Aug-03	1	0	1	1	0	1	1	4
	30-Sep-03	1	0	1	1	0	1	1	0
	29-Oct-03	1	1	1	1	0	1	1	2
	19-Nov-03	1	22	1	2	19	1	2	17
	16-Dec-03	1	2	1	1	0	1	2	0
LTED04	21-Jan-03	1	18	4	3	7	3	3	-
	24-Feb-03	1	0	4	3	5	3	3	-
	24-Mar-03	1	3	4	3	5	4	3	-
	29-Apr-03	1	6	4	3	4	4	3	-
	27-May-03	1	0	3	3	1	4	3	-
	23-Jun-03	1	1	3	3	3	3	3	-
	28-Jul-03	1	0	3	3	0	3	3	-
	25-Aug-03	1	3	3	3	1	3	3	-
	29-Sep-03	1	3	3	3	1	3	3	-
	27-Oct-03	1	3	3	4	4	3	3	-
	15-Dec-03	1	13	3	4	18	3	4	-
LSNT01	21-Jan-03	9	0	1	1	0	1	1	0
	24-Feb-03	1	0	1	1	0	1	1	0
	24-Mar-03	1	0	1	1	0	1	1	0
	29-Apr-03	1	0	1	1	0	1	1	-
	27-May-03	1	0	1	1	0	1	1	0
	23-Jun-03	1	0	1	1	0	1	1	0
	28-Jul-03	1	0	1	1	0	1	1	0
	25-Aug-03	1	0	1	1	1	1	1	-
	29-Sep-03	1	0	1	1	0	1	1	0
	27-Oct-03	1	1	1	1	0	1	1	0
	15-Dec-03	1	0	1	1	0	1	1	0
NSEX01	21-Jan-03	1	0	N/A	N/A	0	N/A	N/A	-
		16	0	-	-	1	-	-	-
		26	0	-	-	1	-	-	-
		36	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
		100	0	-	-	1	-	-	-
		120	0	-	-	0	-	-	-

Table A-15
2003 Offshore Ambient Water Column Monitoring-Bacteria

			Fecal Coliform			Enterococcus			*Escherichia coli*
				Moving Geometric Mean			Moving Geometric Mean		
Station	**Date**	**Depth (m)**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**
NSEX01	24-Feb-03	1	0	N/A	N/A	0	N/A	N/A	-
		16	0	-	-	0	-	-	-
		26	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
		100	0	-	-	0	-	-	-
		169	0	-	-	0	-	-	-
	24-Mar-03	1	0	N/A	N/A	0	N/A	N/A	-
		15	0	-	-	1	-	-	-
		25	0	-	-	0	-	-	-
		35	0	-	-	0	-	-	-
		55	0	-	-	0	-	-	-
		100	0	-	-	0	-	-	-
		167	0	-	-	0	-	-	-
	29-Apr-03	1	0	N/A	N/A	0	N/A	N/A	-
	27-May-03	1	0	N/A	N/A	0	N/A	N/A	-
	23-Jun-03	1	0	N/A	N/A	0	N/A	N/A	-
	28-Jul-03	1	0	N/A	N/A	0	N/A	N/A	-
	25-Aug-03	1	0	N/A	N/A	0	N/A	N/A	-
	29-Sep-03	1	0	N/A	N/A	0	N/A	N/A	-
	27-Oct-03	1	0	N/A	N/A	1	N/A	N/A	-
	15-Dec-03	1	5	1*	1*	4	1*	1*	-

N/A - Not applicable. To-date the required number of samples for the geomean calculation have not been collected at this station.
* - Geomean calculation based upon less than specified number of samples.

Table A-16
2003 Outfall Beach Monitoring-Bacteria

		Fecal Coliform			Enterococcus		
			Moving Geometric Mean			Moving Geometric Mean	
Station	Date	(CFU/100 ml)	n=30	n=12	(CFU/100 ml)	n=30	n=12
KSHZ03	28-Jan-03	19	17	14	12	11	7
	26-Feb-03	26	16	18	73	11	9
	24-Mar-03	6	16	19	9	10	9
	23-Apr-03	15	17	17	-	10	9
	19-May-03	13	19	17	1	10	9
	24-Jun-03	3	16	14	9	10	11
	22-Jul-03	1	14	8	0	9	10
	27-Aug-03	0	11	6	0	9	8
	22-Sep-03	30	11	7	6	10	7
	28-Oct-03	16	11	8	20	9	7
	18-Nov-03	10	11	12	-	9	7
	16-Dec-03	44	12	13	82	9	10
KSSN04	28-Jan-03	6	5	3	7	3	3
	26-Feb-03	4	6	3	1	3	3
	24-Mar-03	1	6	3	2	3	3
	23-Apr-03	0	6	3	-	3	3
	19-May-03	0	5	3	0	3	3
	24-Jun-03	70	5	4	18	3	3
	22-Jul-03	3	6	5	2	3	3
	27-Aug-03	8	5	5	2	3	4
	22-Sep-03	5	5	5	0	3	3
	28-Oct-03	5	5	5	3	3	3
	18-Nov-03	16	5	5	-	3	3
	16-Dec-03	14	5	5	9	3	4
KSSN05	28-Jan-03	109	11	8	53	5	5
	26-Feb-03	8	10	9	10	5	8
	24-Mar-03	11	11	9	8	6	10
	23-Apr-03	1	10	8	-	6	10
	19-May-03	0	9	7	0	6	10
	24-Jun-03	0	9	5	1	5	10
	22-Jul-03	1	8	5	0	5	9
	27-Aug-03	4	7	5	1	4	7
	22-Sep-03	7	8	5	3	4	5
	28-Oct-03	21	8	6	13	4	4
	18-Nov-03	16	8	6	-	4	4
	16-Dec-03	18	9	6	32	4	4
LSKR01	28-Jan-03	4	17	10	9	11	7
	26-Feb-03	0	16	10	1	11	6
	24-Mar-03	4	15	10	1	9	6
	23-Apr-03	14	14	13	1	8	6
	19-May-03	4	12	10	7	8	6
	24-Jun-03	4	11	11	1	7	6
	22-Jul-03	10	11	9	4	7	5
	27-Aug-03	31	11	10	3	7	5
	22-Sep-03	130	13	10	0	6	4
	28-Oct-03	30	13	11	53	6	5
	18-Nov-03	9	13	10	34	7	5
	16-Dec-03	12	13	9	33	7	4
LSKS01	28-Jan-03	62	34	26	20	8	10
	26-Feb-03	90	35	35	9	9	12
	24-Mar-03	20	35	43	8	9	12

Table A-16
2003 Outfall Beach Monitoring-Bacteria

		Fecal Coliform			Enterococcus		
			Moving Geometric Mean			Moving Geometric Mean	
Station	**Date**	**(CFU/100 ml)**	**n=30**	**n=12**	**(CFU/100 ml)**	**n=30**	**n=12**
LSKS01	23-Apr-03	120	35	50	43	8	13
	19-May-03	155	36	56	20	9	15
	24-Jun-03	9	33	49	1	9	10
	22-Jul-03	109	34	46	5	9	7
	27-Aug-03	4	35	44	2	8	8
	23-Sep-03	12	38	39	3	7	6
	28-Oct-03	39	36	29	60	8	8
	18-Nov-03	300	41	41	1005	9	14
	16-Dec-03	30	42	42	51	11	14
MSJL01	28-Jan-03	4	N/A	5	14	N/A	5
	26-Feb-03	2	N/A	5	9	N/A	6
	24-Mar-03	0	N/A	4	0	N/A	6
	23-Apr-03	540	N/A	6	71	N/A	8
	19-May-03	20	N/A	8	24	N/A	10
	24-Jun-03	4	N/A	7	37	N/A	11
	22-Jul-03	40	N/A	7	86	N/A	12
	27-Aug-03	350	N/A	12	830	N/A	21
	23-Sep-03	8	N/A	12	90	N/A	24
	28-Oct-03	46	N/A	14	69	N/A	29
	18-Nov-03	200	N/A	18	970	N/A	48
	16-Dec-03	14	10*	20	15	14*	49

N/A - Not applicable. To-date the required number of samples for the geomean calculation have not been collected at this station.

* - Geomean calculation based upon less than specified number of samples.

Table A-17
2003 Ambient Beach Monitoring-Bacteria

		Fecal Coliform			Enterococcus		
			Moving Geometric Mean			Moving Geometric Mean	
Station	Date	(CFU/100 ml)	n=30	n=12	(CFU/100 ml)	n=30	n=12
ITEDWARDSPT	28-Jan-03	17	8	6	9	8	7
	26-Feb-03	4	7	5	0	6	4
	24-Mar-03	170	8	8	119	8	6
	23-Apr-03	12	8	9	-	8	6
	19-May-03	1	8	9	0	7	6
	24-Jun-03	1	7	8	1	6	6
	22-Jul-03	12	6	7	2	6	7
	27-Aug-03	2	6	7	3	5	5
	23-Sep-03	-	6	7	44	6	6
	28-Oct-03	10	6	8	16	6	7
	18-Nov-03	110	7	9	-	6	7
	16-Dec-03	200	8	12	12	7	7
JSVW04	28-Jan-03	56	6	4	3	4	4
	26-Feb-03	0	6	4	1	4	4
	24-Mar-03	0	5	4	1	4	3
	23-Apr-03	0	4	4	-	4	3
	19-May-03	1	4	4	0	3	3
	24-Jun-03	1	4	3	4	3	3
	22-Jul-03	5	4	3	11	3	4
	26-Aug-03	32	4	4	8	3	4
	22-Sep-03	44	4	5	24	3	5
	28-Oct-03	1	4	4	4	4	5
	18-Nov-03	31	4	5	-	4	5
	16-Dec-03	14	5	5	14	4	5
ITCARKEEKP	28-Jan-03	6	N/A	7	8	N/A	5
	26-Feb-03	6	N/A	7	1	N/A	4
	24-Mar-03	1	N/A	6	1	N/A	4
	23-Apr-03	1	N/A	6	-	N/A	4
	19-May-03	0	N/A	5	0	N/A	4
	24-Jun-03	3	4	5	0	N/A	4
	22-Jul-03	0	4	4	3	3	4
	27-Aug-03	1	4	3	0	3	3
	22-Sep-03	24	4	3	9	3	3
	28-Oct-03	3	4	2	22	3	3
	18-Nov-03	21	4	3	-	3	3
	16-Dec-03	21	4	4	14	3	3
KSLU03	28-Jan-03	42	12	10	12	8	7
	26-Feb-03	8	12	8	5	8	8
	24-Mar-03	1	12	8	4	8	8
	23-Apr-03	9	11	9	-	8	8
	19-May-03	4	10	8	0	8	6
	24-Jun-03	5	10	9	0	7	6
	22-Jul-03	0	9	7	1	7	6
	27-Aug-03	1	9	5	7	7	6
	22-Sep-03	1	9	5	0	7	4
	28-Oct-03	25	10	5	7	7	4
	18-Nov-03	370	12	8	-	7	4
	16-Dec-03	36	12	7	26	7	4
KSQU01	28-Jan-03	17	31	38	13	7	9
	26-Feb-03	4	28	35	7	7	10

Table A-17
2003 Ambient Beach Monitoring-Bacteria

		Fecal Coliform			Enterococcus		
			Moving Geometric Mean			Moving Geometric Mean	
Station	Date	(CFU/100 ml)	n=30	n=12	(CFU/100 ml)	n=30	n=12
KSQU01	24-Mar-03	9	24	33	8	7	10
	23-Apr-03	6	22	28	-	7	10
	19-May-03	17	22	21	4	7	7
	24-Jun-03	16	22	21	4	7	7
	22-Jul-03	12	21	20	1	7	7
	27-Aug-03	45	23	21	9	8	7
	23-Sep-03	76	25	23	52	8	9
	28-Oct-03	32	25	21	22	8	10
	18-Nov-03	680	29	26	-	8	10
	16-Dec-03	49	31	24	27	9	11
KSYV02	28-Jan-03	850	16	21	380	8	8
	26-Feb-03	11	16	22	6	8	9
	24-Mar-03	8	16	21	8	8	10
	23-Apr-03	1	13	15	-	8	10
	19-May-03	0	12	12	1	8	9
	24-Jun-03	5	12	12	0	7	8
	22-Jul-03	1	11	10	5	7	7
	27-Aug-03	5	11	12	3	6	6
	23-Sep-03	4	11	10	6	7	7
	28-Oct-03	15	12	10	15	7	9
	18-Nov-03	310	13	11	-	7	9
	16-Dec-03	470	15	13	430	9	12
LTAB01	28-Jan-03	160	9	7	98	5	5
	26-Feb-03	52	10	8	24	6	5
	24-Mar-03	44	11	11	44	7	7
	23-Apr-03	1	10	11	4	6	7
	19-May-03	0	9	9	1	6	7
	24-Jun-03	4	9	10	1	5	7
	22-Jul-03	0	8	8	0	5	7
	27-Aug-03	7	8	10	4	5	7
	23-Sep-03	25	9	13	2	5	8
	28-Oct-03	28	9	14	19	6	9
	18-Nov-03	34	10	14	100	6	10
	16-Dec-03	39	10	12	43	7	9
LTEH02	28-Jan-03	170	31	29	96	16	20
	26-Feb-03	7	33	27	10	18	18
	24-Mar-03	35	34	30	44	19	21
	23-Apr-03	12	32	29	9	18	21
	19-May-03	4	30	24	1	16	16
	24-Jun-03	2	28	20	1	15	14
	22-Jul-03	8	27	19	2	14	12
	27-Aug-03	4	25	18	4	14	12
	23-Sep-03	7	24	16	1	13	9
	28-Oct-03	17	24	16	34	14	10
	18-Nov-03	650	26	22	690	16	13
	16-Dec-03	39	27	16	100	17	12
LSGY01	28-Jan-03	26	3	5	20	2	3
	26-Feb-03	1	3	4	1	2	3
	24-Mar-03	1	3	4	1	2	3
	23-Apr-03	30	3	5	1	2	2
	19-May-03	2	3	5	0	2	2

Table A-17
2003 Ambient Beach Monitoring-Bacteria

		Fecal Coliform			Enterococcus		
			Moving Geometric Mean			Moving Geometric Mean	
Station	Date	(CFU/100 ml)	n=30	n=12	(CFU/100 ml)	n=30	n=12
LSGY01	24-Jun-03	19	3	6	0	2	2
	22-Jul-03	1	3	6	0	2	2
	27-Aug-03	1	3	5	1	2	2
	23-Sep-03	9	3	5	0	2	2
	28-Oct-03	18	4	6	12	2	3
	18-Nov-03	98	4	7	170	2	3
	16-Dec-03	2	4	6	6	3	3
LSFX01	28-Jan-03	4	4	5	1	3	3
	26-Feb-03	3	4	5	2	3	2
	24-Mar-03	1	4	5	1	3	2
	23-Apr-03	1	4	4	0	3	2
	19-May-03	5	4	5	0	3	2
	24-Jun-03	1	4	4	0	3	2
	22-Jul-03	0	4	4	0	3	2
	27-Aug-03	4	4	3	0	3	2
	23-Sep-03	11	4	3	4	3	2
	28-Oct-03	1	4	3	6	3	2
	18-Nov-03	12	4	3	29	3	3
	16-Dec-03	6	5	3	9	3	2
LSHV01	28-Jan-03	4	4	4	1	3	3
	26-Feb-03	8	4	4	21	3	4
	24-Mar-03	1	4	3	1	3	4
	23-Apr-03	26	4	4	1	3	3
	19-May-03	2	4	4	2	3	3
	24-Jun-03	1	4	3	0	3	3
	22-Jul-03	0	4	3	0	3	3
	27-Aug-03	7	4	3	7	3	3
	23-Sep-03	2	4	3	1	3	3
	28-Oct-03	1	4	3	1	3	3
	18-Nov-03	6	4	3	51	3	3
	16-Dec-03	6	4	3	19	3	3
LSTU01	28-Jan-03	1	4	3	2	2	2
	26-Feb-03	2	4	3	1	2	2
	24-Mar-03	1	4	3	3	2	2
	23-Apr-03	0	3	3	1	2	2
	19-May-03	2	3	3	9	3	2
	24-Jun-03	0	3	2	2	3	3
	22-Jul-03	0	3	2	3	3	2
	27-Aug-03	1	3	2	1	3	2
	23-Sep-03	1	3	1	1	2	2
	28-Oct-03	4	3	1	1	2	2
	18-Nov-03	1	3	1	16	3	3
	16-Dec-03	13	3	2	38	3	3
LSVW01	28-Jan-03	35	49	43	38	19	20
	26-Feb-03	13	45	49	8	18	22
	24-Mar-03	0	35	49	4	16	23
	23-Apr-03	7	34	45	4	16	19
	19-May-03	1	29	28	1	14	13
	24-Jun-03	33	29	24	13	14	16

Table A-17
2003 Ambient Beach Monitoring-Bacteria

		Fecal Coliform			Enterococcus		
			Moving Geometric Mean			Moving Geometric Mean	
Station	Date	(CFU/100 ml)	n=30	n=12	(CFU/100 ml)	n=30	n=12
LSVW01	22-Jul-03	0	25	16	4	14	13
	27-Aug-03	15	25	10	7	14	9
	23-Sep-03	66	27	10	40	15	10
	28-Oct-03	100	27	11	140	16	12
	18-Nov-03	210	27	13	830	18	16
	16-Dec-03	6	26	12	37	19	16
MTEC01	19-May-03	2	6	14	9	2	3
MTLD03	19-May-03	1	13	11	33	2	3
	24-Jun-03	16	10	11	4	2	3
	22-Jul-03	1	10	9	2	2	3
	27-Aug-03	4	8	9	1	2	3
	23-Sep-03	2	7	8	6	2	4
	28-Oct-03	34	8	9	52	2	5
MSSM05	19-May-03	1	45	26	14	4	3
	20-May-03	0	45	26	-	4	3
	17-Jun-03	23	44	26	10	4	4
	24-Jun-03	14	41	21	230	5	6
	14-Jul-03	0	37	14	3	5	6
	22-Jul-03	9	35	13	4	5	7
	25-Aug-03	-	35	13	1	5	6
	27-Aug-03	270	38	18	35	5	8
	23-Sep-03	700	45	24	420	6	13
	28-Oct-03	1	38	24	2	6	10

N/A - Not applicable. To-date the required number of samples for the geomean calculation have not been collected at this station.

APPENDIX B

SEDIMENT MONITORING DATA

B-1 2002 Offshore conventionals
B-2 2002 Offshore metals
B-3 2002 Offshore chlorinated pesticides and PCBs
B-4 2002 Offshore semi-volatile organics
B-5 2002 Beach conventionals
B-6 2002 Beach metals
B-7 2002 Beach chlorinated pesticides and PCBs
B-8 2002 Beach semi-volatile organics
B-9 2002 Offshore organotins
B-10 2003 Beach conventionals
B-11 2003 Beach metals
B-12 2003 Beach chlorinated pesticides and PCBs
B-13 2003 Beach semi-volatile organics

Table B-1
2002 Offshore Sediment Results
Conventionals

	KSPS01			LSCI01			LSCW02			LSML01		
	10/1/2002			10/1/2002			10/1/2002			10/1/2002		
	73.6% Solids			30.6% Solids			30.4% Solids			36.4% Solids		
		Concentration			Concentration			Concentration			Concentration	
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Volatile Solids (%)	0.962	--	0.005	2.61	--	0.005	2.81	--	0.005	2.69	--	0.005
Total Organic Carbon (%)	--	0.35	--	--	2.01	--	--	2.39	--	--	1.89	--
Total Organic Carbon (mg/Kg)	--	3,470	680	--	20,100	2,000	--	23,900	2,000	--	18,900	1,900
Clay (%)	2.8	--	0.1	31.1	--	0.1	37.1	--	0.1	24.9	--	0.1
Silt (%)	3.9	--	0.1	59.6	--	0.1	55.7	--	0.1	42.1	--	0.1
Sand (%)	91.7	--	0.1	9.2	--	0.1	6.8	--	0.1	33.0	--	0.1
Gravel (%)	1.5	--	0.1	<MDL	--	0.1	0.3	--	0.1	<MDL	--	0.1
Ammonia Nitrogen (mg/Kg)	--	3.18	0.14	--	16.7	0.33	--	18.7	0.33	--	17.3	0.27
Total Oil & Grease (mg/Kg)	--	310	140	--	650	330	--	690	330	--	470	270
Total Sulfide (mg/Kg)	--	<MDL	14	--	278	33	--	95	33	--	176	27

	LTBC41			LTCA02			LTDF01			LTED04		
	10/1/2002			10/1/2002			10/1/2002			10/1/2002		
	65.8% Solids			32.5% Solids			56.9% Solids			36.8% Solids		
		Concentration			Concentration			Concentration			Concentration	
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Volatile Solids (%)	1.63	--	0.005	2.66	--	0.005	2.45	--	0.005	2.99	--	0.005
Total Organic Carbon (%)	--	0.71	--	--	2.12	--	--	1.6	--	--	2.28	--
Total Organic Carbon (mg/Kg)	--	7,050	760	--	21,200	1,800	--	15,900	1,800	--	22,800	1,900
Clay (%)	7.5	--	0.1	34.8	--	0.1	9.9	--	0.1	27.3	--	0.1
Silt (%)	24.0	--	0.1	54.5	--	0.1	25.5	--	0.1	54.8	--	0.1
Sand (%)	58.7	--	0.1	10.8	--	0.1	63.8	--	0.1	17.9	--	0.1
Gravel (%)	9.8	--	0.1	<MDL	--	0.1	0.8	--	0.1	<MDL	--	0.1
Ammonia Nitrogen (mg/Kg)	--	2.16	0.15	--	12.0	0.31	--	3.64	0.18	--	9.46	0.27
Total Oil & Grease (mg/Kg)	--	228	150	--	490	310	--	320	180	--	625	270
Total Sulfide (mg/Kg)	--	30.4	15	--	<MDL	31	--	<MDL	18	--	46.2	27

mg/Kg - Milligrams per kilogram (parts per million).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet or dry weight (depending on analyte).

Note - LTBC41 is an outfall monitoring station, all others are ambient monitoring stations.

Table B-2
2002 Offshore Sediment Results
Metals

	KSPS01		LSCI01		LSCW02		LSML01	
	10/1/2002		10/1/2002		10/1/2002		10/1/2002	
	73.6% Solids		30.6% Solids		30.4% Solids		36.4% Solids	
	Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Aluminum *	6,180	6.7	17,200	16	19,200	16	15,300	14
Antimony **	<MDL	2.0	<MDL	4.9	<MDL	4.9	<MDL	4.1
Arsenic	3.5	3.4	9.5	8.2	12	7.9	15	7.1
Beryllium	0.11	0.067	0.39	0.16	0.46	0.16	0.36	0.14
Cadmium	<MDL	0.20	<MDL	0.49	0.49	0.49	<MDL	0.41
Chromium	17.0	0.34	38.9	0.82	42.8	0.79	34.6	0.71
Copper	6.93	0.27	35.3	0.65	55.3	0.63	32.4	0.58
Iron	8,680	3.4	25,400	8.2	28,000	7.9	23,200	7.1
Lead	6.5	2.0	11.8	4.9	36	4.9	16	4.1
Manganese	148	0.13	337	0.32	477	0.32	393	0.27
Mercury	0.034	0.024	0.14	0.062	0.43	0.063	0.12	0.052
Nickel	18.1	1.3	34.3	3.2	35.9	3.2	31.9	2.7
Selenium	<MDL	3.4	<MDL	8.2	<MDL	7.9	<MDL	7.1
Silver	<MDL	0.27	<MDL	0.65	<MDL	0.63	<MDL	0.58
Thallium	<MDL	13	<MDL	32	<MDL	32	<MDL	27
Zinc	24.0	0.34	83.3	0.82	99.3	0.79	76.9	0.71

	LTBC41		LTCA02		LTDF01		LTED04	
	10/1/2002		10/1/2002		10/1/2002		10/1/2002	
	65.8% Solids		32.5% Solids		56.9% Solids		36.8% Solids	
	Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Aluminum *	10,300	7.6	17,800	15	10,900	8.4	18,200	14
Antimony **	<MDL	2.3	<MDL	4.6	<MDL	2.5	<MDL	4.1
Arsenic	6.8	3.8	13	7.7	11	4.2	17	6.8
Beryllium	0.20	0.076	0.40	0.15	0.25	0.084	0.43	0.14
Cadmium	<MDL	0.23	<MDL	0.46	<MDL	0.25	<MDL	0.41
Chromium	27.4	0.38	37.8	0.77	27.9	0.42	35.3	0.68
Copper	27.1	0.30	48.0	0.62	37.4	0.33	51.6	0.54
Iron	15,800	3.8	25,500	7.7	16,400	4.2	25,700	6.8
Lead	20.2	2.3	33.8	4.6	48.0	2.5	35.6	4.1
Manganese	243	0.15	440	0.30	218	0.17	397	0.27
Mercury	0.14	0.029	0.34	0.058	0.425	0.035	0.33	0.052
Nickel	33.4	1.5	32.3	3.0	24.4	1.7	29.3	2.7
Selenium	<MDL	3.8	<MDL	7.7	<MDL	4.2	<MDL	6.8
Silver	0.52	0.30	<MDL	0.62	0.63	0.33	0.60	0.54
Thallium	<MDL	15	<MDL	30	<MDL	17	<MDL	27
Zinc	50.3	0.38	91.4	0.77	78.4	0.42	96.5	0.68

mg/Kg DW - Milligrams per kilogram (parts per million) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates high biased data based upon matrix spike recovery.
** Indicates low biased data based upon matrix spike recovery.
Note - LTBC41 is an outfall monitoring station, all others are ambient monitoring stations.

Table B-3
2002 Offshore Sediment Results
Chlorinated Pesticides and PCBs

	KSPS01		LSCI01		LSCW02		LSML01	
	10/1/2002		10/1/2002		10/1/2002		10/1/2002	
	73.6% Solids		30.6% Solids		30.4% Solids		36.4% Solids	
	Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
4,4'-DDE	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
4,4'-DDT *	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Aldrin	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Alpha-BHC	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Beta-BHC	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Chlordane	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Delta-BHC	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Dieldrin	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Endosulfan I	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Endosulfan II	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Endosulfan Sulfate	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Endrin	<MDL	1.4	<MDL	3.3	<MDL	3.3	<MDL	2.7
Endrin Aldehyde *	<MDL	2.7	<MDL	6.5	<MDL	6.6	<MDL	5.5
Gamma-BHC (Lindane)	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Heptachlor	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Heptachlor Epoxide	<MDL	0.68	<MDL	1.6	<MDL	1.6	<MDL	1.4
Methoxychlor	<MDL	6.8	<MDL	16	<MDL	16	<MDL	14
Toxaphene	<MDL	14	<MDL	33	<MDL	33	<MDL	27
Aroclor 1016	<MDL	1.8	<MDL	4.2	<MDL	4.3	<MDL	3.6
Aroclor 1221	<MDL	3.4	<MDL	8.2	<MDL	8.2	<MDL	6.9
Aroclor 1232	<MDL	3.4	<MDL	8.2	<MDL	8.2	<MDL	6.9
Aroclor 1242	<MDL	1.8	<MDL	4.2	<MDL	4.3	<MDL	3.6
Aroclor 1248	<MDL	1.8	<MDL	4.2	<MDL	4.3	<MDL	3.6
Aroclor 1254	<MDL	1.8	<MDL	4.2	20.9	4.3	<MDL	3.6
Aroclor 1260	<MDL	1.8	<MDL	4.2	16.0	4.3	<MDL	3.6

µg/Kg DW - Micrograms per kilogram (parts per billion) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates data is biased low based upon surrogate or matrix spike recovery.

Note - LTBC41 is an outfall monitoring station, all others are ambient monitoring stations.

Table B-3
2002 Offshore Sediment Results
Chlorinated Pesticides and PCBs

	LTBC41		LTCA02		LTDF01		LTED04	
	10/1/2002		10/1/2002		10/1/2002		10/1/2002	
	65.8% Solids		32.5% Solids		56.9% Solids		36.8% Solids	
	Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1.5	<MDL	3.1	2.8	1.8	<MDL	2.7
4,4'-DDE	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
4,4'-DDT *	<MDL	1.5	12.0	3.1	<MDL	1.8	<MDL	2.7
Aldrin	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
Alpha-BHC	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Beta-BHC	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Chlordane	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Delta-BHC	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Dieldrin	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
Endosulfan I	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
Endosulfan II	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
Endosulfan Sulfate	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
Endrin	<MDL	1.5	<MDL	3.1	<MDL	1.8	<MDL	2.7
Endrin Aldehyde *	<MDL	3.0	<MDL	6.2	<MDL	3.5	<MDL	5.4
Gamma-BHC (Lindane)	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Heptachlor	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Heptachlor Epoxide	<MDL	0.76	<MDL	1.5	<MDL	0.88	<MDL	1.4
Methoxychlor	<MDL	7.6	<MDL	15	<MDL	8.8	<MDL	14
Toxaphene	<MDL	15	<MDL	31	<MDL	18	<MDL	27
Aroclor 1016	<MDL	2.0	<MDL	4.0	<MDL	2.3	<MDL	3.5
Aroclor 1221	<MDL	3.8	<MDL	7.7	<MDL	4.4	<MDL	6.8
Aroclor 1232	<MDL	3.8	<MDL	7.7	<MDL	4.4	<MDL	6.8
Aroclor 1242	<MDL	2.0	<MDL	4.0	<MDL	2.3	<MDL	3.5
Aroclor 1248	9.8	2.0	<MDL	4.0	13.1	2.3	21.7	3.5
Aroclor 1254	26.1	2.0	29.0	4.0	35.0	2.3	31.0	3.5
Aroclor 1260	28.1	2.0	18.0	4.0	34.8	2.3	31.5	3.5

µg/Kg DW - Micrograms per kilogram (parts per billion) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates data is biased low based upon surrogate or matrix spike recovery.

Note - LTBC41 is an outfall monitoring station, all others are ambient monitoring stations.

Table B-4. Offshore Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	KSPS01 10/1/2002 73.6% Solids		LSCI01 10/1/2002 30.6% Solids		LSCW02 10/1/2002 30.4% Solids		LSML01 10/1/2002 36.4% Solids	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene	<MDL	0.35	<MDL	0.85	<MDL	0.86	<MDL	0.71
1,2-Dichlorobenzene	<MDL	0.35	<MDL	0.85	<MDL	0.86	<MDL	0.71
1,2-Diphenylhydrazine	<MDL	14	<MDL	33	<MDL	33	<MDL	27
1,3-Dichlorobenzene	<MDL	0.35	<MDL	0.85	<MDL	0.86	<MDL	0.71
1,4-Dichlorobenzene	<MDL	0.18	<MDL	0.42	<MDL	0.43	<MDL	0.36
2,4,5-Trichlorophenol	<MDL	16	<MDL	39	<MDL	39	<MDL	33
2,4,6-Trichlorophenol	<MDL	18	<MDL	42	<MDL	43	<MDL	36
2,4-Dichlorophenol	<MDL	22	<MDL	52	<MDL	53	<MDL	44
2,4-Dimethylphenol	<MDL	9.5	<MDL	23	<MDL	23	<MDL	19
2,4-Dinitrophenol	<MDL	18	<MDL	42	<MDL	43	<MDL	36
2,4-Dinitrotoluene	<MDL	4.1	<MDL	9.8	<MDL	9.9	<MDL	8.2
2,6-Dinitrotoluene	<MDL	14	<MDL	33	<MDL	33	<MDL	27
2-Chloronaphthalene	<MDL	22	<MDL	52	<MDL	53	<MDL	44
2-Chlorophenol	<MDL	11	<MDL	26	<MDL	26	<MDL	22
2-Methylnaphthalene	<MDL	19	<MDL	46	<MDL	46	<MDL	38
2-Methylphenol	<MDL	26	<MDL	62	<MDL	63	<MDL	52
2-Nitroaniline	<MDL	18	<MDL	42	<MDL	43	<MDL	36
2-Nitrophenol	<MDL	20	<MDL	49	<MDL	49	<MDL	41
3,3'-Dichlorobenzidine *	<MDL	18	<MDL	42	<MDL	43	<MDL	36
3-Nitroaniline **	<MDL	18	<MDL	42	<MDL	43	<MDL	36
4,6-Dinitro-O-Cresol	<MDL	18	<MDL	42	<MDL	43	<MDL	36
4-Bromophenyl Phenyl Ether	<MDL	12	<MDL	29	<MDL	30	<MDL	25
4-Chloro-3-Methylphenol	<MDL	18	<MDL	42	<MDL	43	<MDL	36
4-Chloroaniline *	<MDL	3.7	<MDL	8.8	<MDL	8.9	<MDL	7.4
4-Chlorophenyl Phenyl Ether	<MDL	18	<MDL	42	<MDL	43	<MDL	36
4-Methylphenol	<MDL	22	<MDL	52	<MDL	53	<MDL	44
4-Nitroaniline **	<MDL	18	<MDL	42	<MDL	43	<MDL	36
4-Nitrophenol	<MDL	18	<MDL	42	<MDL	43	<MDL	36
Acenaphthene	<MDL	9.5	<MDL	23	<MDL	23	<MDL	19
Acenaphthylene	<MDL	20	<MDL	49	<MDL	49	<MDL	41
Aniline	<MDL	180	<MDL	420	<MDL	420	<MDL	360
Anthracene **	**31.4**	5.4	<MDL	13	**21**	13	**12**	11
Benzo(a)anthracene	**85.7**	2.7	**28.8**	6.5	**49.0**	6.6	**20.0**	5.5
Benzo(a)pyrene	**140**	4.1	**40.2**	9.8	**75.0**	9.9	**29.4**	8.2
Benzo(b)fluoranthene	**108**	4.1	**44.8**	9.8	**84.2**	9.9	**25.6**	8.2
Benzo(g,h,i)perylene	**96.6**	11	**46**	26	**64.8**	26	**30**	22
Benzo(k)fluoranthene	**56.7**	4.1	**21.3**	9.8	**50.7**	9.9	**14**	8.2
Benzoic Acid	**120**	37	**130**	88	**130**	89	**120**	74
Benzyl Alcohol	<MDL	8.2	<MDL	20	<MDL	20	<MDL	16
Benzyl Butyl Phthalate	<MDL	8.2	<MDL	20	**20**	20	<MDL	16
Bis(2-Chloroethoxy)Methane	<MDL	23	<MDL	56	<MDL	56	<MDL	47
Bis(2-Chloroethyl)Ether	<MDL	20	<MDL	49	<MDL	49	<MDL	41
Bis(2-Chloroisopropyl)Ether	<MDL	20	<MDL	49	<MDL	49	<MDL	41
Bis(2-Ethylhexyl)Phthalate #	**20.8**	9.1	**56.2**	22	**59.5**	22	**36**	18
Caffeine	<MDL	8.2	<MDL	20	<MDL	20	<MDL	16
Carbazole	<MDL	9.5	<MDL	23	<MDL	23	<MDL	19
Chrysene	**81.8**	5.4	**31.5**	13	**59.9**	13	**21**	11
Coprostanol	<MDL	19	<MDL	46	<MDL	46	<MDL	38
Dibenzo(a,h)anthracene +	**26.1**	9.5	**32**	23	**39**	23	**24**	19

Table B-4. Offshore Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	KSPS01 10/1/2002 73.6% Solids		LSCI01 10/1/2002 30.6% Solids		LSCW02 10/1/2002 30.4% Solids		LSML01 10/1/2002 36.4% Solids	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Dibenzofuran	<MDL	19	<MDL	46	<MDL	46	<MDL	38
Diethyl Phthalate	<MDL	8.2	<MDL	20	<MDL	20	<MDL	16
Dimethyl Phthalate	<MDL	15	<MDL	36	<MDL	36	<MDL	30
Di-N-Butyl Phthalate #	**14.4**	6.8	**27**	16	**26**	16	**21**	14
Di-N-Octyl Phthalate	<MDL	11	<MDL	26	<MDL	26	<MDL	22
Fluoranthene	**162**	11	**53.3**	26	**87.5**	26	**33**	22
Fluorene	<MDL	18	<MDL	42	<MDL	43	<MDL	36
Hexachlorobenzene	<MDL	0.90	<MDL	2.2	<MDL	2.2	<MDL	1.8
Hexachlorobutadiene	<MDL	1.0	<MDL	2.5	<MDL	2.5	<MDL	2.1
Hexachlorocyclopentadiene	<MDL	37	<MDL	88	<MDL	89	<MDL	74
Hexachloroethane **	<MDL	20	<MDL	49	<MDL	49	<MDL	41
Indeno(1,2,3-Cd)Pyrene	**84.5**	12	**64.4**	29	**77.6**	30	**47**	25
Isophorone	<MDL	26	<MDL	62	<MDL	63	<MDL	52
Naphthalene **	<MDL	19	<MDL	46	<MDL	46	<MDL	38
Nitrobenzene	<MDL	22	<MDL	52	<MDL	53	<MDL	44
N-Nitrosodimethylamine	<MDL	180	<MDL	420	<MDL	420	<MDL	360
N-Nitrosodi-N-Propylamine	<MDL	12	<MDL	29	<MDL	30	<MDL	25
N-Nitrosodiphenylamine	<MDL	27	<MDL	65	<MDL	66	<MDL	55
Pentachlorophenol	<MDL	6.8	<MDL	16	<MDL	16	<MDL	14
Phenanthrene	**76.8**	5.4	**28.9**	13	**44.1**	13	**16**	11
Phenol	**852**	12	**56**	29	<MDL	30	**44**	25
Pyrene	**226**	5.4	**61.1**	13	**105**	13	**41.2**	11

Note: All semi-volatile organics extracts were analyzed 10 days beyond the method holding time.
Note: LTBC41 is an outfall monitoring station, all others are ambient monitoring stations.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates very low biased data that is based upon either surrogate or matrix spike recovery results less than 10%.
** Indicates low biased data based upon either surrogate or matrix spike recovery results.
\# Indicates method blank contamination
\+ Indicates high baised data based upon either surrogate or matrix spike recovery results.

Table B-4. Offshore Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	LTBC41		LTCA02		LTDF01		LTED04	
	10/1/2002		10/1/2002		10/1/2002		10/1/2002	
	65.8% Solids		32.5% Solids		56.9% Solids		36.8% Solids	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene	<MDL	0.40	<MDL	0.80	<MDL	0.46	<MDL	0.71
1,2-Dichlorobenzene	<MDL	0.40	<MDL	0.80	<MDL	0.46	<MDL	0.71
1,2-Diphenylhydrazine	<MDL	15	<MDL	31	<MDL	18	<MDL	27
1,3-Dichlorobenzene	<MDL	0.40	<MDL	0.80	<MDL	0.46	<MDL	0.71
1,4-Dichlorobenzene	<MDL	0.20	<MDL	0.40	<MDL	0.23	<MDL	0.35
2,4,5-Trichlorophenol	<MDL	18	<MDL	37	<MDL	21	<MDL	33
2,4,6-Trichlorophenol	<MDL	20	<MDL	40	<MDL	23	<MDL	35
2,4-Dichlorophenol	<MDL	24	<MDL	49	<MDL	28	<MDL	43
2,4-Dimethylphenol	<MDL	11	<MDL	22	<MDL	12	<MDL	19
2,4-Dinitrophenol	<MDL	20	<MDL	40	<MDL	23	<MDL	35
2,4-Dinitrotoluene	<MDL	4.6	<MDL	9.2	<MDL	5.3	<MDL	8.2
2,6-Dinitrotoluene	<MDL	15	<MDL	31	<MDL	18	<MDL	27
2-Chloronaphthalene	<MDL	24	<MDL	49	<MDL	28	<MDL	43
2-Chlorophenol	<MDL	12	<MDL	25	<MDL	14	<MDL	22
2-Methylnaphthalene	<MDL	21	<MDL	43	<MDL	25	<MDL	38
2-Methylphenol	<MDL	29	<MDL	58	<MDL	33	<MDL	52
2-Nitroaniline	<MDL	20	<MDL	40	<MDL	23	<MDL	35
2-Nitrophenol	<MDL	23	<MDL	46	<MDL	26	<MDL	41
3,3'-Dichlorobenzidine *	<MDL	20	<MDL	40	<MDL	23	<MDL	35
3-Nitroaniline **	<MDL	20	<MDL	40	<MDL	23	<MDL	35
4,6-Dinitro-O-Cresol	<MDL	20	<MDL	40	<MDL	23	<MDL	35
4-Bromophenyl Phenyl Ether	<MDL	14	<MDL	28	<MDL	16	<MDL	24
4-Chloro-3-Methylphenol	<MDL	20	<MDL	40	<MDL	23	<MDL	35
4-Chloroaniline *	<MDL	4.1	<MDL	8.3	<MDL	4.7	<MDL	7.3
4-Chlorophenyl Phenyl Ether	<MDL	20	<MDL	40	<MDL	23	<MDL	35
4-Methylphenol	<MDL	24	<MDL	49	<MDL	28	<MDL	43
4-Nitroaniline **	<MDL	20	<MDL	40	<MDL	23	<MDL	35
4-Nitrophenol	<MDL	20	<MDL	40	<MDL	23	<MDL	35
Acenaphthene	<MDL	11	<MDL	22	**67.8**	12	<MDL	19
Acenaphthylene	<MDL	23	<MDL	46	**74.0**	26	<MDL	41
Aniline	<MDL	200	<MDL	400	<MDL	230	<MDL	350
Anthracene **	**38.3**	6.1	**23**	12	**306**	7.0	**28.5**	11
Benzo(a)anthracene	**76.4**	3.0	**50.2**	6.2	**729**	3.5	**69.0**	5.4
Benzo(a)pyrene	**112**	4.6	**76.3**	9.2	**958**	5.3	**113**	8.2
Benzo(b)fluoranthene	**122**	4.6	**86.5**	9.2	**1,120**	5.3	**135**	8.2
Benzo(g,h,i)perylene	**69.8**	12	**65.5**	25	**466**	14	**79.6**	22
Benzo(k)fluoranthene	**66.3**	4.6	**51.1**	9.2	**569**	5.3	**73.6**	8.2
Benzoic Acid	**88**	41	**130**	83	**88**	47	**100**	73
Benzyl Alcohol	<MDL	9.1	<MDL	18	<MDL	11	<MDL	16
Benzyl Butyl Phthalate	**18.4**	9.1	**24**	18	**14**	11	<MDL	16
Bis(2-Chloroethoxy)Methane	<MDL	26	<MDL	52	<MDL	30	<MDL	46
Bis(2-Chloroethyl)Ether	<MDL	23	<MDL	46	<MDL	26	<MDL	41
Bis(2-Chloroisopropyl)Ether	<MDL	23	<MDL	46	<MDL	26	<MDL	41
Bis(2-Ethylhexyl)Phthalate #	**72.6**	10	**63.4**	21	**81.7**	12	**80.4**	18
Caffeine	<MDL	9.1	<MDL	18	<MDL	11	<MDL	16
Carbazole	<MDL	11	<MDL	22	**77.9**	12	<MDL	19
Chrysene	**101**	6.1	**64.3**	12	**754**	7.0	**89.4**	11
Coprostanol	<MDL	21	<MDL	43	<MDL	25	<MDL	38
Dibenzo(a,h)anthracene +	**30.7**	11	**37**	22	**163**	12	**41.3**	19

Table B-4. Offshore Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	LTBC41		LTCA02		LTDF01		LTED04	
	10/1/2002		10/1/2002		10/1/2002		10/1/2002	
	65.8% Solids		32.5% Solids		56.9% Solids		36.8% Solids	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Dibenzofuran	<MDL	21	<MDL	43	**32**	25	<MDL	38
Diethyl Phthalate	<MDL	9.1	<MDL	18	<MDL	11	<MDL	16
Dimethyl Phthalate	<MDL	17	<MDL	34	<MDL	19	<MDL	30
Di-N-Butyl Phthalate #	**16.4**	7.6	**30**	15	**23.4**	8.8	**24**	14
Di-N-Octyl Phthalate	<MDL	12	<MDL	25	<MDL	14	<MDL	22
Fluoranthene	**126**	12	**89.8**	25	**1,180**	14	**122**	22
Fluorene	<MDL	20	<MDL	40	**69.2**	23	<MDL	35
Hexachlorobenzene	<MDL	1.0	<MDL	2.0	<MDL	1.2	<MDL	1.8
Hexachlorobutadiene	<MDL	1.1	<MDL	2.3	<MDL	1.3	<MDL	2.0
Hexachlorocyclopentadiene	<MDL	41	<MDL	83	<MDL	47	<MDL	73
Hexachloroethane **	<MDL	23	<MDL	46	<MDL	26	<MDL	41
Indeno(1,2,3-Cd)Pyrene	**77.2**	14	**76.6**	28	**457**	16	**94.3**	24
Isophorone	<MDL	29	<MDL	58	<MDL	33	<MDL	52
Naphthalene **	<MDL	21	<MDL	43	**30**	25	<MDL	38
Nitrobenzene	<MDL	24	<MDL	49	<MDL	28	<MDL	43
N-Nitrosodimethylamine	<MDL	200	<MDL	400	<MDL	230	<MDL	350
N-Nitrosodi-N-Propylamine	<MDL	14	<MDL	28	<MDL	16	<MDL	24
N-Nitrosodiphenylamine	<MDL	30	<MDL	62	<MDL	35	<MDL	54
Pentachlorophenol	<MDL	7.6	<MDL	15	<MDL	8.8	<MDL	14
Phenanthrene	**67.3**	6.1	**42.8**	12	**545**	7.0	**54.3**	11
Phenol	**36.9**	14	**28**	28	**209**	16	**26**	24
Pyrene	**123**	6.1	**106**	12	**1,080**	7.0	**138**	11

Note: All semi-volatile organics data was either extracted 10 days beyond the method holding time.
Note: LTBC41 is an outfall monitoring station, all others are ambient monitoring stations.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates very low biased data that is based upon either surrogate or matrix spike recovery results less than 10%.
** Indicates low biased data based upon either surrogate or matrix spike recovery results.
\# Indicates method blank contamination
\+ Indicates high baised data based upob either surrogate or matrix spike recovery results.

