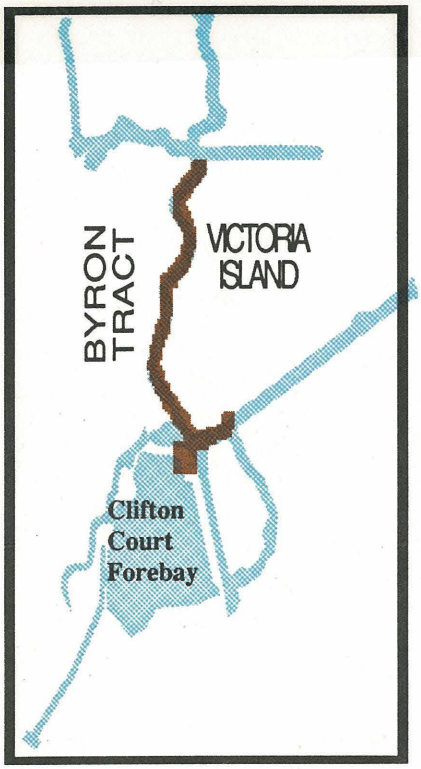
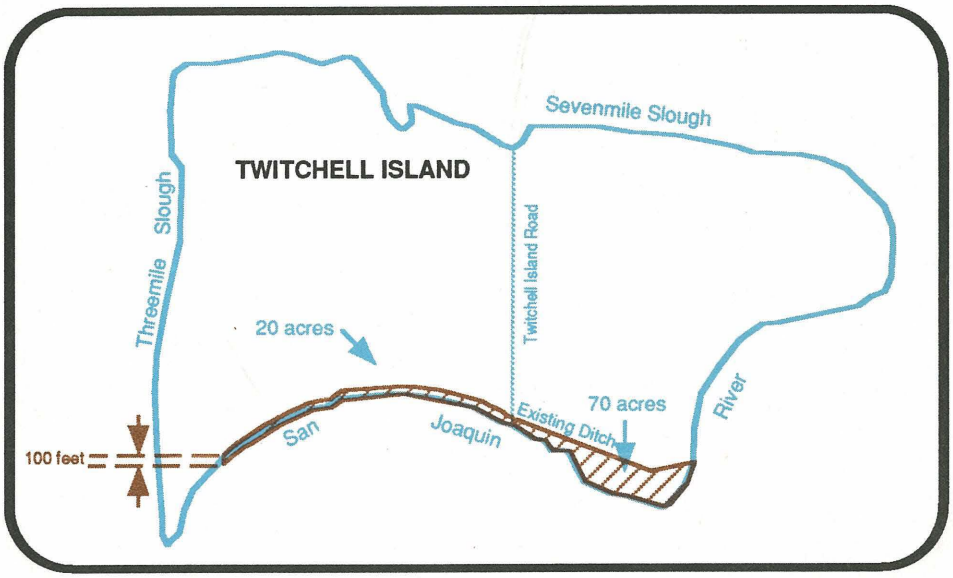
Memorandum Report





Twitchell Island Baseline Study of Dredge Material Reuse Sites

for the Interim South Delta Program

Department of Water Resources
January 1996

State of California

The Resources Agency

Memorandum

Date : JAN 2 3 1996

To : Kathlin Johnson, Chief
Division of Planning

From : Raymond D. Hart, Chief
Division of Local Assistance
Department of Water Resources

Subject: Twitchell Island Baseline Study of Dredge Material Reuse Sites for the Interim South Delta Program - Memorandum Report

The Division of Local Assistance conducted the environmental study described in this Memorandum Report for the Division of Planning. With this report, DLA has fulfilled the Program Work Order Assignment from DOP.

This study was conducted as part of the background information obtained in association with the Interim South Delta Program. The primary objective of this environmental study was to help predict any potential environmental impacts that could occur as a result of the proposed dredge material reuse activities. The work completed in this study is a continuation of previous studies conducted in October and December 1992, September 1994, and June 1995. Samples for this study included channel water, agricultural drainage water, and soil from the proposed sediment disposal and levee reuse sites on Twitchell Island. After collection, the samples were sent to a laboratory and analyzed for chemicals of environmental concern. The results of the investigation are presented here.

Comparison of the soil sample results with criteria from the Central Valley Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, and California Hazardous Waste Regulations indicates that the soil quality is acceptable for the intended use. Review of the results also indicates that potential leaching of the effluent through the Island and levee soils is not likely to affect ground water. Although the total selenium concentrations were found to exceed CVRWQCB Total Maximum Value, all soluble concentrations were below CVRWQCB Soluble Maximum Value. Dredge material effluent could exceed water quality criteria for copper and pH. Therefore, effluent samples should be closely monitored for copper and pH prior to discharge into channel water.

Please direct any questions or comments to Cassandra Enos at (916) 327-1675, or Judy Heath at (916) 327-1672.

Enclosure

SURNAME	C. Enos 1/18/96	J. Heath 1/18/96	[illegible] 1/22/96	[illegible] 1/23/96

DWR 155 (Rev. 2/86)

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State of California
Pete Wilson, Governor

The Resources Agency
Douglas P. Wheeler, Secretary for Resources

Department of Water Resources
David N. Kennedy, Director

Vacant Deputy Director	Robert G. Potter Chief Deputy Director	Carlos Madrid Deputy Director

L. Lucinda Chipponeri Assistant Director for Legislation	Susan N. Weber Chief Counsel

Division of Planning

Kathlin Johnson ..... Chief
Mike Ford ..... Chief, Delta Planning Branch

Division of Local Assistance

Ray Hart ..... Chief
Denis Letl ..... Deputy Chief
Richard Woodard ..... Chief, Water Quality Assessment Branch

This report was prepared by

Cassandra Enos ..... Environmental Specialist III
Carrie Stephens ..... Student Assistant

under the leadership of

Judy Heath ..... Chief, Technical Services Section

with the advisement of

Mike Mirmazaheri ..... Associate Engineer, WR

Executive Summary

The Interim South Delta Program proposed by the California Department of Water Resources is a public water management program to address issues surrounding the southern Sacramento-San Joaquin Delta. The ISDP project area generally comprises the lands and channels southwest of Stockton. The purpose of the Interim South Delta Program is to: (1) improve water levels and circulation in south Delta channels for local agricultural diversions, and (2) improve south Delta hydraulic conditions to increase diversion into Clifton Court Forebay to maximize the frequency of full pumping capacity at Harvey O. Banks Delta Pumping Plant. Under this program, CCF would retain its present size (2,180 acres), a new intake structure would be constructed at its northeastern corner, three flow control structures would be constructed (in Middle River, Old River, and Grantline Canal), a fish control structure would be built at the head of Old River near the San Joaquin River, and channel dredging would occur along Old River between CCF and North Victoria Canal.

The work completed in this study is a continuation of previous studies conducted in 1992, 1994, and 1995. The primary objective of this environmental study was to help predict any potential environmental impacts that could occur as a result of the proposed dredge material disposal activities associated with ISDP. Samples for this study were collected from the channel water and the proposed island and levee disposal sites. After collection, the samples were sent to a laboratory and analyzed for chemicals of environmental concern. The results of the investigation are presented here.

Two concerns are associated with the dredge material disposal activities of ISDP: (1) contamination of surface water, and (2) contamination of ground water. The primary concern with disposal of dredge material on the island and levees is the potential release of contaminants into surface and/or ground water. The major reactions involved in the release of contaminants are oxidation and acidification. Upon transfer of the sediment to land, previously anoxic sediments slowly become oxygenated, or oxidized. During this process, metals, trace elements, and other contaminants associated with the oxidizable fractions may be released as these fractions are oxidized. Oxidation, in turn, may result in acidification of the sediment, resulting in further release of trace metals.

Comparison of the soil sample results with criteria from the Central Valley Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, and California Hazardous Waste Regulations indicates that the soils are of acceptable quality for the intended use. Review of the results also indicates that potential leaching of the effluent through the Island and levee soils is not likely to affect ground water. Although the total selenium concentrations were found to exceed CVRWQCB Total Maximum Value, all soluble concentrations were below CVRWQCB Soluble Maximum Value. There is a potential for the dredge material effluent to exceed water quality criteria for copper and pH. Therefore, effluent samples should be closely monitored for copper and pH prior to discharge into channel water.

Introduction

Project Location

The Interim South Delta Program project area generally comprises the lands and channels southwest of Stockton (Figure 1. *Interim South Delta Program Area*)*. Included in the project area is the South Delta Water Agency which includes about 120,000 acres of irrigated agricultural lands. Important features of the State Water Project and the Central Valley Project are also located in the project area.

The south Delta is approximately bounded by Stockton on the north, Manteca on the east, Tracy on the south, and Discovery Bay on the west. The area contains about 150,000 acres, of which approximately 120,000 acres are used for irrigated agriculture. The remaining area consists of waterways, berms, channel islands, levees, and residential and industrial properties. State Routes 4 and 120, Interstates 5 and 205, and numerous county roads pass through the southern Delta. About 450,000 acre-feet of water is diverted from south Delta channels each year to irrigate the fully developed and highly productive agricultural land. The 75 miles of channels in the southern Delta also serve as drainage and floodwater canals, as wildlife habitat and migratory routes for fish, and as recreation for boaters.