Table B-5
2002 Beach Sediment Results
Conventionals

	ITOCEANAVE			JSVW04			KSYV02			MTLD03		
	8/8/2002			8/8/2002			8/8/2002			8/8/2002		
	85.8% Solids			84.2% Solids			84.3% Solids			94.1% Solids		
		Concentration			Concentration			Concentration			Concentration	
Ambient Stations	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Total Organic Carbon (%)	--	0.07	--	--	<MDL	--	--	0.13	--	--	0.13	--
Total Organic Carbon (mg/Kg)	--	660	580	--	<MDL	590	--	1,320	590	--	1,280	530
Clay (%)	<MDL	--	0.1	<MDL	--	0.1	0.1	--	0.1	0.9	--	0.1
Silt (%)	0.3	--	0.1	1.8	--	0.1	3.2	--	0.1	0.6	--	0.1
Sand (%)	54.5	--	0.1	68.7	--	0.1	62.7	--	0.1	51.6	--	0.1
Gravel (%)	44.4	--	0.1	29.5	--	0.1	34.0	--	0.1	46.5	--	0.1

	KSHZ03			KSSN04			LSKR01			MSJL01		
	8/8/2002			8/8/2002			8/8/2002			8/8/2002		
	81.5% Solids			89.0% Solids			84.8% Solids			74.7% Solids		
		Concentration			Concentration			Concentration			Concentration	
Outfall Stations	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Total Organic Carbon (%)	--	0.11	--	--	<MDL	--	--	0.22	--	--	0.30	--
Total Organic Carbon (mg/Kg)	--	1,100	610	--	<MDL	560	--	2,240	590	--	2,970	670
Clay (%)	0.1	--	0.1	<MDL	--	0.1	<MDL	--	0.1	0.1	--	0.1
Silt (%)	1.6	--	0.1	2.0	--	0.1	1.5	--	0.1	1.8	--	0.1
Sand (%)	82.5	--	0.1	97.4	--	0.1	69.3	--	0.1	68.9	--	0.1
Gravel (%)	15.2	--	0.1	0.6	--	0.1	28.8	--	0.1	29.0	--	0.1

mg/Kg - Milligrams per kilogram (parts per million).

MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet or dry weight (depending on analyte).

Table B-6
2002 Beach Sediment Results
Metals

	ITOCEANAVE		JSVW04		KSYV02		MTLD03	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	85.8% Solids		84.2% Solids		84.3% Solids		94.1% Solids	
	Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Aluminum *	2,980	5.7	5,020	5.7	5,100	6.2	3,960	5.1
Arsenic	<MDL	2.9	<MDL	2.9	<MDL	3.1	<MDL	2.6
Beryllium	<MDL	0.057	0.091	0.057	0.089	0.062	0.083	0.051
Cadmium	<MDL	0.17	<MDL	0.17	<MDL	0.19	<MDL	0.15
Chromium	5.37	0.29	12.8	0.29	10.7	0.31	10.5	0.26
Copper	3.02	0.23	8.71	0.23	8.34	0.25	3.99	0.20
Iron	5,130	2.9	8,410	2.9	8,300	3.1	6,610	2.6
Lead	<MDL	1.7	7.2	1.7	3.7	1.9	2.8	1.5
Manganese	82.3	0.11	132	0.11	134	0.12	113	0.10
Mercury	<MDL	0.023	<MDL	0.023	<MDL	0.024	<MDL	0.021
Nickel	6.45	1.1	20.1	1.1	14.7	1.2	10.4	1.0
Selenium	<MDL	2.9	<MDL	2.9	<MDL	3.1	<MDL	2.6
Silver	<MDL	0.23	<MDL	0.23	<MDL	0.25	<MDL	0.20
Zinc	14.8	0.29	22.8	0.29	29.8	0.31	16.8	0.26

	KSHZ03		KSSN04		LSKR01		MSJL01	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	81.5% Solids		89.0% Solids		84.8% Solids		74.7% Solids	
	Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)	
Outfall Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Aluminum *	5,420	5.9	5,230	5.4	4,740	5.9	6,310	6.7
Arsenic	<MDL	2.9	<MDL	2.7	<MDL	2.9	<MDL	3.3
Beryllium	0.10	0.059	0.097	0.054	0.094	0.059	0.129	0.067
Cadmium	<MDL	0.17	<MDL	0.17	<MDL	0.18	<MDL	0.20
Chromium	18.8	0.29	11.9	0.27	9.59	0.29	20.5	0.33
Copper	5.64	0.23	5.91	0.21	7.26	0.24	8.10	0.27
Iron	8,810	2.9	8,700	2.7	7,550	2.9	10,700	3.3
Lead	4.8	1.7	1.7	1.7	3.5	1.8	3.1	2.0
Manganese	120	0.12	140	0.11	118	0.12	153	0.13
Mercury	<MDL	0.023	<MDL	0.022	<MDL	0.022	<MDL	0.027
Nickel	22.3	1.2	18.1	1.1	12.7	1.2	27.3	1.3
Selenium	<MDL	2.9	<MDL	2.7	<MDL	2.9	<MDL	3.3
Silver	<MDL	0.23	<MDL	0.21	<MDL	0.24	<MDL	0.27
Zinc	24.5	0.29	20.4	0.27	19.9	0.29	25.4	0.33

mg/Kg DW - Milligrams per kilogram (parts per million) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates high biased data based upon matrix spike recovery.

Table B-7
2002 Beach Sediment Results
Chlorinated Pesticides and PCBs

	ITOCEANAVE		JSVW04		KSYV02		MTLD03	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	85.8% Solids		84.2% Solids		84.3% Solids		94.1% Solids	
	Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
4,4'-DDE	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
4,4'-DDT	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Aldrin	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Alpha-BHC	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Beta-BHC	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Chlordane	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Delta-BHC	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Dieldrin	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Endosulfan I	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Endosulfan II	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Endosulfan Sulfate	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Endrin	<MDL	1.2	<MDL	1.2	<MDL	1.2	<MDL	1.1
Endrin Aldehyde *	<MDL	2.3	<MDL	2.4	<MDL	2.4	<MDL	2.1
Gamma-BHC (Lindane)	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Heptachlor	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Heptachlor Epoxide	<MDL	0.58	<MDL	0.59	<MDL	0.59	<MDL	0.53
Methoxychlor	<MDL	5.8	<MDL	5.9	<MDL	5.9	<MDL	5.3
Toxaphene	<MDL	12	<MDL	12	<MDL	12	<MDL	11
Aroclor 1016	<MDL	1.5	<MDL	1.5	<MDL	1.5	<MDL	1.4
Aroclor 1221	<MDL	2.9	<MDL	3.0	<MDL	3.0	<MDL	2.7
Aroclor 1232	<MDL	2.9	<MDL	3.0	<MDL	3.0	<MDL	2.7
Aroclor 1242	<MDL	1.5	<MDL	1.5	<MDL	1.5	<MDL	1.4
Aroclor 1248	<MDL	1.5	<MDL	1.5	<MDL	1.5	<MDL	1.4
Aroclor 1254	<MDL	1.5	<MDL	1.5	<MDL	1.5	<MDL	1.4
Aroclor 1260	<MDL	1.5	<MDL	1.5	<MDL	1.5	15.2	1.4

µg/Kg DW - Micrograms per kilogram (parts per billion) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates low biased data based upon surrogate or matrix spike recovery results.

Table B-7
2002 Beach Sediment Results
Chlorinated Pesticides and PCBs

	KSHZ03		KSSN04		LSKR01		MSJL01	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	81.5% Solids		89.0% Solids		84.8% Solids		74.7% Solids	
	Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)	
Outfall Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
4,4'-DDE	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
4,4'-DDT	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Aldrin	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Alpha-BHC	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Beta-BHC	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Chlordane	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Delta-BHC	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Dieldrin	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Endosulfan I	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Endosulfan II	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Endosulfan Sulfate	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Endrin	<MDL	1.2	<MDL	1.1	<MDL	1.2	<MDL	1.3
Endrin Aldehyde *	<MDL	2.5	<MDL	2.2	<MDL	2.4	<MDL	2.7
Gamma-BHC (Lindane)	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Heptachlor	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Heptachlor Epoxide	<MDL	0.61	<MDL	0.56	<MDL	0.59	<MDL	0.67
Methoxychlor	<MDL	6.1	<MDL	5.6	<MDL	5.9	<MDL	6.7
Toxaphene	<MDL	12	<MDL	11	<MDL	12	<MDL	13
Aroclor 1016	<MDL	1.6	<MDL	1.5	<MDL	1.5	<MDL	1.7
Aroclor 1221	<MDL	3.1	<MDL	2.8	<MDL	2.9	<MDL	3.3
Aroclor 1232	<MDL	3.1	<MDL	2.8	<MDL	2.9	<MDL	3.3
Aroclor 1242	<MDL	1.6	<MDL	1.5	<MDL	1.5	<MDL	1.7
Aroclor 1248	<MDL	1.6	<MDL	1.5	<MDL	1.5	<MDL	1.7
Aroclor 1254	<MDL	1.6	<MDL	1.5	<MDL	1.5	<MDL	1.7
Aroclor 1260	<MDL	1.6	<MDL	1.5	<MDL	1.5	<MDL	1.7

µg/Kg DW - Micrograms per kilogram (parts per billion) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates low biased data based upon surrogate or matrix spike recovery results.

Table B-8. 2002 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	ITOCEANAVE 8/8/2002 85.8% Solids		JSVW04 8/8/2002 84.2% Solids		KSYV02 8/8/2002 84.3% Solids		MTLD03 8/8/2002 94.1% Solids	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene	<MDL	0.30	<MDL	0.31	<MDL	0.31	<MDL	0.28
1,2-Dichlorobenzene	<MDL	0.30	<MDL	0.31	<MDL	0.31	<MDL	0.28
1,2-Diphenylhydrazine	<MDL	12	<MDL	12	<MDL	12	<MDL	11
1,3-Dichlorobenzene	<MDL	0.30	<MDL	0.31	<MDL	0.31	<MDL	0.28
1,4-Dichlorobenzene	<MDL	0.15	<MDL	0.15	<MDL	0.15	<MDL	0.14
2,4,5-Trichlorophenol	<MDL	14	<MDL	14	<MDL	14	<MDL	13
2,4,6-Trichlorophenol	<MDL	15	<MDL	15	<MDL	15	<MDL	14
2,4-Dichlorophenol	<MDL	19	<MDL	19	<MDL	19	<MDL	17
2,4-Dimethylphenol	<MDL	8.2	<MDL	8.3	<MDL	8.3	<MDL	7.4
2,4-Dinitrophenol	<MDL	15	<MDL	15	<MDL	15	<MDL	14
2,4-Dinitrotoluene	<MDL	3.5	<MDL	3.6	<MDL	3.6	<MDL	3.2
2,6-Dinitrotoluene	<MDL	12	<MDL	12	<MDL	12	<MDL	11
2-Chloronaphthalene	<MDL	19	<MDL	19	<MDL	19	<MDL	17
2-Chlorophenol	<MDL	9.3	<MDL	10	<MDL	9.5	<MDL	8.5
2-Methylnaphthalene	<MDL	16	<MDL	17	<MDL	17	<MDL	15
2-Methylphenol	<MDL	22	<MDL	23	<MDL	23	<MDL	20
2-Nitroaniline	<MDL	15	<MDL	15	<MDL	15	<MDL	14
2-Nitrophenol	<MDL	17	<MDL	18	<MDL	18	<MDL	16
3,3'-Dichlorobenzidine *	<MDL	15	<MDL	15	<MDL	15	<MDL	14
3-Nitroaniline *	<MDL	15	<MDL	15	<MDL	15	<MDL	14
4,6-Dinitro-O-Cresol	<MDL	15	<MDL	15	<MDL	15	<MDL	14
4-Bromophenyl Phenyl Ether	<MDL	10	<MDL	11	<MDL	11	<MDL	10
4-Chloro-3-Methylphenol	<MDL	15	<MDL	15	<MDL	15	<MDL	14
4-Chloroaniline *	<MDL	3.1	<MDL	3.2	<MDL	3.2	<MDL	2.9
4-Chlorophenyl Phenyl Ether	<MDL	15	<MDL	15	<MDL	15	<MDL	14
4-Methylphenol	<MDL	19	<MDL	19	<MDL	19	<MDL	17
4-Nitroaniline **	<MDL	15	<MDL	15	<MDL	15	<MDL	14
4-Nitrophenol	<MDL	15	<MDL	15	<MDL	15	<MDL	14
Acenaphthene	<MDL	8.2	<MDL	8.3	<MDL	8.3	<MDL	7.4
Acenaphthylene	<MDL	17	<MDL	18	<MDL	18	<MDL	16
Aniline	<MDL	150	<MDL	150	<MDL	150	<MDL	140
Anthracene	<MDL	4.7	<MDL	4.8	<MDL	4.7	<MDL	4.3
Benzo(a)anthracene	<MDL	2.3	<MDL	2.4	<MDL	2.4	<MDL	2.1
Benzo(a)pyrene	<MDL	3.5	<MDL	3.6	<MDL	3.6	<MDL	3.2
Benzo(b)fluoranthene	<MDL	3.5	<MDL	3.6	<MDL	3.6	<MDL	3.2
Benzo(g,h,i)perylene	<MDL	9.3	<MDL	10	<MDL	9.5	<MDL	8.5
Benzo(k)fluoranthene	<MDL	3.5	<MDL	3.6	<MDL	3.6	<MDL	3.2
Benzoic Acid	<MDL	31	**75**	32	**64**	32	**70**	29
Benzyl Alcohol	<MDL	7.0	<MDL	7.1	<MDL	7.1	<MDL	6.4
Benzyl Butyl Phthalate	<MDL	7.0	<MDL	7.1	<MDL	7.1	<MDL	6.4
Bis(2-Chloroethoxy)Methane	<MDL	20	<MDL	20	<MDL	20	<MDL	18
Bis(2-Chloroethyl)Ether	<MDL	17	<MDL	18	<MDL	18	<MDL	16
Bis(2-Chloroisopropyl)Ether	<MDL	17	<MDL	18	<MDL	18	<MDL	16
Bis(2-Ethylhexyl)Phthalate #	**14**	7.8	**13**	8.0	**14**	7.9	**15**	7.1
Caffeine	<MDL	7.0	<MDL	7.1	<MDL	7.1	<MDL	6.4
Carbazole	<MDL	8.2	<MDL	8.3	<MDL	8.3	<MDL	7.4
Chrysene	<MDL	4.7	<MDL	4.8	<MDL	4.7	<MDL	4.3
Coprostanol	<MDL	16	<MDL	17	<MDL	17	**74.6**	15
Dibenzo(a,h)anthracene	<MDL	8.2	<MDL	8.3	<MDL	8.3	<MDL	7.4
Dibenzofuran	<MDL	16	<MDL	17	<MDL	17	<MDL	15

Table B-8. 2002 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	ITOCEANAVE		JSVW04		KSYV02		MTLD03	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	85.8% Solids		84.2% Solids		84.3% Solids		94.1% Solids	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Diethyl Phthalate	<MDL	7.0	<MDL	7.1	<MDL	7.1	<MDL	6.4
Dimethyl Phthalate	<MDL	13	<MDL	13	<MDL	13	<MDL	12
Di-N-Butyl Phthalate #	**13.3**	5.8	**11**	5.9	**11**	5.9	**11.8**	5.3
Di-N-Octyl Phthalate	<MDL	9.3	<MDL	10	<MDL	9.5	<MDL	8.5
Fluoranthene	<MDL	9.3	<MDL	10	<MDL	9.5	<MDL	8.5
Fluorene	<MDL	15	<MDL	15	<MDL	15	<MDL	14
Hexachlorobenzene	<MDL	0.77	<MDL	0.78	<MDL	0.78	**2.51**	0.70
Hexachlorobutadiene	<MDL	0.87	<MDL	0.89	<MDL	0.89	<MDL	0.80
Hexachlorocyclopentadiene	<MDL	31	<MDL	32	<MDL	32	<MDL	29
Hexachloroethane **	<MDL	17	<MDL	18	<MDL	18	<MDL	16
Indeno(1,2,3-Cd)Pyrene	<MDL	10	<MDL	11	<MDL	11	<MDL	10
Isophorone	<MDL	22	<MDL	23	<MDL	23	<MDL	20
Naphthalene **	<MDL	16	<MDL	17	<MDL	17	<MDL	15
Nitrobenzene	<MDL	19	<MDL	19	<MDL	19	<MDL	17
N-Nitrosodimethylamine	<MDL	3.1	<MDL	3.2	<MDL	3.2	<MDL	2.9
N-Nitrosodi-N-Propylamine	<MDL	10	<MDL	11	<MDL	11	<MDL	10
N-Nitrosodiphenylamine	<MDL	23	<MDL	24	<MDL	24	<MDL	21
Pentachlorophenol	<MDL	5.8	<MDL	5.9	<MDL	5.9	<MDL	5.3
Phenanthrene	<MDL	4.7	<MDL	4.8	<MDL	4.7	<MDL	4.3
Phenol	<MDL	10	<MDL	11	<MDL	11	<MDL	10
Pyrene	<MDL	4.7	<MDL	4.8	<MDL	4.7	<MDL	4.3

MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates very low biased data that is based upon either surrogate or matrix spike recovery results less than 10%.
** Indicates low biased data based upon either surrogate or matrix spike recovery results.
\# Indicates method blank contamination

Table B-8. 2002 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	KSHZ03		KSSN04		LSKR01		MSJL01	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	81.5% Solids		89.0% Solids		84.8% Solids		74.7% Solids	
Outfall Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene	<MDL	0.32	<MDL	0.29	<MDL	0.31	<MDL	0.35
1,2-Dichlorobenzene	<MDL	0.32	<MDL	0.29	<MDL	0.31	<MDL	0.35
1,2-Diphenylhydrazine	<MDL	12	<MDL	11	<MDL	12	<MDL	13
1,3-Dichlorobenzene	<MDL	0.32	<MDL	0.29	<MDL	0.31	<MDL	0.35
1,4-Dichlorobenzene	<MDL	0.16	<MDL	0.15	<MDL	0.15	<MDL	0.17
2,4,5-Trichlorophenol	<MDL	15	<MDL	13	<MDL	14	<MDL	16
2,4,6-Trichlorophenol	<MDL	16	<MDL	15	<MDL	15	<MDL	17
2,4-Dichlorophenol	<MDL	20	<MDL	18	<MDL	19	<MDL	21
2,4-Dimethylphenol	<MDL	8.6	<MDL	7.9	<MDL	8.3	<MDL	9.4
2,4-Dinitrophenol	<MDL	16	<MDL	15	<MDL	15	<MDL	17
2,4-Dinitrotoluene	<MDL	3.7	<MDL	3.4	<MDL	3.5	<MDL	4.0
2,6-Dinitrotoluene	<MDL	12	<MDL	11	<MDL	12	<MDL	13
2-Chloronaphthalene	<MDL	20	<MDL	18	<MDL	19	<MDL	21
2-Chlorophenol	<MDL	10	<MDL	9.0	<MDL	9.4	<MDL	11
2-Methylnaphthalene	<MDL	17	<MDL	16	<MDL	17	<MDL	19
2-Methylphenol	<MDL	23	<MDL	21	<MDL	22	<MDL	25
2-Nitroaniline	<MDL	16	<MDL	15	<MDL	15	<MDL	17
2-Nitrophenol	<MDL	18	<MDL	17	<MDL	18	<MDL	20
3,3'-Dichlorobenzidine *	<MDL	16	<MDL	15	<MDL	15	<MDL	17
3-Nitroaniline *	<MDL	16	<MDL	15	<MDL	15	<MDL	17
4,6-Dinitro-O-Cresol	<MDL	16	<MDL	15	<MDL	15	<MDL	17
4-Bromophenyl Phenyl Ether	<MDL	11	<MDL	10	<MDL	11	<MDL	12
4-Chloro-3-Methylphenol	<MDL	16	<MDL	15	<MDL	15	<MDL	17
4-Chloroaniline *	<MDL	3.3	<MDL	3.0	<MDL	3.2	<MDL	3.6
4-Chlorophenyl Phenyl Ether	<MDL	16	<MDL	15	<MDL	15	<MDL	17
4-Methylphenol	<MDL	20	<MDL	18	<MDL	19	<MDL	21
4-Nitroaniline **	<MDL	16	<MDL	15	<MDL	15	<MDL	17
4-Nitrophenol	<MDL	16	<MDL	15	<MDL	15	<MDL	17
Acenaphthene	<MDL	8.6	<MDL	7.9	<MDL	8.3	<MDL	9.4
Acenaphthylene	<MDL	18	<MDL	17	<MDL	18	<MDL	20
Aniline	<MDL	160	<MDL	150	<MDL	150	<MDL	170
Anthracene	<MDL	4.9	<MDL	4.5	<MDL	4.7	<MDL	5.4
Benzo(a)anthracene	**12.8**	2.5	<MDL	2.2	<MDL	2.4	<MDL	2.7
Benzo(a)pyrene	**16.6**	3.7	**4.2**	3.4	<MDL	3.5	<MDL	4.0
Benzo(b)fluoranthene	**9.9**	3.7	<MDL	3.4	<MDL	3.5	<MDL	4.0
Benzo(g,h,i)perylene	**12**	10	<MDL	9.0	<MDL	9.4	<MDL	11
Benzo(k)fluoranthene	**9.72**	3.7	<MDL	3.4	<MDL	3.5	<MDL	4.0
Benzoic Acid	**75**	33	**57**	30	**65**	32	**95**	36
Benzyl Alcohol	<MDL	7.4	<MDL	6.7	<MDL	7.1	<MDL	8.0
Benzyl Butyl Phthalate	<MDL	7.4	<MDL	6.7	<MDL	7.1	<MDL	8.0
Bis(2-Chloroethoxy)Methane	<MDL	21	<MDL	19	<MDL	20	<MDL	23
Bis(2-Chloroethyl)Ether	<MDL	18	<MDL	17	<MDL	18	<MDL	20
Bis(2-Chloroisopropyl)Ether	<MDL	18	<MDL	17	<MDL	18	<MDL	20
Bis(2-Ethylhexyl)Phthalate #	**16**	8.2	**16**	7.5	**12**	7.9	**15**	9.0
Caffeine	<MDL	7.4	<MDL	6.7	<MDL	7.1	<MDL	8.0
Carbazole	<MDL	8.6	<MDL	7.9	<MDL	8.3	<MDL	9.4
Chrysene	**13.1**	4.9	<MDL	4.5	<MDL	4.7	<MDL	5.4
Coprostanol	<MDL	17	<MDL	16	<MDL	17	<MDL	19
Dibenzo(a,h)anthracene	<MDL	8.6	<MDL	7.9	<MDL	8.3	<MDL	9.4
Dibenzofuran	<MDL	17	<MDL	16	<MDL	17	<MDL	19

Table B-8. 2002 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	ITOCEANAVE		JSVW04		KSYV02		MTLD03	
	8/8/2002		8/8/2002		8/8/2002		8/8/2002	
	85.8% Solids		84.2% Solids		84.3% Solids		94.1% Solids	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Diethyl Phthalate	<MDL	7.4	<MDL	6.7	<MDL	7.1	<MDL	8.0
Dimethyl Phthalate	<MDL	13	<MDL	12	<MDL	13	<MDL	15
Di-N-Butyl Phthalate #	**14.7**	6.1	**11.3**	5.6	**11.9**	5.9	**19.3**	6.7
Di-N-Octyl Phthalate	<MDL	10	<MDL	9.0	<MDL	9.4	<MDL	11
Fluoranthene	**39.3**	10	<MDL	9.0	<MDL	9.4	<MDL	11
Fluorene	<MDL	16	<MDL	15	<MDL	15	<MDL	17
Hexachlorobenzene	<MDL	0.81	<MDL	0.74	<MDL	0.78	<MDL	0.88
Hexachlorobutadiene	<MDL	0.92	<MDL	0.84	<MDL	0.88	<MDL	1.0
Hexachlorocyclopentadiene	<MDL	33	<MDL	30	<MDL	32	<MDL	36
Hexachloroethane **	<MDL	18	<MDL	17	<MDL	18	<MDL	20
Indeno(1,2,3-Cd)Pyrene	<MDL	11	<MDL	10	<MDL	11	<MDL	12
Isophorone	<MDL	23	<MDL	21	<MDL	22	<MDL	25
Naphthalene **	<MDL	17	<MDL	16	<MDL	17	<MDL	19
Nitrobenzene	<MDL	20	<MDL	18	<MDL	19	<MDL	21
N-Nitrosodimethylamine	<MDL	160	<MDL	3.0	<MDL	3.2	<MDL	3.6
N-Nitrosodi-N-Propylamine	<MDL	11	<MDL	10	<MDL	11	<MDL	12
N-Nitrosodiphenylamine	<MDL	25	<MDL	22	<MDL	24	<MDL	27
Pentachlorophenol	<MDL	6.1	<MDL	5.6	<MDL	5.9	<MDL	6.7
Phenanthrene	**21.7**	4.9	<MDL	4.5	<MDL	4.7	<MDL	5.4
Phenol	<MDL	11	<MDL	10	<MDL	11	<MDL	12
Pyrene	**40.6**	4.9	**9.04**	4.5	<MDL	4.7	<MDL	5.4

MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates very low biased data that is based upon either surrogate or matrix spike recovery results less than 10%.
** Indicates low biased data based upon either surrogate or matrix spike recovery results.
\# Indicates method blank contamination

Table B-9. 2002 Offshore Sediment Monitoring
Organotins (µg/Kg dry weight)

	Sample	Mono-n-butyltin		Di-n-butyltin *		Tri-n-butyltin *		Tetra-n-butyltin	
Locator	**Date**	**Value**	**MDL**	**Value**	**MDL**	**Value**	**MDL**	**Value**	**MDL**
LTCA02	1-Oct-02	6.0	2.4	8.7	1.1	4.3	0.3	< MDL	0.12
LSCW02	1-Oct-02	7.9	2.4	7.5	1.2	3.8	0.3	< MDL	0.12
LTDF01	1-Oct-02	13.7	2.4	19.2	0.6	32.0	0.3	0.67	0.12
LTED04	1-Oct-02	6.7	2.4	14.3	1.0	11.1	0.3	< MDL	0.12
LSCI01	1-Oct-02	4.0	2.4	< MDL	1.1	0.6	0.3	< MDL	0.12
LSML01	1-Oct-02	5.1	2.4	3.6	1.0	0.6	0.3	< MDL	0.12
KSPS01	1-Oct-02	2.9	2.4	< MDL	0.5	0.6	0.3	< MDL	0.12
LTBC41	1-Oct-02	17.0	2.4	22.2	0.5	56.6	0.3	0.56	0.12

< MDL indicates sample result below the method detection limit
* Indicates low biased data based upon surrogate or matrix spike recovery results.

wet

Locator	Collectdate		Qual	Di-n-Butylti	MDL	RDL	Qual	Mono-n-Bu	MDL
LTCA02	10/1/2002	0.33	G	2.84	0.35	0.7		4.23	1.7
LSCW02	10/1/2002	0.3	G	2.29	0.35	0.7		5.52	1.7
LTDF01	10/1/2002	0.57	G	10.9	0.35	0.7		9.57	1.7
LTED04	10/1/2002	0.37	G	5.25	0.35	0.7		4.68	1.7
LSCI01	10/1/2002	0.31	<MDL,G		0.35	0.7	<RDL	2.8	1.7
LSML01	10/1/2002	0.36	G	1.31	0.35	0.7		3.55	1.7
KSPS01	10/1/2002	0.74	<MDL,G		0.35	0.7	<RDL	2	1.7
LTBC41	10/1/2002	0.66	G	14.6	0.35	0.7		11.9	1.7

dry

				8.738462	1.076923			6.042857	2.428571
				7.532895	1.151316			7.885714	2.428571
				19.15641	0.615114			13.67143	2.428571
				14.2663	0.951087			6.685714	2.428571
				0	1.143791			4	2.428571
				3.598901	0.961538			5.071429	2.428571
				0	0.475543			2.857143	2.428571
				22.18845	0.531915			17	2.428571

RDL	Qual	Tetra-n-Bu	MDL	RDL	Qual	Tri-n-Butylt	MDL	RDL
3.37	<MDL		0.4	0.801	G	3.45	0.21	0.415
3.37	<MDL		0.4	0.801	G	3.06	0.21	0.415
3.37		2.26	0.4	0.801	G	25.6	0.21	0.415
3.37	<MDL		0.4	0.801	G	8.88	0.21	0.415
3.37	<MDL		0.4	0.801	G	0.497	0.21	0.415
3.37	<MDL		0.4	0.801	G	0.465	0.21	0.415
3.37	<MDL		0.4	0.801	G	0.447	0.21	0.415
3.37		1.9	0.4	0.801	G	45.3	0.21	0.415

0	0.118694	4.307116	0.262172
0	0.118694	3.820225	0.262172
0.670623	0.118694	31.96005	0.262172
0	0.118694	11.08614	0.262172
0	0.118694	0.620474	0.262172
0	0.118694	0.580524	0.262172
0	0.118694	0.558052	0.262172
0.563798	0.118694	56.55431	0.262172

Table B-10
2003 Beach Sediment Results
Conventionals

Ambient Stations	JSVW04 8/12/2003 93.3% Solids			KSLU03 8/13/2003 97.8% Solids			MTLD03 8/13/2003 87.6% Solids		
		Concentration			Concentration			Concentration	
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Total Organic Carbon (%)	--	<MDL	--	--	<MDL	--	--	0.10	--
Total Organic Carbon (mg/Kg)	--	<MDL	500	--	<MDL	500	--	980	500
Clay (%)	<MDL	--	0.1	0.5	--	0.1	1.2	--	0.1
Silt (%)	1.4	--	0.1	0.6	--	0.1	1.6	--	0.1
Sand (%)	79.6	--	0.1	54.0	--	0.1	51.4	--	0.1
Gravel (%)	19.2	--	0.1	45.1	--	0.1	45.8	--	0.1

Outfall Stations	KSHZ03 8/12/2003 84.6% Solids			KSSN05 8/13/2003 90.3% Solids			LSKR01 8/13/2003 89.0% Solids			MSJL01 8/11/2003 78.4% Solids		
		Concentration			Concentration			Concentration			Concentration	
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Total Organic Carbon (%)	--	<MDL	--	--	0.05	--	--	<MDL	--	--	0.36	--
Total Organic Carbon (mg/Kg)	--	<MDL	500	--	510	500	--	<MDL	500	--	3,580	500
Clay (%)	0.7	--	0.1	1.4	--	0.1	1.1	--	0.1	2.7	--	0.1
Silt (%)	0.7	--	0.1	0.3	--	0.1	1.1	--	0.1	1.9	--	0.1
Sand (%)	77.8	--	0.1	93.3	--	0.1	57.6	--	0.1	77.4	--	0.1
Gravel (%)	20.9	--	0.1	5.1	--	0.1	40.3	--	0.1	18.0	--	0.1

mg/Kg - Milligrams per kilogram (parts per million).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet or dry weight (depending on analyte).

Table B-11
2003 Beach Sediment Results
Metals

Ambient Stations	JSVW04		KSLU03		MTLD03	
	8/12/2003		8/13/2003		8/13/2003	
	93.3% Solids		97.8% Solids		87.6% Solids	
	Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)	
	Value	MDL	Value	MDL	Value	MDL
Aluminum *	5,790	4.9	4,810	5.0	4,900	5.0
Arsenic	<MDL	2.5	<MDL	2.5	<MDL	2.5
Beryllium	0.10	0.049	0.065	0.05	0.095	0.05
Cadmium	<MDL	0.15	<MDL	0.15	<MDL	0.15
Chromium	16.2	0.25	8.11	0.25	10.1	0.25
Copper	8.34	0.20	5.06	0.20	8.72	0.20
Iron	7,960	2.5	6,420	2.5	7,610	2.5
Lead	8.40	1.5	3.00	1.5	3.40	1.5
Manganese	148	0.099	108	0.10	97.7	0.10
Mercury	<MDL	0.019	<MDL	0.02	<MDL	0.019
Nickel	20.9	0.99	9.77	1.0	9.87	1.0
Selenium	<MDL	2.5	<MDL	2.5	<MDL	2.5
Silver *	0.30	0.20	0.27	0.20	0.32	0.20
Zinc	28.8	0.25	17.3	0.25	18.1	0.25

Outfall Stations	KSHZ03		KSSN05		LSKR01		MSJL01	
	8/12/2003		8/13/2003		8/13/2003		8/11/2003	
	84.6% Solids		90.3% Solids		89.0% Solids		78.4% Solids	
	Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)		Concentration (mg/Kg DW)	
	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Aluminum *	5,880	5.0	5,650	5.2	3,140	4.8	5,830	4.8
Arsenic	<MDL	2.5	<MDL	2.6	<MDL	2.4	<MDL	2.4
Beryllium	0.10	0.050	0.10	0.052	0.068	0.048	0.092	0.048
Cadmium	<MDL	0.15	<MDL	0.16	<MDL	0.15	<MDL	0.15
Chromium	15.1	0.25	12.0	0.26	12.6	0.24	14.7	0.24
Copper	5.30	0.20	6.27	0.21	5.04	0.19	5.27	0.19
Iron	6,790	2.5	7,590	2.5	5,860	2.5	7,050	2.4
Lead	4.20	1.5	2.50	1.6	2.90	1.5	3.30	1.5
Manganese	140	0.10	172	0.10	95.0	0.097	120	0.097
Mercury	<MDL	0.02	<MDL	0.020	<MDL	0.021	<MDL	0.019
Nickel	18.2	1.0	21.1	1.0	9.41	0.97	19.0	0.97
Selenium	<MDL	2.5	<MDL	2.6	<MDL	2.4	<MDL	2.4
Silver *	0.26	0.20	0.32	0.21	0.23	0.19	0.35	0.19
Zinc	23.7	0.25	20.5	0.26	15.6	0.24	22.6	0.24

mg/Kg DW - Milligrams per kilogram (parts per million) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates data is biased high upon matrix spike or SRM recovery results.

Table B-12
2003 Beach Sediment Results
Chlorinated Pesticides and PCBs

	JSVW04		KSLU03		MTLD03	
	8/12/2003		8/13/2003		8/13/2003	
	93.3% Solids		97.8% Solids		87.6% Solids	
	Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1	<MDL	1	<MDL	1
4,4'-DDE	<MDL	1	<MDL	1	<MDL	1
4,4'-DDT	<MDL	1	<MDL	1	<MDL	1
Aldrin	<MDL	1	<MDL	1	<MDL	1
Alpha-BHC	<MDL	0.5	<MDL	0.5	<MDL	0.5
Alpha-Chlordane	<MDL	0.5	<MDL	0.5	<MDL	0.5
Beta-BHC	<MDL	0.5	<MDL	0.5	<MDL	0.5
Delta-BHC	<MDL	0.5	<MDL	0.5	<MDL	0.5
Dieldrin	<MDL	1	<MDL	1	<MDL	1
Endosulfan I	<MDL	1	<MDL	1	<MDL	1
Endosulfan II	<MDL	1	<MDL	1	<MDL	1
Endosulfan Sulfate	<MDL	1	<MDL	1	<MDL	1
Endrin	<MDL	1	<MDL	1	<MDL	1
Endrin Aldehyde *	<MDL	2	<MDL	2	<MDL	2
Gamma-BHC (Lindane)	<MDL	0.5	<MDL	0.5	<MDL	0.5
Gamma-Chlordane	<MDL	0.5	<MDL	0.5	<MDL	0.5
Heptachlor	<MDL	0.5	<MDL	0.5	<MDL	0.5
Heptachlor Epoxide	<MDL	0.5	<MDL	0.5	<MDL	0.5
Methoxychlor	<MDL	5	<MDL	5	<MDL	5
Toxaphene	<MDL	10	<MDL	10	<MDL	10
Aroclor 1016	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1221	<MDL	2.5	<MDL	2.5	<MDL	2.5
Aroclor 1232	<MDL	2.5	<MDL	2.5	<MDL	2.5
Aroclor 1242	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1248	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1254	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1260	<MDL	1.3	<MDL	1.3	<MDL	1.3

µg/Kg DW - Micrograms per kilogram (parts per billion) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates low biased data based upon either surrogate or matrix spike recovery results.

Table B-12
2003 Beach Sediment Results
Chlorinated Pesticides and PCBs

	KSHZ03		KSSN05		LSKR01		MSJL01	
	8/12/2003		8/13/2003		8/13/2003		8/11/2003	
	84.6% Solids		90.3% Solids		89.0% Solids		78.4% Solids	
	Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)		Concentration (µg/Kg DW)	
Outfall Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
4,4'-DDD	<MDL	1	<MDL	1	<MDL	1	<MDL	1
4,4'-DDE	<MDL	1	<MDL	1	<MDL	1	<MDL	1
4,4'-DDT	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Aldrin	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Alpha-BHC	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Alpha-Chlordane	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Beta-BHC	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Delta-BHC	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Dieldrin	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Endosulfan I	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Endosulfan II	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Endosulfan Sulfate	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Endrin	<MDL	1	<MDL	1	<MDL	1	<MDL	1
Endrin Aldehyde *	<MDL	2	<MDL	2	<MDL	2	<MDL	2
Gamma-BHC (Lindane)	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Gamma-Chlordane	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Heptachlor	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Heptachlor Epoxide	<MDL	0.5	<MDL	0.5	<MDL	0.5	<MDL	0.5
Methoxychlor	<MDL	5	<MDL	5	<MDL	5	<MDL	5
Toxaphene	<MDL	10	<MDL	10	<MDL	10	<MDL	10
Aroclor 1016	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1221	<MDL	2.5	<MDL	2.5	<MDL	2.5	<MDL	2.5
Aroclor 1232	<MDL	2.5	<MDL	2.5	<MDL	2.5	<MDL	2.5
Aroclor 1242	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1248	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1254	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3
Aroclor 1260	<MDL	1.3	<MDL	1.3	<MDL	1.3	<MDL	1.3

µg/Kg DW - Micrograms per kilogram (parts per billion) on a dry weight basis, based on percent solids analysis.
MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates low biased data based upon either surrogate or matrix spike recovery results.

Table B-13. Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	JSVW04		KSLU03		MTLD03	
	8/12/2003		8/13/2003		8/13/2003	
	93.3% Solids		97.8% Solids		87.6% Solids	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene *	<MDL	0.26	<MDL	0.26	<MDL	0.26
1,2-Dichlorobenzene *	<MDL	0.26	<MDL	0.26	<MDL	0.26
1,2-Diphenylhydrazine	<MDL	10	<MDL	10	<MDL	10
1,3-Dichlorobenzene *	<MDL	0.26	<MDL	0.26	<MDL	0.26
1,4-Dichlorobenzene *	<MDL	0.13	<MDL	0.13	<MDL	0.13
2,4,5-Trichlorophenol *	<MDL	12	<MDL	12	<MDL	12
2,4,6-Trichlorophenol *	<MDL	13	<MDL	13	<MDL	13
2,4-Dichlorophenol *	<MDL	16	<MDL	16	<MDL	16
2,4-Dimethylphenol *	<MDL	7.0	<MDL	7.0	<MDL	7.0
2,4-Dinitrophenol *	<MDL	13	<MDL	13	<MDL	13
2,4-Dinitrotoluene	<MDL	3.0	<MDL	3.0	<MDL	3.0
2,6-Dinitrotoluene	<MDL	10	<MDL	10	<MDL	10
2-Chloronaphthalene *	<MDL	16	<MDL	16	<MDL	16
2-Chlorophenol *	<MDL	8.0	<MDL	8.0	<MDL	8.0
2-Methylnaphthalene *	<MDL	14	<MDL	14	<MDL	14
2-Methylphenol *	<MDL	19	<MDL	19	<MDL	19
2-Nitroaniline	<MDL	13	<MDL	13	<MDL	13
2-Nitrophenol *	<MDL	15	<MDL	15	<MDL	15
3,3'-Dichlorobenzidine *	<MDL	13	<MDL	13	<MDL	13
3-Nitroaniline *	<MDL	13	<MDL	13	<MDL	13
4,6-Dinitro-O-Cresol *	<MDL	13	<MDL	13	<MDL	13
4-Bromophenyl Phenyl Ether	<MDL	9.0	<MDL	9.0	<MDL	9.0
4-Chloro-3-Methylphenol *	<MDL	13	<MDL	13	<MDL	13
4-Chloroaniline *	<MDL	2.7	<MDL	2.7	<MDL	2.7
4-Chlorophenyl Phenyl Ether	<MDL	13	<MDL	13	<MDL	13
4-Methylphenol *	<MDL	16	<MDL	16	<MDL	16
4-Nitroaniline *	<MDL	13	<MDL	13	<MDL	13
4-Nitrophenol *	<MDL	13	<MDL	13	<MDL	13
Acenaphthene	<MDL	7.0	<MDL	7.0	<MDL	7.0
Acenaphthylene *	<MDL	15	<MDL	15	<MDL	15
Aniline *	<MDL	130	<MDL	130	<MDL	130
Anthracene *	<MDL	4.0	<MDL	4.0	<MDL	4.0
Benzo(a)anthracene **	<MDL	2.0	3.80	2.0	<MDL	2.0
Benzo(a)pyrene **	<MDL	3.0	<MDL	3.0	<MDL	3.0
Benzo(b)fluoranthene **	<MDL	3.0	8.11	3.0	<MDL	3.0
Benzo(g,h,i)perylene	<MDL	8.0	<MDL	8.0	<MDL	8.0
Benzo(k)fluoranthene **	<MDL	3.0	5.30	3.0	<MDL	3.0
Benzoic Acid *	<MDL	13	<MDL	13	<MDL	13
Benzyl Alcohol	<MDL	6.0	<MDL	6.0	<MDL	6.0
Benzyl Butyl Phthalate	<MDL	6.0	15.0	6.0	<MDL	6.0
Bis(2-Chloroethoxy)Methane *	<MDL	17	<MDL	17	<MDL	17
Bis(2-Chloroethyl)Ether *	<MDL	15	<MDL	15	<MDL	15
Bis(2-Chloroisopropyl)Ether *	<MDL	15	<MDL	15	<MDL	15
Bis(2-Ethylhexyl)Phthalate #	**22.8**	6.7	<MDL	6.7	**8.30**	6.7
Caffeine	<MDL	6.0	<MDL	6.0	<MDL	6.0
Carbazole	<MDL	7.0	<MDL	7.0	<MDL	7.0
Chrysene **	<MDL	4.0	5.60	4.0	<MDL	4.0
Coprostanol	<MDL	14	<MDL	14	<MDL	14
Dibenzo(a,h)anthracene +	<MDL	7.0	<MDL	7.0	<MDL	7.0
Dibenzofuran	<MDL	14	<MDL	14	<MDL	14

Table B-13. 2003 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	JSVW04		KSLU03		MTLD03	
	8/12/2003		8/13/2003		8/13/2003	
	93.3% Solids		97.8% Solids		87.6% Solids	
Ambient Stations	Value	MDL	Value	MDL	Value	MDL
Diethyl Phthalate	<MDL	6.0	<MDL	6.0	<MDL	6.0
Dimethyl Phthalate	<MDL	11	<MDL	11	<MDL	11
Di-N-Butyl Phthalate + *	**96.5**	5.0	**56.5**	5.0	**85.4**	5.0
Di-N-Octyl Phthalate	<MDL	8.0	<MDL	8.0	<MDL	8.0
Fluoranthene **	<MDL	8.0	<MDL	8.0	<MDL	8.0
Fluorene	<MDL	13	<MDL	13	<MDL	13
Hexachlorobenzene	<MDL	0.66	<MDL	0.66	**1.30**	0.66
Hexachlorobutadiene *	<MDL	0.75	<MDL	0.75	<MDL	0.75
Hexachlorocyclopentadiene *	<MDL	27	<MDL	27	<MDL	27
Hexachloroethane *	<MDL	15	<MDL	15	<MDL	15
Indeno(1,2,3-Cd)Pyrene	<MDL	9.0	<MDL	9.0	<MDL	9.0
Isophorone *	<MDL	19	<MDL	19	<MDL	19
Naphthalene *	<MDL	14	<MDL	14	<MDL	14
Nitrobenzene *	<MDL	16	<MDL	16	<MDL	16
N-Nitrosodimethylamine *	<MDL	27.0	<MDL	27.0	<MDL	27.0
N-Nitrosodi-N-Propylamine *	<MDL	9.0	<MDL	9.0	<MDL	9.0
N-Nitrosodiphenylamine	<MDL	20	<MDL	20	<MDL	20
Pentachlorophenol *	<MDL	5.0	<MDL	5.0	<MDL	5.0
Phenanthrene *,**	<MDL	4.0	<MDL	4.0	<MDL	4.0
Phenol *	<MDL	9.0	<MDL	9.0	<MDL	9.0
Pyrene **	<MDL	4.0	**4.50**	4.0	<MDL	4.0

MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates low biased data that is based upon either surrogate or matrix spike recovery results.
** Indicates value may be an estimate based upon unacceptable precision of laboratory replicate.
\# Indicates method blank contamination
\+ Indicates high baised data based upon either surrogate or matrix spike recovery results.