ISDP incorporates parts or all of Orwood Tract, Woodward Island, Upper Jones Tract, Victoria Island, Coney Island, Union Island, Middle and Upper Roberts Island, Fabian Island, Byron Tract, and Stewart Tract.

Project Description

The purpose of ISDP is to: (1) improve water levels and circulation in south Delta channels for local agricultural diversions, and (2) improve south Delta hydraulic conditions to increase diversion into Clifton Court Forebay to maximize the frequency of full pumping capacity at Banks Pumping Plant. Under this program, CCF would retain its present size (2,180 acres), a new intake structure would be constructed at its northeastern corner, three flow control structures would be constructed (in Middle River, Old River, and Grantline Canal), a fish control structure would be built at the head of Old River near the San Joaquin River, and channel dredging would occur along Old River between CCF and North Victoria Canal (Figure 2. *ISDP Proposed Dredging Area*).

The dredging would involve approximately 4.9 miles of Old River north of the proposed new intake structure to CCF. The proposed channel cross-section consists of a waterside slope of 2 horizontal to 1 vertical with an average channel depth no greater than 5 feet below the existing channel bed. The proposed dredging would remove approximately 1.25 million cubic yards of material.

* See Appendices A and B for all figures and tables.

The dredge material would be used for maintenance of existing levees. Several locations have been considered for the dredge material placement, including Victoria Island, Twitchell Island, and Byron Tract.

Dredging of Channels

Two dredging methods are being considered for ISDP - hydraulic dredging and mechanical dredging.

Hydraulic dredging is only capable of pumping between 12 and 18 percent solids. Material dredged in this manner has to be deposited into ponds for sediment settlement. Once the sediments have settled, the holding ponds are typically drained.

The alternate form of dredging - mechanical dredging - allows for quicker drying and placement of dredge material, and avoids discharging substantial quantities of liquids. Transportation of dredge material is most commonly done by barge. A decision on which method of dredging to use will be made prior to commencing any work.

Method of Disposal of Dredge Materials

If mechanical dredging is used, the dredge material will be barged to the disposal site. At the disposal site, the dredge material is deposited on the backside of the levee and the sediment is allowed to dewater by gravity and evaporation. A ditch is constructed to collect the runoff from the sediment. When the moisture content of the material is within acceptable engineering limits, the material is to be used on the backside of levees to provide additional stability. The levee reinforcement will proceed as directed by the project's engineering specifications.

If hydraulic dredging is used to dredge the channels, the sediment will settle in designated ponds adjacent to the project area and dewater until the material is within acceptable engineering limits. Based on 1 million cubic yards of dredged material, the ponding area is estimated to be 600 acres. Water from the ponds that reenters the river will be carefully monitored to comply with applicable water quality standards.

Potential Environmental Impacts

This section addresses both potential short- and long-term water quality impacts from the dredge material disposal associated with the implementation of ISDP.

Short- and long-term impacts associated with disposal of dredge material on the island and levee are the release of contaminants from the dredge material and their possible introduction into surface water and/or ground water. The major reactions resulting in contaminant release are oxidation and acidification. In the water environment, most sediments exist in an anoxic, or oxygen-free, environment. The diffusion of oxygen in sediment is so slow that the oxygen content declines rapidly with increasing depth. A strong oxygen concentration gradient may exist over a depth of millimeters.

Upon transfer of the sediment to land, previously anoxic sediments slowly become oxygenated, or oxidized. This process may take a period of years, depending on the amount of dredge material, the redox potential of the sediment, and the amount of oxidizable matter. During this process, metals, trace elements, and other contaminants associated with the oxidizable fractions may be released as these fractions are oxidized.

Oxidation of the dredge material may result in acidification of the sediment. Oxidation reactions result in the production of hydrogen ions and lower the pH of the sediment. The amount of acidification is dependent on the neutralization capacity of the sediment. Acidification may result in the displacement and release of metals by the increased concentration of hydrogen ions.

Rainfall can percolate through the dredge material carrying the released contaminants to ground water and soil. Surface runoff from rainfall can flow over the dredge material, carrying the contaminants into surface waters. The loading of contaminants into the aquatic environment could cause adverse impacts to aquatic life or human health if concentrations are above the Central Valley Regional Water Quality Control Board's Water Quality Objectives, or other water quality standards.

An evaluation of the suitability of the dredge material for island disposal and levee reinforcement is contained in the May 1995 Department of Water Resources memorandum report *Water and Sediment Quality Study for the Interim South Delta Program.* This report addresses the background conditions in the proposed levee disposal sites.

Objectives of Environmental Study

The purpose of this study was to evaluate the baseline conditions of the channel water and levee soil on Twitchell Island, one of the potential dredge material disposal sites. Twitchell Island is proposed as a dredge material disposal site in the event that clamshell dredging is selected. The primary objective of this environmental study is to help predict any impact that may occur as a result of the proposed dredge material reuse activities associated with ISDP, including the effects of the physical and chemical components of the dredged material on the environment. The work completed in this study is a continuation of sampling which was conducted in 1992, 1994, and 1995. The results of these studies have been published in the following reports:

- *Environmental Study for the Interim South Delta Program: Water, Sediment and Soil Quality, May 1994*
- *Memorandum Report: Water and Sediment Quality Study for the Interim South Delta Program, May 1995*
- *Memorandum Report: Victoria Island Baseline Study for the Interim South Delta Program, November 1995*

The management strategy proposed for ISDP is a tiered approach to testing. The decision-making framework includes compliance with the California and federal water and soil quality criteria, and standard quality assurance/quality control principles. Where criteria are lacking, historical data are considered. In this study, representative areas, including areas of potential environmental concern within project boundaries, were evaluated, and the environmental impacts of a larger project predicted. Objectives are to:

- Document and better understand the existing baseline conditions prior to disposal of dredge material on Twitchell Island. The testing is for the purpose of evaluating current conditions in the project area with respect to chemical and physical properties of the channel water and the levee soils.
- Provide data sufficient to obtain necessary permits to begin construction.
- Provide information to regulatory agencies which have jurisdiction over the protection of fish, wildlife, and water quality. These agencies include CVRWQCB, California Department of Fish and Game, U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.
- Predict whether there will be water quality and/or biological impacts as a result of beneficial reuse of the dredge material associated with the project.

Baseline Sampling Plan Summary

General Study Description

This study was designed to obtain information about the baseline conditions at the proposed dredge material reuse sites on Twitchell Island (Figure 3. *Twitchell Island Baseline Sampling Sites and Proposed Dredge Material Disposal Sites*). This study is an expansion of previous studies that have been conducted throughout the south Delta by the Department. In 1992 and 1994, water, sediment, and soil samples were collected to obtain baseline information for ISDP. In 1995, water and soil were collected from Victoria Island to obtain baseline information on the potential dredge material reuse site. In this project, sampling and chemical analysis of San Joaquin River water (receiving water, up and downstream of the site), the Twitchell Island drain, and the proposed dredge material reuse sites were conducted.

The following guidance documents were used for developing the sampling plan: *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*, Ontario Ministry of the Environment, Canada, June 1992, Revised March 1993, and *Testing Guidelines For Dredged Material Disposal At San Francisco Bay Sites*, USACE San Francisco District, Regulatory Branch, Public Notice, Number: 93-2 , February 1, 1993.

BSK Analytical Laboratory was the laboratory contracted for analyses of soil, as well as tributyltin and sulfides in water. DWR's Bryte Chemical Laboratory analyzed all other water samples. DWR's Soil Laboratory analyzed the soil for grain size.

Water Sample Collection and Analysis

Table 1 lists the parameters for water sample analyses, their detection limits, and EPA method number. The metals analyses include results for dissolved concentrations.

Receiving Waters

Background testing was conducted on August 7, 1995 on waters of the San Joaquin River adjacent to the Island. The River, hereafter referred to as receiving waters, is the body of water to which the drain on the Island discharges.

In order to determine baseline data for the receiving waters, two samples were collected. One was collected upstream and one downstream in the San Joaquin River. Samples were collected from siphons located upstream and downstream of the agricultural drain (Figure 3. *Twitchell Island Baseline Sampling Sites and Proposed Dredge Material Disposal Sites*). The siphons pull water directly from the San Joaquin River and are representative of the water quality in the channel.

Water samples were taken using a stainless steel 3-gallon bucket with extended handles. This bucket is periodically cleaned and checked to ensure that it is not leaching metals and is not a source of contamination for environmental samples. Samples for dissolved metals analysis were filtered in the field using a 142-millimeter-diameter filter and a 0.45 micron membrane filter.

Water samples were placed in sampling containers supplied by DWR's Bryte Chemical Laboratory and BSK Analytical Laboratory. Each container was labeled with the sample number, sampling date, and location. Samples were stored in an ice chest for transportation back to DWR's Bryte Chemical Laboratory or held in a designated refrigerator for shipment to BSK Analytical Services. This was coordinated so that sample holding times were not exceeded.

Twitchell Island Drainage Water

One sample was collected from the drain adjacent to the project site, identified as TID shown on Figure 3. *Twitchell Island Baseline Sampling Sites and Proposed Dredge Material Disposal Sites.*

Samples were collected and handled in the same manner as the receiving water samples.

Soil Samples

Table 2. *Parameters for Chemical Analysis of Background Soil Samples* lists the parameters, their detection limits, and EPA method number for the sample analyses. The metals analyses include total and soluble concentrations. Soluble metal concentrations were determined after performing a Title 22 Waste Extraction Test using deionized water (DI WET). Total dissolved solids, pH, and electrical conductivity were measured after performing the DI WET.

Island Soils

The soil samples were collected on August 7, 1995. The southern portion of the Island bounded by the San Joaquin River is the area targeted for the dredge material spoils placement. The approximate locations sampled are shown on Figure 3. *Twitchell Island Baseline Sampling Sites and Proposed Dredge Material Disposal Sites.* Background soil samples were taken from the area underlying and adjacent to the area where dredge spoils will be placed. Up to 1.25 million cubic yards of dredge material could be placed on the Island. The sample locations were divided into seven groups. Each group consisted of three individual samples and one composite derived from contiguous samples. For example, A1-A3 comprised one composite sample. A total of seven composites were submitted to the laboratory.

All samples were obtained commencing from a depth of 1 foot below the surface. Sampling sites were collected using a stainless steel split core sampler and slide hammer. Samples were composited and homogenized by BSK Analytical Laboratory. Individual samples

were homogenized and a subsample of soil from each discrete sample was taken. Individual soil samples were labeled and stored until after the analytical results were received and evaluated. Subsamples from three contiguous sites were composited, resulting in one composite sample. Samples were composited in Teflon-lined or stainless steel containers to avoid any sample contamination.

Samples were retained in glass jars. All containers were labeled with the sample number, sampling date, and location. Samples were stored in an ice chest for transportation back to the West Sacramento water quality assessment field facility. Individual samples were placed in storage until distribution to contract laboratory representatives. This was coordinated so that sample holding times were not exceeded. Excess site material was stored until laboratory results were received and the data reviewed.

Levee Soils

Baseline sampling was also conducted on the levee soils. Samples were analyzed for the same constituents as the island soils (Table 2. *Parameters for Chemical Analysis of Background Soil Samples*).

The southern portion of the Island bounded by the San Joaquin River is the area targeted for levee stabilization. The locations to be sampled are shown on Figure 3. *Twitchell Island Baseline Sampling Sites and Proposed Dredge Material Disposal Sites*. Background soil samples were taken from the area underlying and adjacent to the area where dredge materials will be placed. DWR staff sampled levee soils in 1,000-foot intervals. One composite sample was generated from every 3,000 feet of contiguous levee area. All samples were obtained commencing from a depth of 1 foot below lowest adjacent grade.

Samples were collected and handled in the same manner as the Island soil samples.

Quality Assurance/Quality Control

Quality Assurance/Quality Control procedures were implemented for the analysis of water and soil samples. Quality control for both the field sampling and laboratory analysis programs was conducted according to EPA methods.

Field Quality Control

Water

EPA methods for sample collection, preservation, and handling of water were followed. Field quality control samples were utilized to determine any sampling bias. Field quality control for background sampling consisted of one filtered and one unfiltered field blank. The same analyses presented in Table 1 were performed on these samples.

Soil

EPA methods for sample collection, preservation, and handling of soil material were followed.

Laboratory Quality Control

Laboratory quality control procedures listed in EPA methods were followed. This included the analysis of the following: laboratory blanks, laboratory control samples, matrix spike samples, duplicate samples, and surrogate analytes where applicable.

Data Quality Assessment

A summary of the data quality assessment is presented in Table 3. *Data Quality Assessment Summary.*

Sample Representativeness

The purpose of this study was to evaluate the baseline water and soil conditions in the proposed island and levee areas. It is not intended to be a comprehensive evaluation of the soil and water quality; it is meant only to define the current conditions and predict future project effects. The samples, along with previous sampling data, will provide information that can be used in project planning decisions.

In order for a sampling program to provide valuable information, the samples collected must be representative of environmental conditions. EPA defines representativeness as "The degree to which the data accurately and precisely represent a characteristic of a population parameter, variation of a property, a process characteristic, or an operational condition." Several factors make it difficult to thoroughly characterize the water and soil quality in the Sacramento-San Joaquin Delta.

One of the major factors is the hydrology of the area. The primary inputs of water in the Delta are the Sacramento and San Joaquin Rivers and their tributaries. Inflows from the Rivers vary seasonally, depending on precipitation as well as SWP releases from Lake Oroville and CVP releases from Shasta Lake. A portion of the fresh water entering the Delta is exported for use elsewhere. Exporters include SWP, CVP, water districts, and over 1,800 agricultural diversions. Much of the remaining water flows out through San Francisco Bay to the Pacific Ocean, preventing saline water from the Bay from flowing into the Delta.

In addition to the above imports and exports, the hydrology of the Delta is affected by the ocean tidal cycle. Since the Delta is part of a tidal estuary, the water levels and direction of flow vary with the ocean tidal cycle.

Another major factor affecting the water quality of the Delta is the industrial and agricultural activities inside and outside of the Delta. In addition to surface runoff from local cities, the Delta receives discharges from waste water treatment facilities and industrial sites. These discharges contain varying amounts of trace elements and organic chemicals. Water for agricultural irrigation is diverted to Delta islands, and the excess is returned to Delta channels. This agricultural drain water often contains high levels of salts and may contain detectable levels of pesticides. In addition, runoff from farms in the Sacramento and San Joaquin Valleys similarly affects Delta quality.

Recreational activities are another factor affecting the water quality of the Delta. The Delta is a source for many recreational activities including fishing and boating. The impact of these activities on the Delta is unknown and is likely to vary seasonally. The above factors illustrate the dynamic conditions of the Delta. A thorough evaluation of the water quality would require extensive, if not continuous, monitoring of the area.

Unlike water, soil is less dynamic, but in many cases more heterogenous. Variability is inherent in naturally deposited solids such as soils. This natural variability makes it difficult to thoroughly characterize the entire project alternative area.

Laboratory Data Validation

A data quality assessment was performed to determine whether the data collected were acceptable for the intended use. Laboratory data were evaluated for precision, accuracy, and comparability. Laboratory methods, procedures, holding times, and quality control sample data were reviewed to assess data quality. Based on the results of the data quality assessment, sample data may be qualified as estimated or questionable. Estimated or questionable data may or may not be considered acceptable depending on the intended use of the data. In cases where data are to be used for regulatory purposes, such as analyzing drinking water for compliance with maximum contaminant levels, estimated or questionable data are not acceptable. In cases where data are to be used to evaluate general baseline conditions, such as this study, estimated data may be considered acceptable.

The results of the data quality assessment indicate that, in general, the data are of good quality. In three cases, the laboratory control sample results were outside of the acceptance limits. Laboratory control samples provide information on the accuracy of the sample results. Laboratory control samples are prepared by adding a known concentration of method analyte(s) to a clean matrix. Generally, one laboratory control sample is prepared for every ten samples, otherwise known as a "batch." In the above-mentioned instances, the laboratory control samples for EPA method 6010 (cadmium, lead, and zinc) were below the minimum control limit. However, the duplicate laboratory control samples were within the control limit, indicating acceptable accuracy. No samples were considered estimated.

Three matrix spikes analyzed for EPA Method 6010 (cadmium, lead, and silver) and one matrix spike for EPA Method 8100 (benzo[a]pyrene) had recoveries outside of the laboratory acceptance range. Matrix spikes provide information on the accuracy of the sample results in an environmental sample. The accuracy of sample results is often less in environmental samples due to matrix interferences. The matrix spikes are prepared by adding a known concentration of method analytes to an environmental sample. Similar to laboratory control samples, one matrix spike is generally prepared for every ten samples. In the above cases, the laboratory control samples associated with the batch had recoveries within the acceptance ranges. No samples were considered estimated.

Field Blanks

Field blanks were collected for the channel water and agricultural drain samples. One unfiltered and one filtered sample were collected. Results for both blanks were not-detectable for all metals.

Sample Results and Discussion

Surface Water

Criteria and Standards

The results of the channel water sample analyses were compared to standards for the protection of aquatic life and human health. These include the *California Inland Surface Water Plan* Water Quality Objectives for the protection of aquatic life (four-day average), and EPA and California Department of Health Services Maximum Contaminant Levels for the protection of drinking water. When comparing the results to the federal and State MCLs, the more stringent of the two was used.

In some cases, WQO may be lower than the laboratory reporting level, and a constituent cannot be detected at low enough concentrations to determine compliance with WQO. CVRWQCB has established a list of acceptable laboratory methods for analyses. If the appropriate method of analysis is used and the laboratory makes a diligent effort to achieve the lowest possible reporting limit, a not-detectable concentration will be considered in compliance, even if the reporting limit is above WQO. Table 4. *Water Quality Standards* contains a list of WQO, CVRWQCB-approved laboratory methods, and MCLs.