Table B-13. 2003 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	KSHZ03		KSSN05		LSKR01		MSJL01	
	8/12/2003		8/13/2003		8/13/2003		8/11/2003	
	84.6% Solids		90.3% Solids		89.0% Solids		78.4% Solids	
Outfall Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
1,2,4-Trichlorobenzene *	<MDL	0.26	<MDL	0.26	<MDL	0.26	<MDL	0.26
1,2-Dichlorobenzene *	<MDL	0.26	<MDL	0.26	<MDL	0.26	<MDL	0.26
1,2-Diphenylhydrazine	<MDL	10	<MDL	10	<MDL	10	<MDL	10
1,3-Dichlorobenzene *	<MDL	0.26	<MDL	0.26	<MDL	0.26	<MDL	0.26
1,4-Dichlorobenzene *	<MDL	0.13	<MDL	0.13	<MDL	0.13	<MDL	0.13
2,4,5-Trichlorophenol *	<MDL	12	<MDL	12	<MDL	12	<MDL	12
2,4,6-Trichlorophenol *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
2,4-Dichlorophenol *	<MDL	16	<MDL	16	<MDL	16	<MDL	16
2,4-Dimethylphenol *	<MDL	7.0	<MDL	7.0	<MDL	7.0	<MDL	7.0
2,4-Dinitrophenol *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
2,4-Dinitrotoluene	<MDL	3.0	<MDL	3.0	<MDL	3.0	<MDL	3.0
2,6-Dinitrotoluene	<MDL	10	<MDL	10	<MDL	10	<MDL	10
2-Chloronaphthalene *	<MDL	16	<MDL	16	<MDL	16	<MDL	16
2-Chlorophenol *	<MDL	8.0	<MDL	8.0	<MDL	8.0	<MDL	8.0
2-Methylnaphthalene *	<MDL	14	<MDL	14	<MDL	14	<MDL	14
2-Methylphenol *	<MDL	19	<MDL	19	<MDL	19	<MDL	19
2-Nitroaniline	<MDL	13	<MDL	13	<MDL	13	<MDL	13
2-Nitrophenol *	<MDL	15	<MDL	15	<MDL	15	<MDL	15
3,3'-Dichlorobenzidine *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
3-Nitroaniline *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
4,6-Dinitro-O-Cresol *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
4-Bromophenyl Phenyl Ether	<MDL	9.0	<MDL	9.0	<MDL	9.0	<MDL	9.0
4-Chloro-3-Methylphenol *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
4-Chloroaniline *	<MDL	2.7	<MDL	2.7	<MDL	2.7	<MDL	2.7
4-Chlorophenyl Phenyl Ether	<MDL	13	<MDL	13	<MDL	13	<MDL	13
4-Methylphenol *	<MDL	16	<MDL	16	<MDL	16	<MDL	16
4-Nitroaniline *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
4-Nitrophenol *	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Acenaphthene	<MDL	7.0	<MDL	7.0	<MDL	7.0	<MDL	7.0
Acenaphthylene *	<MDL	15	<MDL	15	<MDL	15	<MDL	15
Aniline *	<MDL	130	<MDL	130	<MDL	130	<MDL	130
Anthracene *	**6.50**	4.0	<MDL	4.0	<MDL	4.0	<MDL	4.0
Benzo(a)anthracene **	**19.1**	2.0	<MDL	2.0	<MDL	2.0	<MDL	2.0
Benzo(a)pyrene **	**18.9**	3.0	<MDL	3.0	<MDL	3.0	<MDL	3.0
Benzo(b)fluoranthene **	**9.57**	3.0	<MDL	3.0	<MDL	3.0	<MDL	3.0
Benzo(g,h,i)perylene	**10.0**	8.0	<MDL	8.0	<MDL	8.0	<MDL	8.0
Benzo(k)fluoranthene **	**17.5**	3.0	<MDL	3.0	<MDL	3.0	<MDL	3.0
Benzoic Acid *	<MDL	13	<MDL	13	<MDL	13	**43.0**	13
Benzyl Alcohol	<MDL	6.0	<MDL	6.0	<MDL	6.0	<MDL	6.0
Benzyl Butyl Phthalate	<MDL	6.0	<MDL	6.0	<MDL	6.0	<MDL	6.0
Bis(2-Chloroethoxy)Methane *	<MDL	17	<MDL	17	<MDL	17	<MDL	17
Bis(2-Chloroethyl)Ether *	<MDL	15	<MDL	15	<MDL	15	<MDL	15
Bis(2-Chloroisopropyl)Ether *	<MDL	15	<MDL	15	<MDL	15	<MDL	15
Bis(2-Ethylhexyl)Phthalate #	<MDL	6.7	**8.25**	6.7	<MDL	6.7	**8.10**	6.7
Caffeine	<MDL	6.0	<MDL	6.0	<MDL	6.0	<MDL	6.0
Carbazole	<MDL	7.0	<MDL	7.0	<MDL	7.0	<MDL	7.0
Chrysene **	**19.4**	4.0	<MDL	4.0	<MDL	4.0	<MDL	4.0
Coprostanol	<MDL	14	<MDL	14	<MDL	14	<MDL	14
Dibenzo(a,h)anthracene +	<MDL	7.0	<MDL	7.0	<MDL	7.0	<MDL	7.0
Dibenzofuran	<MDL	14	<MDL	14	<MDL	14	<MDL	14

Table B-13. 2003 Beach Sediment Results
Semi-volatile Organics (ug/Kg dry weight)

	KSHZ03		KSSN05		LSKR01		MSJL01	
	8/12/2003		8/13/2003		8/13/2003		8/11/2003	
	84.6% Solids		90.3% Solids		89.0% Solids		78.4% Solids	
Outfall Stations	Value	MDL	Value	MDL	Value	MDL	Value	MDL
Diethyl Phthalate	<MDL	6.0	<MDL	6.0	<MDL	6.0	<MDL	6.0
Dimethyl Phthalate	<MDL	11	<MDL	11	<MDL	11	<MDL	11
Di-N-Butyl Phthalate + *	**49.8**	5.0	**53.9**	5.0	**5.30**	5.0	<MDL	5.0
Di-N-Octyl Phthalate	<MDL	8.0	<MDL	8.0	<MDL	8.0	<MDL	8.0
Fluoranthene **	**41.6**	8.0	<MDL	8.0	<MDL	8.0	**15.0**	8.0
Fluorene	<MDL	13	<MDL	13	<MDL	13	<MDL	13
Hexachlorobenzene	<MDL	0.66	<MDL	0.66	<MDL	0.66	<MDL	0.66
Hexachlorobutadiene *	<MDL	0.75	<MDL	0.75	<MDL	0.75	<MDL	0.75
Hexachlorocyclopentadiene *	<MDL	27	<MDL	27	<MDL	27	<MDL	27
Hexachloroethane *	<MDL	15	<MDL	15	<MDL	15	<MDL	15
Indeno(1,2,3-Cd)Pyrene	**10.0**	9.0	<MDL	9.0	<MDL	9.0	<MDL	9.0
Isophorone *	<MDL	19	<MDL	19	<MDL	19	<MDL	19
Naphthalene *	<MDL	14	<MDL	14	<MDL	14	<MDL	14
Nitrobenzene *	<MDL	16	<MDL	16	<MDL	16	<MDL	16
N-Nitrosodimethylamine *	<MDL	27.0	<MDL	27.0	<MDL	27.0	<MDL	27.0
N-Nitrosodi-N-Propylamine *	<MDL	9.0	<MDL	9.0	<MDL	9.0	<MDL	9.0
N-Nitrosodiphenylamine	<MDL	20	<MDL	20	<MDL	20	<MDL	20
Pentachlorophenol *	<MDL	5.0	<MDL	5.0	<MDL	5.0	<MDL	5.0
Phenanthrene *,**	**42.2**	4.0	<MDL	4.0	<MDL	4.0	**17.0**	4.0
Phenol *	<MDL	9.0	<MDL	9.0	<MDL	9.0	**20.3**	9.0
Pyrene **	**55.2**	4.0	<MDL	4.0	<MDL	4.0	**8.16**	4.0

MDL - Method detection limit (the concentration at which an analyte can reliably be detected).
* Indicates low biased data that is based upon either surrogate or matrix spike recovery results.
** Indicates value may be an estimate based upon unacceptable precision of laboratory replicate.
\# Indicates method blank contamination
\+ Indicates high baised data based upon either surrogate or matrix spike recovery results.

APPENDIX C

SHELLFISH MONITORING DATA

C-1 2002 Metals
C-2 2002 Chlorinated pesticides/PCBs
C-3 2002 Semi-volatile organics
C-4 2002 Bacteria
C-5 2003 Metals
C-6 2003 Chlorinated pesticides/PCBs
C-7 2003 Semi-volatile organics
C-8 2003 Bacteria
C-9 Butter clam shell lengths

Table C-1
2002 Shellfish Results
Metals

	KSHZ03			KSSN04			KSSN05			LSKR01		
	8/19/2002			8/20/2002			8/20/2002			8/20/2002		
	17.7% Solids			17.4% Solids			18.8% Solids			17.6% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	24.2	137	0.99	60	345	1	73.2	389	1	23	131	1
Arsenic	2.39	13.5	0.072	2.94	16.9	0.076	2.38	12.7	0.076	2.66	15.1	0.1
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.0572	0.323	0.004	0.0516	0.297	0.004	0.0591	0.314	0.004	0.0543	0.309	0.004
Chromium	0.28	1.58	0.05	0.438	2.52	0.05	0.359	1.91	0.05	0.2	1.14	0.05
Copper	1.72	9.72	0.04	2.05	11.8	0.04	1.67	8.88	0.04	1.84	10.5	0.04
Iron	42.9	242	0.5	89.3	513	0.5	123	654	0.5	43.5	247	0.5
Lead	0.24	1.36	0.008	0.121	0.695	0.008	0.101	0.537	0.008	0.0962	0.547	0.008
Manganese	1.41	7.97	0.02	2.03	11.7	0.02	2.33	12.4	0.02	1.3	7.39	0.02
Mercury	0.0066	0.037	0.004	0.0096	0.055	0.004	0.0062	0.033	0.0039	0.005	0.028	0.004
Nickel	0.752	4.25	0.012	0.847	4.87	0.012	1.06	5.64	0.012	0.822	4.67	0.012
Selenium	0.39	2.20	0.22	0.34	1.95	0.22	0.35	1.86	0.22	<MDL	<MDL	0.3
Silver	0.572	3.23	0.008	1.22	7.01	0.008	0.128	0.681	0.008	0.508	2.89	0.008
Zinc	12.7	71.8	0.05	12.9	74.1	0.05	14.5	77.1	0.05	13.4	76.1	0.05

	MSJL01			ITOCEANAVE			JSVW04			MTLD03		
	8/21/2002			8/19/2002			8/19/2002			8/21/2002		
	16.3% Solids			15.6% Solids			16.6% Solids			14.6% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	25.2	155	1	12	76.9	1	15.3	92.2	1	13.6	93.2	0.99
Arsenic	2.91	17.9	0.076	3.14	20.1	0.2	3.2	19.3	0.05	3.47	23.7	0.076
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.0659	0.404	0.004	0.0582	0.373	0.004	0.0644	0.388	0.004	0.0787	0.539	0.004
Chromium	0.27	1.66	0.05	0.382	2.45	0.05	0.345	2.08	0.05	0.302	2.07	0.05
Copper	1.54	9.45	0.04	2.34	15.0	0.04	2	12.0	0.04	1.49	10.2	0.04
Iron	48.9	300	0.5	21.9	140	0.5	31.7	191	0.5	26	178	0.5
Lead	0.0562	0.345	0.008	0.0688	0.441	0.008	0.152	0.916	0.008	0.0756	0.518	0.008
Manganese	1.19	7.30	0.02	0.893	5.72	0.02	1.5	9.04	0.02	0.766	5.25	0.02
Mercury	0.01	0.061	0.0039	0.011	0.071	0.0039	0.0078	0.047	0.0039	0.013	0.086	0.0039
Nickel	0.934	5.73	0.012	0.986	6.32	0.012	0.925	5.57	0.012	0.819	5.61	0.012
Selenium	0.35	2.15	0.22	0.68	4.36	0.6	0.38	2.29	0.15	0.4	2.74	0.22
Silver	1.11	6.81	0.008	2.4	15.4	0.008	1.22	7.35	0.008	1.13	7.71	0.008
Zinc	11.6	71.2	0.05	12.2	78.2	0.05	13.7	82.5	0.05	12.6	86.0	0.05

mg/Kg - Milligrams per kilogram (parts per million).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-2
2002 Shellfish Results
Chlorinated Pesticides and PCBs

	KSHZ03			KSSN04			KSSN05			LSKR01		
	8/19/2002			8/20/2002			8/20/2002			8/20/2002		
	17.7% Solids			17.4% Solids			18.8% Solids			17.6% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
4,4'-DDD	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDE	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDT	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Aldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Alpha-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Aroclor 1016	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1221	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1232	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1242	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1248	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1254	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1260	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Beta-BHC	<MDL	<MDL	0.5	1.13	6.49	0.5	1.27	6.76	0.5	<MDL	<MDL	0.5
Chlordane	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Delta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Dieldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan I	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan II	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan Sulfate	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin Aldehyde	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2
Gamma-BHC (Lindane)	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor Epoxide	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Methoxychlor	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Toxaphene	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-2
2002 Shellfish Results
Chlorinated Pesticides and PCBs

	MSJL01			ITOCEANAVE			JSVW04			MTLD03		
	8/21/2002			8/19/2002			8/19/2002			8/21/2002		
	16.3% Solids			15.6% Solids			16.6% Solids			14.6% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
4,4'-DDD	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDE	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDT	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Aldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Alpha-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Aroclor 1016	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1221	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1232	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1242	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1248	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1254	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1260	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Beta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Chlordane	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Delta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Dieldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan I	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan II	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan Sulfate	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin Aldehyde	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2
Gamma-BHC (Lindane)	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor Epoxide	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Methoxychlor	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Toxaphene	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-3
2002 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	KSHZ03			KSSN04			KSSN05			LSKR01		
	8/19/2002			8/20/2002			8/20/2002			8/20/2002		
	17.7% Solids			17.4% Solids			18.8% Solids			17.6% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
1,2,4-Trichlorobenzene	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3
1,2-Dichlorobenzene	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3
1,2-Diphenylhydrazine	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200
1,3-Dichlorobenzene	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3
1,4-Dichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
2,4,5-Trichlorophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2,4,6-Trichlorophenol	<MDL	<MDL	260	<MDL	<MDL	260	<MDL	<MDL	260	<MDL	<MDL	260
2,4-Dichlorophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2,4-Dimethylphenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2,4-Dinitrophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2,4-Dinitrotoluene	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2,6-Dinitrotoluene	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200
2-Chloronaphthalene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
2-Chlorophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2-Methylnaphthalene	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2-Methylphenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
2-Nitroaniline	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2-Nitrophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
3,3'-Dichlorobenzidine	<MDL	<MDL	530	<MDL	<MDL	530	<MDL	<MDL	530	<MDL	<MDL	530
3-Nitroaniline	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4,6-Dinitro-O-Cresol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4-Bromophenyl Phenyl Ether	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
4-Chloro-3-Methylphenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4-Chloroaniline	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
4-Chlorophenyl Phenyl Ether	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
4-Methylphenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
4-Nitroaniline	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4-Nitrophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
Acenaphthene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Acenaphthylene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Aniline	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700
Anthracene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Benzidine	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700
Benzo(a)anthracene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Benzo(a)pyrene	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Benzo(b)fluoranthene	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Benzo(g,h,i)perylene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160

Table C-3
2002 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	KSHZ03			KSSN04			KSSN05			LSKR01		
	8/19/2002			8/20/2002			8/20/2002			8/20/2002		
	17.7% Solids			17.4% Solids			18.8% Solids			17.6% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Benzo(k)fluoranthene	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Benzoic Acid	6,950	39,300	530	6,470	37,200	530	6,530	34,700	530	7,430	42,200	530
Benzyl Alcohol	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Benzyl Butyl Phthalate	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Bis(2-Chloroethoxy)Methane	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Bis(2-Chloroethyl)Ether	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Bis(2-Chloroisopropyl)Ether	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Bis(2-Ethylhexyl)Phthalate	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Carbazole	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140
Chrysene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Coprostanol	<MDL	<MDL	280	<MDL	<MDL	280	<MDL	<MDL	280	<MDL	<MDL	280
Caffeine	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Dibenzo(a,h)anthracene	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140
Dibenzofuran	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Diethyl Phthalate	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Dimethyl Phthalate	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Di-N-Butyl Phthalate	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100
Di-N-Octyl Phthalate	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Fluorene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Fluoranthene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Hexachlorobenzene	<MDL	<MDL	13	<MDL	<MDL	13	<MDL	<MDL	13	<MDL	<MDL	13
Hexachlorobutadiene	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Hexachlorocyclopentadiene	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
Hexachloroethane	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Indeno(1,2,3-Cd)Pyrene	<MDL	<MDL	180	<MDL	<MDL	180	<MDL	<MDL	180	<MDL	<MDL	180
Isophorone	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
N-Nitrosodi-N-Propylamine	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
N-Nitrosodimethylamine	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700
N-Nitrosodiphenylamine	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Nitrobenzene	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Naphthalene	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Pentachlorophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
Phenanthrene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Phenol	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Pyrene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-3
2002 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	MSJL01			ITOCEANAVE			JSVW04			MTLD03		
	8/21/2002			8/19/2002			8/19/2002			8/21/2002		
	16.3% Solids			15.6% Solids			16.6% Solids			14.6% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
1,2,4-Trichlorobenzene	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3
1,2-Dichlorobenzene	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3
1,2-Diphenylhydrazine	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200
1,3-Dichlorobenzene	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3	<MDL	<MDL	5.3
1,4-Dichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
2,4,5-Trichlorophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2,4,6-Trichlorophenol	<MDL	<MDL	260	<MDL	<MDL	260	<MDL	<MDL	260	<MDL	<MDL	260
2,4-Dichlorophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2,4-Dimethylphenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2,4-Dinitrophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2,4-Dinitrotoluene	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2,6-Dinitrotoluene	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200	<MDL	<MDL	200
2-Chloronaphthalene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
2-Chlorophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2-Methylnaphthalene	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
2-Methylphenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
2-Nitroaniline	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
2-Nitrophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
3,3'-Dichlorobenzidine	<MDL	<MDL	530	<MDL	<MDL	530	<MDL	<MDL	530	<MDL	<MDL	530
3-Nitroaniline	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4,6-Dinitro-O-Cresol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4-Bromophenyl Phenyl Ether	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
4-Chloro-3-Methylphenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4-Chloroaniline	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
4-Chlorophenyl Phenyl Ether	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
4-Methylphenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
4-Nitroaniline	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
4-Nitrophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
Acenaphthene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Acenaphthylene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Aniline	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700
Anthracene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Benzidine	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700
Benzo(a)anthracene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Benzo(a)pyrene	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Benzo(b)fluoranthene	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Benzo(g,h,i)perylene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160

Table C-3
2002 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	MSJL01			ITOCEANAVE			JSVW04			MTLD03		
	8/21/2002			8/19/2002			8/19/2002			8/21/2002		
	16.3% Solids			15.6% Solids			16.6% Solids			14.6% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Benzo(k)fluoranthene	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Benzoic Acid	13,100	80,400	530	12,400	79,500	530	4,760	28,700	530	8,950	61,300	530
Benzyl Alcohol	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Benzyl Butyl Phthalate	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Bis(2-Chloroethoxy)Methane	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Bis(2-Chloroethyl)Ether	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Bis(2-Chloroisopropyl)Ether	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Bis(2-Ethylhexyl)Phthalate	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Carbazole	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140
Chrysene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Coprostanol	<MDL	<MDL	280	<MDL	<MDL	280	<MDL	<MDL	280	<MDL	<MDL	280
Caffeine	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Dibenzo(a,h)anthracene	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140
Dibenzofuran	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Diethyl Phthalate	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120	<MDL	<MDL	120
Dimethyl Phthalate	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Di-N-Butyl Phthalate	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100
Di-N-Octyl Phthalate	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Fluorene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Fluoranthene	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Hexachlorobenzene	<MDL	<MDL	13	<MDL	<MDL	13	<MDL	<MDL	13	<MDL	<MDL	13
Hexachlorobutadiene	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Hexachlorocyclopentadiene	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
Hexachloroethane	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Indeno(1,2,3-Cd)Pyrene	<MDL	<MDL	180	<MDL	<MDL	180	<MDL	<MDL	180	<MDL	<MDL	180
Isophorone	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
N-Nitrosodi-N-Propylamine	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
N-Nitrosodimethylamine	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700	<MDL	<MDL	2,700
N-Nitrosodiphenylamine	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Nitrobenzene	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Naphthalene	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Pentachlorophenol	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
Phenanthrene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Phenol	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160	<MDL	<MDL	160
Pyrene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-4
2002 Shellfish Results
Bacteria

Station	Date	Fecal Coliform (MPN/100g)	Enterococcus (MPN/100g)
KSHZ03	5/13/2002	490	490
	6/10/2002	80	330
	7/9/2002	490	140
	8/5/2002	20	50
	9/17/2002	1,300	80
KSSN04	5/13/2002	70	80
	6/10/2002	1,100	1,400
	7/8/2002	<MDL (20)	<MDL (20)
	8/5/2002	20	40
	9/16/2002	40	40
LSKR01	5/13/2002	1,300	24,000
	6/11/2002	330	1,300
	7/9/2002	790	330
	8/5/2002	120	1,100
	9/17/2002	2,300	7,900
MSJL01	5/14/2002	150	150
	6/10/2002	130	170
	7/8/2002	350	240
	8/6/2002	1,100	70
	9/16/2002	1,300	2,300
ITEDWARDSPT	5/13/2002	460	3,300
	6/10/2002	130	490
	7/8/2002	230	2,200
	8/5/2002	50	1,100
	9/17/2002	80	790
ITOCEANAVE	5/13/2002	460	1,300
	6/10/2002	130	170
	7/8/2002	70	490
	8/5/2002	330	790
	9/17/2002	20	70

Station	Date	Fecal Coliform (MPN/100g)	Enterococcus (MPN/100g)
JSVW04	5/13/2002	130	630
	6/10/2002	460	1,300
	7/9/2002	330	700
	8/5/2002	3,300	490
	9/17/2002	130	1,100
KSLU03	5/13/2002	330	490
	6/10/2002	330	4,900
	7/8/2002	230	330
	8/5/2002	170	130
	9/16/2002	790	23,000
MSSM05	5/14/2002	54,000	11,000
	6/10/2002	5,600	35,000
	7/8/2002	170	330
	8/6/2002	2,300	240
	9/16/2002	7,900	23,000
MTEC01	5/14/2002	<MDL (20)	220
	6/11/2002	50	700
	7/8/2002	490	230
	8/5/2002	790	40
	9/16/2002	50	1,300
MTLD03	5/13/2002	70	170
	6/11/2002	7,900	13,000
	7/8/2002	170	340
	8/5/2002	110	270
	9/16/2002	65	230

MPN/100g - Most probable number per 100 grams of tissue.
<MDL (20) - Result is less than the method detection limit of 20 MPN/100g.
Station Name - Outfall monitoring station.

Table C-5
2003 Shellfish Results
Metals

	KSHZ03			KSLU03			KSSN05			LSKS01		
	8/12/2003			8/11/2003			8/12/2003			8/11/2003		
	20.2% Solids			20.0% Solids			19.4% Solids			20.0% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	9.05	44.8	1	20.9	105	1	38.5	198	1	29.6	148	1
Arsenic	2.83	14.0	0.02	2.74	13.7	0.02	2.38	12.3	0.02	3.82	19.1	0.02
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.0081	<MDL	<MDL	0.0081
Cadmium	0.0569	0.282	0.004	0.0598	0.299	0.004	0.0460	0.237	0.004	0.0626	0.313	0.004
Chromium	0.200	0.990	0.05	0.200	1.00	0.05	0.265	1.37	0.05	0.255	1.28	0.05
Copper	2.49	12.3	0.04	1.84	9.20	0.04	2.60	13.4	0.04	1.91	9.55	0.04
Iron	27.4	136	0.5	41.9	210	0.5	74.5	384	0.5	58.2	291	0.5
Lead	0.153	0.757	0.008	0.121	0.605	0.008	0.106	0.546	0.0081	0.116	0.580	0.0081
Manganese	1.89	9.36	0.02	2.90	14.5	0.02	2.30	11.9	0.02	1.99	10.0	0.02
Mercury	0.0052	0.0257	0.004	0.0046	0.0230	0.004	0.0042	0.0216	0.0038	0.0050	0.0250	0.0039
Nickel	0.684	3.39	0.012	0.860	4.30	0.012	0.961	4.95	0.012	0.918	4.59	0.012
Selenium	0.309	1.53	0.06	0.320	1.60	0.06	0.290	1.49	0.06	0.403	2.02	0.06
Silver	0.761	3.77	0.04	0.222	1.11	0.04	0.307	1.58	0.04	0.807	4.04	0.04
Zinc	13.8	68.3	0.05	14.2	71.0	0.05	15.0	77.3	0.05	15.1	75.5	0.05

	MSJL01			JSVW04			MTLD03		
	8/11/2003			8/12/2003			8/11/2003		
	19.3% Solids			19.6% Solids			20.5% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	15.4	79.8	1	11.1	56.6	1	13.5	65.6	1
Arsenic	3.54	18.3	0.02	3.66	18.7	0.02	4.07	19.8	0.02
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.0680	0.352	0.004	0.0743	0.379	0.004	0.0800	0.390	0.004
Chromium	0.251	1.30	0.05	0.264	1.35	0.05	0.282	1.38	0.05
Copper	1.56	8.08	0.04	2.79	14.2	0.04	1.69	8.22	0.04
Iron	34.2	177	0.5	26.5	135	0.5	28.0	137	0.5
Lead	0.0666	0.345	0.008	0.220	1.12	0.008	0.122	0.593	0.008
Manganese	1.93	10.0	0.02	2.21	11.3	0.02	1.59	7.76	0.02
Mercury	0.0080	0.0415	0.0041	<MDL	<MDL	0.004	0.0091	0.0444	0.004
Nickel	0.887	4.60	0.012	0.874	4.46	0.012	0.755	3.68	0.012
Selenium	0.356	1.84	0.06	0.420	2.14	0.06	0.465	2.27	0.06
Silver	0.746	3.87	0.04	0.976	4.98	0.04	1.21	5.90	0.04
Zinc	14.5	75.1	0.05	15.6	79.6	0.05	14.6	71.0	0.05

mg/Kg - Milligrams per kilogram (parts per million).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-6
2003 Shellfish Results
Chlorinated Pesticides and PCBs

	KSHZ03			KSLU03			KSSN05			LSKS01		
	8/12/2003			8/11/2003			8/12/2003			8/11/2003		
	20.2% Solids			20.0% Solids			19.4% Solids			20.0% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
4,4'-DDD	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDE	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDT	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Aldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Alpha-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Aroclor 1016	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1221	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1232	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1242	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1248	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1254	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1260	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Beta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Chlordane	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Delta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Dieldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan I	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan II	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan Sulfate	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin Aldehyde	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2
Gamma-BHC (Lindane)	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor Epoxide	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Methoxychlor	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Toxaphene	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-6
2003 Shellfish Results
Chlorinated Pesticides and PCBs

	MSJL01			JSVW04			MTLD03		
	8/11/2003			8/12/2003			8/11/2003		
	19.3% Solids			19.6% Solids			20.5% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
4,4'-DDD	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDE	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
4,4'-DDT	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Aldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Alpha-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Aroclor 1016	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1221	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1232	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Aroclor 1242	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1248	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1254	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Aroclor 1260	<MDL	<MDL	2.5	<MDL	<MDL	2.5	<MDL	<MDL	2.5
Beta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Chlordane	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Delta-BHC	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Dieldrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan I	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan II	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endosulfan Sulfate	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin	<MDL	<MDL	1	<MDL	<MDL	1	<MDL	<MDL	1
Endrin Aldehyde	<MDL	<MDL	2	<MDL	<MDL	2	<MDL	<MDL	2
Gamma-BHC (Lindane)	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Heptachlor Epoxide	<MDL	<MDL	0.5	<MDL	<MDL	0.5	<MDL	<MDL	0.5
Methoxychlor	<MDL	<MDL	5	<MDL	<MDL	5	<MDL	<MDL	5
Toxaphene	<MDL	<MDL	10	<MDL	<MDL	10	<MDL	<MDL	10

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-7
2003 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	KSHZ03			KSLU03			KSSN05			LSKS01		
	8/12/2003			8/11/2003			8/12/2003			8/11/2003		
	20.2% Solids			20.0% Solids			19.4% Solids			20.0% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
1,2,4-Trichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
1,2-Dichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
1,2-Diphenylhydrazine	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
1,3-Dichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
1,4-Dichlorobenzene	<MDL	<MDL	1.3	<MDL	<MDL	1.3	<MDL	<MDL	1.3	<MDL	<MDL	1.3
2,4,5-Trichlorophenol	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
2,4,6-Trichlorophenol	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
2,4-Dichlorophenol	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2,4-Dimethylphenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2,4-Dinitrophenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2,4-Dinitrotoluene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2,6-Dinitrotoluene	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100
2-Chloronaphthalene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
2-Chlorophenol	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2-Methylnaphthalene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2-Methylphenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2-Nitroaniline	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2-Nitrophenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
3,3'-Dichlorobenzidine	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
3-Nitroaniline	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
4,6-Dinitro-O-Cresol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
4-Bromophenyl Phenyl Ether	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
4-Chloro-3-Methylphenol	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
4-Chloroaniline	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
4-Chlorophenyl Phenyl Ether	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
4-Methylphenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
4-Nitroaniline	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
4-Nitrophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Acenaphthene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Acenaphthylene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Aniline	<MDL	<MDL	1,300	<MDL	<MDL	1,300	<MDL	<MDL	1,300	<MDL	<MDL	1,300
Anthracene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Benzidine	<MDL	<MDL	1,300	<MDL	<MDL	1,300	<MDL	<MDL	1,300	<MDL	<MDL	1,300
Benzo(a)anthracene	<MDL	<MDL	20	<MDL	<MDL	20	<MDL	<MDL	20	<MDL	<MDL	20
Benzo(a)pyrene	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30
Benzo(b)fluoranthene	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30
Benzo(g,h,i)perylene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80

Table C-7
2003 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	KSHZ03			KSLU03			KSSN05			LSKS01		
	8/12/2003			8/11/2003			8/12/2003			8/11/2003		
	20.2% Solids			20.0% Solids			19.4% Solids			20.0% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Benzo(k)fluoranthene	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30
Benzoic Acid	2,130	10,500	130	3,180	15,900	130	1,200	6,200	130	2,760	13,800	130
Benzyl Alcohol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Benzyl Butyl Phthalate	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Bis(2-Chloroethoxy)Methane	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Bis(2-Chloroethyl)Ether	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Bis(2-Chloroisopropyl)Ether	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Bis(2-Ethylhexyl)Phthalate	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Carbazole	<MDL	<MDL	70	<MDL	<MDL	70	<MDL	<MDL	70	<MDL	<MDL	70
Chrysene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Coprostanol	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140
Caffeine	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Dibenzo(a,h)anthracene	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Dibenzofuran	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Diethyl Phthalate	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Dimethyl Phthalate	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Di-N-Butyl Phthalate	<MDL	<MDL	50	<MDL	<MDL	50	<MDL	<MDL	50	<MDL	<MDL	50
Di-N-Octyl Phthalate	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Fluorene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Fluoranthene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Hexachlorobenzene	<MDL	<MDL	6.6	<MDL	<MDL	6.6	<MDL	<MDL	6.6	<MDL	<MDL	6.6
Hexachlorobutadiene	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Hexachlorocyclopentadiene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Hexachloroethane	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Indeno(1,2,3-Cd)Pyrene	<MDL	<MDL	90	<MDL	<MDL	90	<MDL	<MDL	90	<MDL	<MDL	90
Isophorone	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
N-Nitrosodi-N-Propylamine	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
N-Nitrosodimethylamine	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
N-Nitrosodiphenylamine	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Nitrobenzene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Naphthalene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Pentachlorophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Phenanthrene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Phenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Pyrene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-7
2003 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	MSJL01			JSVW04			MTLD03		
	8/11/2003			8/12/2003			8/11/2003		
	19.3% Solids			19.6% Solids			20.5% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
1,2,4-Trichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
1,2-Dichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
1,2-Diphenylhydrazine	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
1,3-Dichlorobenzene	<MDL	<MDL	2.6	<MDL	<MDL	2.6	<MDL	<MDL	2.6
1,4-Dichlorobenzene	<MDL	<MDL	1.3	<MDL	<MDL	1.3	<MDL	<MDL	1.3
2,4,5-Trichlorophenol	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
2,4,6-Trichlorophenol	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
2,4-Dichlorophenol	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2,4-Dimethylphenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2,4-Dinitrophenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2,4-Dinitrotoluene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2,6-Dinitrotoluene	<MDL	<MDL	100	<MDL	<MDL	100	<MDL	<MDL	100
2-Chloronaphthalene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
2-Chlorophenol	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2-Methylnaphthalene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
2-Methylphenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2-Nitroaniline	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
2-Nitrophenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
3,3'-Dichlorobenzidine	<MDL	<MDL	270	<MDL	<MDL	270	<MDL	<MDL	270
3-Nitroaniline	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
4,6-Dinitro-O-Cresol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
4-Bromophenyl Phenyl Ether	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
4-Chloro-3-Methylphenol	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
4-Chloroaniline	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
4-Chlorophenyl Phenyl Ether	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
4-Methylphenol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
4-Nitroaniline	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
4-Nitrophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Acenaphthene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Acenaphthylene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Aniline	<MDL	<MDL	1,300	<MDL	<MDL	1,300	<MDL	<MDL	1,300
Anthracene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Benzidine	<MDL	<MDL	1,300	<MDL	<MDL	1,300	<MDL	<MDL	1,300
Benzo(a)anthracene	<MDL	<MDL	20	<MDL	<MDL	20	<MDL	<MDL	20
Benzo(a)pyrene	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30
Benzo(b)fluoranthene	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30
Benzo(g,h,i)perylene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80

Table C-7
2003 Shellfish Results
Base / Neutral / Acid Extractable Semivolatile Compounds

	MSJL01			JSVW04			MTLD03		
	8/11/2003			8/12/2003			8/11/2003		
	19.3% Solids			19.6% Solids			20.5% Solids		
	Concentration (µg/Kg)			Concentration (µg/Kg)			Concentration (µg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Benzo(k)fluoranthene	<MDL	<MDL	30	<MDL	<MDL	30	<MDL	<MDL	30
Benzoic Acid	2,920	15,100	130	3,140	16,000	130	2,365	11,600	130
Benzyl Alcohol	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Benzyl Butyl Phthalate	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Bis(2-Chloroethoxy)Methane	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Bis(2-Chloroethyl)Ether	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Bis(2-Chloroisopropyl)Ether	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Bis(2-Ethylhexyl)Phthalate	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Carbazole	<MDL	<MDL	70	<MDL	<MDL	70	<MDL	<MDL	70
Chrysene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Coprostanol	<MDL	<MDL	140	<MDL	<MDL	140	<MDL	<MDL	140
Caffeine	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Dibenzo(a,h)anthracene	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Dibenzofuran	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Diethyl Phthalate	<MDL	<MDL	60	<MDL	<MDL	60	<MDL	<MDL	60
Dimethyl Phthalate	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Di-N-Butyl Phthalate	<MDL	<MDL	50	<MDL	<MDL	50	<MDL	<MDL	50
Di-N-Octyl Phthalate	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Fluorene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Fluoranthene	<MDL	<MDL	80	<MDL	<MDL	80	<MDL	<MDL	80
Hexachlorobenzene	<MDL	<MDL	6.6	<MDL	<MDL	6.6	<MDL	<MDL	6.6
Hexachlorobutadiene	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Hexachlorocyclopentadiene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Hexachloroethane	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Indeno(1,2,3-Cd)Pyrene	<MDL	<MDL	90	<MDL	<MDL	90	<MDL	<MDL	90
Isophorone	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
N-Nitrosodi-N-Propylamine	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
N-Nitrosodimethylamine	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
N-Nitrosodiphenylamine	<MDL	<MDL	27	<MDL	<MDL	27	<MDL	<MDL	27
Nitrobenzene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Naphthalene	<MDL	<MDL	67	<MDL	<MDL	67	<MDL	<MDL	67
Pentachlorophenol	<MDL	<MDL	130	<MDL	<MDL	130	<MDL	<MDL	130
Phenanthrene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40
Phenol	<MDL	<MDL	53	<MDL	<MDL	53	<MDL	<MDL	53
Pyrene	<MDL	<MDL	40	<MDL	<MDL	40	<MDL	<MDL	40

µg/Kg - Micrograms per kilogram (parts per billion).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table C-8
2003 Shellfish Results
Bacteria

Station	Date	Fecal Coliform (MPN/100g)	Enterococcus (MPN/100g)
KSHZ03	5/19/2003	260	70
	6/16/2003	50	40
	7/14/2003	50	50
	8/25/2003	<MDL (20)	50
	9/22/2003	110	130
KSSN04	5/19/2003	50	80
	6/16/2003	80	330
	7/14/2003	130	140
	8/25/2003	110	40
	9/22/2003	70	120
KSSN05	5/19/2003	330	140
	6/16/2003	130	40
	7/14/2003	80	20
	8/25/2003	80	200
	9/22/2003	1,700	170
LSKR01	5/19/2003	700	330
	6/16/2003	490	1,700
	7/14/2003	1,700	82
	8/25/2003	700	1,800
	9/22/2003	1,700	260
MSJL01	5/20/2003	80	170
	6/17/2003	130	1,300
	7/14/2003	80	230
	8/25/2003	170	940
	9/23/2003	2,300	2,300

Station	Date	Fecal Coliform (MPN/100g)	Enterococcus (MPN/100g)
JSVW04	5/19/2003	230	130
	6/16/2003	790	130
	7/14/2003	50	50
	8/25/2003	790	490
	9/22/2003	700	1,700
KSLU03	5/19/2003	790	1,300
	6/16/2003	20	260
	7/14/2003	110	330
	8/25/2003	130	2,300
	9/22/2003	1,300	310
MSSM05	5/20/2003	20	50
	6/17/2003	2,300	17000
	7/14/2003	80	<MDL (20)
	8/25/2003	170	1,700
	9/23/2003	3,500	3,500
MTLD03*	5/19/2003	40	110
	6/16/2003	55	205
	7/14/2003	65	185
	8/25/2003	170	435
	9/22/2003	75	300

*** Values are averages of two field replicates. When results were reported as <MDL, the full detection limit (20) was used in the calculation of the average.**

MPN/100g - Most probable number per 100 grams of tissue.
<MDL (20) - Result is less than the method detection limit of 20 MPN/100g.
Station Name - Outfall monitoring station.

Table C-9 Butter Clam Shell Lengths (mm)

Station	Date	Shell Length of Individual Clams Comprising Composite Sample (mm)											Composite sample mean shell length (mm)
JSVW04	5/13/02	65	64	62	70	67	68	69	63	69	61	60	65
	6/10/02	60	101	59	68	58	58	80	57	61	85		69
	7/9/02	86	87	87	88	95	94	84	91	91			89
	8/5/02	68	61	58	70	63	65	64	60	60	65		63
	8/19/02	91	94	102	97	92	90						94
	9/17/02	68	82	78	65	66	74	77	62	61	61		69
	5/19/03	69	68	63	70	67	76	66	63	68	64		67
	6/16/03	85	74	86	73	78	80	77	74	75	69		77
	7/14/03	96	86	95	90	93	79	102	102	85	90		92
	8/12/03	90	90	93	75	87	80	92	86	93	88		87
	8/26/03	94	86	92	91	89	84	89	83	74	86		87
	9/22/03	58	66	55	64	62	59	65	52	53	60		59
KSHZ03	5/13/02	89	91	81	94	80	86	84	85	87	87		86
	6/10/02	94	70	68	80	78	68	71	72	79	65		75
	7/9/02	74	77	66	84	77	76	81	81	83	82		78
	8/5/02	91	102	91	95	99	87	89	86	88	92		92
	8/19/02	82	85	76	91	88	82						84
	9/17/02	89	79	77	85	81	76	75	75	71	69		78
	5/19/03	95	86	86	85	87	92	94	94	97	86		90
	6/16/03	95	84	93	87	82	94	80	83	86	94		88
	7/14/03	87	86	80	93	75	80	90	75	82	76		82
	8/12/03	80	85	83	90	85	90	93	81	86			86
	8/25/03	80	77	90	84	75	73	80	81	81	81		80
	9/22/03	72	74	81	75	65	73	73	66	78	66		72
KSLU03	5/13/02	88	96	87	99	97	97	85	88	91	93		92
	6/10/02	81	94	88	89	88	90	89	94	89	95		90
	7/8/02	80	87	82	89	82	85	75	82	89	81		83
	8/5/02	95	93	91	97	89	94	90	93	92	86		92
	9/16/02	98	101	99	84	87	102	90	89	92	83		93
	5/19/03	102	100	94	100	102	103	92	87	97	92		97
	6/16/03	97	100	90	97	94	92	104	100	96	99		97
	7/14/03	100	95	91	100	96	104	99	89	100	99		97
	8/13/03	79	77	88	64	78	66	76	89	74			77
	8/25/03	94	86	92	91	89	84	89	83	74	86		87
	9/22/03	85	102	99	92	96	90	93	93	85	95		93
KSSN04	5/13/02	82	91	90	90	93	87	88	87	90	88		89
	6/10/02	89	87	87	89	90	81	88	85	92	87	90	88
	7/8/02	83	93	80	85	84	90	88	85	86	83		86
	8/5/02	84	85	79	82	89	82	88	83	84	82		84
	8/20/02	85	90	80	85	87	82						85
	9/16/02	71	77	85	87	90	83	86	75	80	80		81
	5/19/03	86	84	77	69	72	83	78	81	79	87		80
	6/16/03	82	87	85	77	84	82	70	78	75	83		80
	7/14/03	87	81	75	83	68	83	79	80	85	80		80
	8/25/03	85	90	77	84	81	80	78	77	81	86		82
	9/22/03	77	82	92	78	85	77	85	84	81	77		82

Table C-9 Butter Clam Shell Lengths (mm)

Station	Date	Size of Individual Clams Comprising Composite Sample (mm)												Composite sample mean shell length (mm)
KSSN05	8/20/02	70	69	76	71	82	70	70	73	77	75			
		65	71	68	74	65								72
	5/19/03	84	80	73	59	63	63	72	66	67	67			69
	6/16/03	70	68	76	70	71	67	70	73	83	71			72
	7/14/03	52	78	78	68	69	71	59	59	82	80			70
	8/12/03	87	89	87	85	76	75	74						82
	8/25/03	74	76	75	62	75	72	64	67	70	71			71
	9/22/03	66	78	70	62	69	65	73	68	65	62			68
LSKR01	5/13/02	74	63	63	73	65	62	60	65	73	69			67
	6/11/02	94	85	92	89	85	82	89	84	89	95			88
	7/9/02	71	75	72	79	81	72	71	74	69	71			74
	8/5/02	60	73	67	70	69	60	75	58	61	65			66
	8/20/02	79	71	68	84	73	68	70	69	74	77	77	72	74
	9/17/02	76	78	60	59	78	56	67	64	72	64			67
	5/19/03	96	87	88	89	98	91	92	86	84	80			89
	6/16/03	69	86	80	70	78	68	73	84	75	79			76
	7/14/03	89	83	93	72	89	79	86	94	85	75			85
	8/25/03	74	68	77	80	74	65	90	69	74	82			75
	9/22/03	85	86	90	90	81	78	85	83	85	95			86
LSKS01	8/13/03	91	89	83	85	91	85	91	85	87				87
MTEC01	5/14/02	89	90	99	107	91	89	92	93	89	90			93
	6/11/02	97	96	100	102	98								99
	7/8/02	93	95	92	110	110	115	91	97	98	102			100
	8/5/02	93	93	95	96	96	90	102	96	91	93			95
	9/16/02	107	96	108	92	81	85	102	97	95	101			96
MSJL01	5/14/02	72	77	67	65	74	74	66	64	75	66			70
	5/14/02	67	72	68	65	76	72	74	72	78	77			72
	6/10/02	92	80	72	85	100	91	88	78	80	65			83
	7/8/02	72	73	80	68	71	73	71	68	66	68			71
	7/8/02	72	56	72	63	65	75	68	63	68	66			67
	8/6/02	82	78	82	83	80	82	84	88	82	77			82
	8/21/02	84	70	62	80	82	70	69	63	65	62			
		71	67	70	62	67	80	100	78					72
	9/16/02	86	83	68	78	75	84	65	72	83	82			78
	5/20/03	92	90	90	89	91	97	81	96	87	92			91
	6/17/03	92	68	87	71	97	65	80	63	93	66			78
	7/14/03	77	59	77	71	80	75	77	71	63	70			72
	8/11/03	93	91	90	87	92	88	86	80					88
	8/25/03	69	76	78	79	77	79	76	68	76	80			76
	9/23/03	73	80	73	68	62	75	70	77	65	66			71
MTLD03	5/13/02	73	67	84	85	60	77	78	62	74	76			74
	6/11/02	72	64	66	60	61	57	71	62	88	83			68
	7/8/02	70	62	72	93	72	78	72	72	80	78	84		76
	8/21/02	72	79	74	71	74	62	79	71	74	75			
		65	78	67	70	76	66	58	62					71
	8/21/02	54	66	65	86	66	70	67	71	76	78			
		72	65	70	74	66	65	65	55					68
	9/16/02	78	71	70	65	77	65	65	70	65	72			70

Table C-9 Butter Clam Shell Lengths (mm)

Station	Date	Size of Individual Clams Comprising Composite Sample (mm)										Composite sample mean shell length (mm)
MTLD03 (cont.)	9/16/02	65	67	68	60	65	72	75	71	70	64	68
	5/19/03	97	96	98	97	102	98	96	100	98	89	97
	5/19/03	103	94	94	106	94	99	103	92	99	100	98
	6/16/03	83	81	79	83	83	78	74	81	75	78	80
	6/16/03	91	62	63	62	91	86	70	86	67	69	75
	7/14/03	108	74	97	71	71	62	69	70	66	70	76
	7/14/03	94	91	96	94	93	92	89	98	91	99	94
	8/5/03	72	79	77	60	71	69	74	78	71	70	72
	8/5/03	74	82	76	68	65	75	65	62	72		71
	8/11/03	84	86	77	88	78	82	81	78	79	86	82
	8/11/03	73	73	75	86	72	72	68	69	73	72	73
	8/25/03	82	81	70	85	80	88	94	72	70	81	80
	8/25/03	89	84	82	88	81	82	75	86	77	83	83
	9/23/03	102	73	71	70	83	70	94	94	98	75	83
	9/23/03	74	75	80	76	79	85	79	73	80	70	77
MSSM05	5/14/02	87	73	90	83	65	83	87	86	88	71	81
	6/10/02	62	85	81	82	83	88	63	76	65	75	76
	6/10/02	74	83	71	79	93	73	70	73	85	82	78
	7/8/02	68	90	87	86	89	78	80	77	65	69	79
	8/6/02	77	71	79	69	72	73	81	74	89	74	76
	9/16/02	80	76	90	71	58	92	75	85	68	63	76
	5/20/03	96	91	102	90	95	91	97	89	89	92	93
	6/17/03	94	103	80	88	79	107	89	84	92	81	90
	7/14/03	95	87	78	102	96	97	97	89			93
	8/25/03	71	84	84	85	74	89	85	80	86	76	81
	9/23/03	85	79	85	80	82	85	83	86	76	76	82

APPENDIX D

ALGAE MONITORING DATA

D-1 2002 Metals
D-2 2003 Metals

Table D-1
2002 Macroalgae Results
Metals

	KSHZ03			KSSN04			KSSN05			LSKR01		
	8/8/2002			8/8/2002			8/8/2002			8/8/2002		
	14.1% Solids			10.0% Solids			11.5% Solids			15.7% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	32.4	230	1	31.7	317	1	178	1,550	1	11.2	71.3	0.99
Arsenic	0.698	4.95	0.075	0.710	7.10	0.075	0.94	8.17	0.075	0.81	5.16	0.075
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.0396	0.281	0.004	0.0431	0.431	0.004	0.0652	0.567	0.004	0.0374	0.238	0.004
Chromium	0.11	0.78	0.05	0.13	1.3	0.05	0.465	4.04	0.05	0.062	0.39	0.049
Copper	1.28	9.08	0.04	0.887	8.87	0.04	2.11	18.3	0.04	1.6	10.2	0.04
Iron	51.4	365	0.5	74.5	745	0.5	275	2,390	0.5	34.6	220	0.49
Lead	0.032	0.23	0.008	0.0840	0.840	0.008	0.103	0.896	0.008	0.038	0.24	0.008
Manganese	2.58	18.3	0.02	2.39	23.9	0.02	33.6	292	0.02	9.5	60.5	0.02
Mercury	<MDL	<MDL	0.004	<MDL	<MDL	0.0040	<MDL	<MDL	0.0039	<MDL	<MDL	0.0038
Nickel	0.39	2.8	0.2	0.28	2.8	0.2	0.66	5.7	0.2	0.44	2.8	0.2
Selenium	<MDL	<MDL	0.22	<MDL	<MDL	0.23	<MDL	<MDL	0.22	<MDL	<MDL	0.22
Silver	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Zinc	1.21	8.58	0.05	1.54	15.4	0.05	2.18	19.0	0.05	1.68	10.7	0.049

	MSJL01			ITOCEANAVE			JSVW04			KSLU03		
	8/8/2002			8/8/2002			8/8/2002			8/8/2002		
	8.7% Solids			9.7% Solids			12.4% Solids			6.3% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	17.3	199	1	7.87	81.1	1	37.4	302	1	69.2	1,100	0.99
Arsenic	0.562	6.46	0.075	0.675	6.96	0.075	0.759	6.12	0.075	0.34	5.4	0.075
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.0679	0.780	0.004	0.115	1.19	0.004	0.089	0.718	0.004	0.0432	0.681	0.004
Chromium	0.094	1.1	0.05	<MDL	<MDL	0.05	0.11	0.89	0.05	0.23	3.6	0.05
Copper	1.01	11.6	0.04	0.428	4.41	0.04	1.36	11.0	0.04	1.57	24.8	0.04
Iron	44.4	510	0.5	15.9	164	0.5	59.1	477	0.5	114	1,810	0.5
Lead	0.028	0.32	0.008	<MDL	<MDL	0.008	0.036	0.29	0.008	0.121	1.91	0.008
Manganese	10	115	0.02	1.5	15.5	0.02	2.46	19.8	0.02	3.57	56.7	0.02
Mercury	<MDL	<MDL	0.0036	<MDL	<MDL	0.004	<MDL	<MDL	0.0038	<MDL	<MDL	0.0037
Nickel	0.54	6.2	0.2	<MDL	<MDL	0.2	0.5	4.0	0.2	0.32	5.0	0.2
Selenium	<MDL	<MDL	0.22	<MDL	<MDL	0.23	<MDL	<MDL	0.22	<MDL	<MDL	0.22
Silver	<MDL	<MDL	0.008	<MDL	<MDL	0.008	0.0094	0.076	0.008	<MDL	<MDL	0.008
Zinc	1.58	18.2	0.05	0.619	6.38	0.05	1.74	14.0	0.05	1.22	19.2	0.05

mg/Kg - Milligrams per kilogram (parts per million).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

Table D-1
2002 Macroalgae Results
Metals

	KSYV02			MTLD03		
	8/8/2002			8/8/2002		
	10.6% Solids			15.5% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	29.2	275	1	25	161	1
Arsenic	0.559	5.27	0.075	0.783	5.05	0.075
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.017	0.16	0.004	0.0338	0.218	0.004
Chromium	0.098	0.92	0.05	0.091	0.59	0.05
Copper	1.8	17.0	0.04	1.64	10.6	0.04
Iron	74.4	702	0.5	147	948	0.5
Lead	0.0869	0.820	0.008	0.184	1.19	0.008
Manganese	4.04	38.1	0.02	12.5	80.6	0.02
Mercury	<MDL	<MDL	0.0036	<MDL	<MDL	0.004
Nickel	0.21	2.0	0.2	0.57	3.7	0.2
Selenium	<MDL	<MDL	0.22	<MDL	<MDL	0.22
Silver	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Zinc	2.02	19.1	0.05	1.42	9.16	0.05

mg/Kg - Milligrams per kilogram (parts per million).

MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.

Table D-2
2003 Macroalgae Results
Metals

	KSHZ03			KSSN04			KSSN05			LSKR01		
	8/12/2003			8/13/2003			8/13/2003			8/13/2003		
	7.9% Solids			9.1% Solids			8.4% Solids			9.7% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	13.4	170	1	43.2	474	1	67.2	800	0.99	14.0	144	0.99
Arsenic	0.73	9.18	0.10	0.83	9.08	0.10	0.53	6.29	0.10	0.75	7.73	0.10
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.074	0.94	0.004	0.075	0.83	0.004	0.048	0.57	0.004	0.086	0.89	0.004
Chromium	<MDL	<MDL	0.05	0.10	1.14	0.05	0.18	2.14	0.05	<MDL	<MDL	0.05
Copper	0.50	6.35	0.04	0.60	6.55	0.04	0.70	8.30	0.04	0.48	4.97	0.04
Iron	33.7	427	0.5	80.1	880	0.5	104	1,238	0.5	26.5	273	0.5
Lead	0.024	0.30	0.008	0.063	0.70	0.008	0.034	0.40	0.008	0.018	0.19	0.008
Manganese	5.45	69.0	0.02	2.26	24.8	0.02	3.45	41.1	0.02	3.20	33.0	0.02
Mercury	<MDL	<MDL	0.004	<MDL	<MDL	0.004	<MDL	<MDL	0.004	<MDL	<MDL	0.0039
Nickel	0.21	2.66	0.2	0.29	3.19	0.2	0.32	3.81	0.2	0.26	2.68	0.2
Selenium	<MDL	<MDL	0.06	<MDL	<MDL	0.06	<MDL	<MDL	0.06	<MDL	<MDL	0.06
Silver	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Zinc	1.27	16.1	0.05	1.66	18.2	0.05	1.09	13.0	0.05	1.14	11.8	0.05

	MSJL01			JSVW04			KSLU03			MTLD03		
	8/11/2003			8/12/2003			8/13/2003			8/13/2003		
	7.8% Solids			8.3% Solids			7.4% Solids			6.2% Solids		
	Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)			Concentration (mg/Kg)		
	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL	Wet Wt.	Dry Wt.	MDL
Aluminum	46.9	601	1	34.0	410	1	8.97	121	0.99	30.6	494	0.99
Arsenic	0.631	8.09	0.10	0.52	6.27	0.10	0.47	6.35	0.10	0.71	11.4	0.10
Beryllium	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Cadmium	0.052	0.67	0.004	0.050	0.60	0.004	0.031	0.42	0.004	0.077	1.24	0.004
Chromium	0.14	1.79	0.05	0.10	1.20	0.05	<MDL	<MDL	0.05	0.071	1.15	0.05
Copper	0.464	5.95	0.04	0.51	6.10	0.04	0.45	6.11	0.04	0.42	6.77	0.04
Iron	89.5	1150	0.5	66.5	801	0.5	35.2	476	0.5	54.1	873	0.5
Lead	0.0408	0.52	0.008	0.052	0.63	0.008	0.027	0.36	0.008	0.087	1.41	0.008
Manganese	6.58	84.4	0.02	2.29	27.6	0.02	1.01	13.6	0.02	6.31	102	0.02
Mercury	<MDL	<MDL	0.0039	<MDL	<MDL	0.0041	<MDL	<MDL	0.004	<MDL	<MDL	0.0039
Nickel	0.54	6.92	0.2	0.40	4.82	0.2	<MDL	<MDL	0.2	0.24	3.87	0.2
Selenium	<MDL	<MDL	0.06	<MDL	<MDL	0.06	<MDL	<MDL	0.06	<MDL	<MDL	0.06
Silver	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008	<MDL	<MDL	0.008
Zinc	1.06	13.6	0.05	1.15	13.9	0.05	0.616	8.32	0.05	0.94	15.2	0.05

mg/Kg - Milligrams per kilogram (parts per million).
MDL - Method detection limit (the concentration at which an analyte can reliably be detected). The MDL column values are in wet weight.
Station Name - Outfall monitoring station.

APPENDIX E

MONITORING STATION LOCATIONS

E-1 2002 Monitoring station locations
E-2 2003 Monitoring station locations

Table E-1
2002 Monitoring Station Locations

Outfall Monitoring Station Locations

Station	Location	Bottom Depth (m)	NAD83 Northing	NAD83 Easting	NAD83 Latitude	NAD83 Longitude
Offshore						
CK200P	Carkeek CSO TP Outfall	54	263862	1257836	47 39 38	122 26 50
KSSK02	West Point TP Outfall	77	245156	1242705	47 39 38	122 26 50
LTBC41	Denny Way CSO Outfall	18	230921	1261799	47 37 02	122 21 44
LSEP01	South TP Outfall	192	223637	1247496	47 36 12	122 25 33
LSKQ06	Alki CSO TP Outfall	48	212165	1248493	47 34 14	122 25 16
VO50E	Vashon TP Outfall	40	169454	1243253	47 27 11	122 26 19
Beach						
KSHZ03	Carkeek Park	--	263736	1259784	47 42 45	122 22 46
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
MSJL01	Vashon Island - Gorsuch Creek	--	169666	1241897	47 27 13	122 26 39

Ambient Monitoring Station Locations

Station	Location	Bottom Depth (m)	NAD83 Northing	NAD83 Easting	NAD83 Latitude	NAD83 Longitude
Offshore						
PTWELLS1	Point Wells	145	290395	1253659	47 47 06	122 24 24
KSBP01	Point Jefferson	260	275214	1247880	47 44 36	122 25 44
KSPS01	Shilshole Bay	20	252601	1250971	47 40 54	122 24 52
KSRU02	Lake Washington Ship Canal	--	247213	1254282	47 40 01	122 24 02
LSCI01	Central Basin	204	228252	1240053	47 36 51	122 27 24
LSCW02	Outer Elliott Bay	183	227106	1256271	47 36 43	122 23 27
LTDF01	Inner Elliott Bay	33	225366	1267270	47 36 28	122 20 46
LTED04	Elliott Bay	90	224199	1264780	47 36 16	122 21 22
LTEH02	Inner Elliott Bay	--	222696	1269069	47 36 02	122 20 19
LTCA02	Inner Elliott Bay	132	226303	1260915	47 36 43	122 23 27
LSML01	West Seattle	247	209645	1242953	47 33 48	122 26 36
LSNT01	Dolphin Point	207	198653	1245194	47 32 00	122 26 00
Beach/Stream						
ITMUKILTSP	Mukilteo State Park	--	348724	1279072	47 56 47	122 18 28
ITPICNICPT	Picnic Point Park	--	324868	1272488	47 52 50	122 19 58
ITMEADOWBP	Meadowdale Beach Park	--	317128	1271813	47 51 34	122 20 05
ITOCEANAVE	Ocean Avenue - Edmonds	--	305093	1262971	47 49 33	122 22 12
ITBRACKETT	Brackett's Landing UW Park	--	300713	1259740	47 48 50	122 22 58
ITEDWARDSPT	Edwards Point	--	297035	1256652	47 48 13	122 23 42
JSVW04	Richmond Beach	--	286171	1257194	47 46 25	122 23 35
ITBOEINGCR	Boeing Creek	--	276958	1259102	47 44 55	122 23 00
ITCARKEEKP	Carkeek Park	--	263756	1259917	47 42 45	122 22 44
KTHA01	Piper's Creek	--	263290	1261108	47 42 41	122 22 27
KSJX02	Blue Ridge Beach Park	--	260178	1256882	47 42 09	122 23 27
KSLU03	Golden Gardens Park	--	256354	1253305	47 41 31	122 24 19
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
0305	West Waterway	--	211346	1265729	47 34 09	122 21 04
0307	Duwamish River	--	195911	1277781	47 31 39	122 18 04
LSGY01	Seacrest Park	--	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	Lincoln Park	--	197288	1253039	47 31 48	122 24 05
LSVW01	Fauntleroy Cove	--	194969	1254846	47 31 26	122 23 38
MTEC01	Seahurst Park	--	174011	1260832	47 27 59	122 22 09
MTLD03	Normandy Park	--	165142	1263285	47 26 33	122 21 26
MSSM05	Vashon Island - Tramp Harbor	--	154907	1243459	47 24 47	122 26 16

MOSS Station

Table E-2
2003 Monitoring Station Locations

Outfall Monitoring Station Locations

Station	Location	Bottom Depth (m)	NAD83 Northing	NAD83 Easting	NAD83 Latitude	NAD83 Longitude
Offshore						
CK200P	Carkeek CSO TP Outfall	54	263862	1257836	47 39 38	122 26 50
KSSK02	West Point TP Outfall	77	245156	1242705	47 39 38	122 26 50
LTBC42	Denny Way CSO Outfall	18	230921	1261799	47 37 02	122 21 44
LSEP01	South TP Outfall	192	223637	1247496	47 36 12	122 25 33
LSKQ06	Alki CSO TP Outfall	48	212165	1248493	47 34 14	122 25 16
VO50E	Vashon TP Outfall	40	169454	1243253	47 27 11	122 26 19
Beach						
KSHZ03	Carkeek Park	--	263736	1259784	47 42 45	122 22 46
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
MSJL01	Vashon Island - Gorsuch Creek	--	169666	1241897	47 27 13	122 26 39

Ambient Monitoring Station Locations

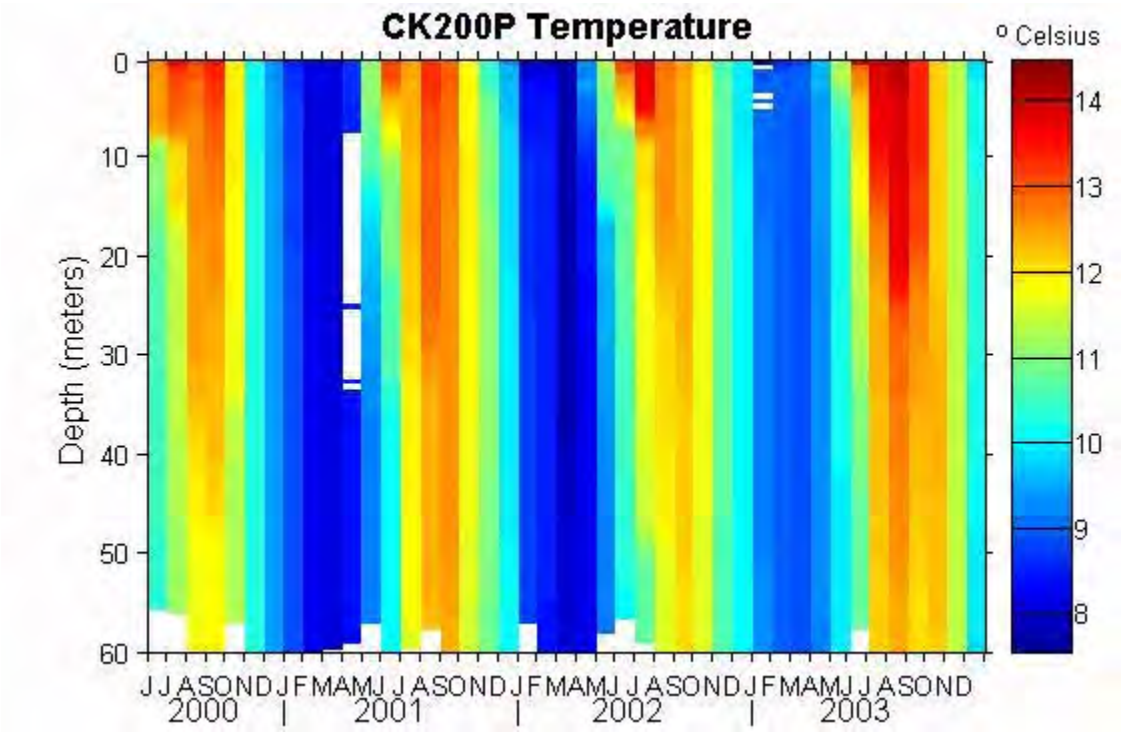
Station	Location	Bottom Depth (m)	NAD83 Northing	NAD83 Easting	NAD83 Latitude	NAD83 Longitude
Offshore						
PTWELLS1	Point Wells	145	290395	1253659	47 47 06	122 24 24
KSBP01	Point Jefferson	260	275214	1247880	47 44 36	122 25 44
LTED04	Elliott Bay	90	224199	1264780	47 36 16	122 21 22
LTEH02	Inner Elliott Bay	--	222696	1269069	47 36 02	122 20 19
LSNT01	Dolphin Point	207	198653	1245194	47 32 00	122 26 00
NSEX01	East Passage	169	134701	1255331	47 21 31	122 23 13
Beach/Stream						
ITEDWARDSPT	Edwards Point	--	297035	1256652	47 48 13	122 23 42
JSVW04	Richmond Beach	--	286171	1257194	47 46 25	122 23 35
ITCARKEEKP	Carkeek Park	--	263756	1259917	47 42 45	122 22 44
KTHA01	Piper's Creek	--	263290	1261108	47 42 41	122 22 27
KSLU03	Golden Gardens Park	--	256354	1253305	47 41 31	122 24 19
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
LSGY01	Seacrest Park	--	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	Lincoln Park	--	197288	1253039	47 31 48	122 24 05
LSVW01	Fauntleroy Cove	--	194969	1254846	47 31 26	122 23 38
MTEC01	Seahurst Park	--	174011	1260832	47 27 59	122 22 09
MTLD03	Normandy Park	--	165142	1263285	47 26 33	122 21 26
MSSM05	Vashon Island - Tramp Harbor	--	154907	1243459	47 24 47	122 26 16

APPENDIX F

CTD Profiles

F-1 Temperature
F-2 Salinity
F-3 Density
F-4 Dissolved oxygen
F-5 Turbidity
F-6 PAR
F-4 Chlorophyll

Figure F-1: Offshore Temperature



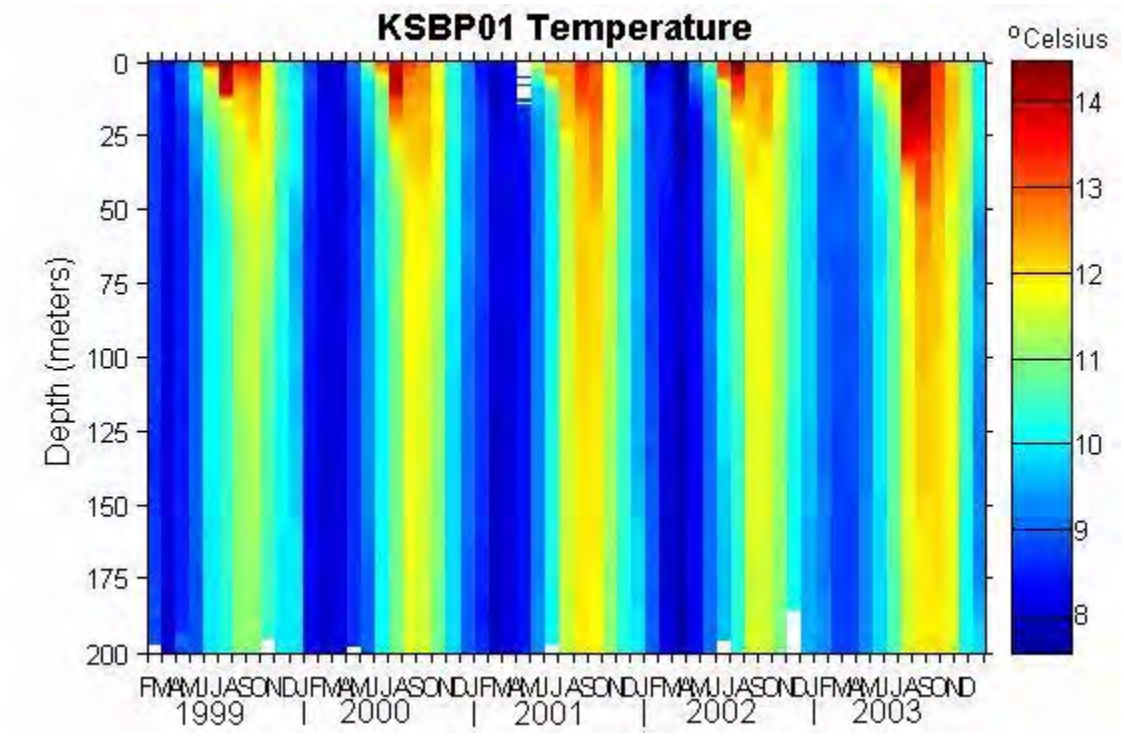
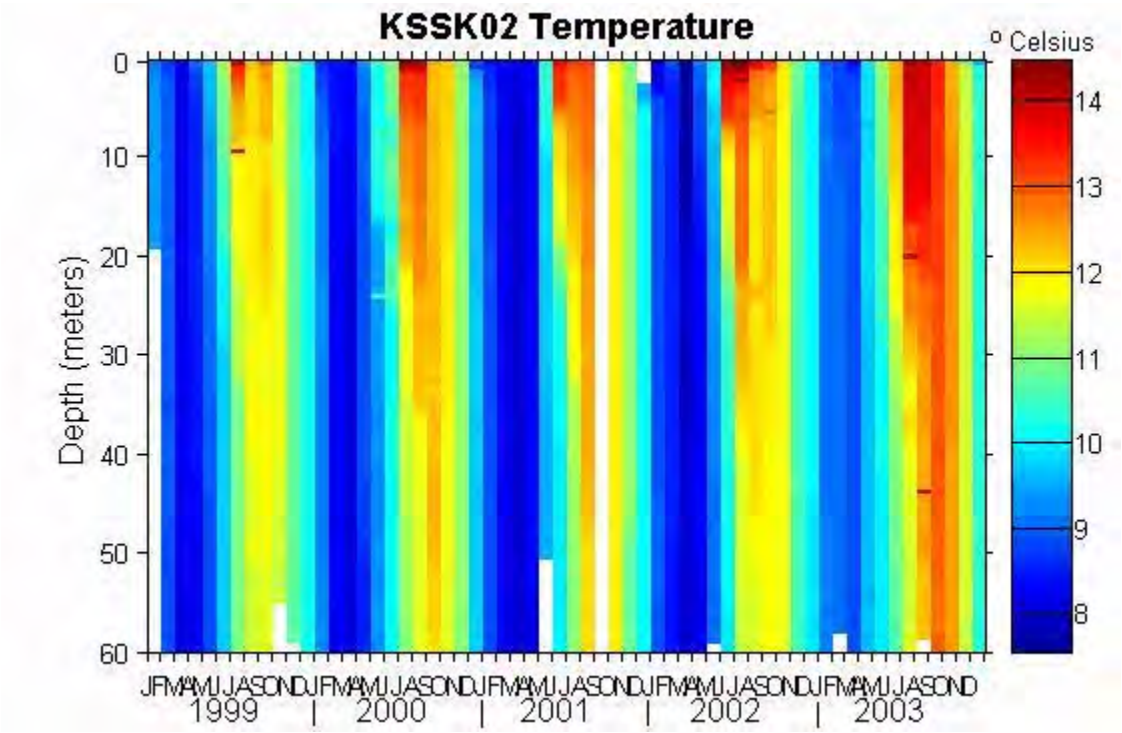


Figure F-1: Offshore Temperature



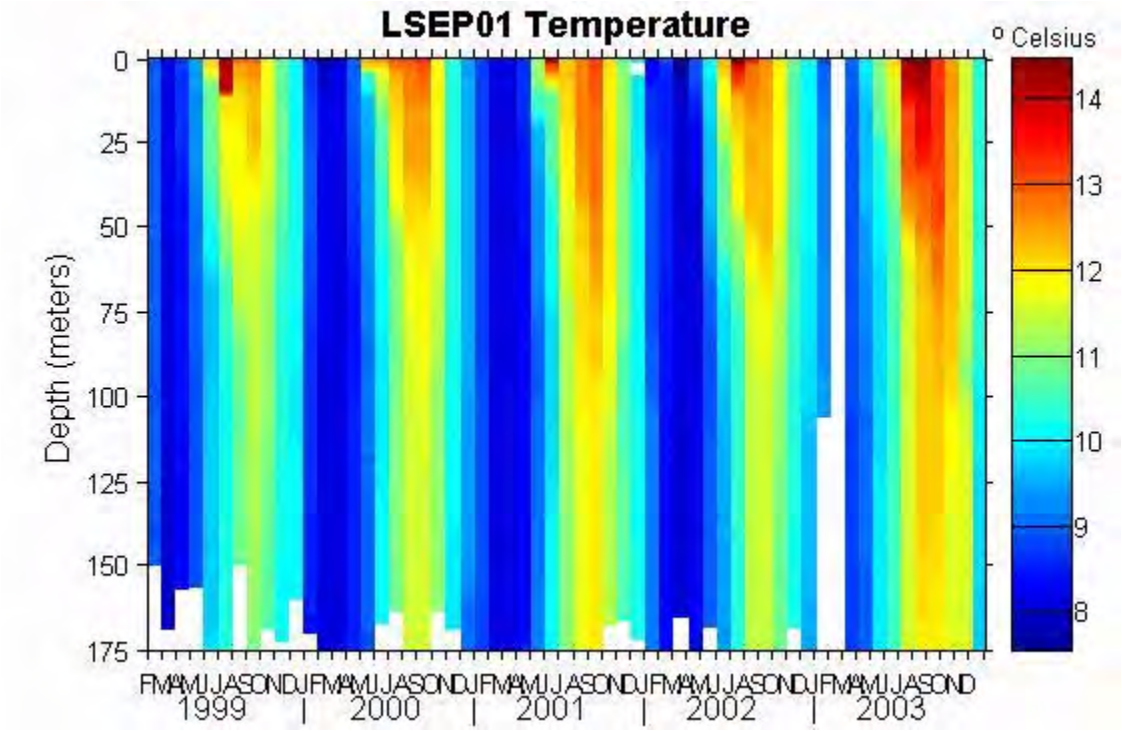
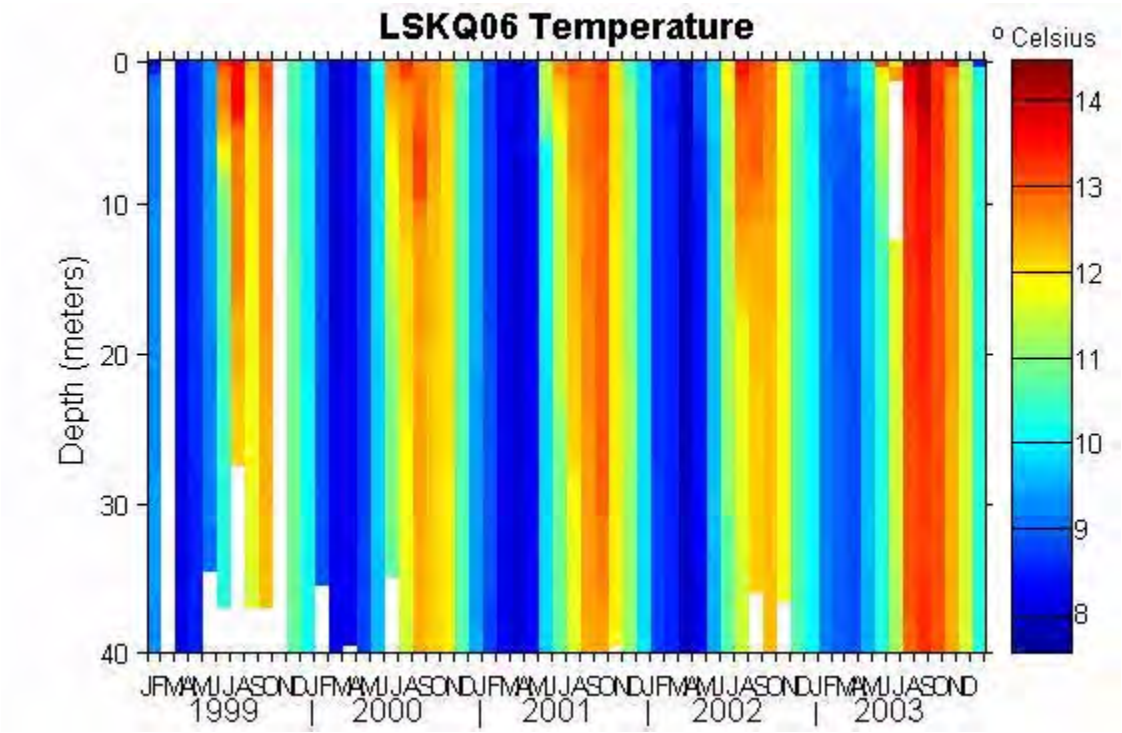


Figure F-1: Offshore Temperature



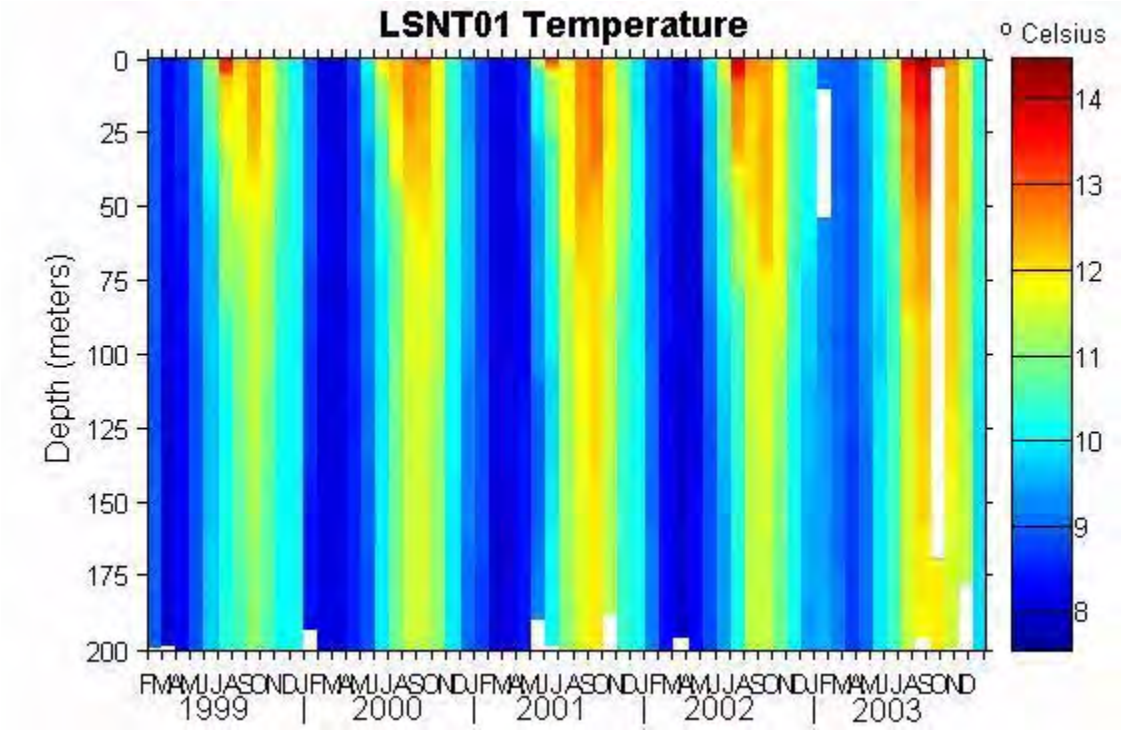
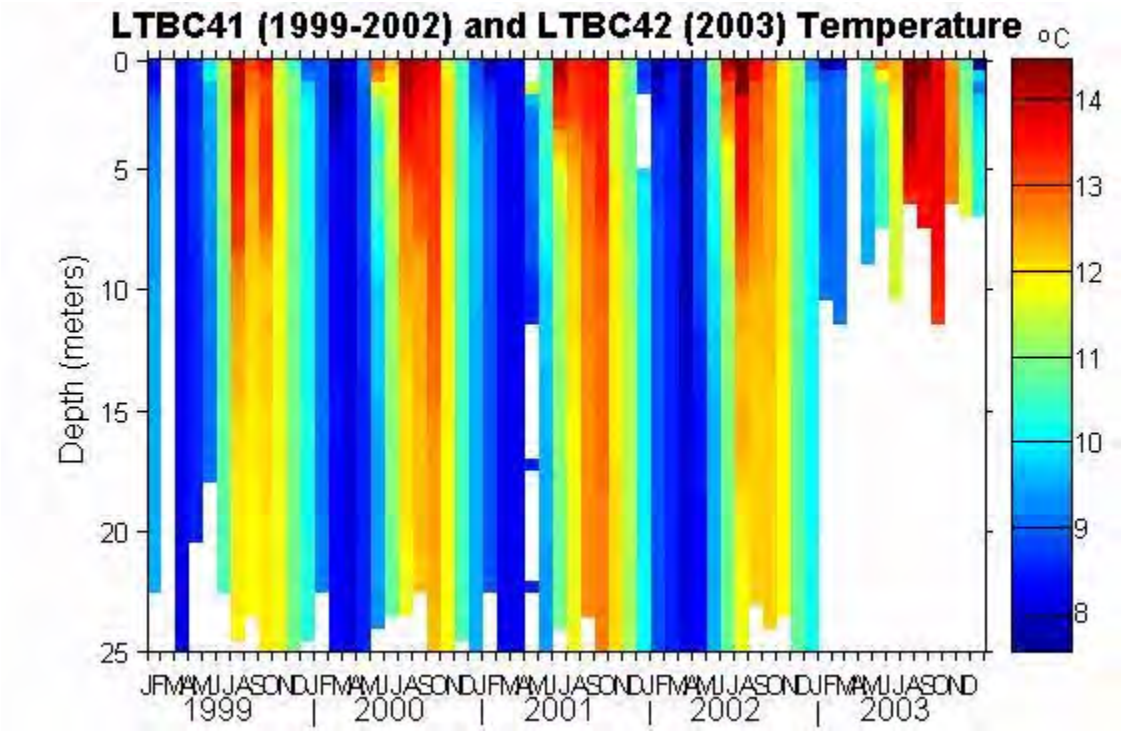