Standard Minerals and Miscellaneous Water Quality Parameters

Water samples were analyzed for standard minerals including boron, calcium, chloride, fluoride, magnesium, nitrate, potassium, sodium, and sulfate. In addition, staff analyzed water samples for other miscellaneous water quality parameters including hardness, total alkalinity, pH, total dissolved solids, and specific conductance. The agricultural drainage water had consistently higher concentrations of the above constituents than the river samples (Figures 4 through 17). No WQO exist for the above parameters. Primary and/or secondary MCLs exist for some of the constituents, none of which was exceeded.

Trace Metals

All water samples were analyzed for trace metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. Metals were below detectable concentrations in all samples except for arsenic, nickel, and zinc (Figures 18 through 20). As with the mineral analysis, the agricultural drain water showed significantly higher concentrations of the detected metals as compared to the river sites. None of the detected metals exceeded its respective WQO or MCLs.

Island and Levee Soil Criteria and Standards

With the exception of the California Total Threshold Limit Concentration and Soluble Threshold Limit Concentration, no enforceable federal or State soil quality standards exist (Table 5. *Sediment Standards and Criteria*). In an attempt to evaluate the quality of the soil data with respect to the intended use, the data were compared to the California TTLC and STLC, as well as to nonenforceable California criteria. The use of nonenforceable criteria does not constitute an endorsement of the criteria by DWR. They are used only as a point of reference for evaluation of ISDP soil data. The applicability of the criteria with respect to intended use was evaluated prior to use in this study. In general, results were compared to the most stringent or conservative values. DWR staff concludes that the intended use of these criteria is consistent with the objectives of this study. A list of the criteria and a short description of each is given in Table 5. *Sediment Standards and Criteria.*

The San Francisco Bay Regional Water Quality Control Board interim sediment screening criteria were developed to facilitate beneficial reuse of dredged materials. The criteria are used to evaluate the potential for water quality impacts from the disposal of the sediment near a water body, such as use of dredged material for levee maintenance. The criteria are defined as the maximum concentrations of constituents in dredged sediment acceptable for the designated use. However, the sediment testing results are evaluated on a case-by-case basis. Although the island and levee soil samples will not be placed on the levee, the soil will be in contact with water that will be discharged to the channel.

In addition to the above criteria, CVRWQCB *Draft General Order Waste Discharge Requirements for Dredging Activities Associated with Maintenance and New Construction Projects in the Delta* was used as a guidance document. The General Order Waste Discharge Requirements document was developed for maintenance dredging activities in the Sacramento-San Joaquin Delta. The document is currently in draft form and is **not** enforceable. Total Maximum Values are given for constituents of concern for both dryside and waterside of levee disposal. For this study, TMV for dryside levee disposal was used. Two Soluble Maximum Values are provided, one for discharge of decant water to the River and one without discharge to the River. Although these values apply to the dredged sediment itself, they provide guidelines for evaluation of the island and levee soil.

Island Soil Samples

Physical Analysis

A grain-size distribution and soil classification was conducted for all samples. A summary of the soil classification results is presented in Table 6. *Soil Classification for Island Samples*. In general, all samples were classified as either silty sand or fine-grained material. Additional tests were not conducted to further classify the fine-grained materials. Grain size distributions for individual samples are shown in Figures 21 through 27.

All island soil samples were analyzed for specific conductance. Results ranged from 2,200 to 34,000 µmhos/cm (Figure 28. *Specific Conductance in Island Soil Samples*). The sites were also analyzed for moisture concentration, with results ranging from 1.8 to 17.8 percent (Figure 29. *Moisture Concentrations in Island Soil Samples*).

Net Acid Base Potential

The Net Acid Base Potential is a measure of the acid or base that will be generated from a soil. The ABP is calculated by subtracting the neutralization potential in tons of $CaCO_3$/1000 tons of material from the acid generating potential in tons of $CaCO_3$/1000 tons of material. A value of zero indicates that the acid generating and neutralization potentials are equal and, theoretically, the soil will remain neutral. A positive value indicates that a net acid material will be generated and a negative value indicates that a net base material will be generated.

The ABP results for the island soil samples range from -4.12 to -8.40 (Figure 30. *Net Acid Base Potential for Island Soil Samples*). CVRWQCB uses a guideline of -2 as the net ABP where acidic conditions are likely to develop. All of the samples have values below CVRWQCB guideline.

Organic Analysis

Island soil samples were analyzed for several organic constituents including phthalate esters, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and chlorinated pesticides (Table 2. *Parameters for Chemical Analysis of Background Soil Samples*). All results were not-detectable.

All soil samples were analyzed for volatile solids, total organic carbon and total oil and grease. Volatile solids in the backside soils ranged from 3.4 to 26.7 percent (Figure 31. *Total Volatile Solids Concentrations in Island Soil Samples*). The total volatile solids analysis provides a rough approximation of the amount of organic matter in the sediment. This indicates that the island soil has a range of approximately 3 to 27 percent organic matter in the soil.

TOC concentrations ranged from 1,900 to 60,000 mg/kg wet weight (Figure 32. *Total Organic Carbon Concentrations in Island Soil Samples*). Total oil and grease concentrations ranged from 23 to 99 mg/kg wet weight and 25.3 to 112.7 mg/kg dry weight (Figure 33. *Total Oil and Grease Concentrations in Island Soil Samples*).

Total Trace Metals

Metals were found in detectable concentrations in most samples (Figures 34 through 48). Cadmium, silver, and thallium were the only metals not detected in any of the soil samples. Arsenic was detected at all sites with concentrations ranging from 0.79 to 7.9 mg/kg wet weight, and 0.7 to 8.7 mg/kg dry weight (Figure 34. *Arsenic Concentrations in Island Soil Samples).* No

concentrations exceeded TMV of 33 mg/kg dry weight (same as the SFRWQCB value). No sites exceeded TTLC of 500 mg/kg wet weight.

Chromium was detected in all samples, with concentrations ranging from 17 to 74 mg/kg wet weight, and 17 to 82 mg/kg dry weight (Figure 35. *Chromium Concentrations in Island Soil Samples).* One site exceeded TMV of 80 mg/kg dry weight. All other sites were below TMV, and all sites were below SFRWQCB and TTLC criteria.

Copper was found in detectable concentrations at all sites. Concentrations ranged from 8 to 42 mg/kg wet weight and 8 to 46 mg/kg dry weight (Figure 36. *Copper Concentrations in Island Soil Samples*). None of the criteria was exceeded.

Lead was detected in all samples. Concentrations ranged from 6.4 to 26 mg/kg wet weight and 6.5 to 29 mg/kg dry weight (Figure 37. *Lead Concentrations in Island Soil Samples*). No applicable criteria were exceeded.

Mercury was detected in three of seven sites, with results ranging from 0.1 to 0.2 mg/kg wet weight and 0.10 to 0.22 mg/kg dry weight (Figure 38. *Mercury Concentrations in Island Soil Samples*). No concentrations exceeded applicable criteria.

Nickel was found in concentrations ranging from 18 to 68 mg/kg wet weight and 20.3 to 75.2 mg/kg dry weight. All samples had detectable concentrations. Three sites exceeded the TMV of 30 mg/kg dry weight (Figure 39. *Nickel Concentrations in Island Soil Samples).* However, this value is likely to be revised. No sites exceeded SFRWQCB or TTLC criteria.

Selenium was detectable in five of the seven sites, with concentrations ranging from 0.5 to 2.4 mg/kg wet weight and 0.5 to 2.9 mg/kg dry weight (Figure 40. *Selenium Concentrations in Island Soil Samples).* Four sites exceeded TMV of 0.7 mg/kg dry weight. No other criteria were exceeded.

Zinc was detectable in all samples. Concentrations ranged from 22 to 73 mg/kg wet weight and 27 to 81 mg/kg dry weight (Figure 41. *Zinc Concentrations in Island Soil Samples*). None of the applicable criteria was exceeded.

Sites E and F were found to have significantly higher concentrations of chromium, copper, lead, nickel, and zinc. However, although elevated above the other sites, sites E and F were not found to have high metals concentrations. With the exception of chromium at site F and nickel at both sites, no samples were found to exceed any of the criteria.

Tributyltin Analysis

All samples were analyzed for tributyltin. TBT was detected at site G only, in concentrations of 2 µg/kg wet weight, and 2.2 µg/kg dry weight. The remainder of the sites had

not-detectable concentrations with a reporting limit of 1 µg/kg wet weight and 1.3 to 1.7 µg/kg dry weight. The detected value cannot be directly compared to TMV (0.2 mg/kg OC or 200 µg/kg OC). TMV is normalized as organic carbon by dividing the dry weight in mg/kg by the dissolved organic carbon. However, it is not likely that the dissolved organic carbon value would be low enough to cause the 2.2 µg/kg dry weight value to be above TMV.