Figure F-1: Offshore Temperature



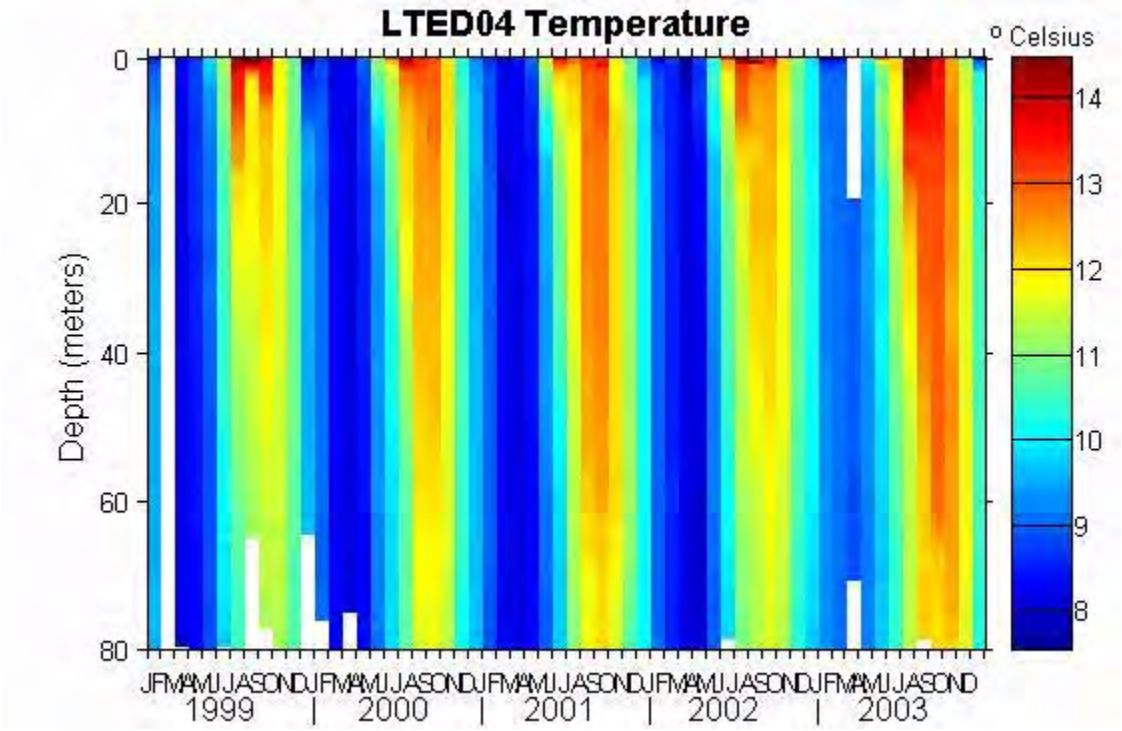
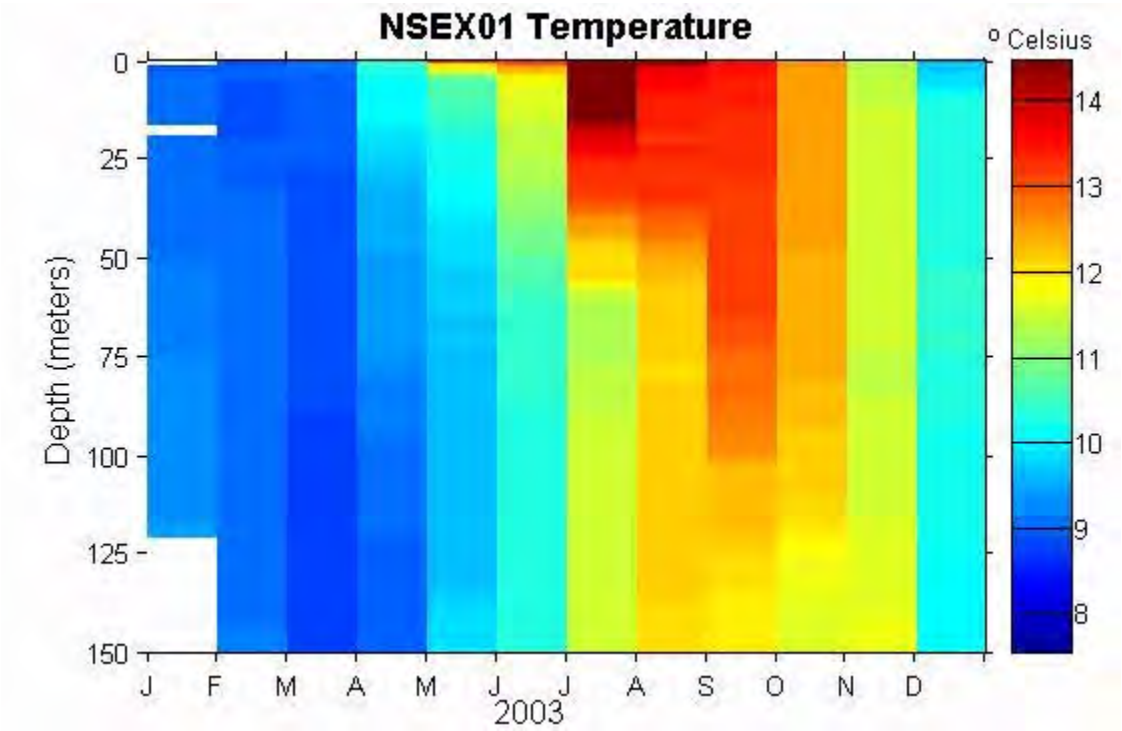


Figure F-1: Offshore Temperature



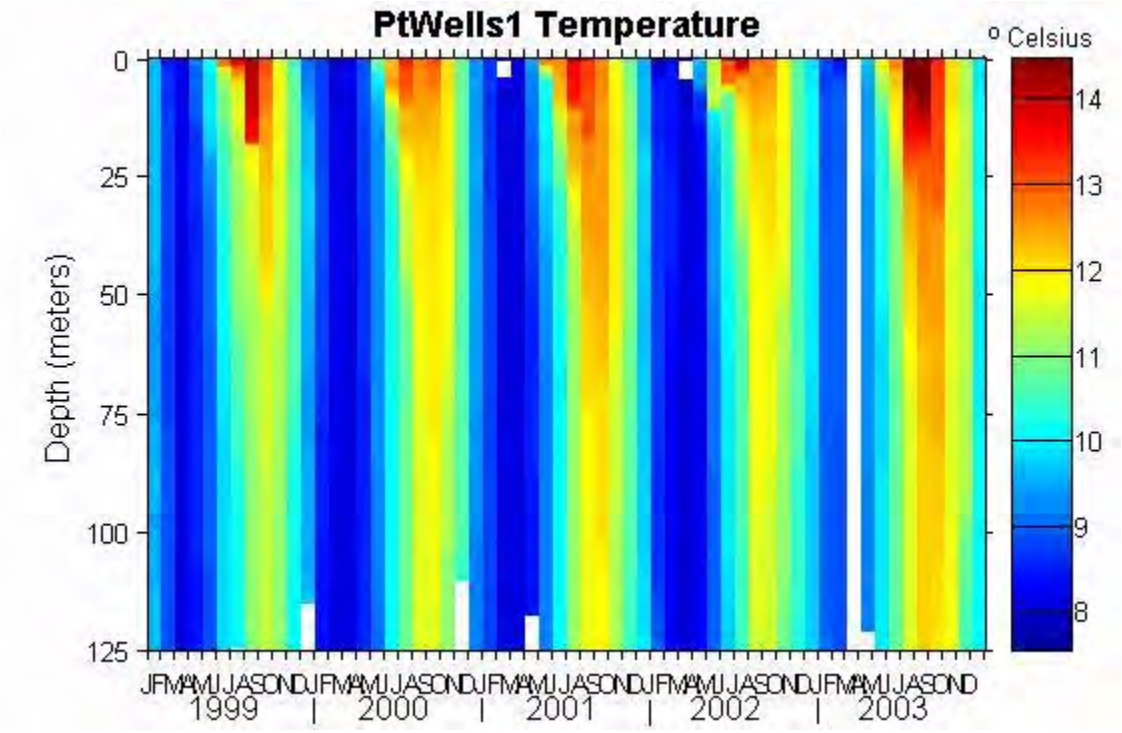


Figure F-1: Offshore Temperature

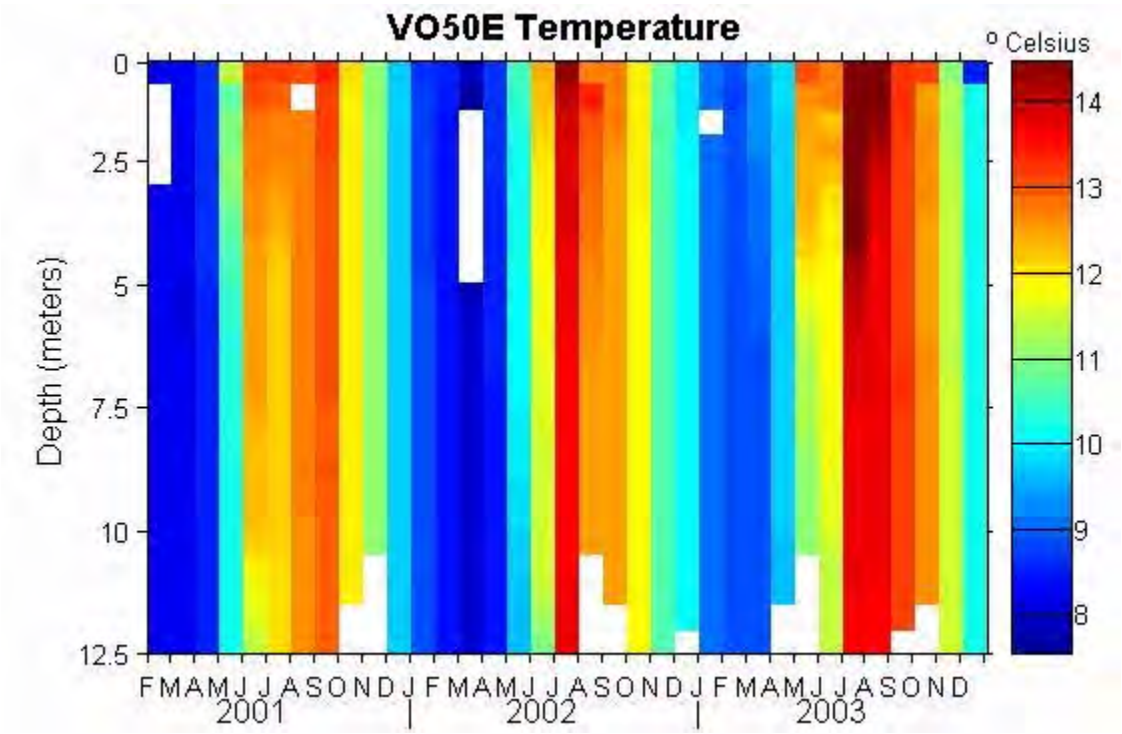


Figure F-2: Offshore Salinity

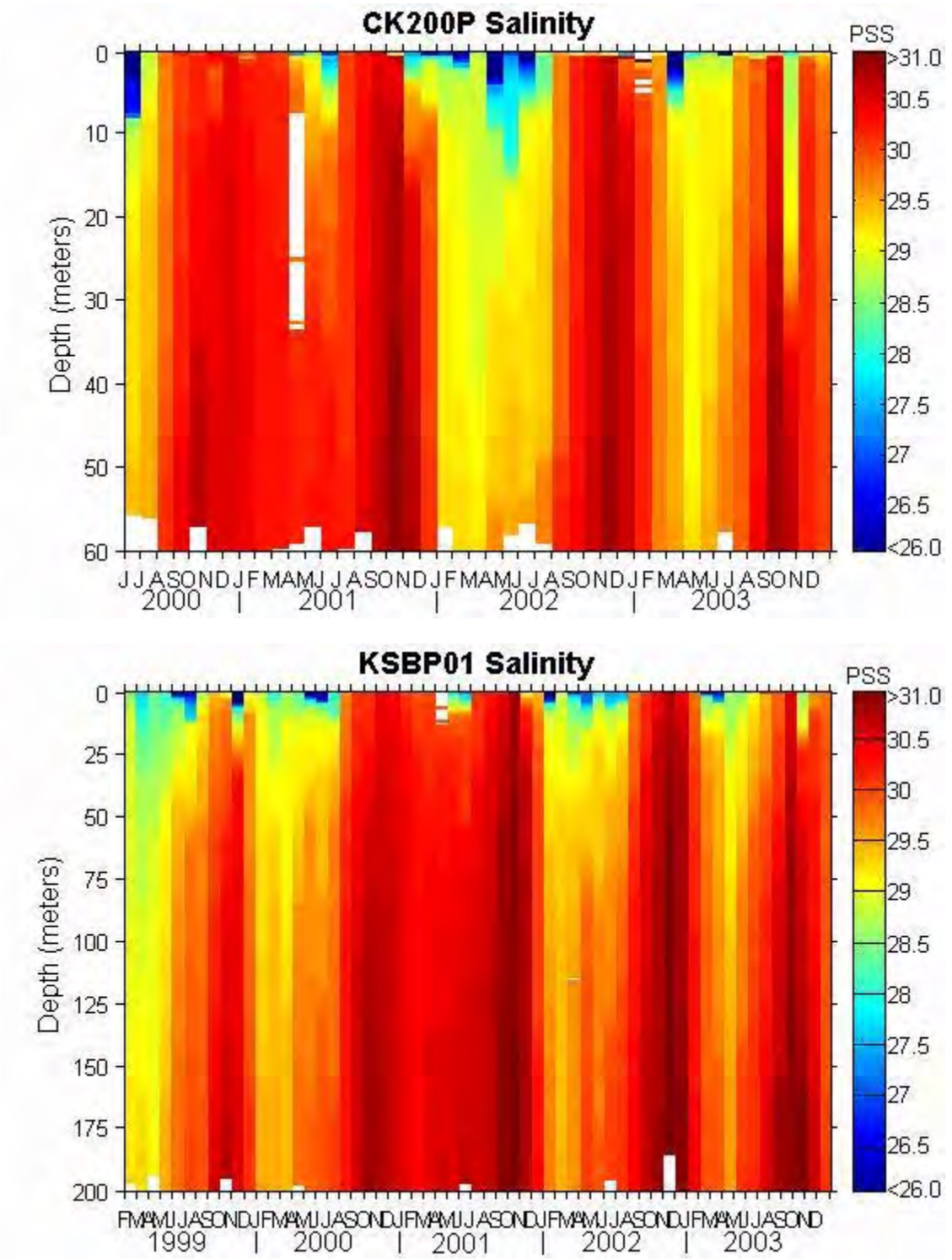


Figure F-2: Offshore Salinity

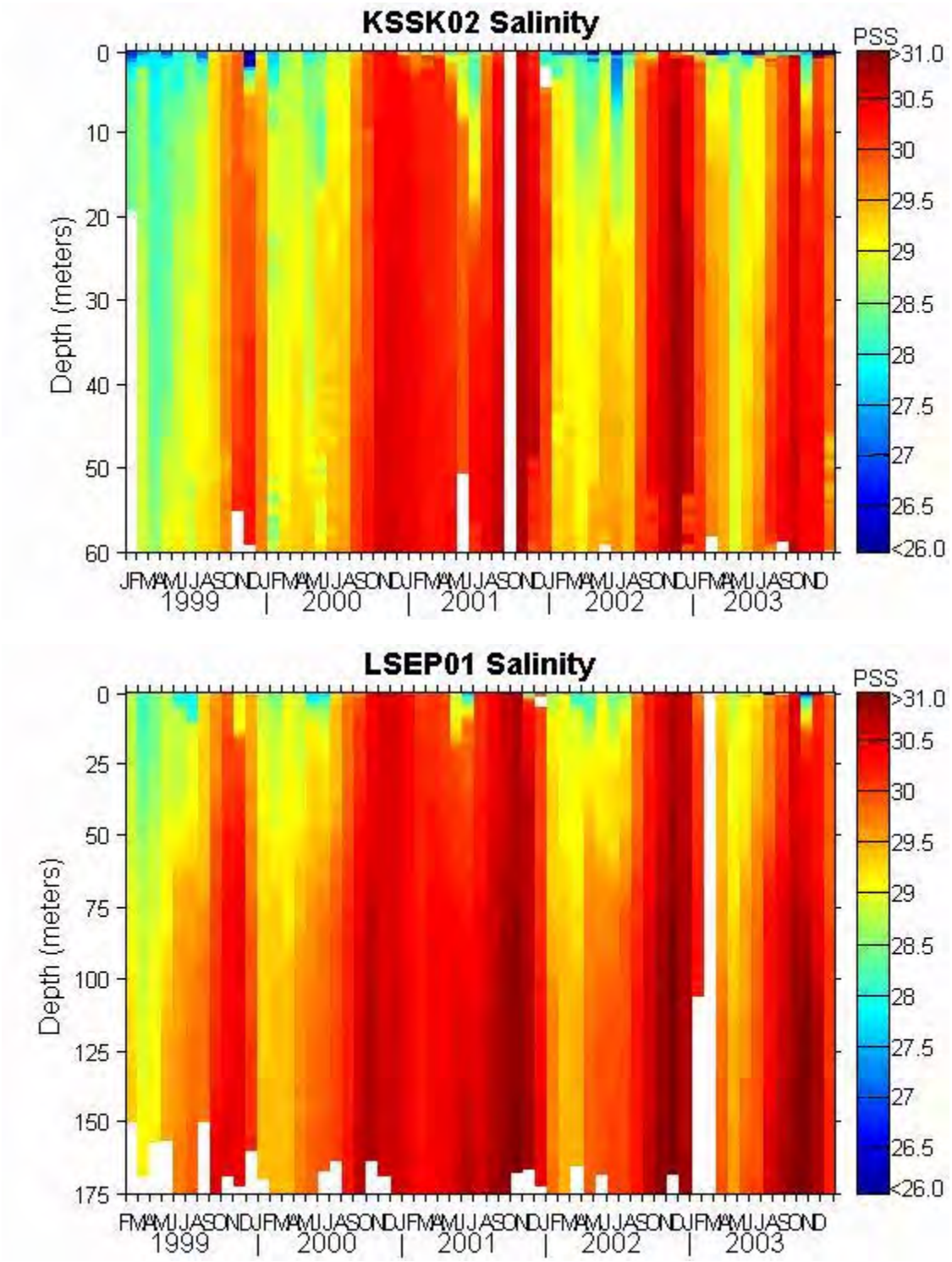


Figure F-2: Offshore Salinity

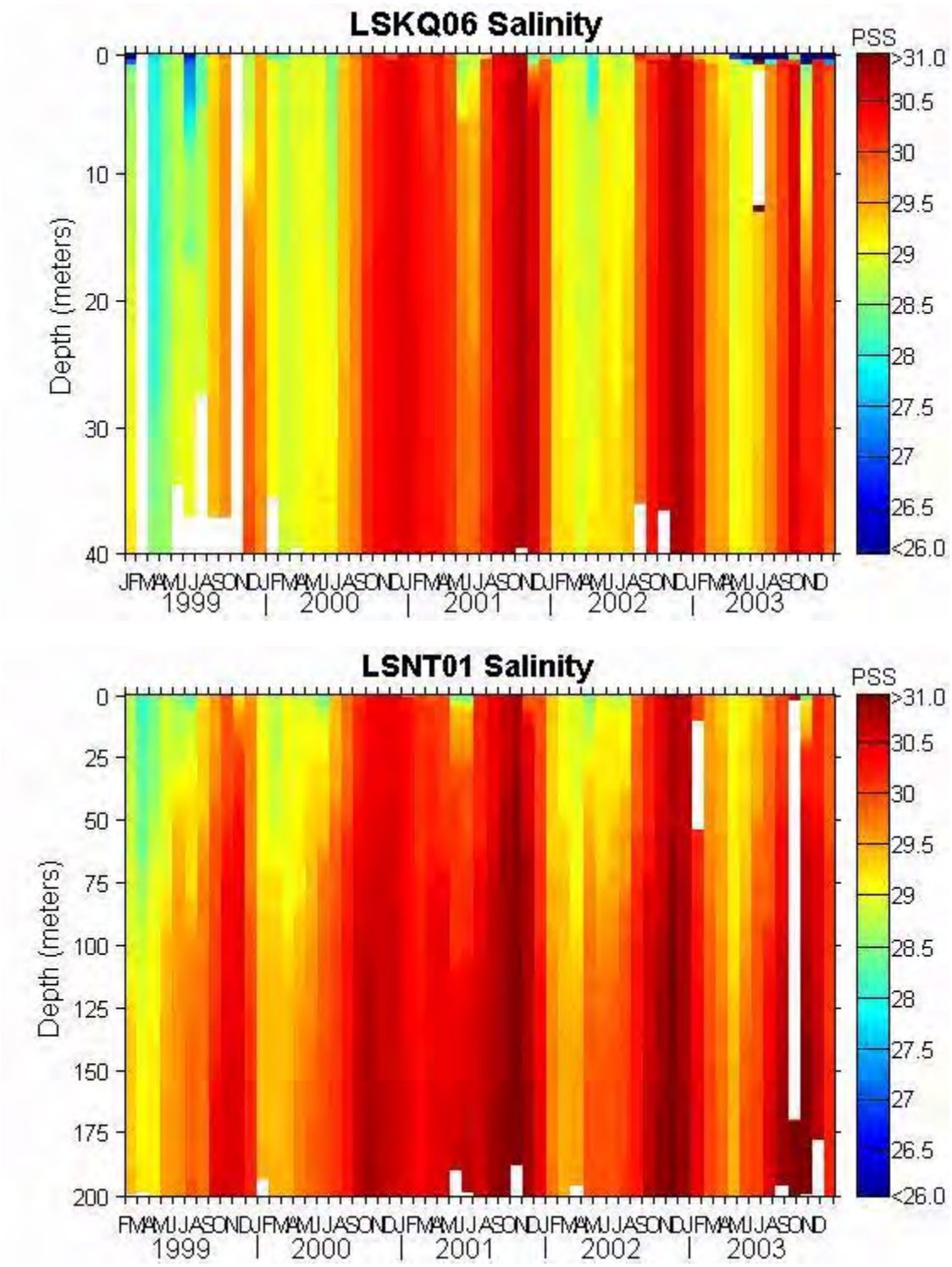
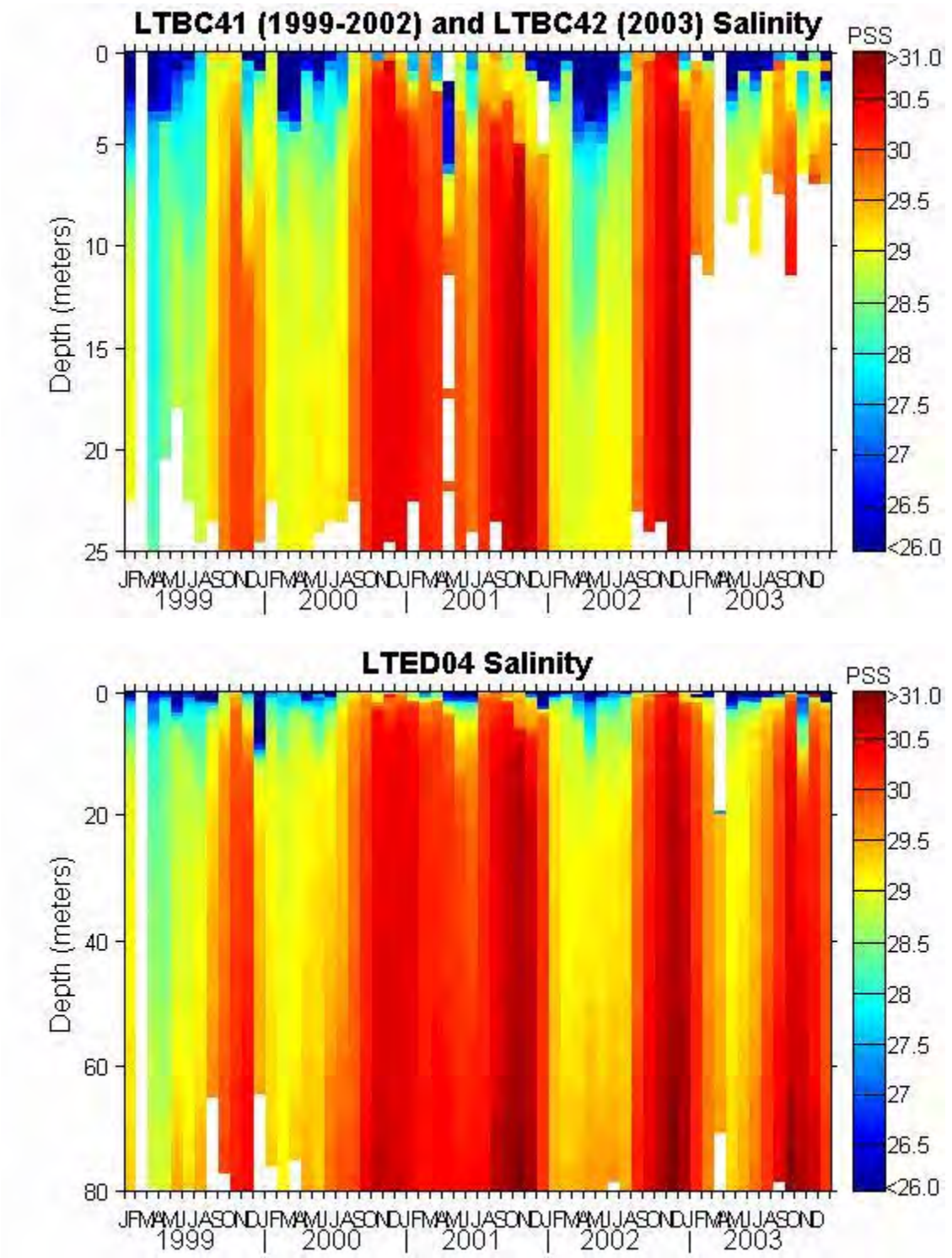


Figure F-2: Offshore Salinity



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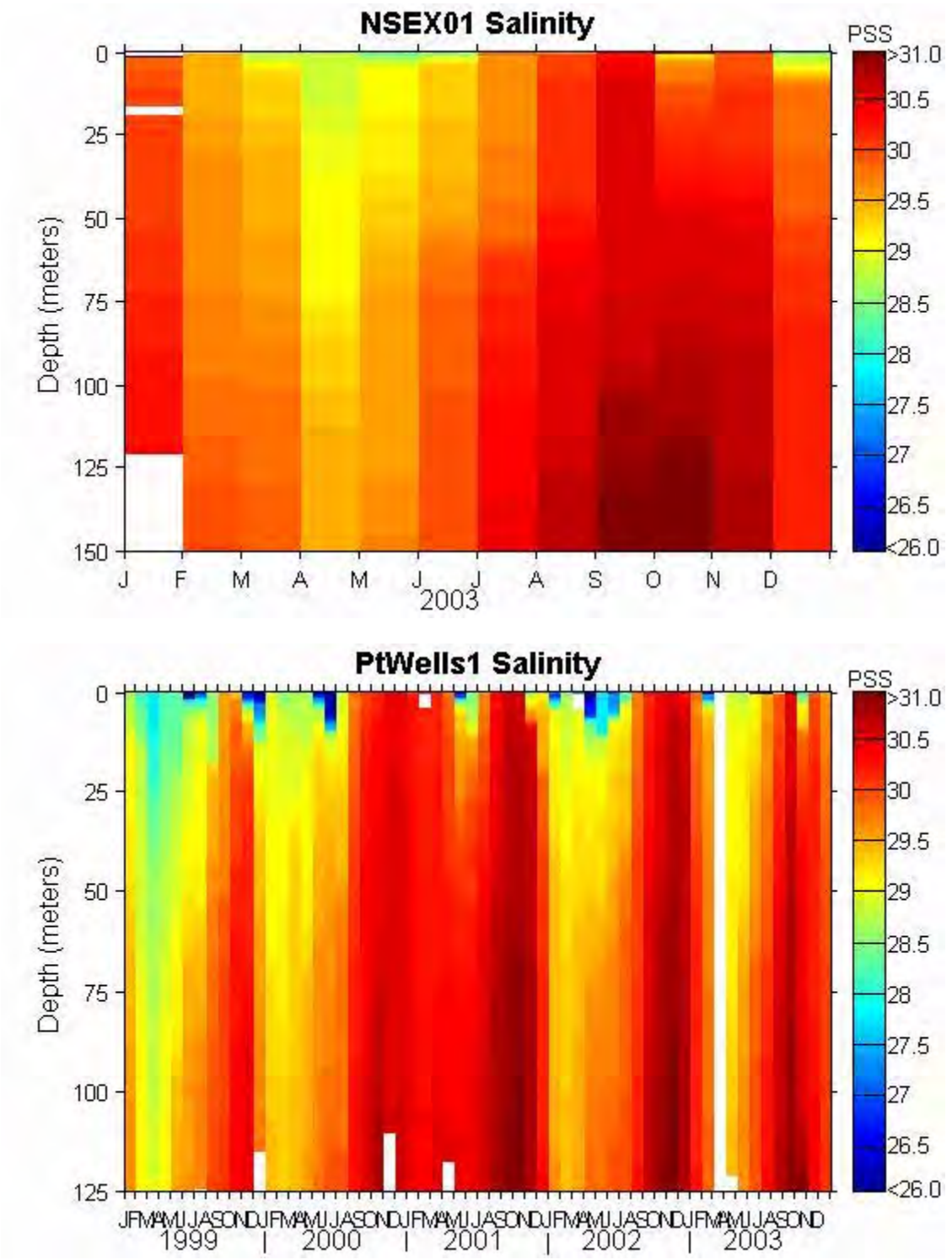
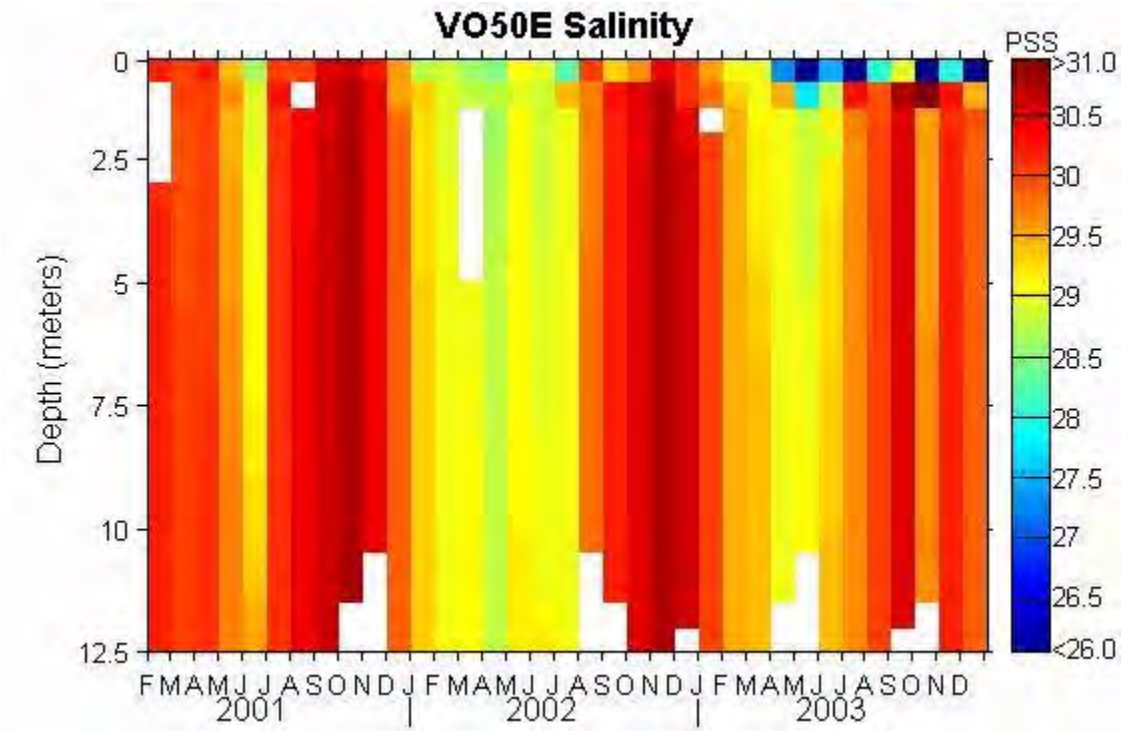


Figure F-2: Offshore Salinity



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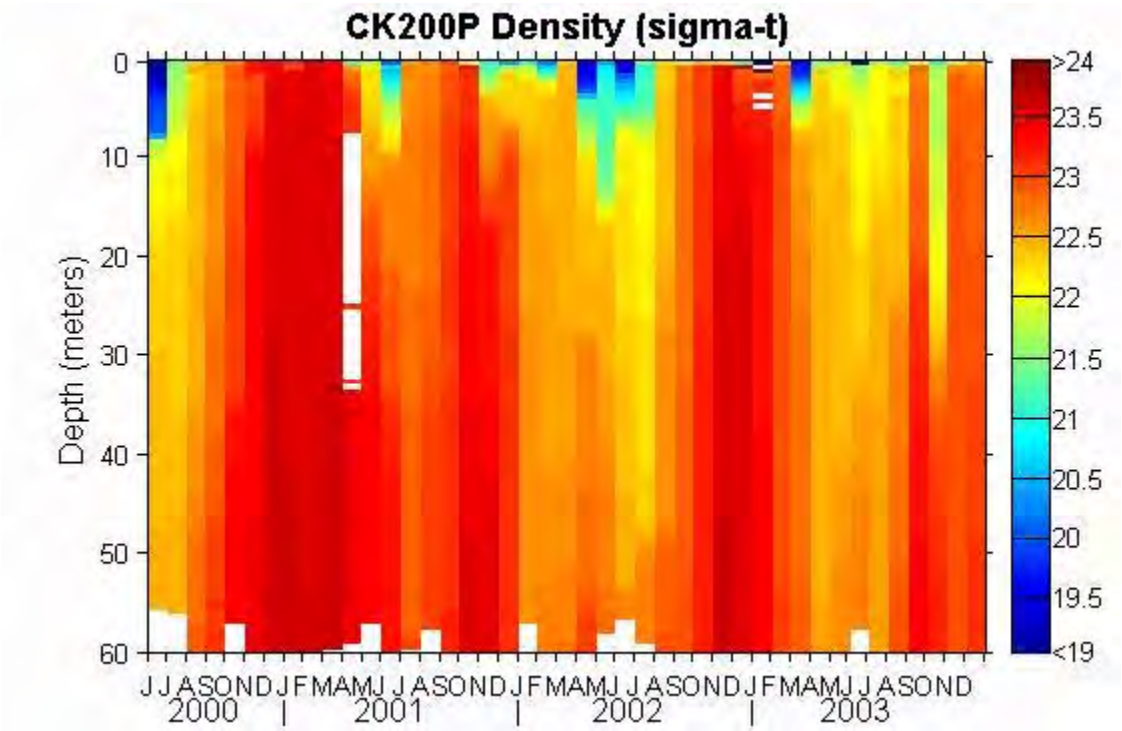

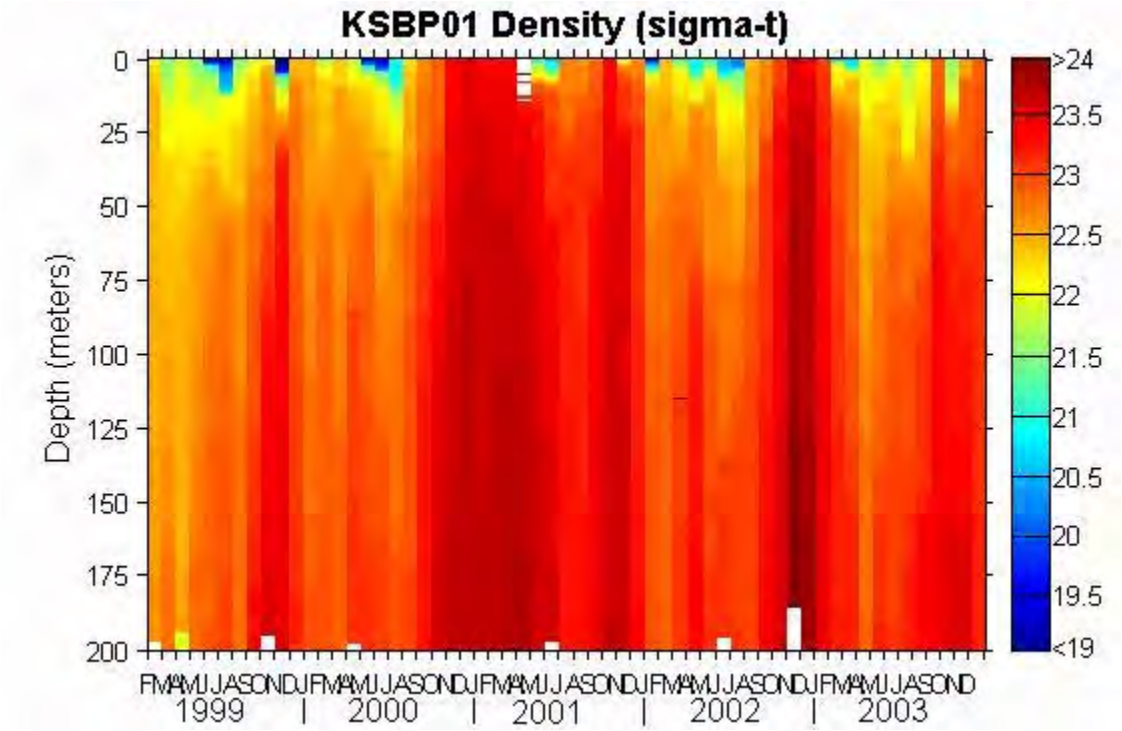

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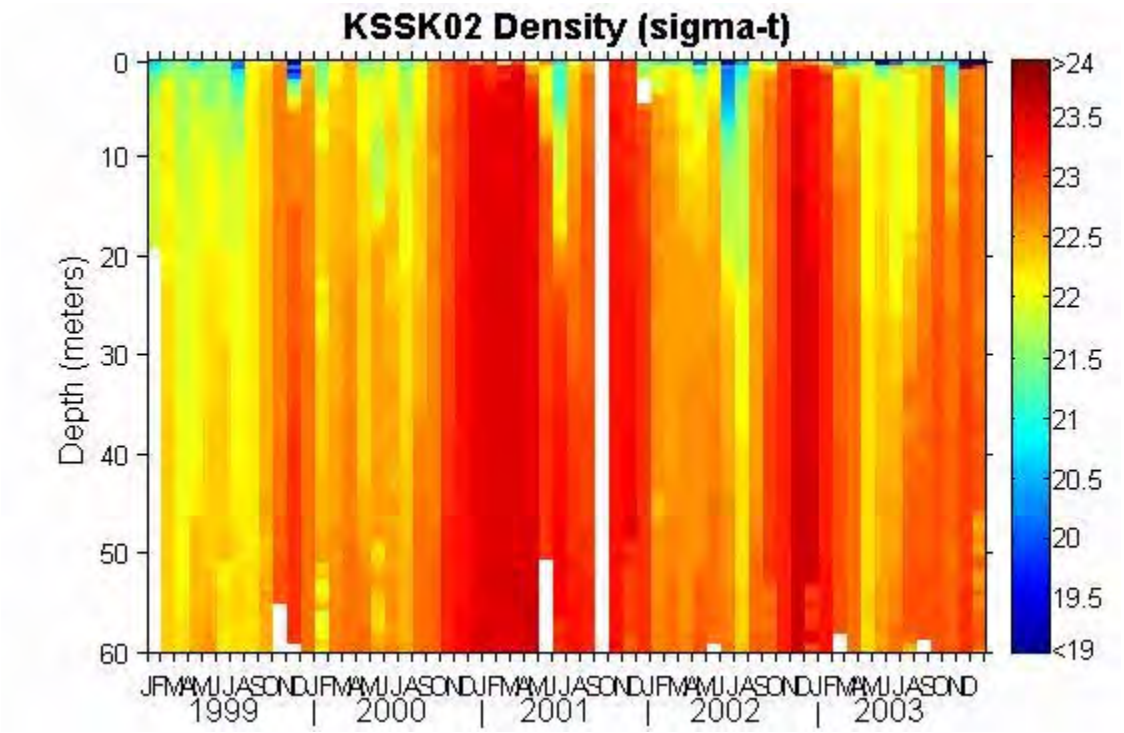

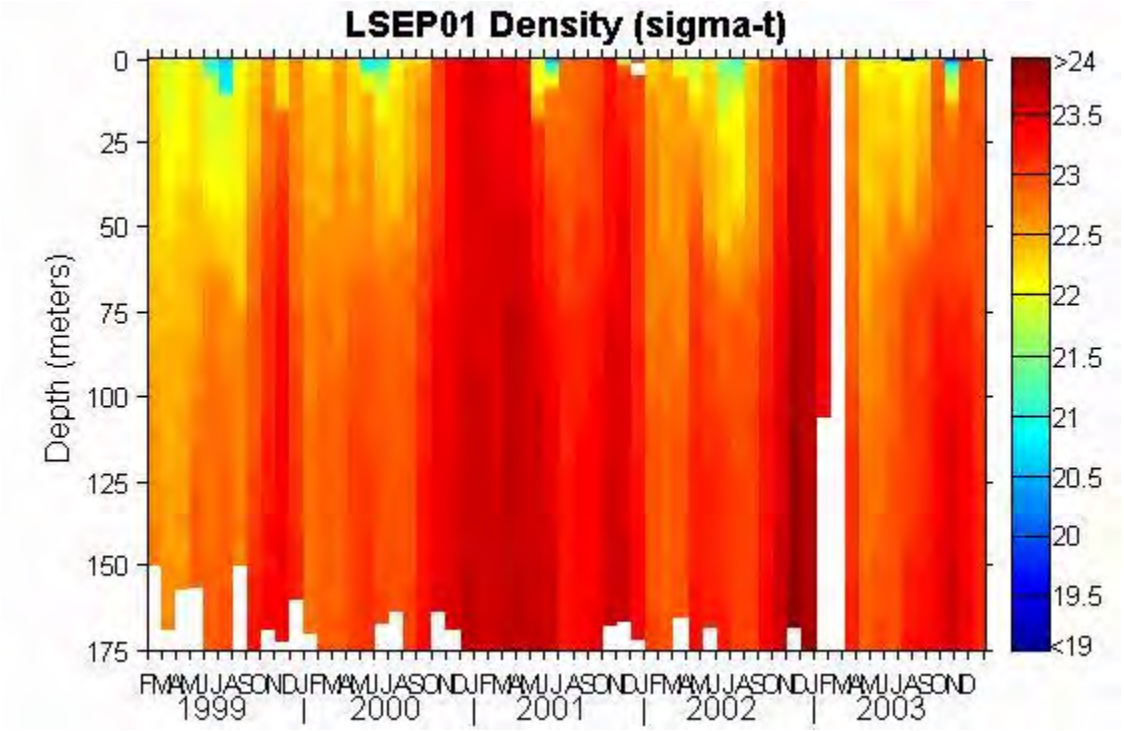

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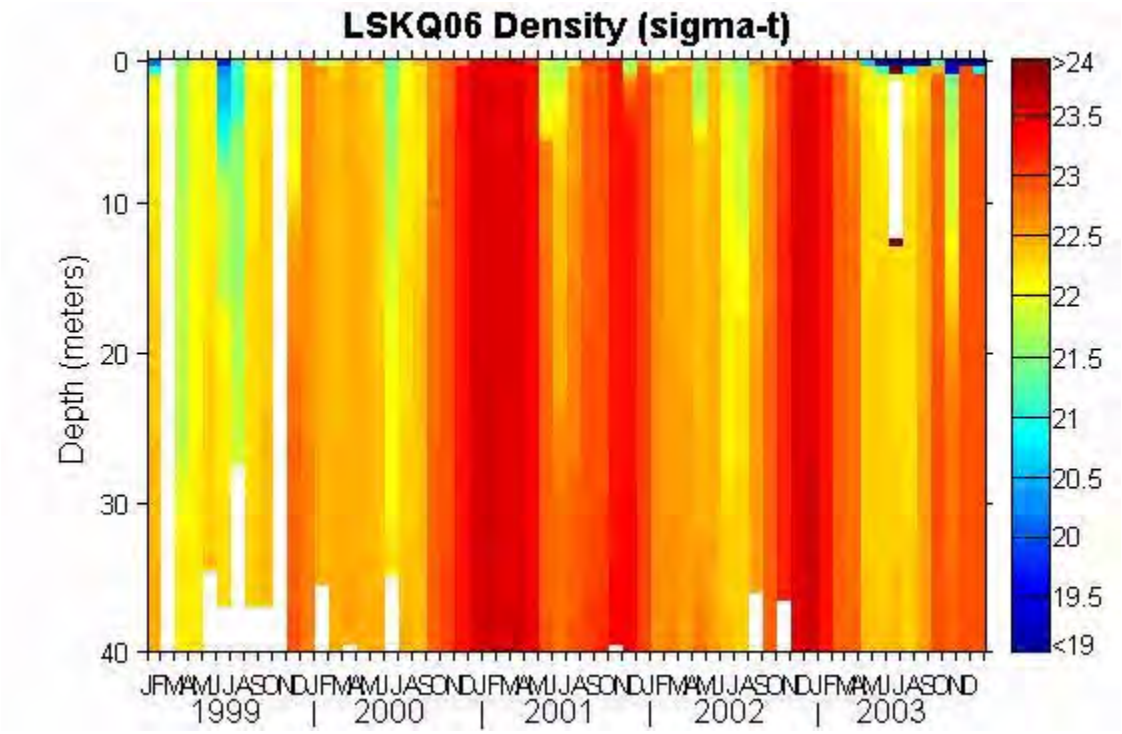