Soluble Results

Soluble metal analyses were performed on all samples. Samples were extracted using the Waste Extraction Test from Title 22 of the California Code of Regulations. The WET was performed using deionized water in place of citric acid. The extracts from the WET test were analyzed for metals. Cadmium, silver, mercury, and thallium had not-detectable results in all sample extracts. Soluble arsenic was detected at all sites, with concentrations ranging from 0.003 to 0.011 mg/L (Figure 42. *Soluble Arsenic Concentrations in Island Soil Samples*). No samples exceeded either the Soluble Maximum Value without river discharge (0.5 mg/L) or the SMV with river discharge (0.05 mg/L). No sites exceeded STLC.

Soluble chromium was detected at 6 of the 7 sites. Detectable concentrations ranged from 0.005 to 0.036 mg/L (Figure 43. *Soluble Chromium Concentrations in Island Soil Samples*). Two of the sites exceeded SMV with river discharge (0.016 mg/L). None of the sites exceeded SMV without river discharge (0.5 mg/L) or STLC.

Soluble copper concentrations were found in all samples ranging from 0.008 to 0.097 mg/L (Figure 44. *Soluble Copper Concentrations in Island Soil Samples*). All sites exceeded SMV with river discharge (0.0054 mg/L). Sites A through E slightly exceeded SMV, while sites F and G significantly exceeded the value. No sites exceeded SMV without river discharge (10 mg/L) or STLC.

Soluble lead was detected in six of seven sites, with concentrations ranging from 0.006 to 0.048 mg/L (Figure 45. *Soluble Lead Concentrations in Island Soil Samples*). Detectable values were below all criteria.

Soluble nickel was detected in one site (Figure 46. *Soluble Nickel Concentrations in Island Soil Samples)*, exceeding SMV with river discharge (0.1 mg/L). No other criteria were exceeded.

Soluble selenium concentrations were fairly consistent, ranging from 0.002 to 0.003 mg/L (Figure 47. *Soluble Selenium Concentrations in Island Soil Samples*). Values were detected in six of the seven sites; none exceeded the criteria.

Soluble zinc was detected at all sites, with concentrations ranging from 0.018 to 1.5 mg/L (Figure 48. *Soluble Zinc Concentrations in Island Soil Samples*). Six of the seven sites exceeded SMV with river discharge of 0.054 mg/L. No other criteria were exceeded.

All sample extracts were analyzed for total dissolved solids. TDS values ranged from 160 to 1,500 mg/L (Figure 49. *Soluble Total Dissolved Solids Concentrations in Island Soil Samples*). These values are significantly higher than the agricultural drain and channel water samples which ranged from 8 to 25 mg/L TDS.

All soil extracts were also analyzed for pH. Soluble pH concentrations ranged from 5.8 to 7.4 pH units (Figure 50. *Soluble pH Concentrations in Island Soil Samples*). The CVRWQCB General Order has minimum and maximum effluent limitations of 6.5 and 8.5 pH units. Five of the seven samples had soluble pH results below the minimum CVRWQCB guideline.

All sample extracts were analyzed for specific conductance. Concentrations ranged from 93 to 2,400 µmhos/cm (Figure 51. *Soluble Specific Conductance in Island Soil Samples*). Concentrations for five of the seven sites ranged from 93 to 220 µmhos/cm. Site G had a slightly higher concentration of 810 µmhos/cm, while site E had a significantly higher concentration of 2,400 µmhos/cm. Specific conductance concentrations in the channel water and agricultural drain ranged from 130 to 525 µmhos/cm. The majority of the island soil samples had soluble specific conductance concentrations within this range, with the exceptions of sites G and E.

Levee Soil Sample Results

Physical Analysis

As with the island soil samples, a grain size distribution and soil classification was conducted for all levee soil samples. A summary of the soil classification results is presented in Table 7. *Soil Classification for Levee Samples*. In general, as with the island samples, all samples were classified as either silty sand or fine-grained material. Additional tests were not conducted to further classify the fine-grained materials. Grain size distributions for individual samples are shown in Figures 52 through 56.

As with island samples, the levee soils were analyzed for percent moisture. The results ranged from 1.3 to 5.2 percent (Figure 57. *Moisture Concentrations in Levee Soil Samples*). The samples were also analyzed for specific conductance, and the results ranged from 320 to 23,000 µmhos/cm (Figure 58. *Specific Conductance in Levee Soil Samples*).

Net Acid Base Potential

The ABP results for levee soil samples range from -4.2 to -8.03 pH units (Figure 59. *Net Acid Base Potential for Levee Soil Samples*). All sites were below CVRWQCB Maximum Guideline (-2).

Organic Analysis

Levee soil samples were analyzed for the same constituents as the island samples, including phthalate esters, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and chlorinated pesticides (Table 2. *Parameters for Chemical Analysis of Background Soil Samples*). With one exception, all results were not-detectable. Levee site 10-12 had detectable concentrations of fluoranthene (0.06 mg/kg wet weight, 0.063 mg/kg dry weight) and pyrene (0.13 mg/kg wet weight, 0.014 mg/kg dry weight). Both constituents are PAHs which are regulated as total PAHs. TMV for total PAHs is 4 mg/kg OC (mg/kg dry weight divided by dissolved organic carbon). The total PAH value at site 10-12 is 0.077 mg/kg dry weight. Samples were not analyzed for dissolved organic carbon; therefore, the result cannot be directly compared to TMV. However, it is unlikely that the result would be elevated above TMV.

As with island soil samples, all levee sites were analyzed for volatile solids, total organic carbon, and total oil and grease. Volatile solids in the levee samples ranged from 3 to 9.5 percent organic matter present in the soil (Figure 60. *Total Volatile Solids Concentrations in Levee Soil Samples*). These values are lower than the island sites, which ranged from 3.4 to 26.7 percent organic matter. This is reasonable, since the levee is less likely to have plant and other organic material.

TOC concentrations ranged from 2,200 to 9,700 mg/kg wet weight (Figure 61. *Total Organic Carbon Concentrations in Levee Soil Samples*). TOG concentrations ranged from 25 to 140 mg/kg wet weight, and 26 to 144 mg/kg dry weight (Figure 62. *Total Oil and Grease Concentrations in Levee Soil Samples*). No criteria for oil and grease are available.

Total Trace Metals

As with the island soil samples, metals were found in detectable concentrations in most levee soil samples. Cadmium, silver, and thallium were exceptions and were not detectable in any of the levee soil samples.

Chromium, copper, lead, and zinc were detected in all samples. Chromium was detected with concentrations ranging from 18 to 48 mg/kg wet weight, and 19 to 50 mg/kg dry weight (Figure 63. *Chromium Concentrations in Levee Soil Samples*). Copper concentrations ranged from 13 to 23 mg/kg wet weight, and 13 to 24 mg/kg dry weight (Figure 64. *Copper Concentrations in Levee Soil Samples*). Lead was found in concentrations ranging from 6.9 to 14 mg/kg wet weight, and 7.1 to 15 mg/kg dry weight (Figure 65. *Lead Concentrations in Levee Soil Samples*). Zinc was detected at concentrations ranging from 29 to 51 mg/kg wet weight, and 29.9 to 53.0 mg/kg dry weight (Figure 66. *Zinc Concentrations in Levee Soil Samples*). None of the metals exceeded any of the applicable criteria.

Arsenic was detectable in three of the five sites, with results ranging from 3.7 to 5.4 mg/kg wet weight, and 3.8 to 5.6 mg/kg dry weight (Figure 67. *Arsenic Concentrations in Levee Soil Samples*). None of the criteria was exceeded.

Mercury was detected at one site, with results of 0.1 mg/kg wet weight, and 0.1 mg/kg dry weight (Figure 68. *Mercury Concentrations in Levee Soil Samples*). These values do not exceed any of the given criteria.

Nickel was detected at all sites, with concentrations ranging from 20 to 57 mg/kg wet weight, and 20.6 to 60.1 mg/kg dry weight (Figure 69. *Nickel Concentrations in Levee Soil Samples*). Four of the five sites exceeded the current TMV of 30 mg/kg dry weight; however, the criterion is likely to change. No other criteria were exceeded.

Selenium was found in detectable concentrations at four of the five sites, with values ranging from 1.1 to 1.4 mg/kg wet weight, and 1.1 to 1.4 mg/kg dry weight (Figure 70. *Selenium Concentrations in Levee Soil Samples*). All of the detected values exceeded TMV of 0.7 mg/kg dry weight. No sites exceeded TTLC.

Tributyltin Analysis

All TBT results were not-detectable for levee soil samples. The reporting limit was 1 µg/kg wet weight, and 1.01 to 1.05 µg/kg dry weight.

Soluble Results

In the same manner as the island soil samples, the levee soil samples were extracted using a DI WET and the extract analyzed for trace metals, TDS, and pH. Cadmium, mercury, selenium, silver, and thallium were not detected in any of the soil extract samples.

Soluble arsenic concentrations ranged from 0.008 to 0.019 mg/L, and were detected at four of the five sites (Figure 71. *Soluble Arsenic Concentrations in Levee Soil Samples*). No samples exceeded any criteria.

Soluble chromium was detected at four of the five sites, with detectable concentrations ranging from 0.01 to 0.037 mg/L (Figure 72. *Soluble Chromium Concentrations in Levee Soil Samples*). None of the samples exceeded SMV allowed with no discharge to the River (0.5 mg/L). Three of the sites exceeded WQO (0.011mg/L) and SMV with discharge to the River (0.016 mg/L).