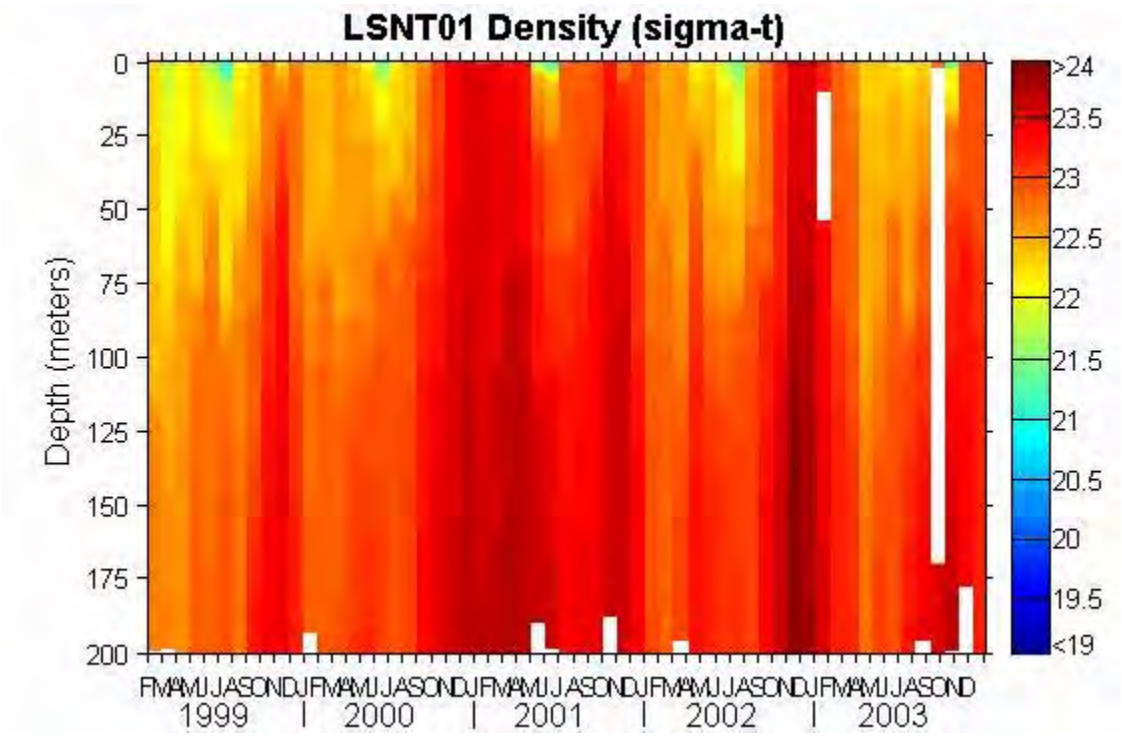

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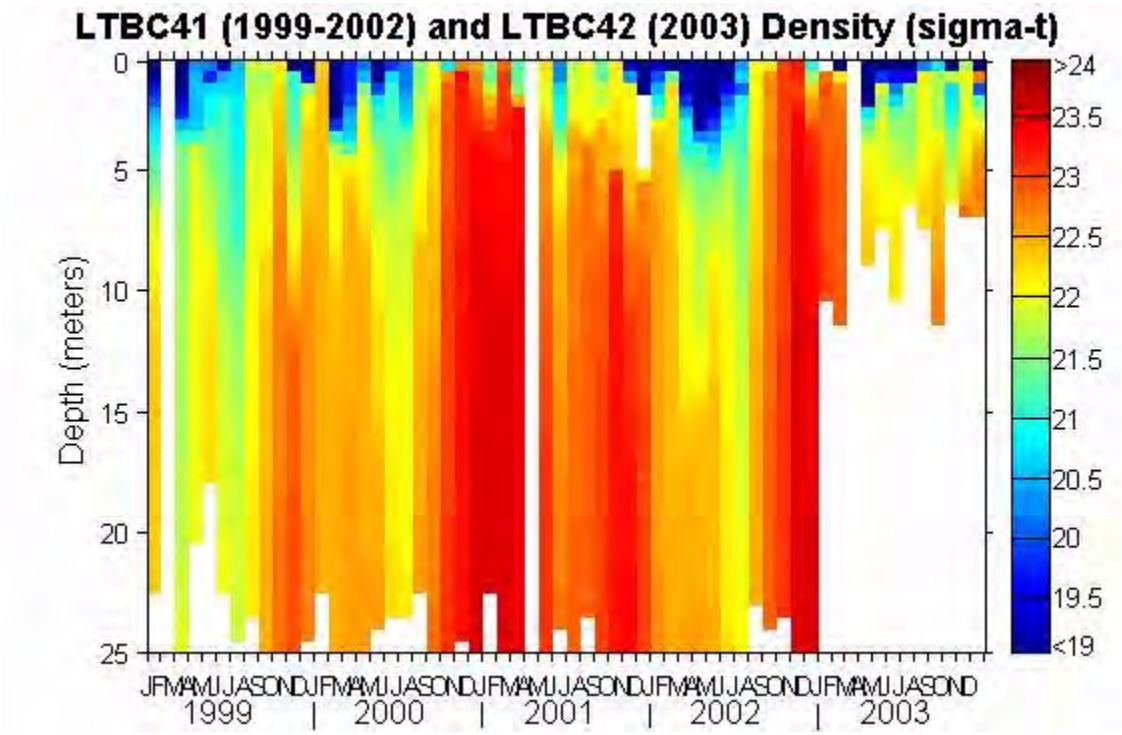

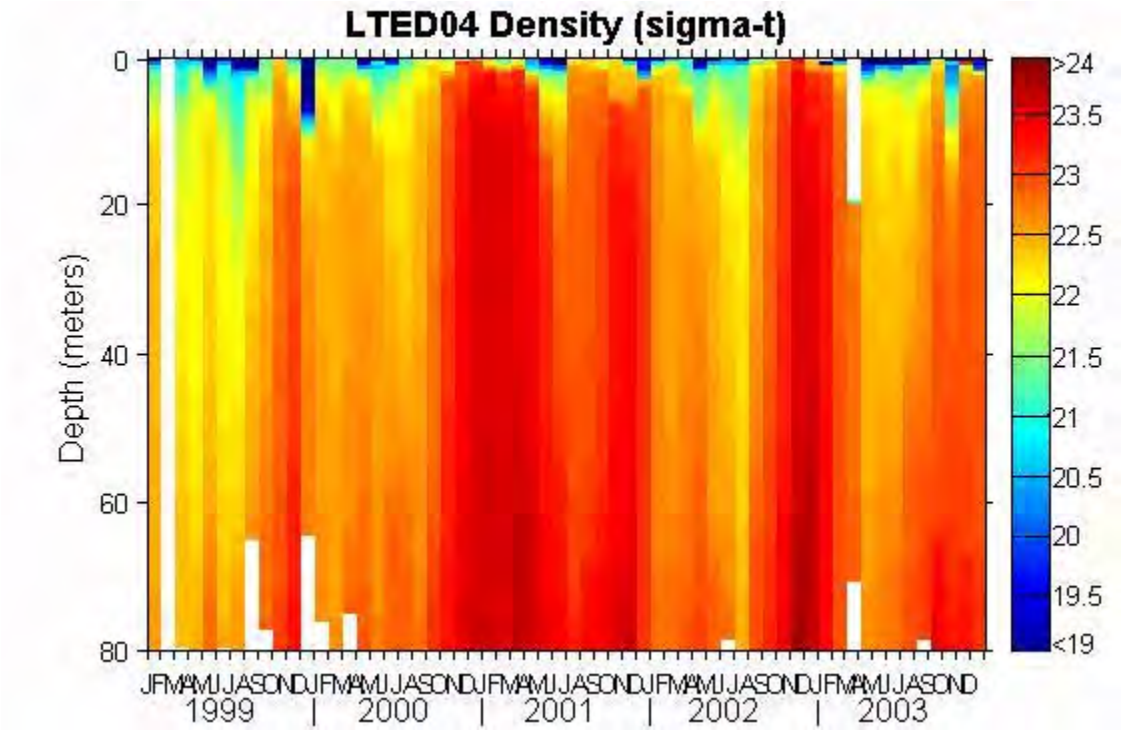

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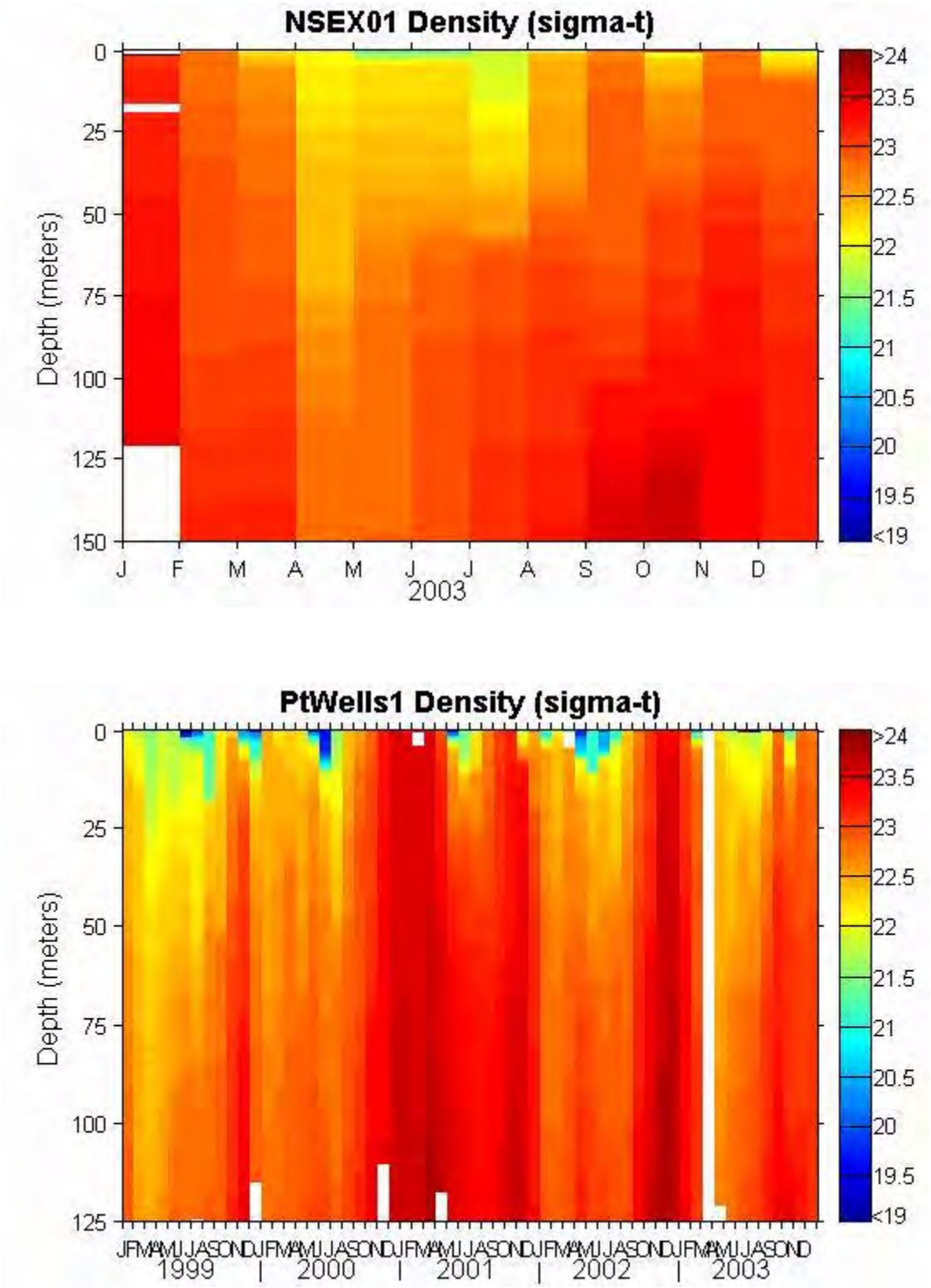

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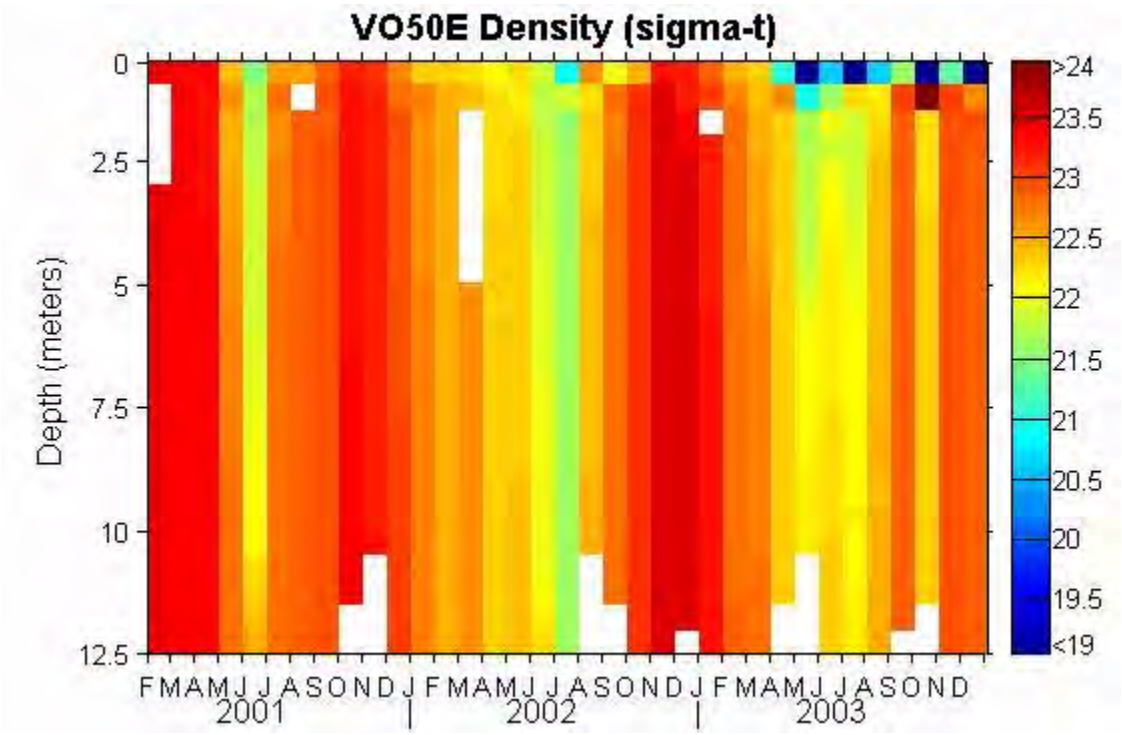
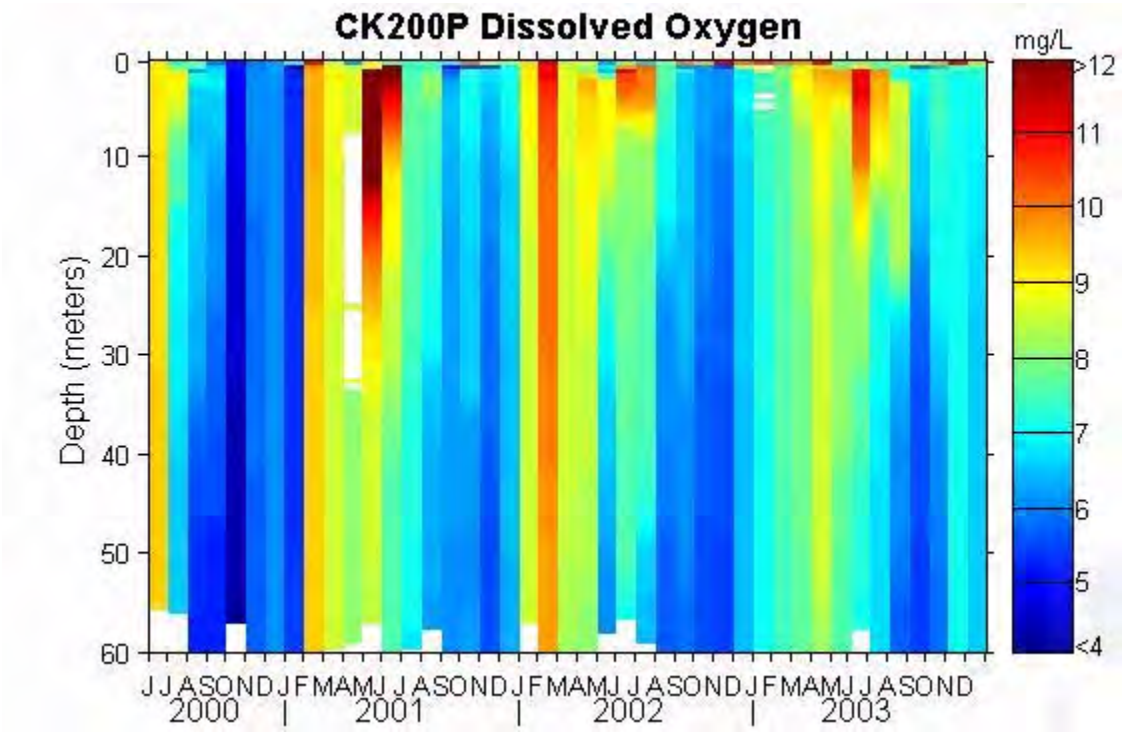
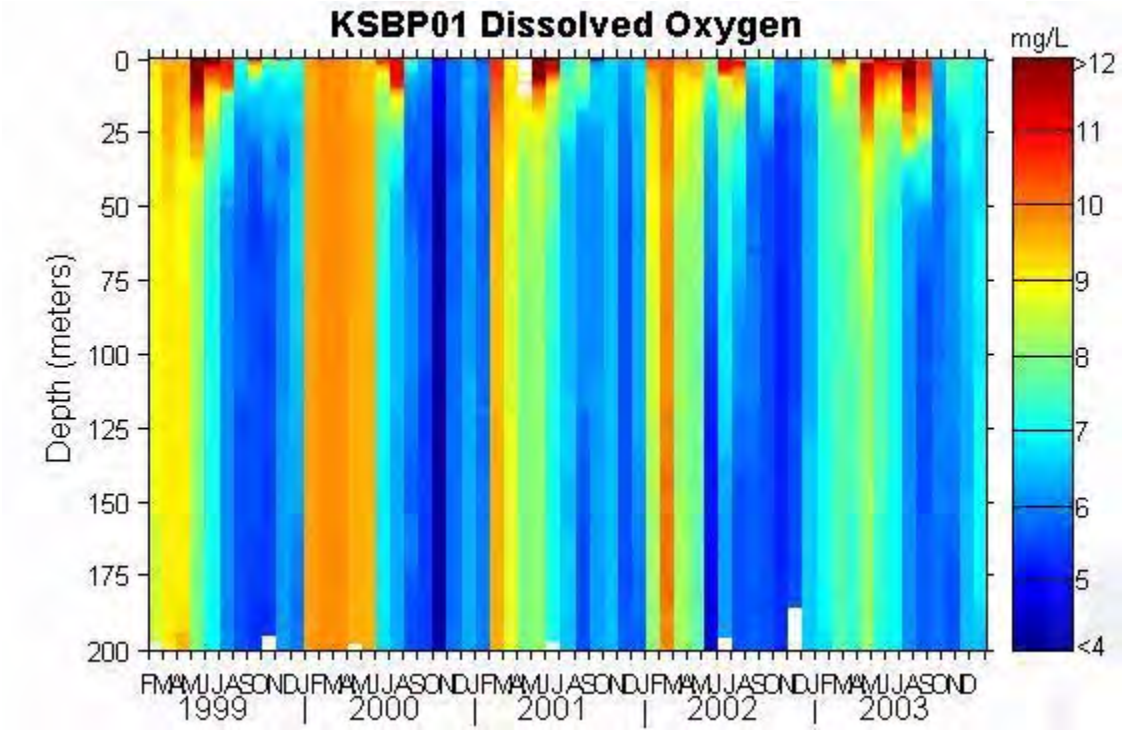


Figure F-4: Offshore Dissolved Oxygen





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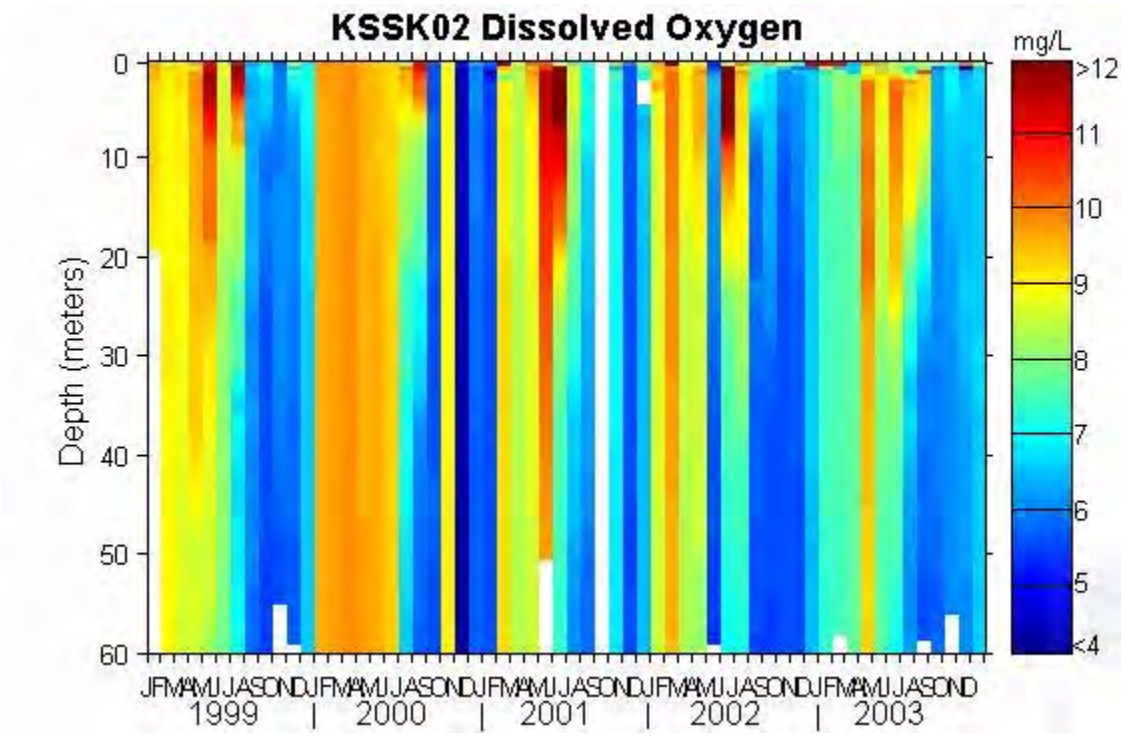

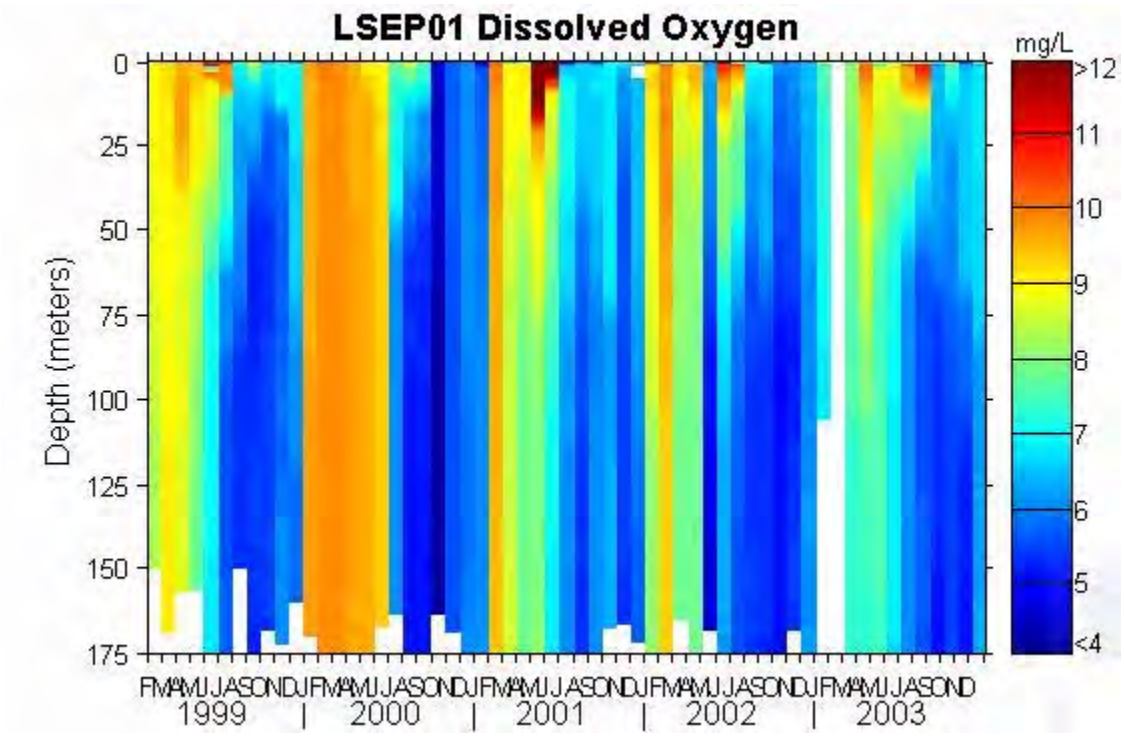

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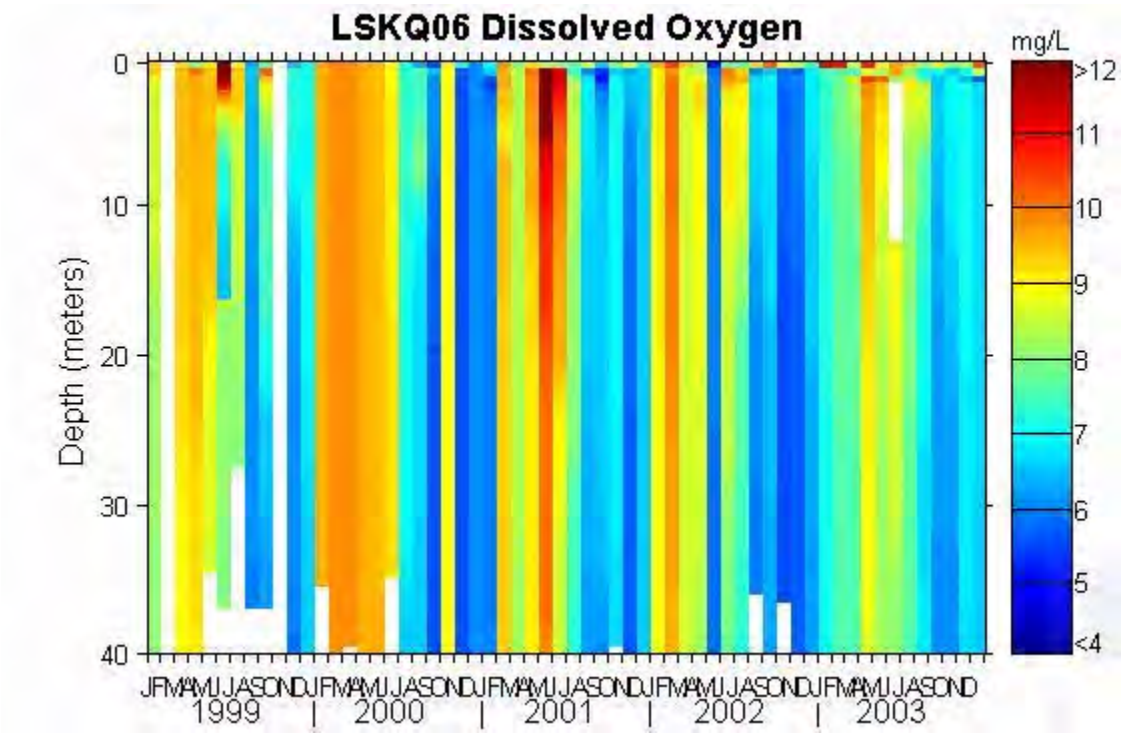

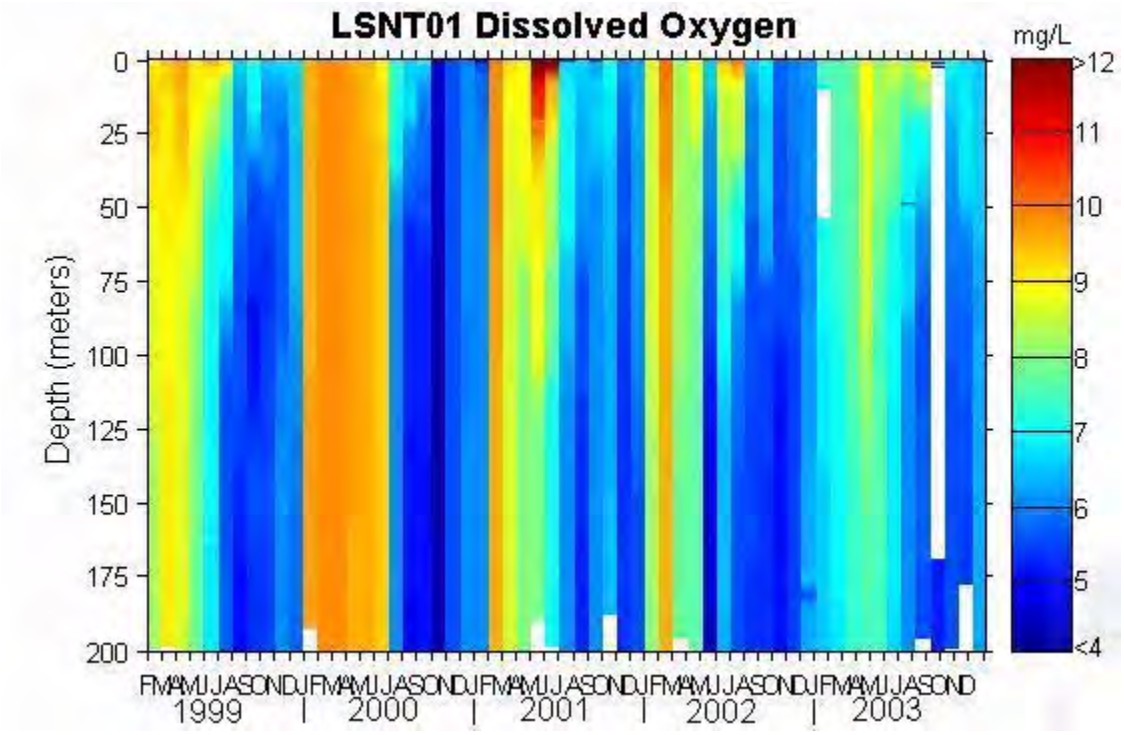

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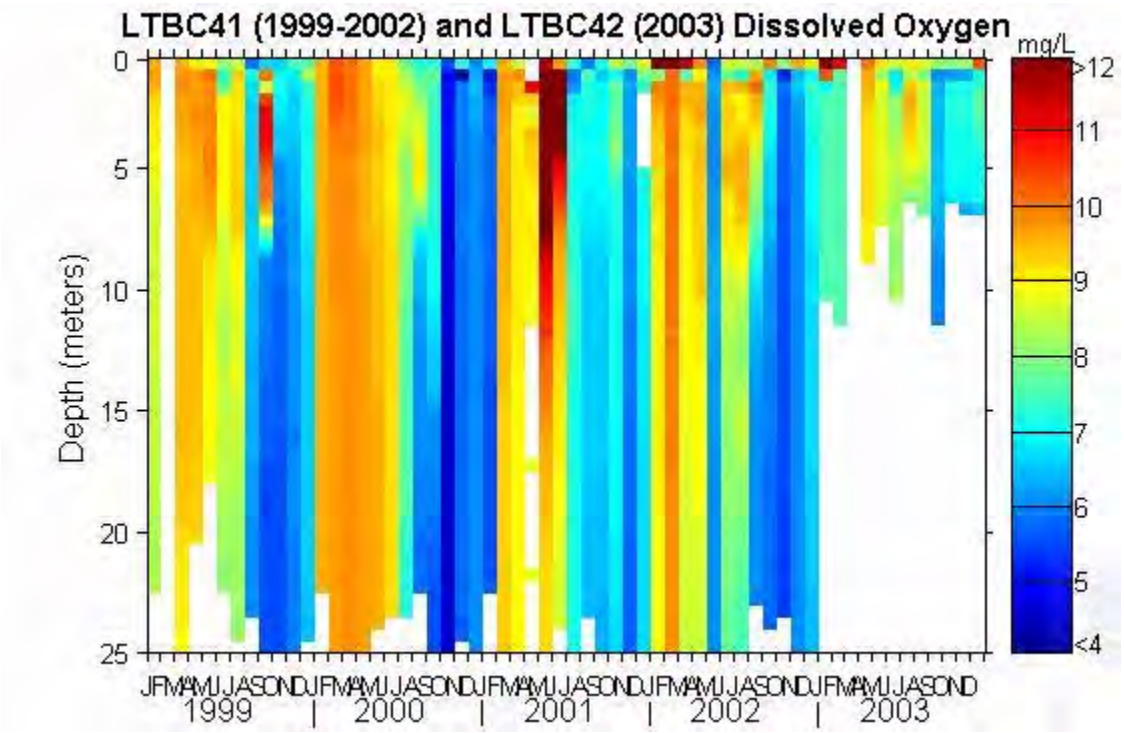

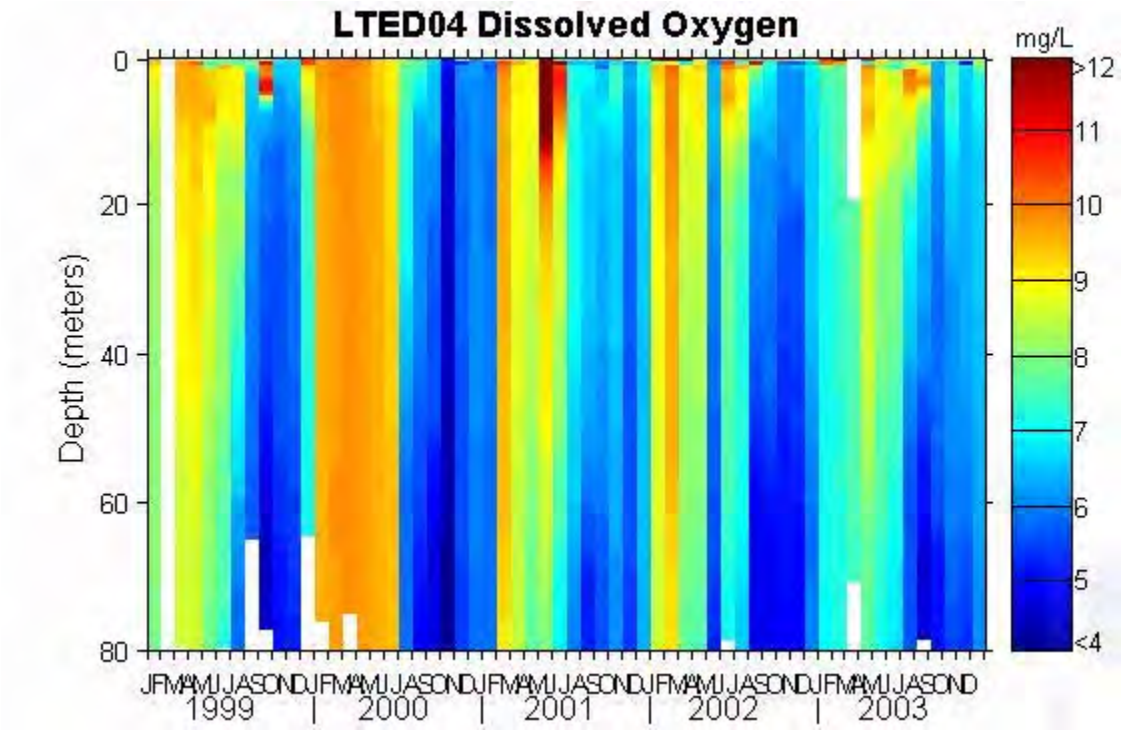

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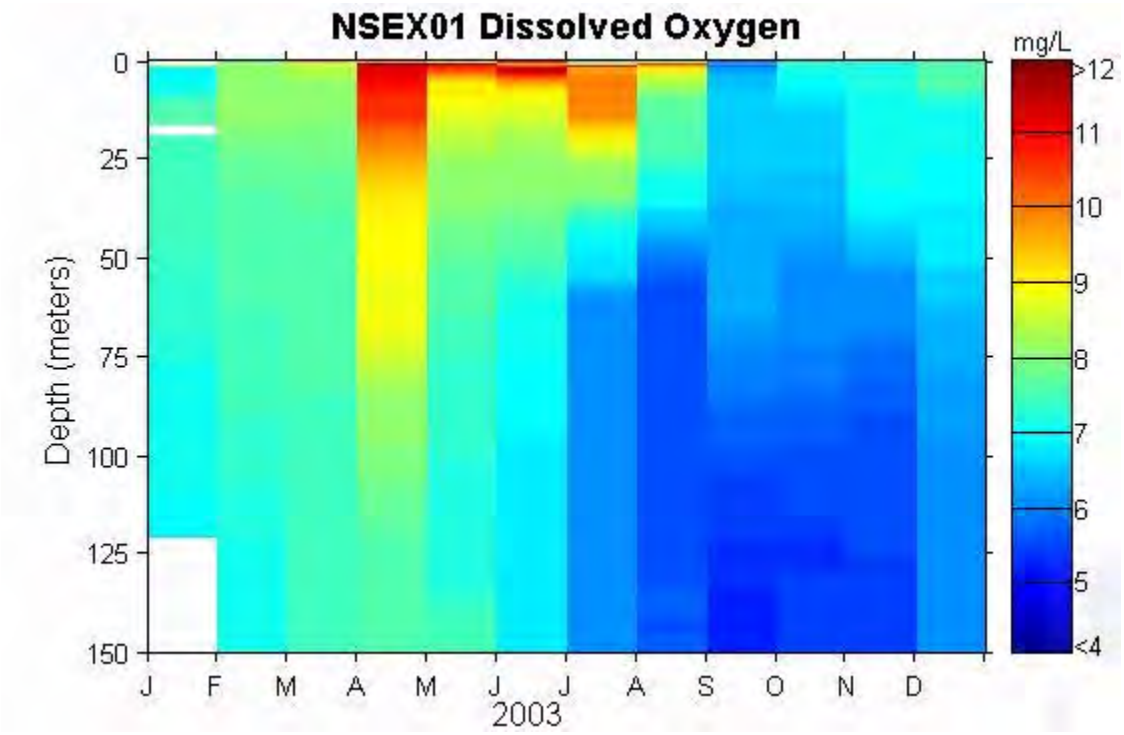

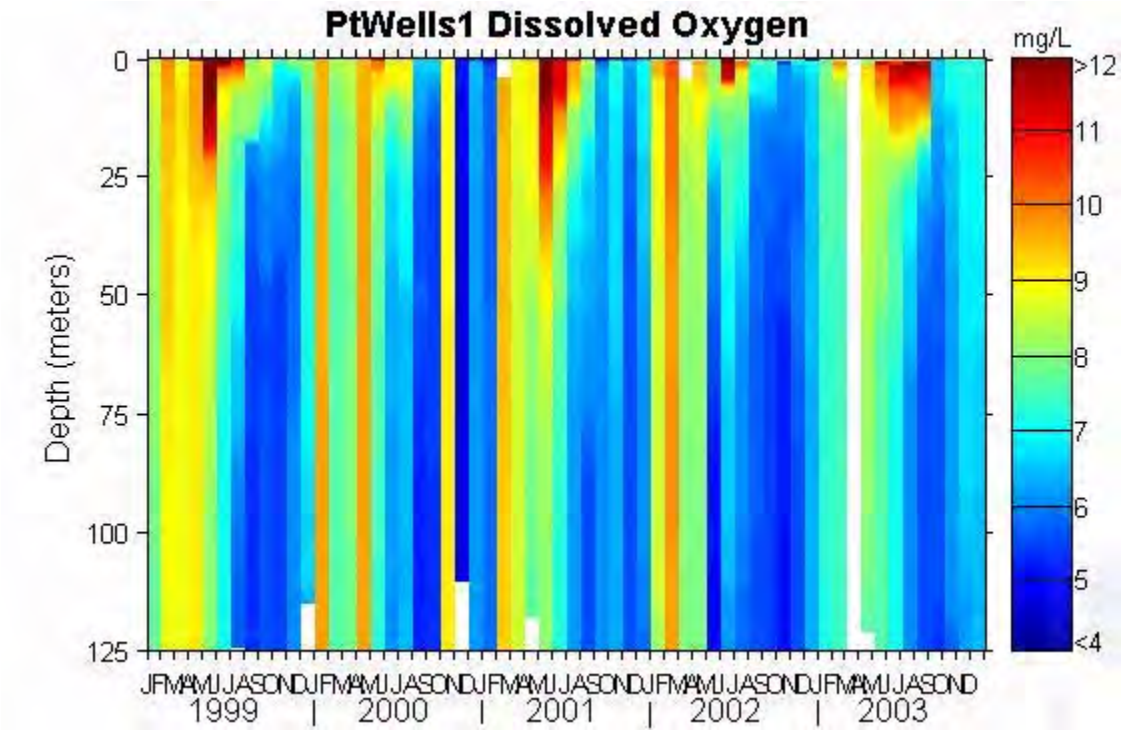

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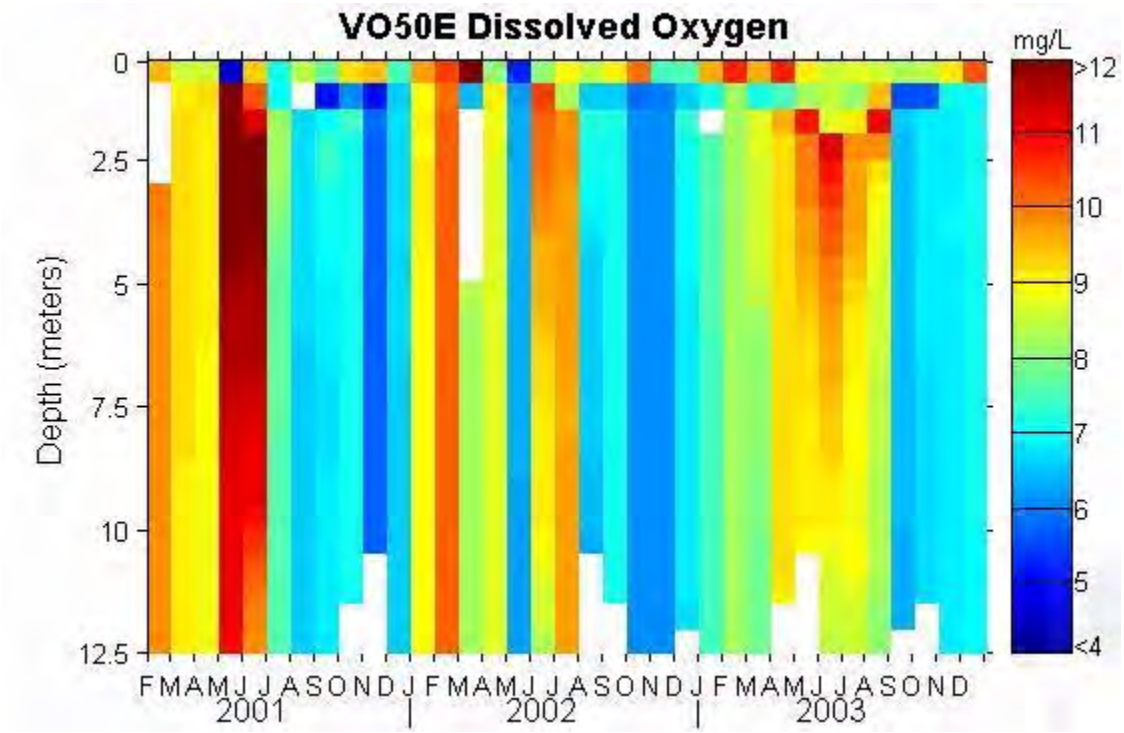
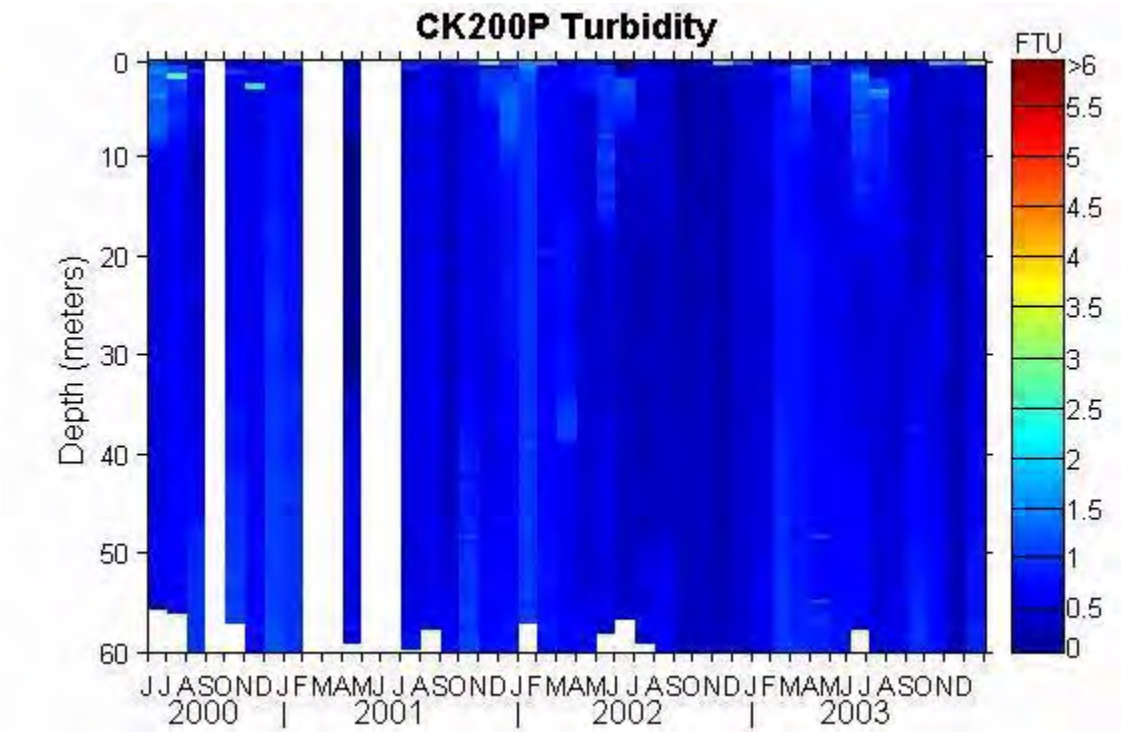
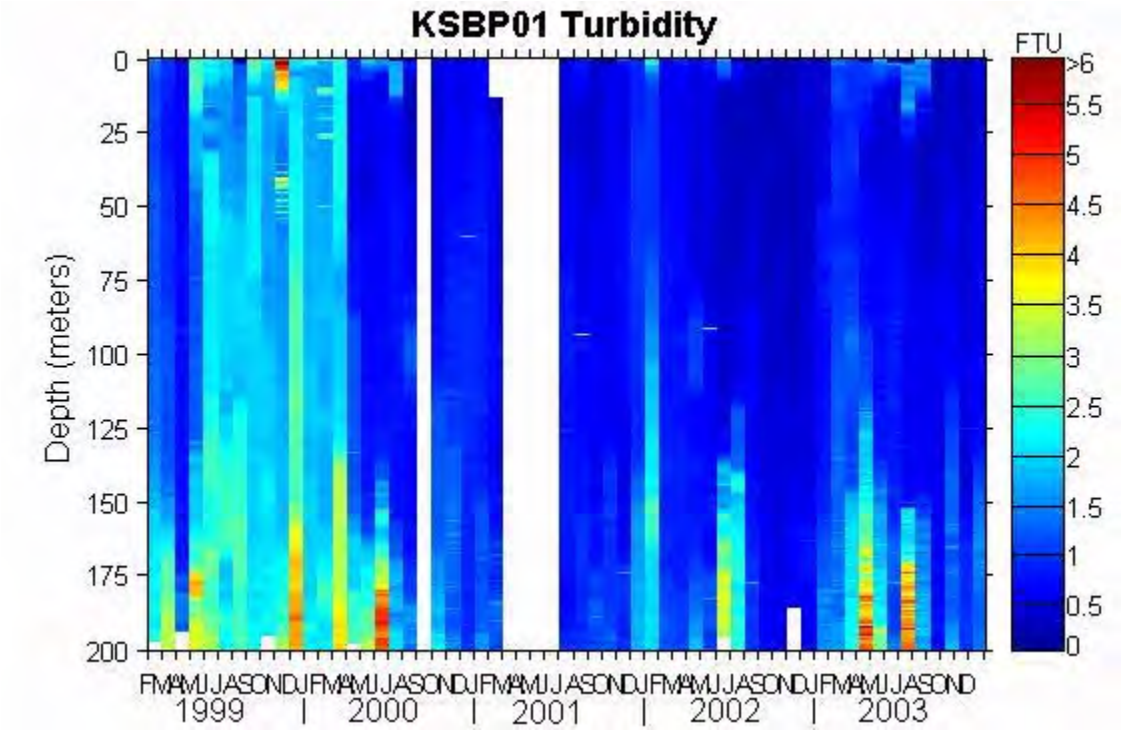


Figure F-5: Offshore Turbidity





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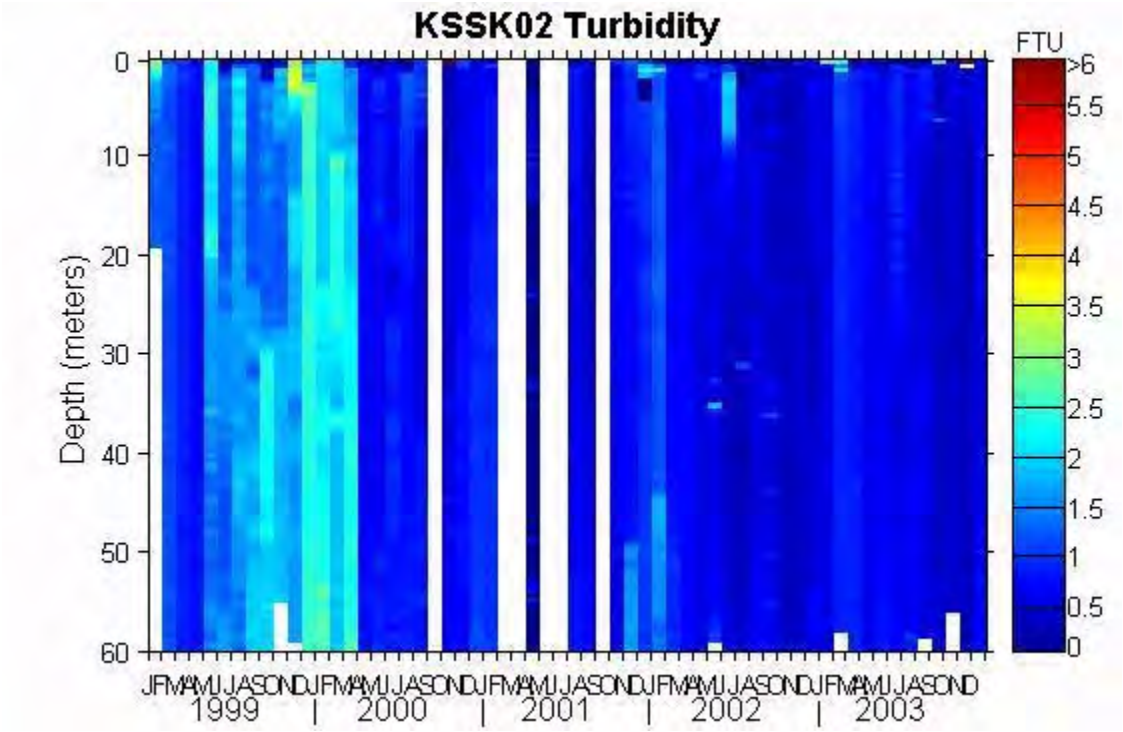

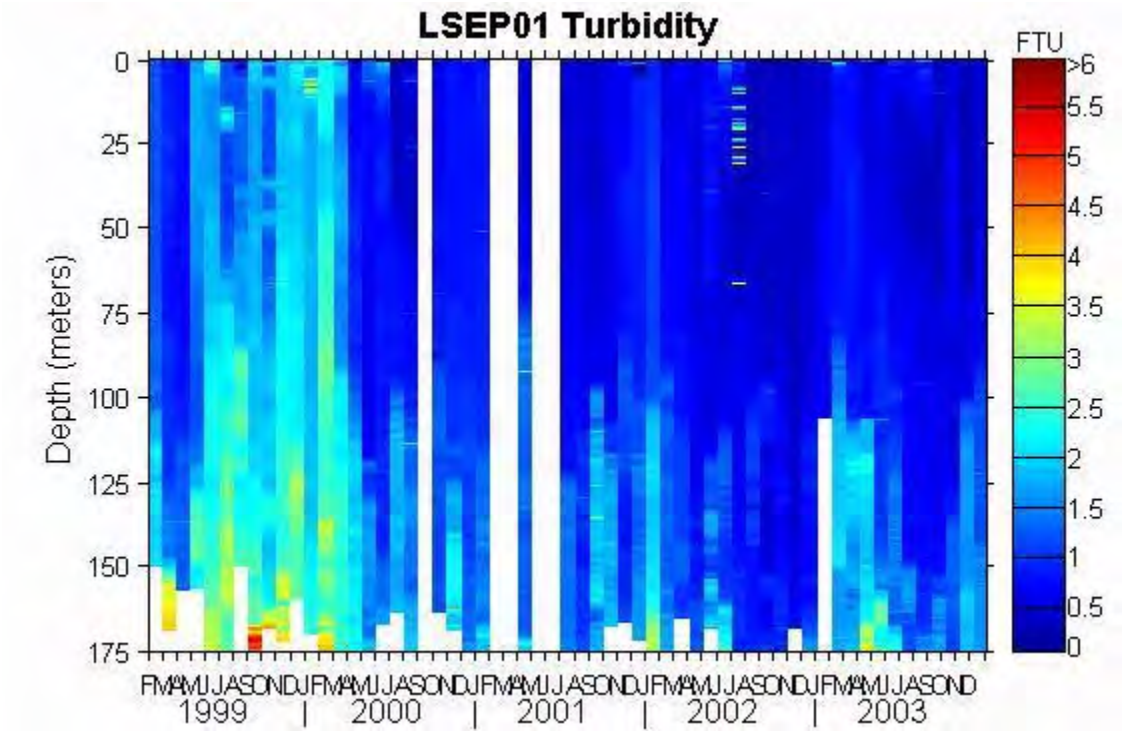

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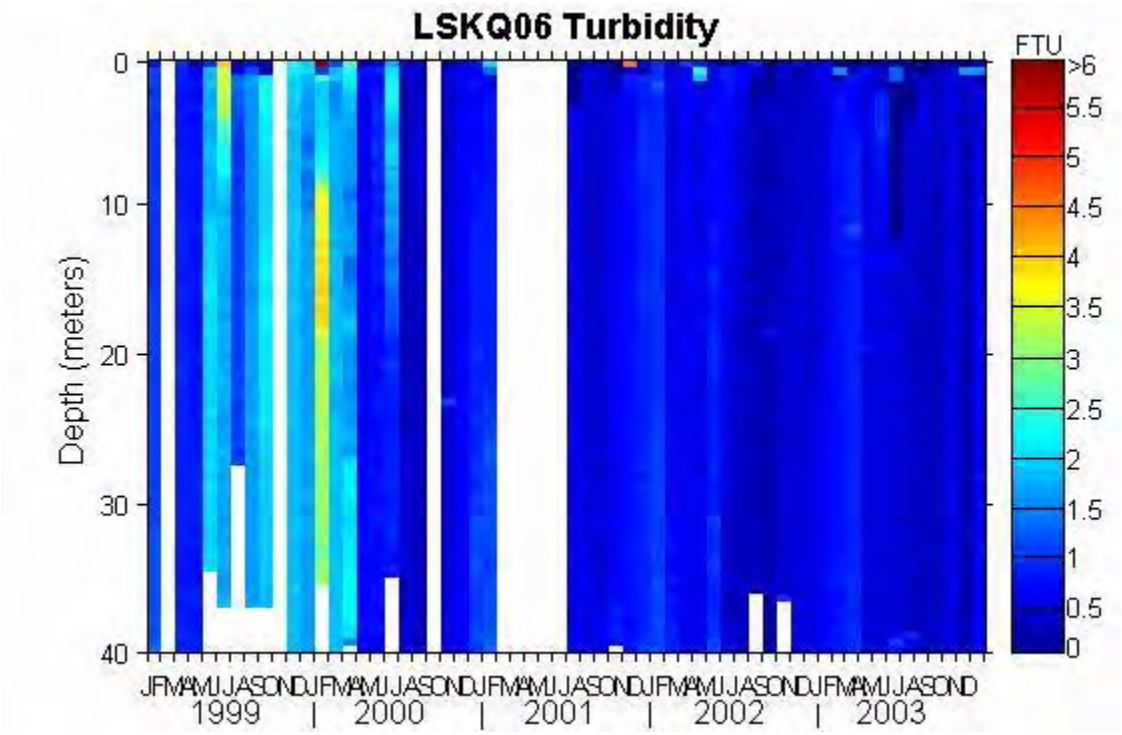

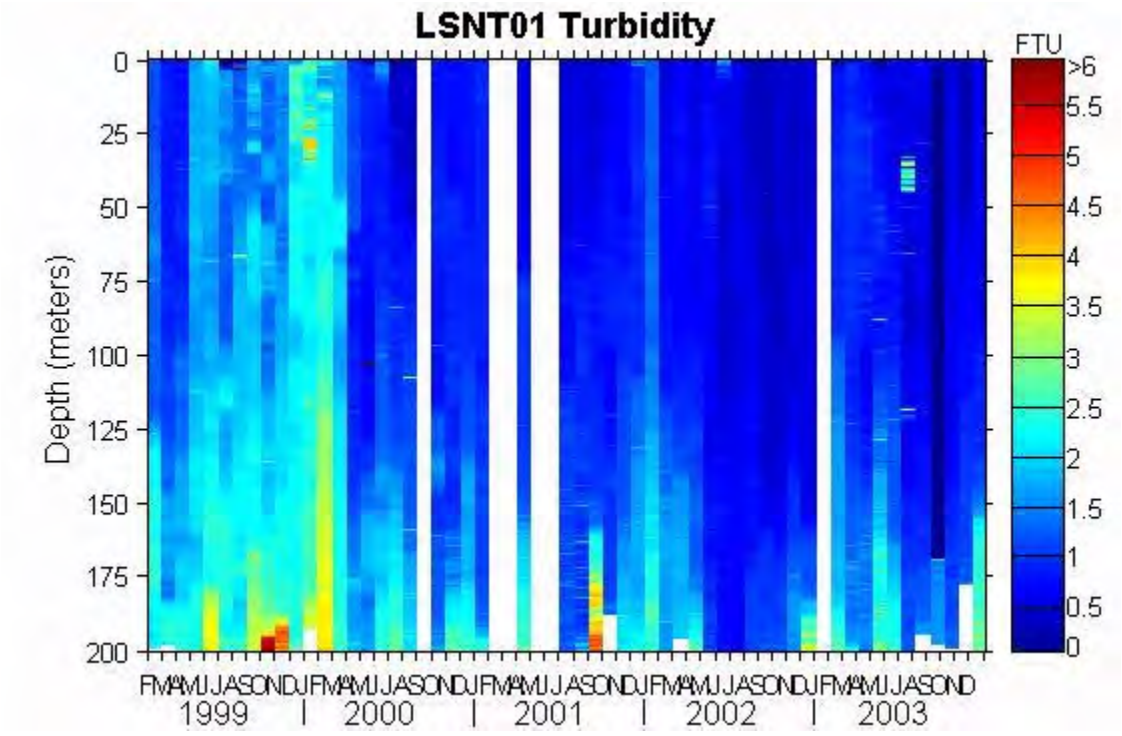

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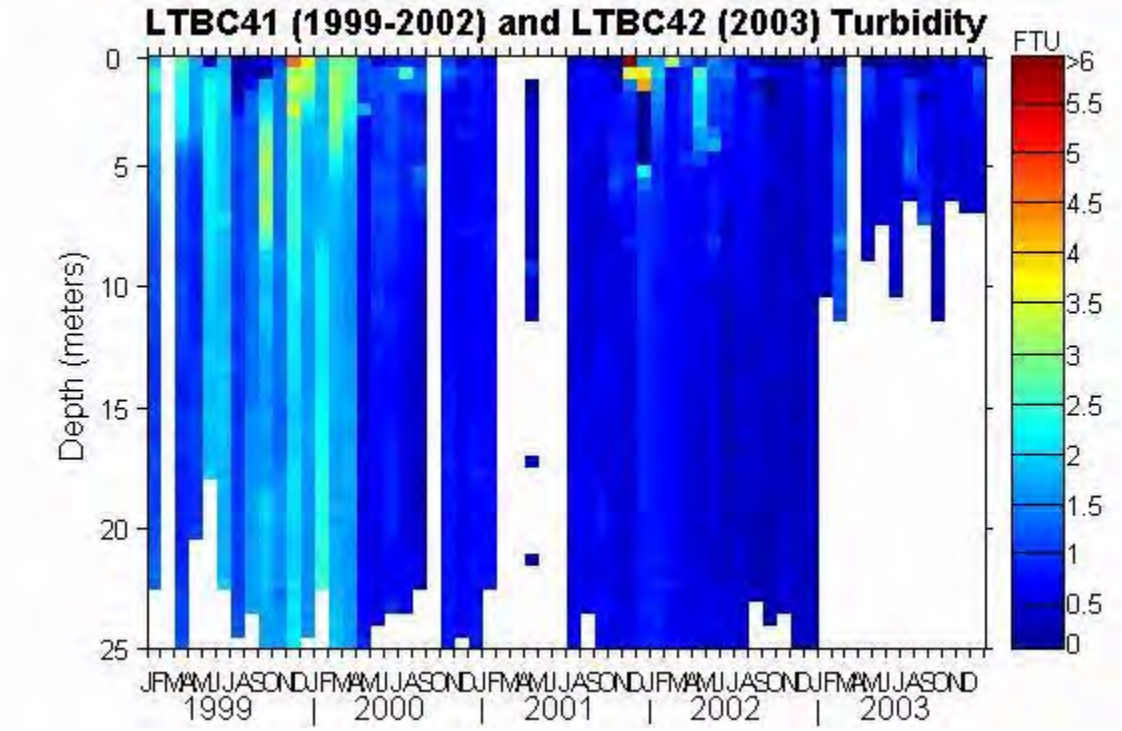

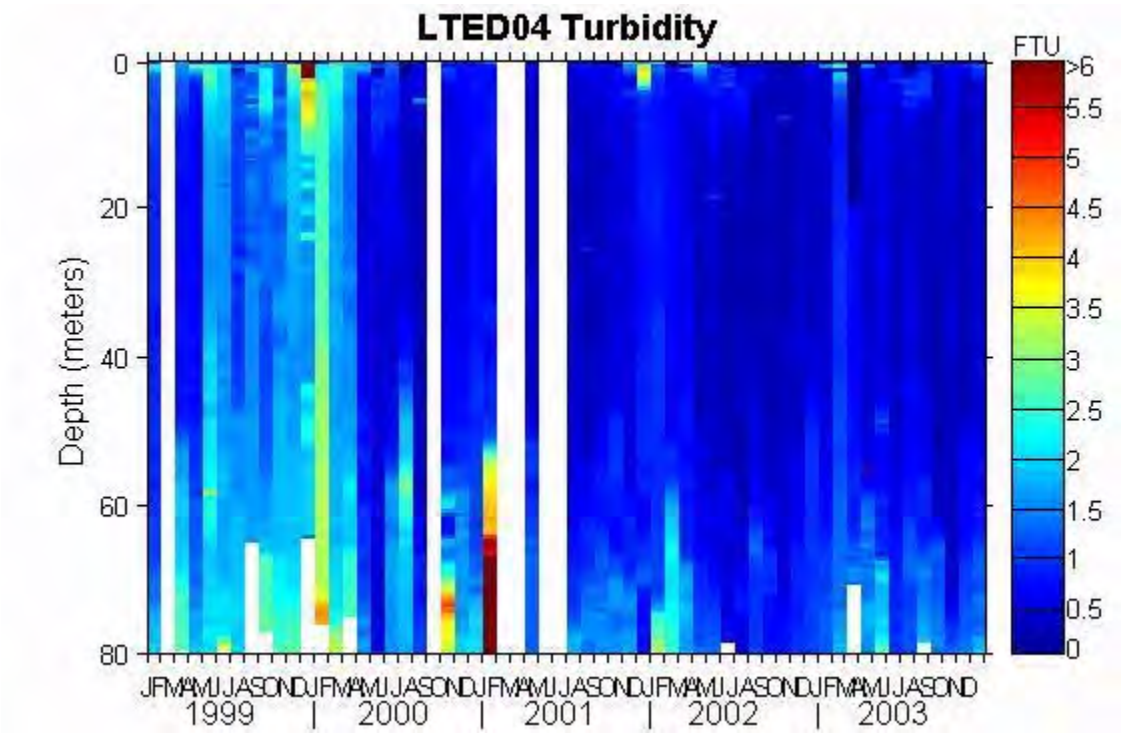

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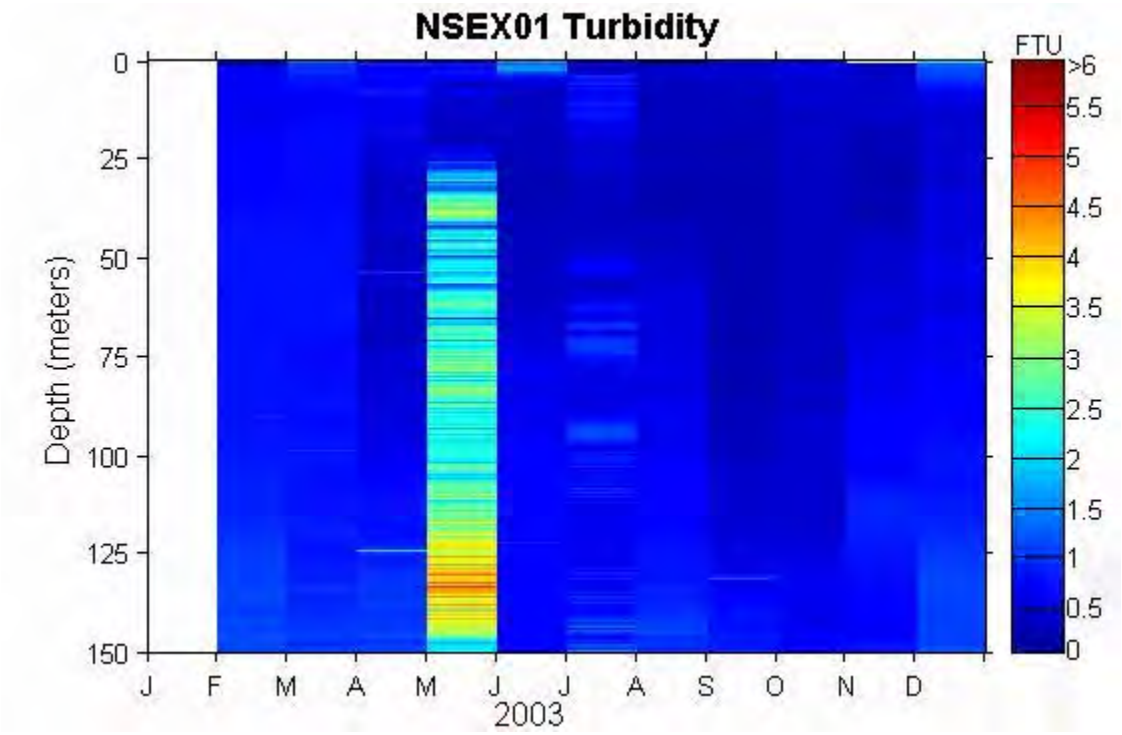

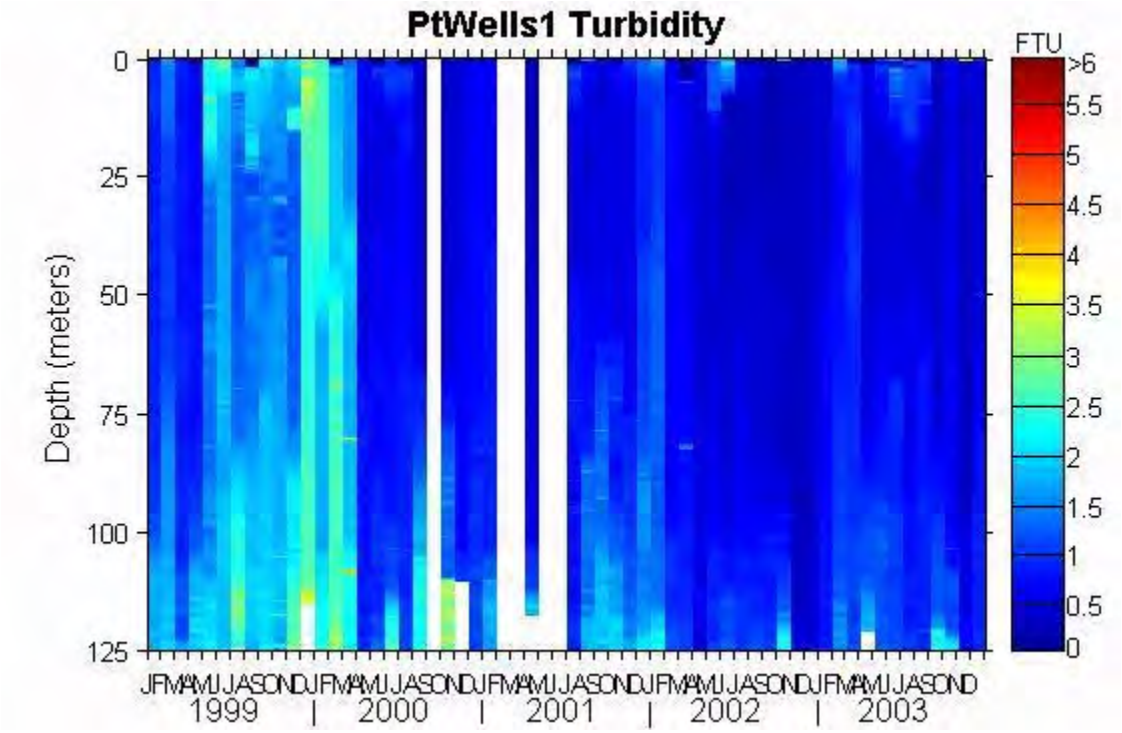

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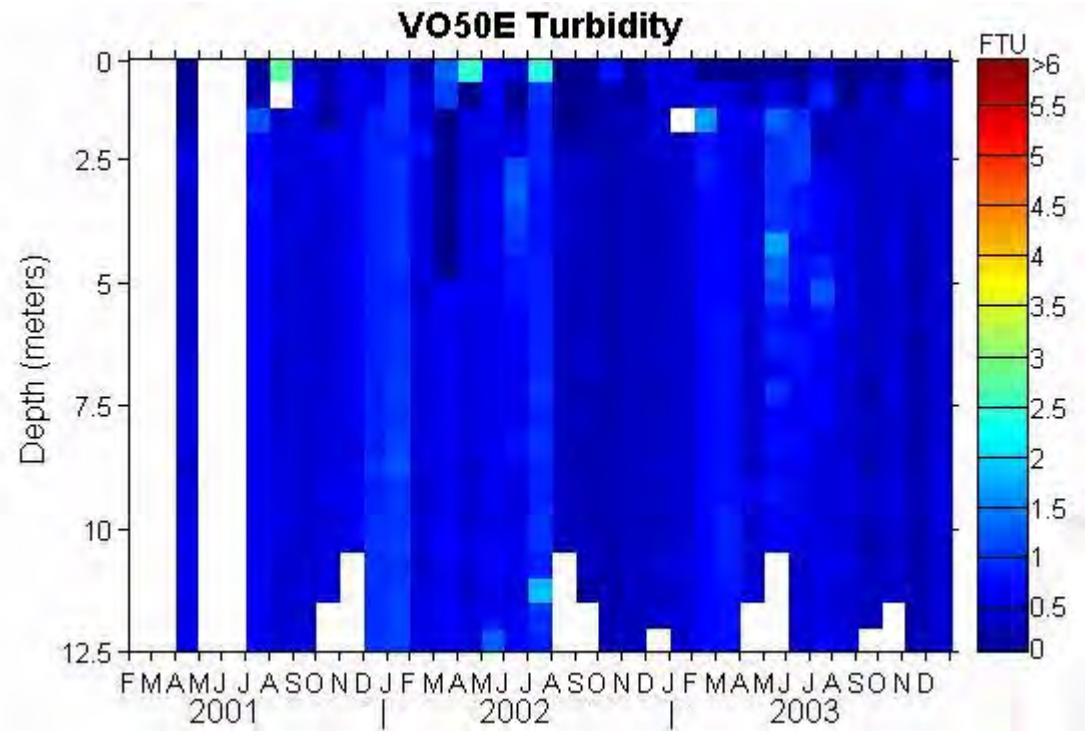
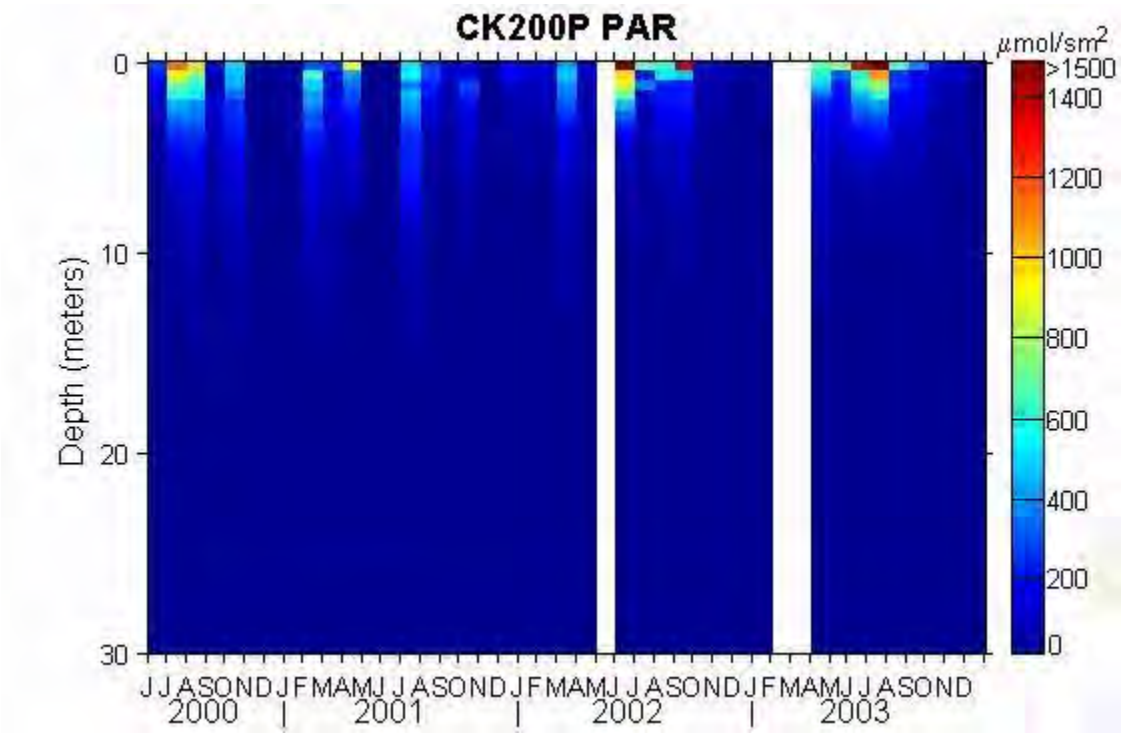
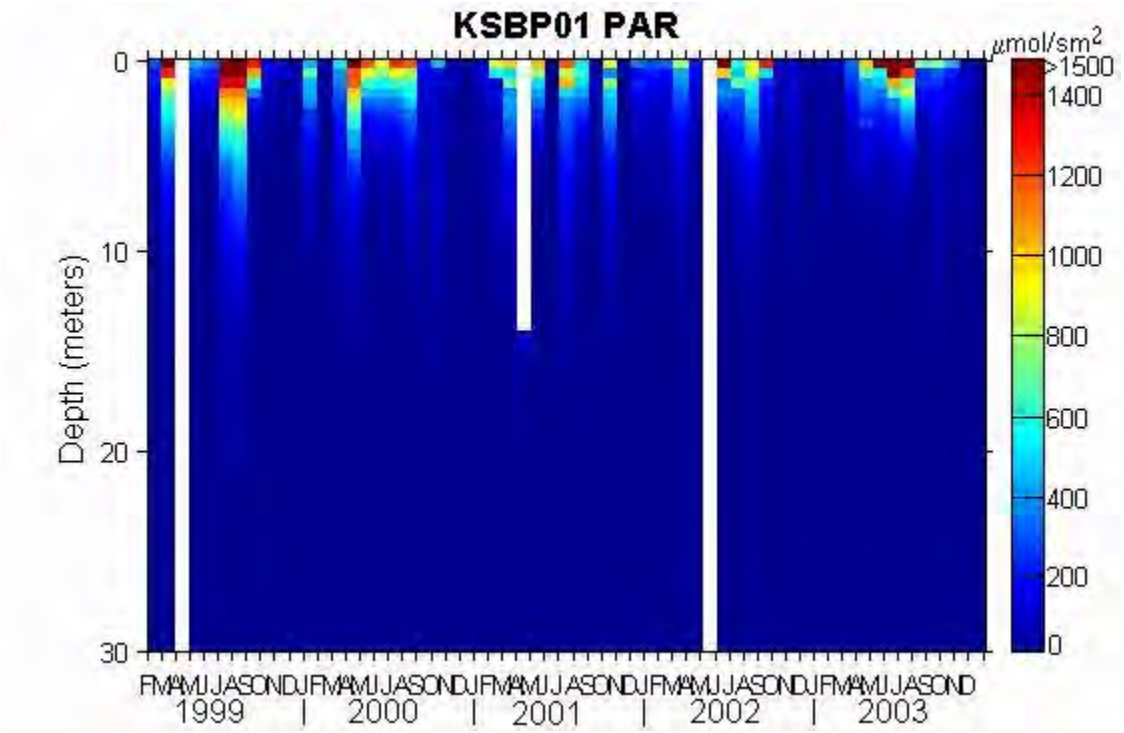


Figure F-6: Offshore Photosynthetically Active Radiation (PAR)





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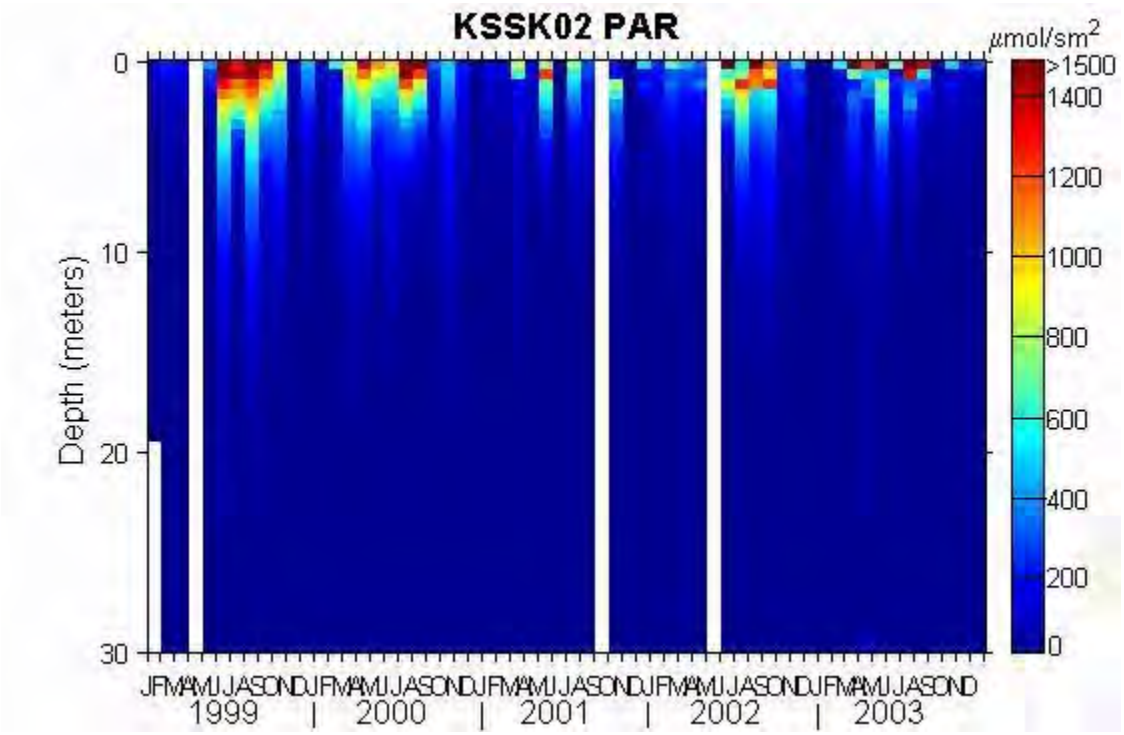

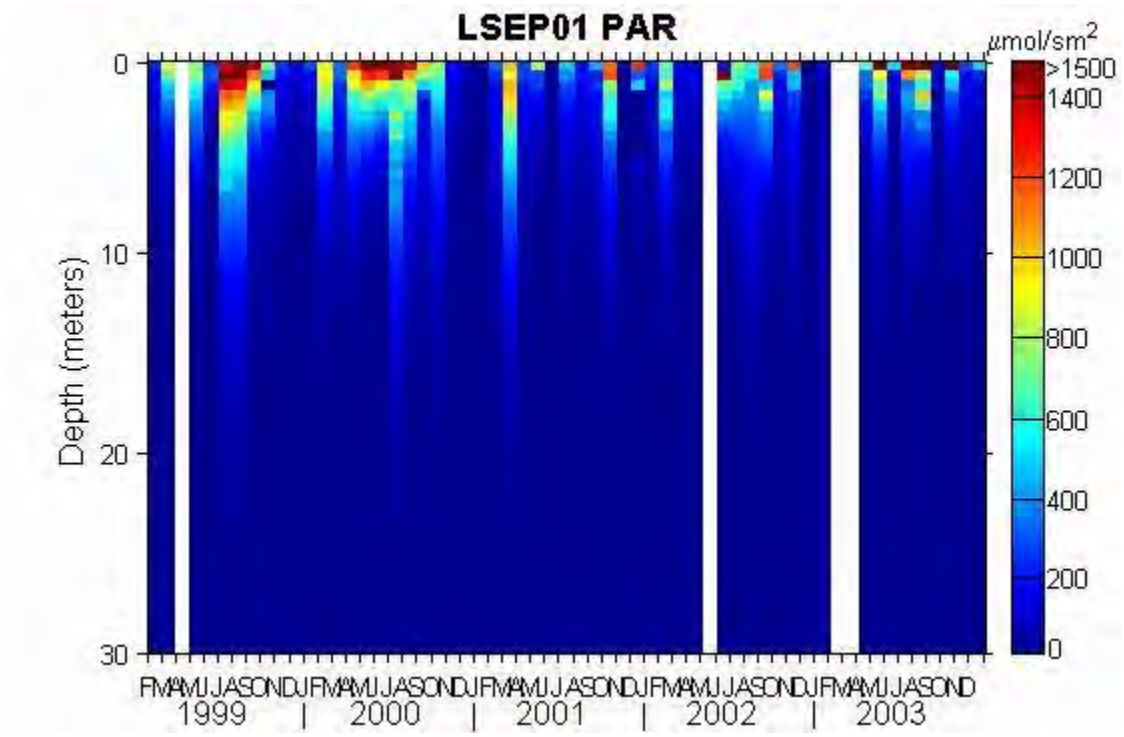

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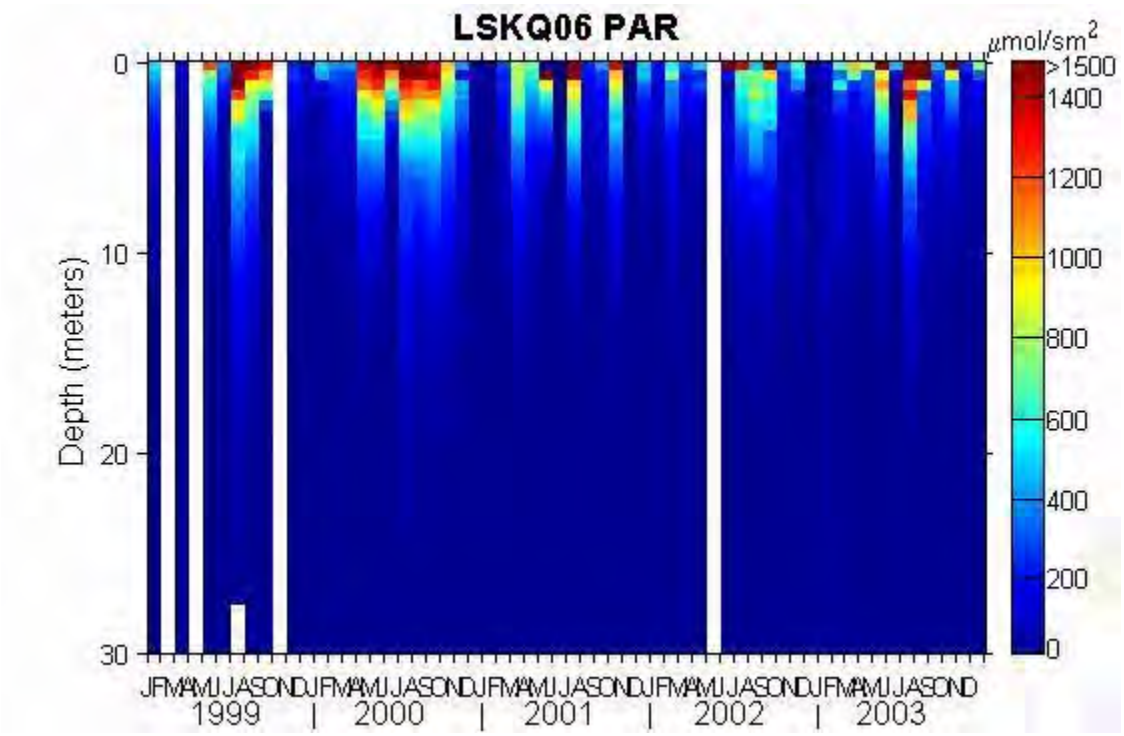