Soluble copper was found detectable in all samples, with concentrations ranging from 0.009 to 0.058 mg/L (Figure 73. *Soluble Copper Concentrations in Levee Soil Samples*). No sites exceeded SMV allowable without discharge to the River (10 mg/L). All of the sites exceeded SMV with discharge to the River (0.054 mg/L). None of the sites exceeded STLC.

Soluble lead was detected at four of the five sites, with concentrations ranging from 0.01 to 0.025 mg/L (Figure 74. *Soluble Lead Concentrations in Levee Soil Samples*). No sites exceeded SMV without river discharge (0.15 mg/L). All detectable concentrations exceeded SMV with river discharge (0.00099 mg/L). No sites exceeded STLC.

Soluble nickel, with concentrations ranging from 0.023 to 0.14 mg/L, was found in all samples (Figure 75. *Soluble Nickel Concentrations in Levee Soil Samples*). No sites exceeded SMV without river discharge (1 mg /L). One site exceeded SMV with river discharge (0.1 mg/L). STLC was not exceeded.

Soluble selenium was only detected in one of the five samples (Figure 76. *Soluble Selenium in Levee Soil Samples*). The detectable concentration (0.004 mg/L) was below all criteria.

Soluble zinc was found in all samples at concentrations ranging from 0.023 to 0.15 mg/L (Figure 77. *Soluble Zinc Concentrations in Levee Soil Samples*). No sites exceeded SMV without river discharge (50 mg/L) or the STLC. Four sites exceeded SMV with river discharge (0.054 mg/L) as well as WQO (0.049 mg/L).

Total dissolved solids concentrations in the levee soil sample extracts ranged from 270 to 860 mg/L (Figure 78. *Soluble Total Dissolved Solids Concentrations in Levee Soil Samples*). As with the island samples, the soluble TDS values are significantly higher than the agricultural drain and channel water samples which ranged from 8 to 25 mg/L TDS.

pH values below the minimum CVRWQCB guideline (6.5 pH units) for discharge to surface water were detected in four of the five sites. Soluble pH concentrations ranged from 5.6 to 7 pH units (Figure 79. *Soluble pH Concentrations in Levee Soil Samples*).

As with island soil samples, levee soils were analyzed for soluble specific conductance. Results from sample extracts ranged from 32 to 1,400 µmhos/cm (Figure 80. *Soluble Specific Conductance in Levee Soil Samples*). Four of the five sites had specific conductance values ranging from 32 to 170 µmhos/cm, while Site E had a significantly higher value of 1,400 µmhos/cm. Specific conductance concentrations in the channel water and agricultural drain ranged from 130 to 525 µmhos/cm. Only Site E had a soluble specific conductance value outside of this range.

Conclusion

Two concerns are associated with the dredge material disposal activities of ISDP: (1) contamination of surface water, and (2) contamination of ground water. The primary concern with disposal of dredge material onto the island and levees is the potential release of contaminants from the dredge material into the effluent. Discharge of the effluent into the surface water may result in exceedence of water quality standards. Leaching of the effluent could result in ground water contamination.

Samples were analyzed for several synthetic organic compounds. With two exceptions, all results were not-detectable. The two detectable concentrations were significantly below all applicable criteria. All samples were analyzed for tributyltin. While one island soil sample had a detectable concentration of tributyltin, the remainder of the island samples and levee soil samples had not-detectable results.

Trace metals were found in detectable concentrations in most of the island and soil samples. No samples had concentrations exceeding either SFRWQCB criteria or TTLC values. Few samples had results which exceeded their TMVs. However, the majority of detectable concentrations for nickel and selenium were found to exceed their respective TMVs, in both the island and soil samples.

Similar to total metal results, none of the detected concentrations of soluble trace metals exceeded STLC values. No soluble results were found to exceed SMV without discharge to the River; however, a few metals were found in concentrations exceeding SMV with discharge to the River. For both island and levee soil samples, soluble copper was detected in every sample, with all concentrations exceeding SMV for discharge to the River.

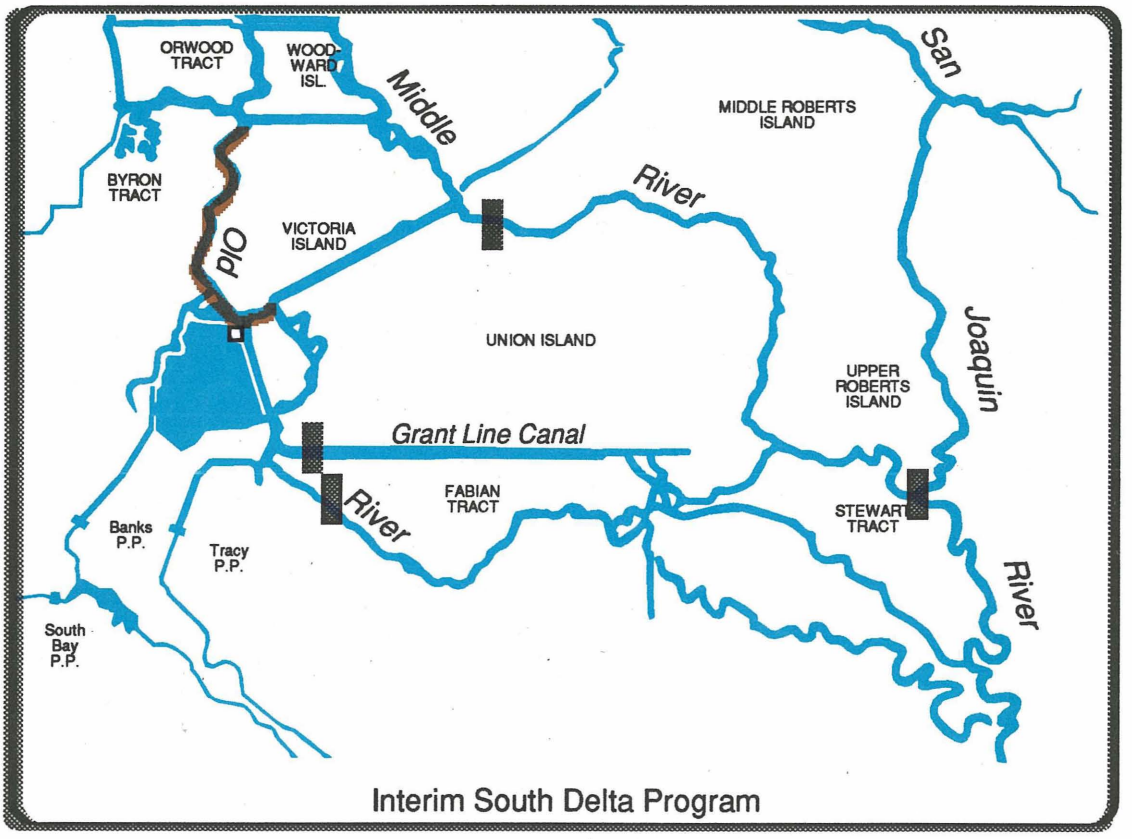
Comparison of the soil sample results with criteria from the CVRWQCB, SFRWQCB, and California Hazardous Waste Regulations indicates that the soils are of acceptable quality for the intended use. Review of the results also indicates that potential leaching of the effluent through the island and levee soils is not likely to affect ground water. Although the total selenium concentrations were found to exceed TMV, all soluble concentrations were below SMV. Dredge material effluent could exceed water quality criteria for copper and pH. Therefore, effluent samples should be closely monitored for copper and pH prior to discharge into channel water.