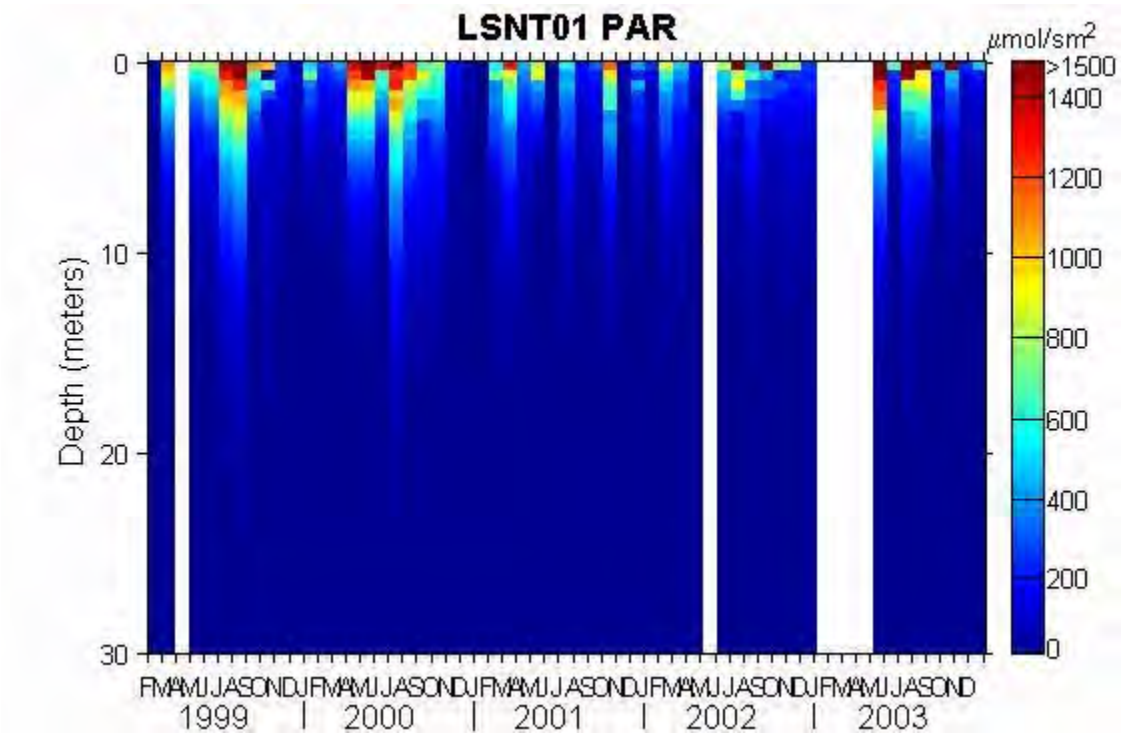

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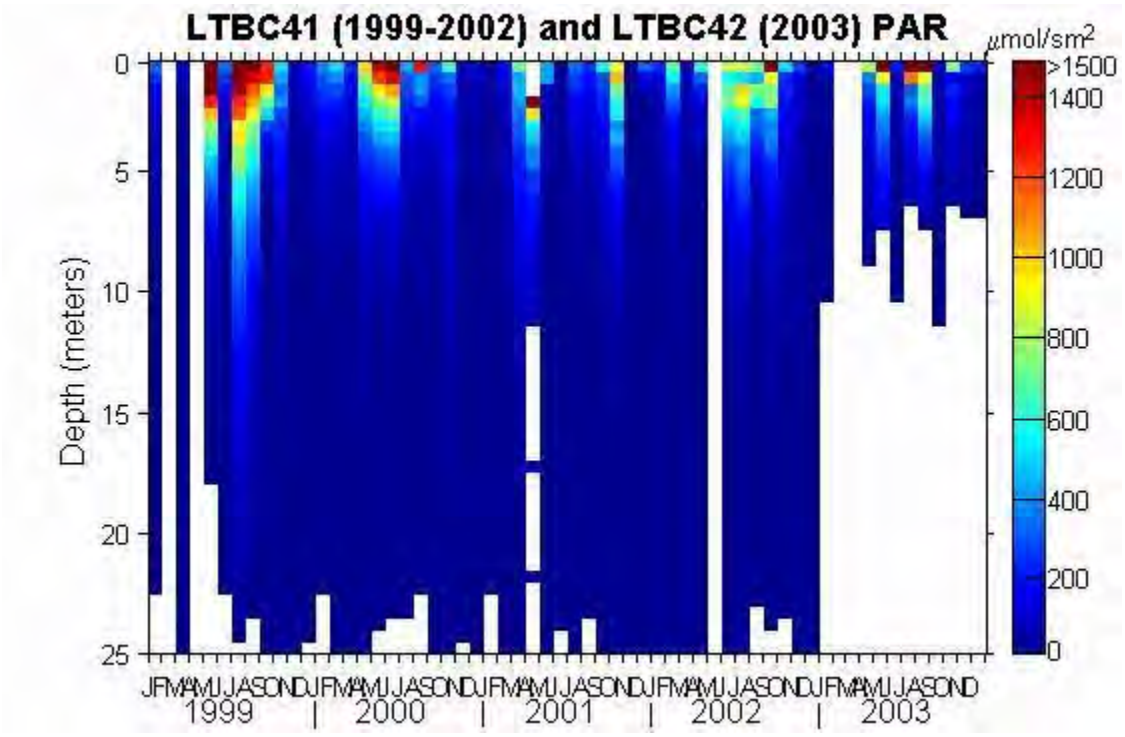

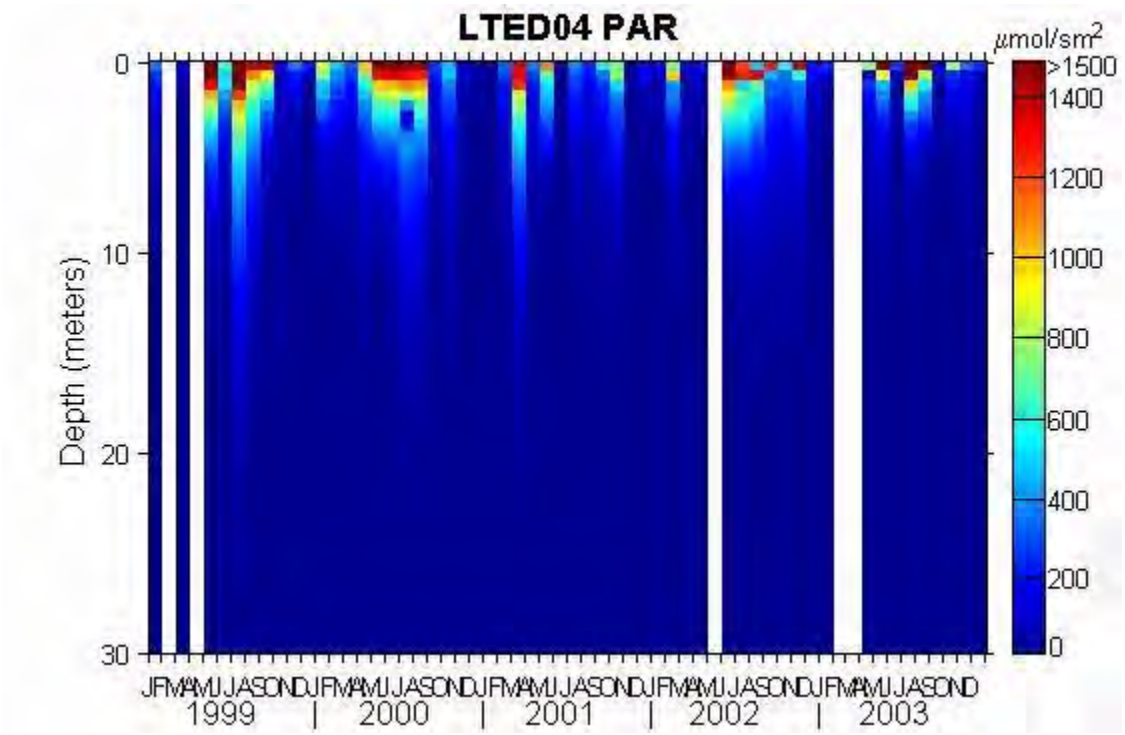

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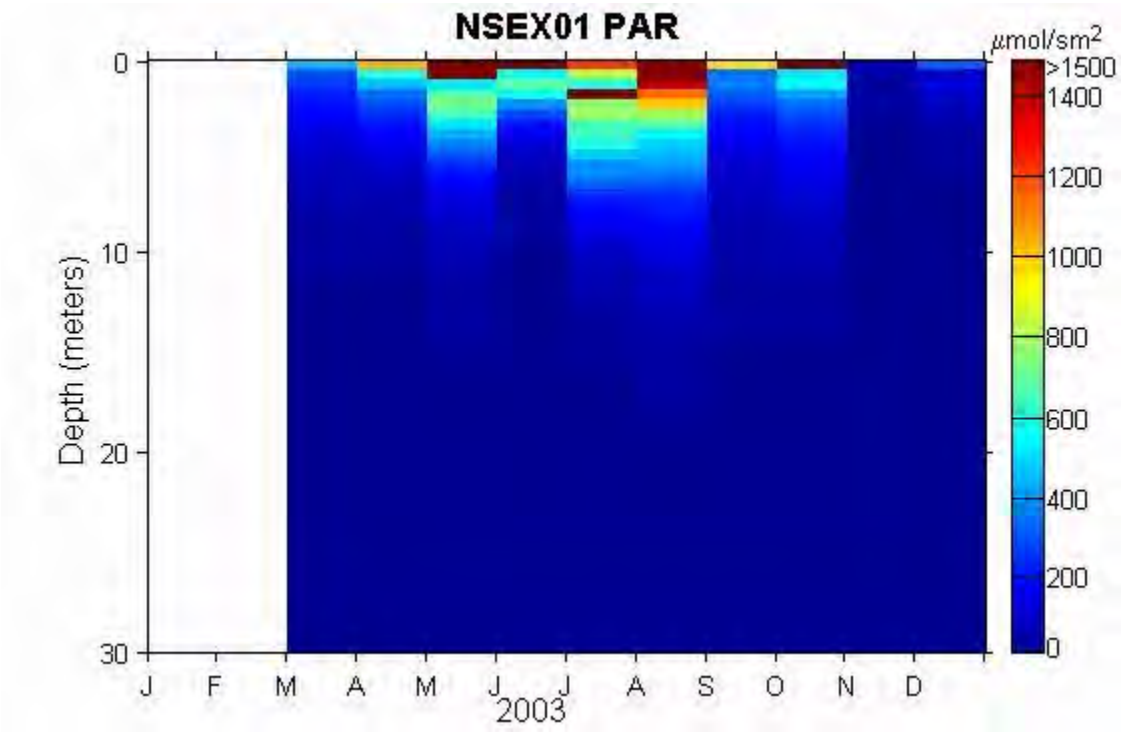


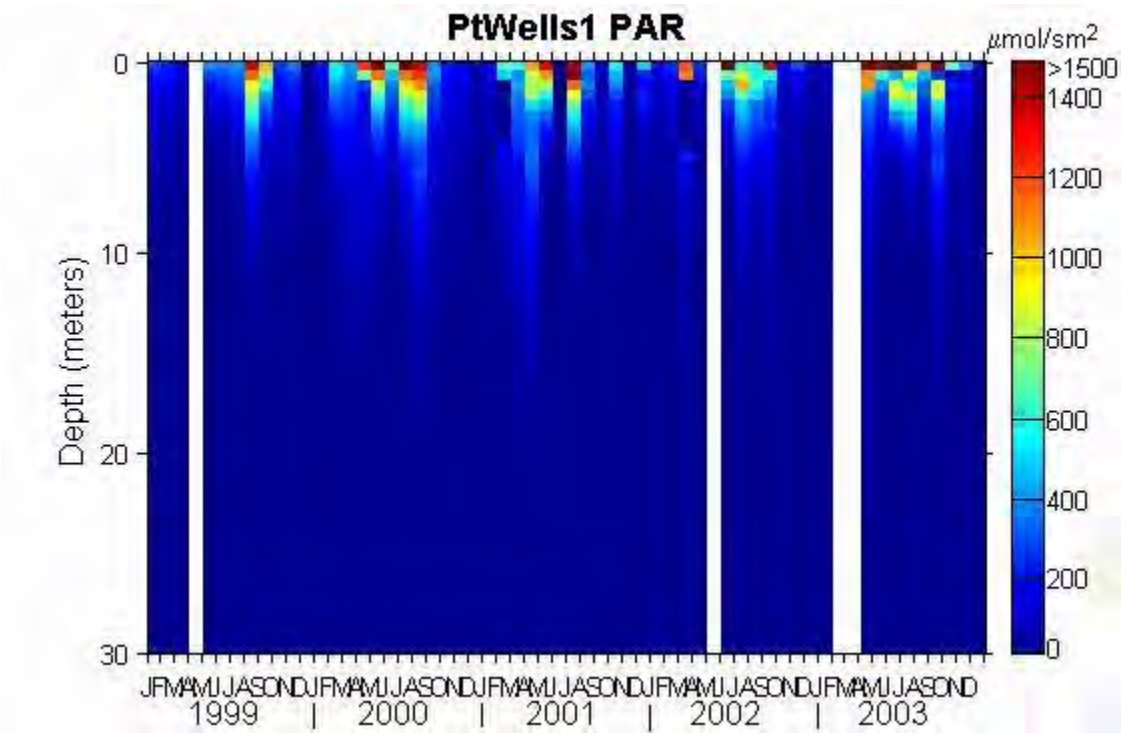


Figure F-6: Offshore Photosynthetically Active Radiation (PAR)

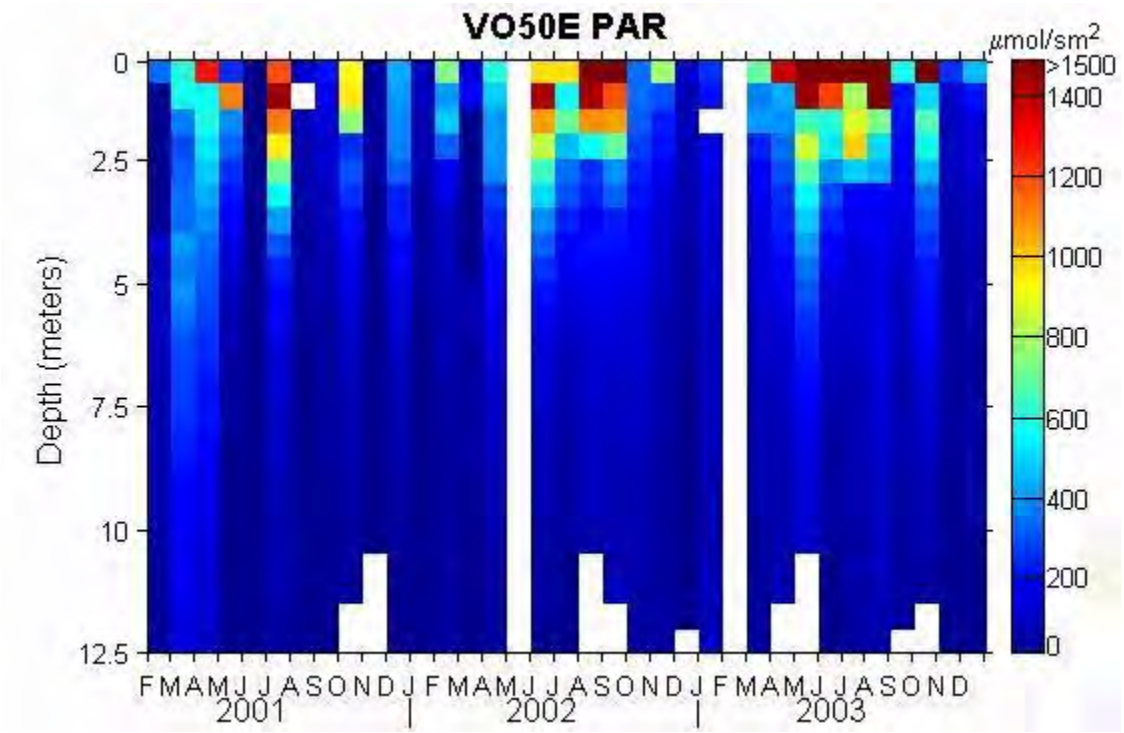
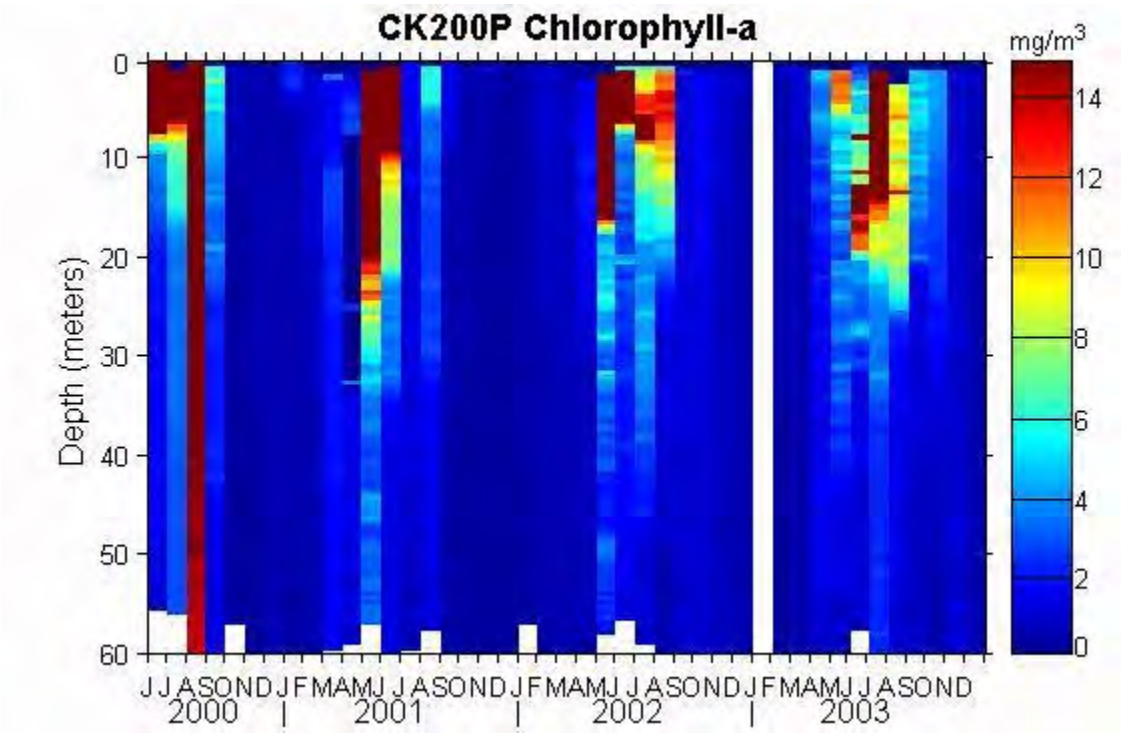
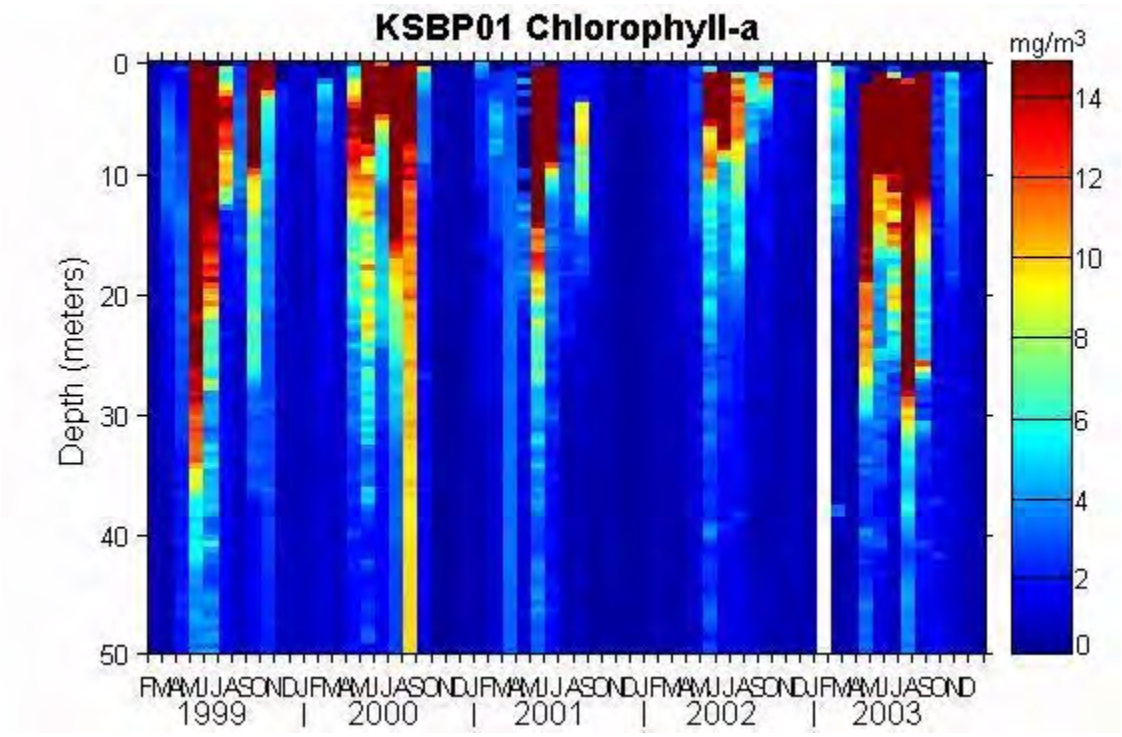


Figure F-7: Offshore Chlorophyll-*a* Concentrations





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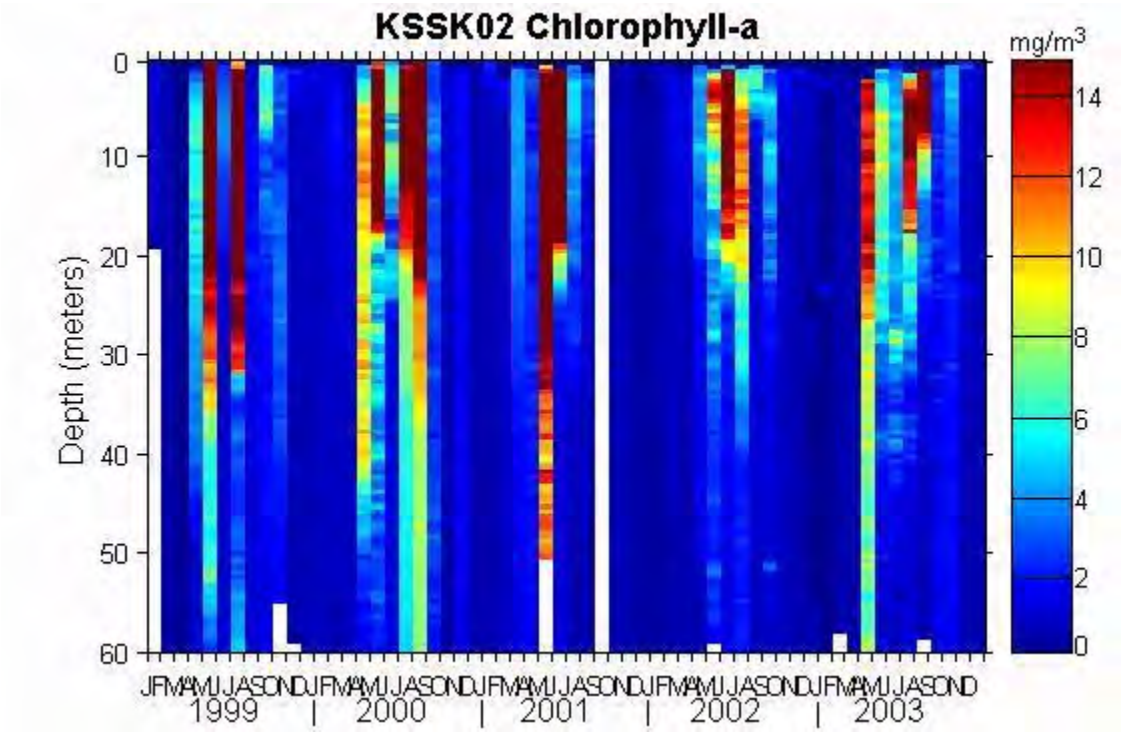

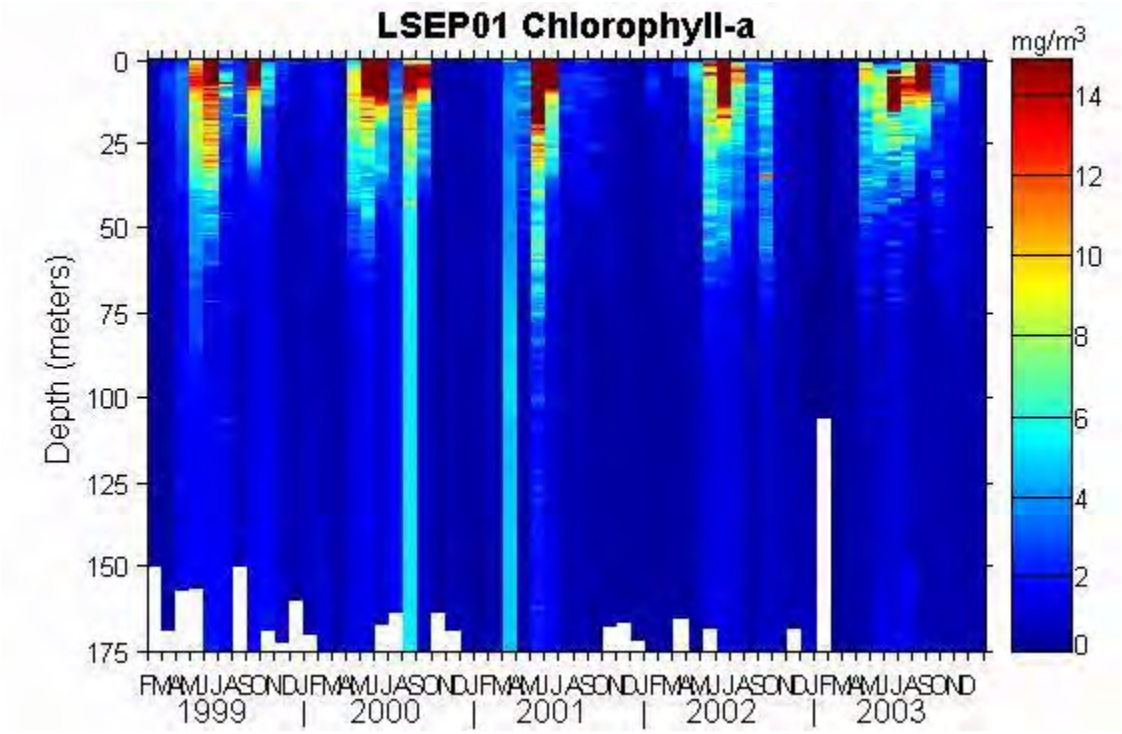

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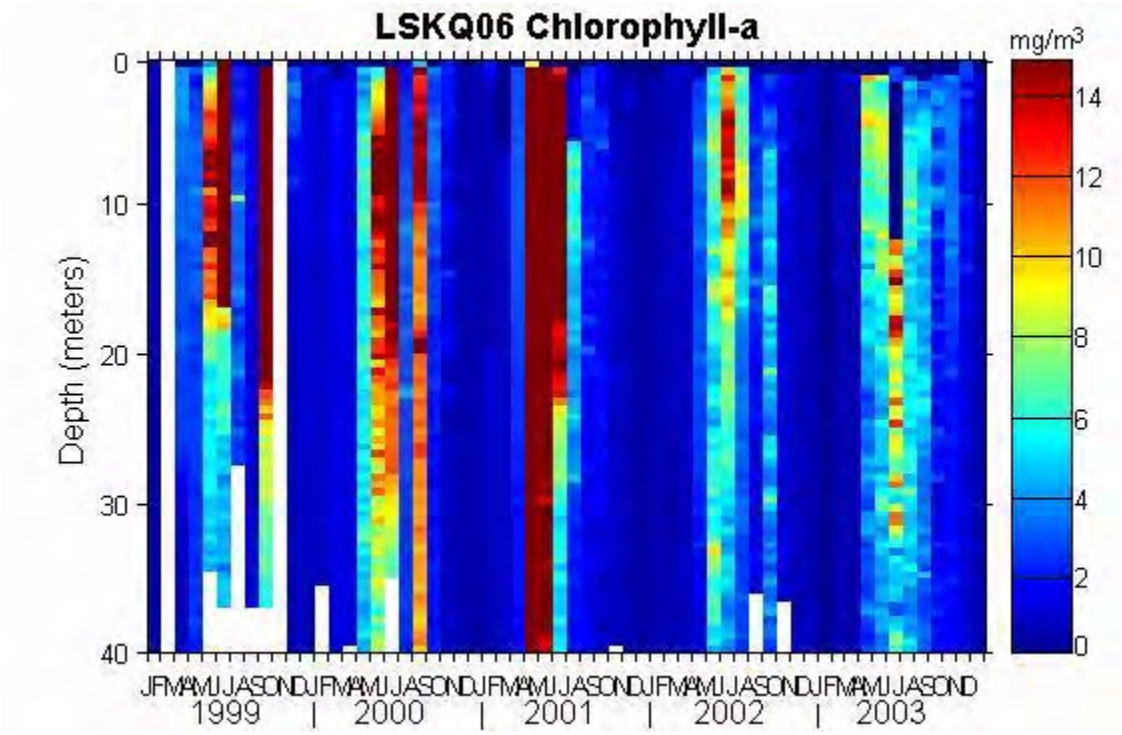

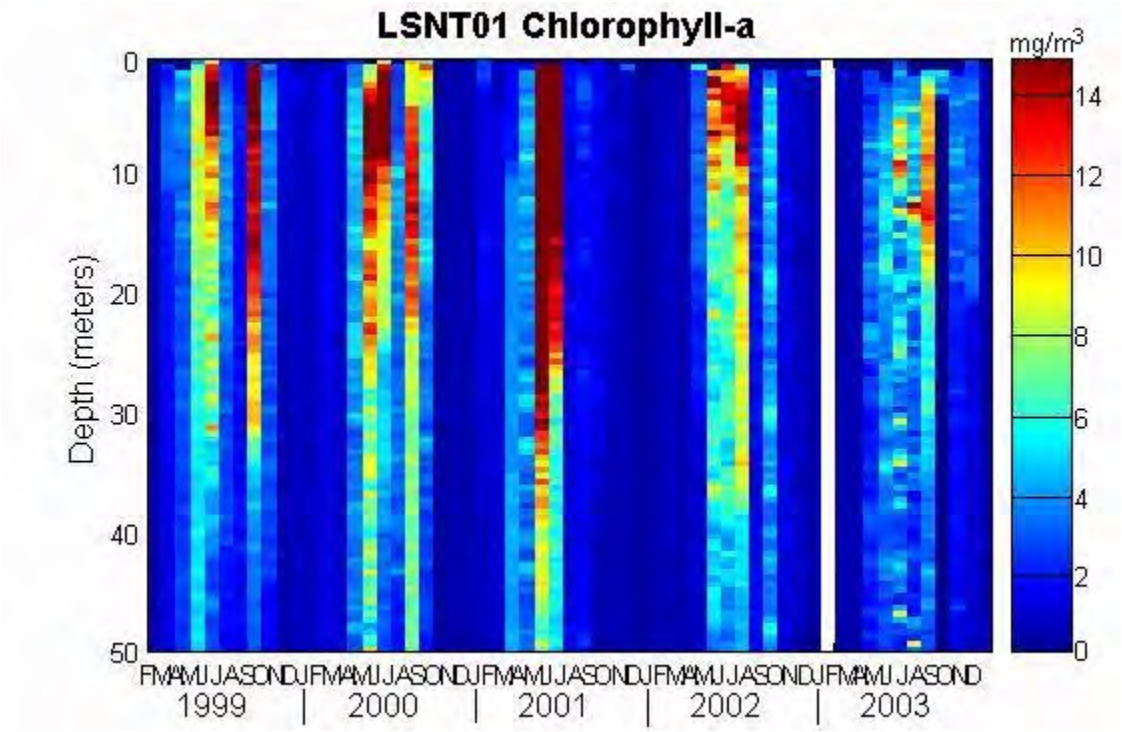

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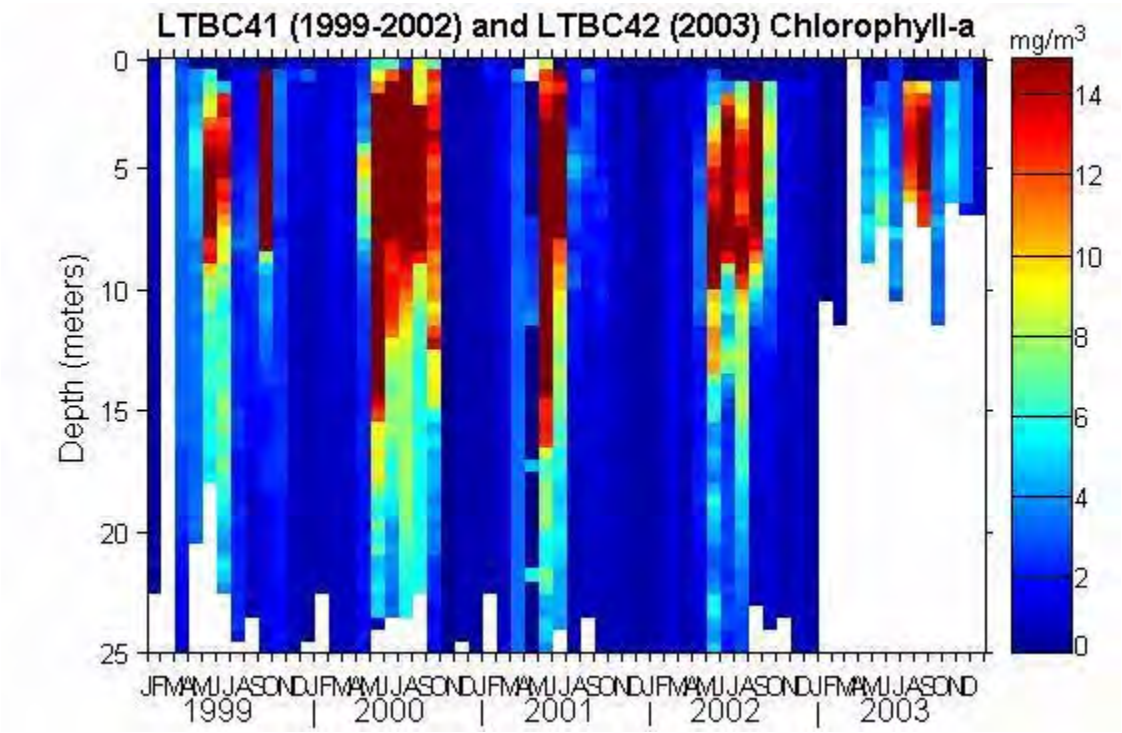

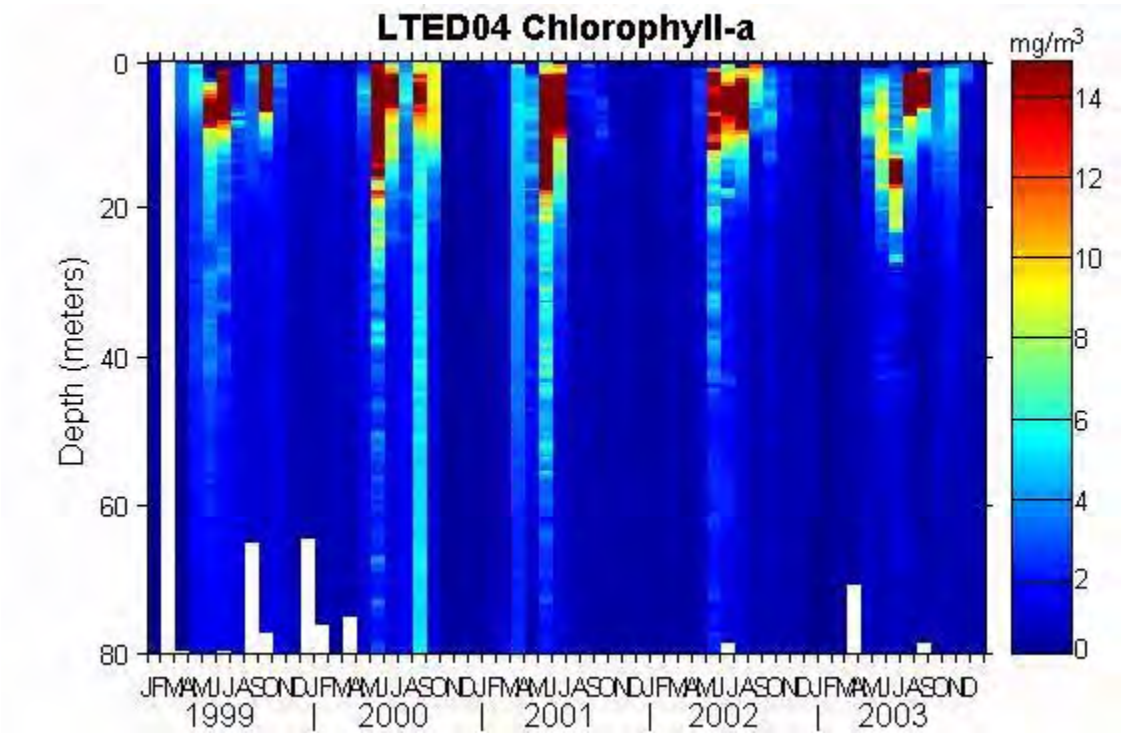

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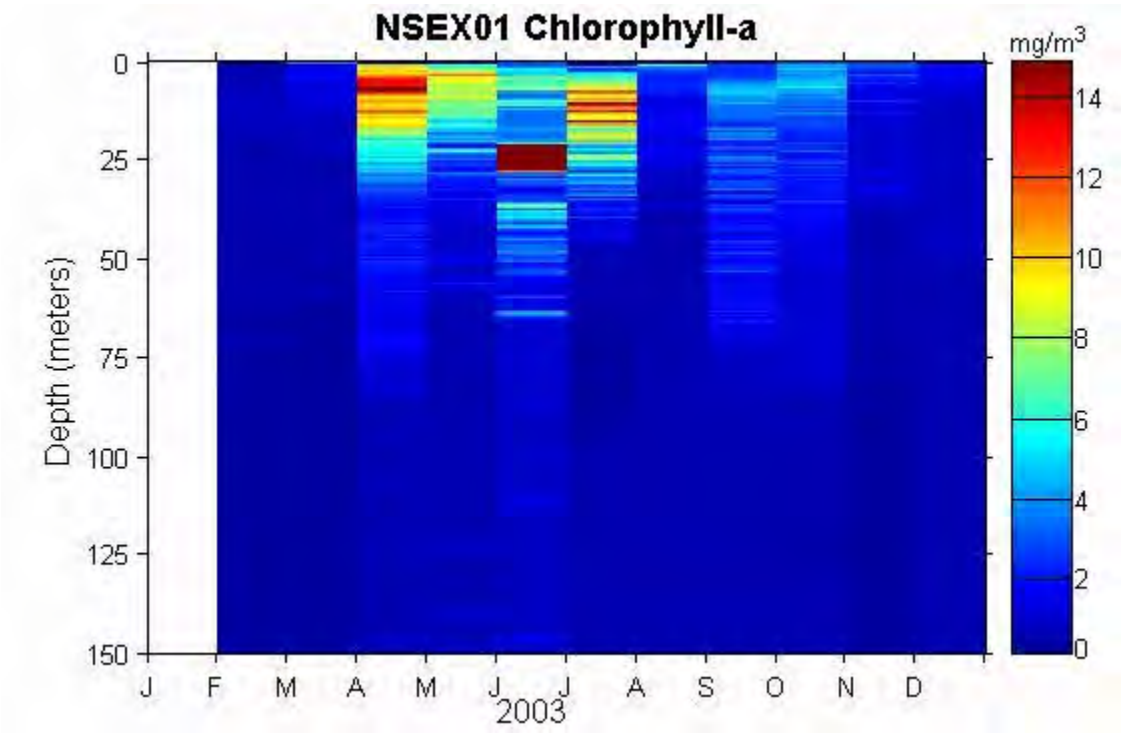

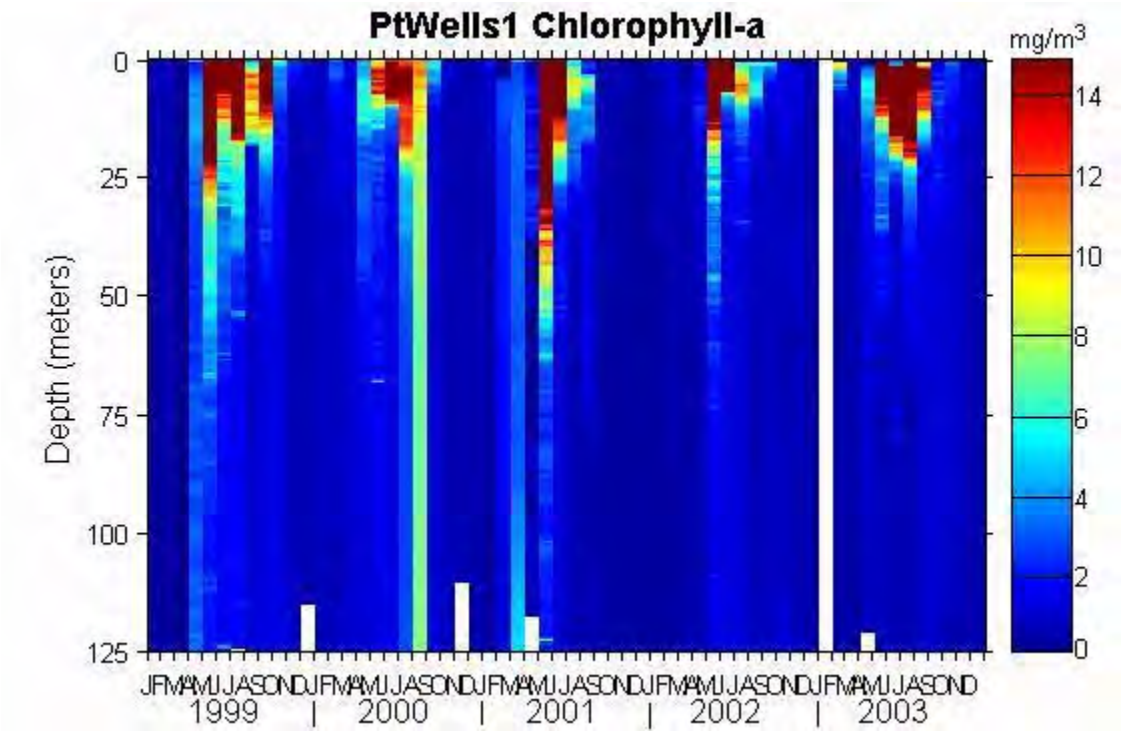
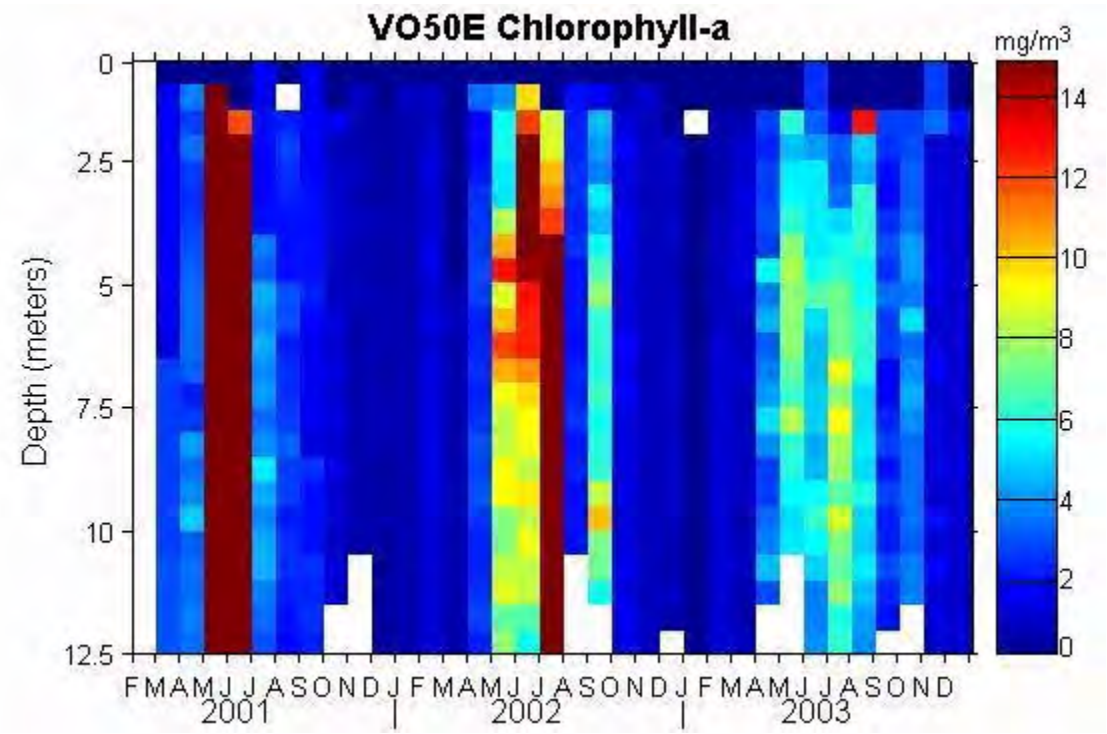
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