Appendix A

Figures

Figure-1

Interim South Delta Program Area



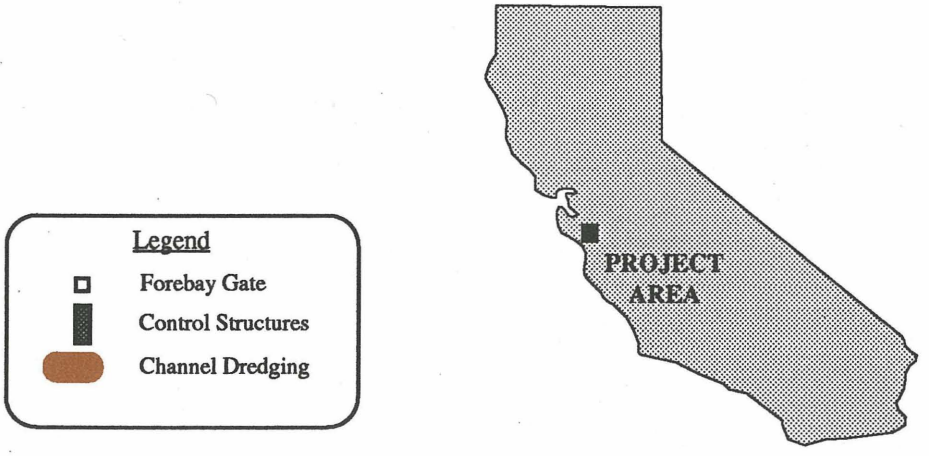
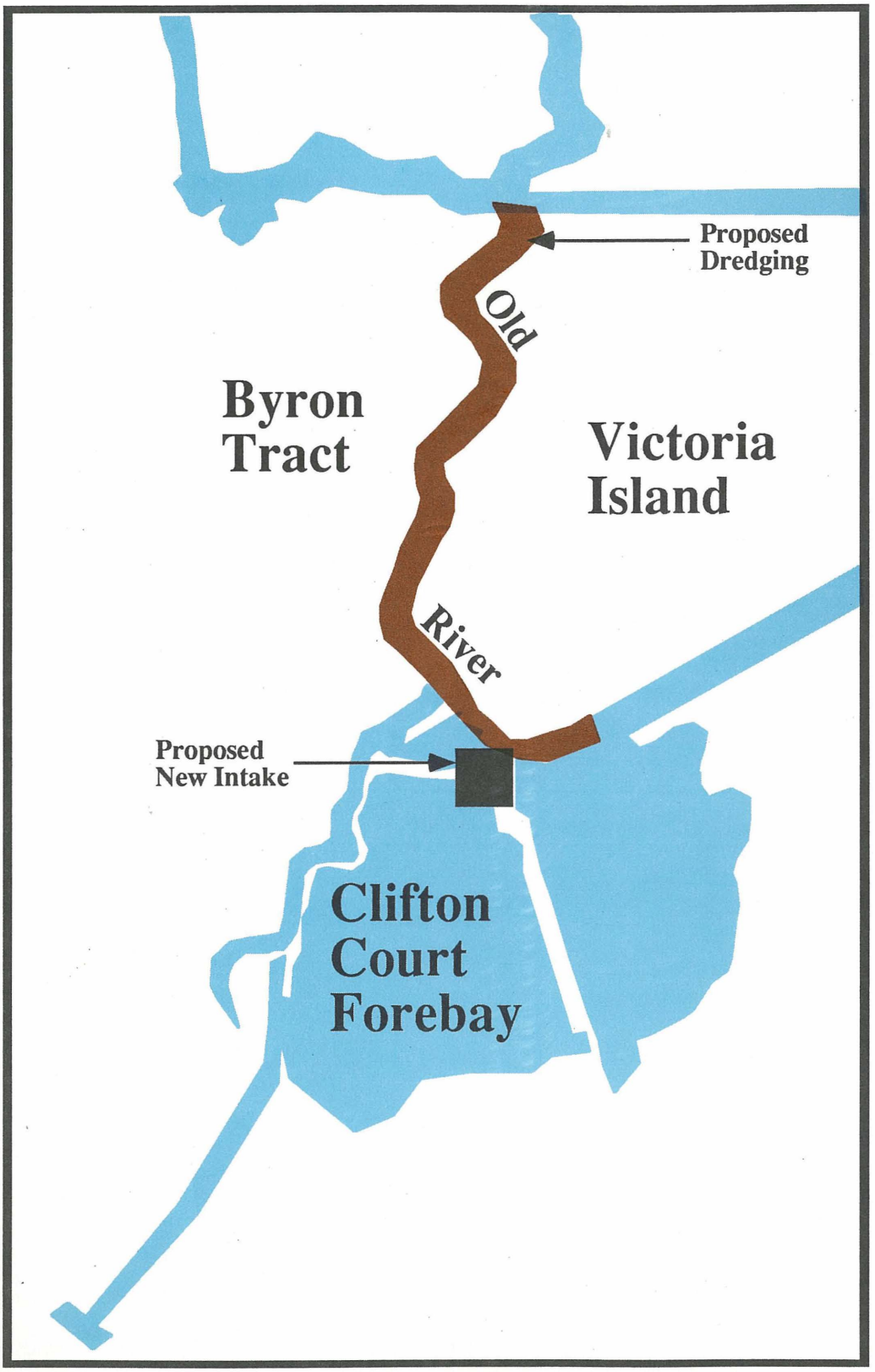
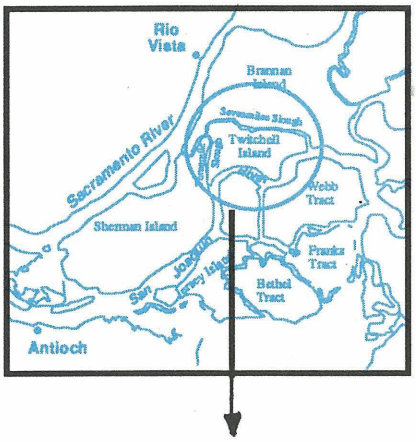


Figure-2
ISDP Proposed Dredging Area



Proposed Dredged Material Disposal Sites



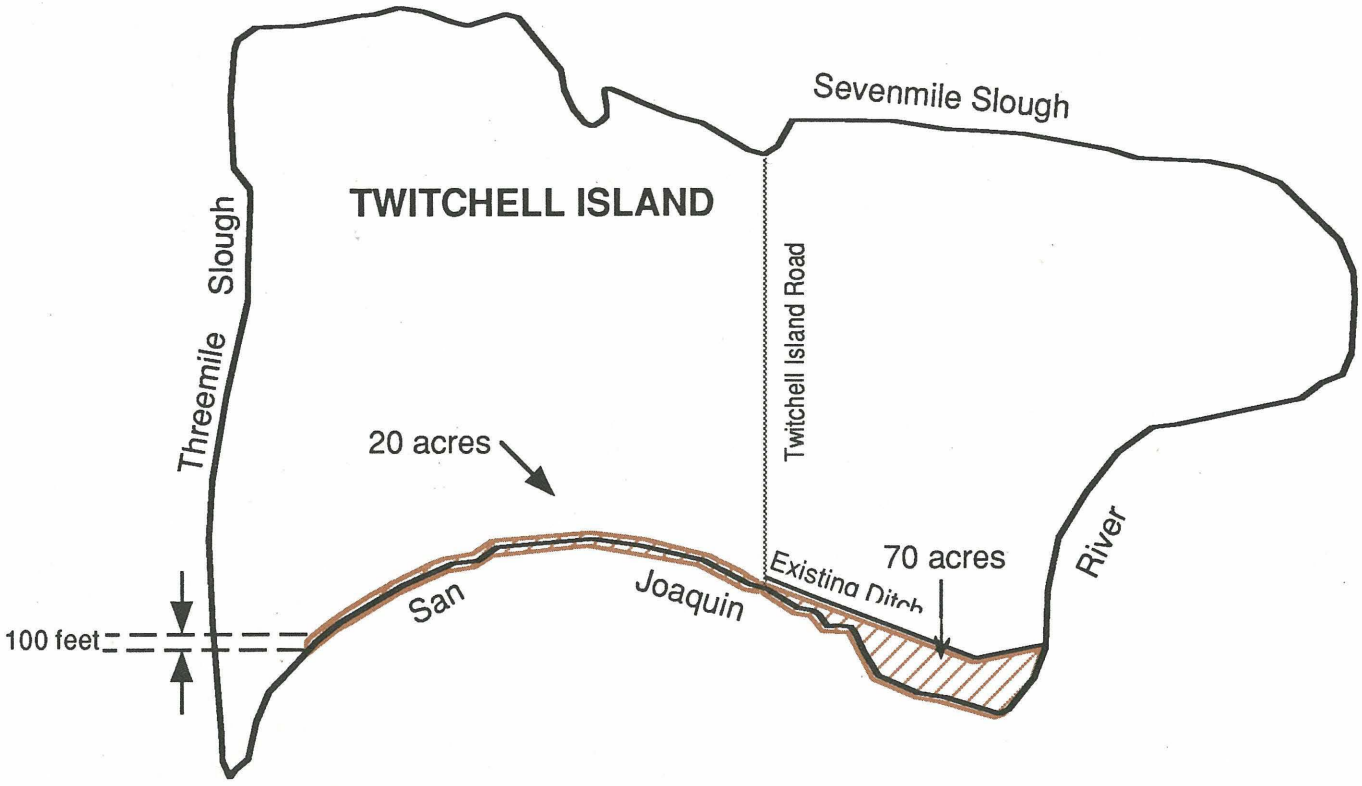


Figure-3

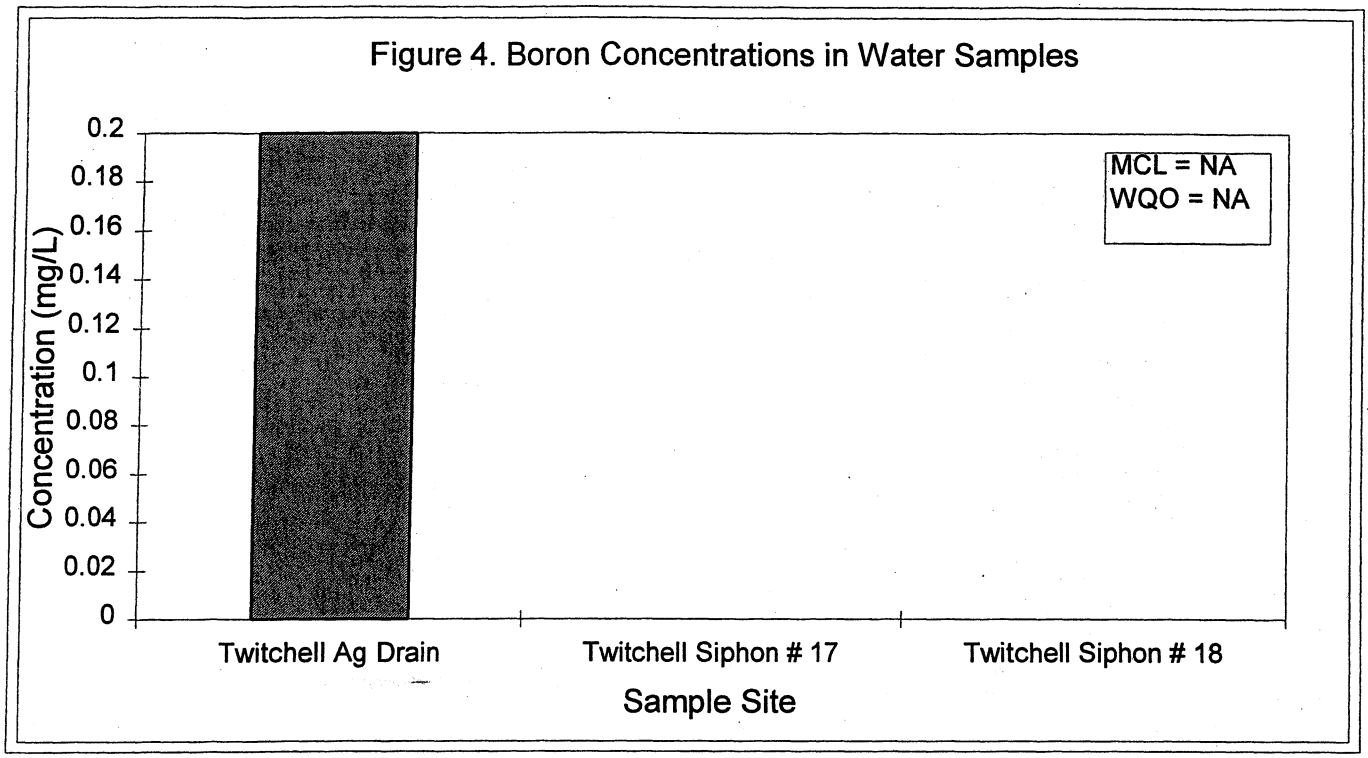


Figure 4. Boron Concentrations in Water Samples
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/L)
MCL = NA
WQO = NA
Twitchell Ag Drain
Twitchell Siphon # 17
Twitchell Siphon # 18
Sample Site

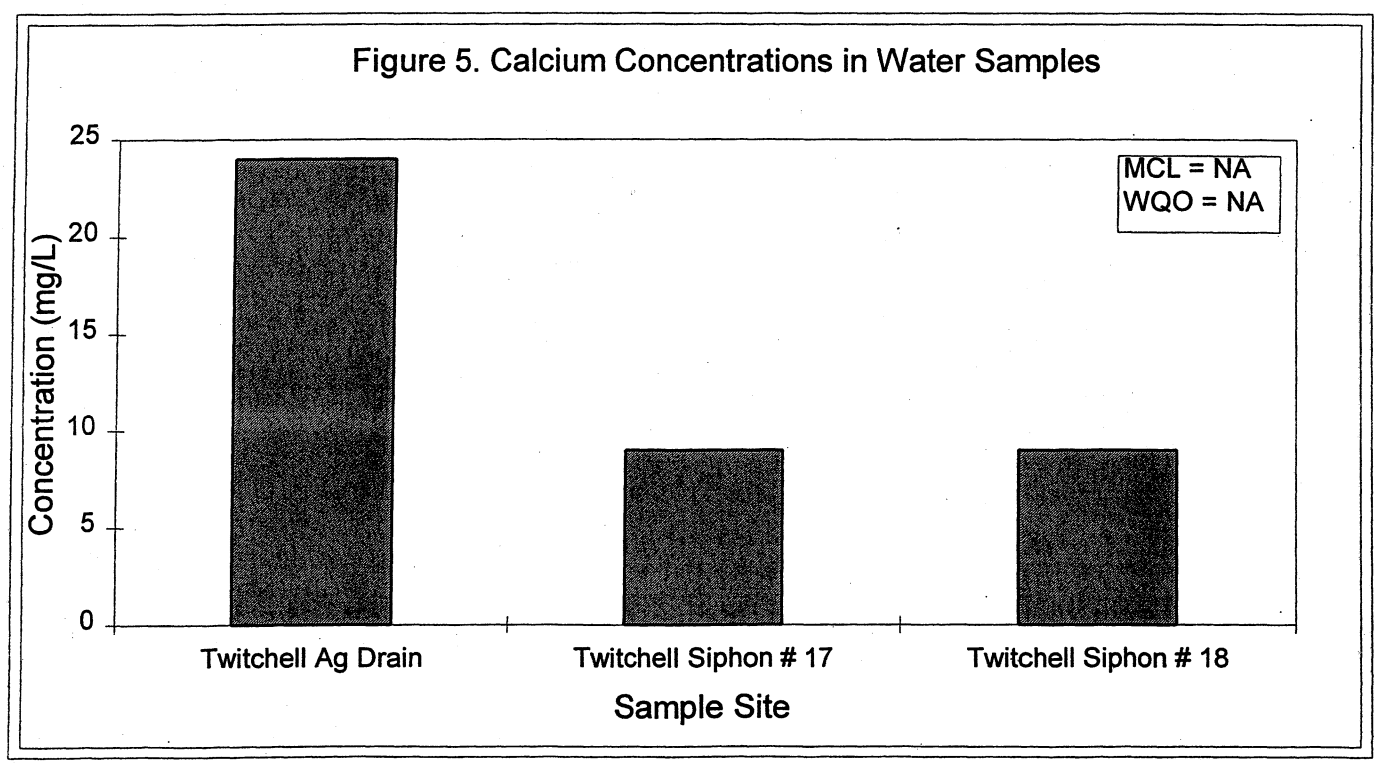


Figure 5. Calcium Concentrations in Water Samples
25
20
15
10
5
0
Concentration (mg/L)
MCL = NA
WQO = NA
Twitchell Ag Drain
Twitchell Siphon # 17
Twitchell Siphon # 18
Sample Site

Figure 6. Chloride Concentrations in Water Samples

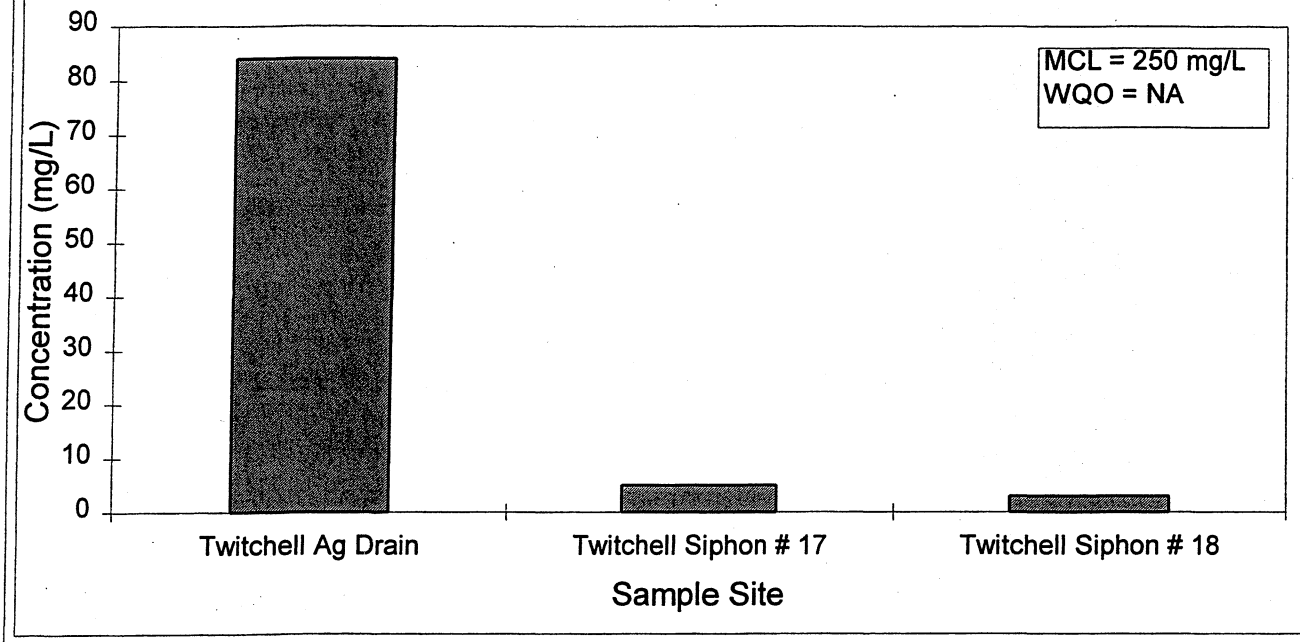
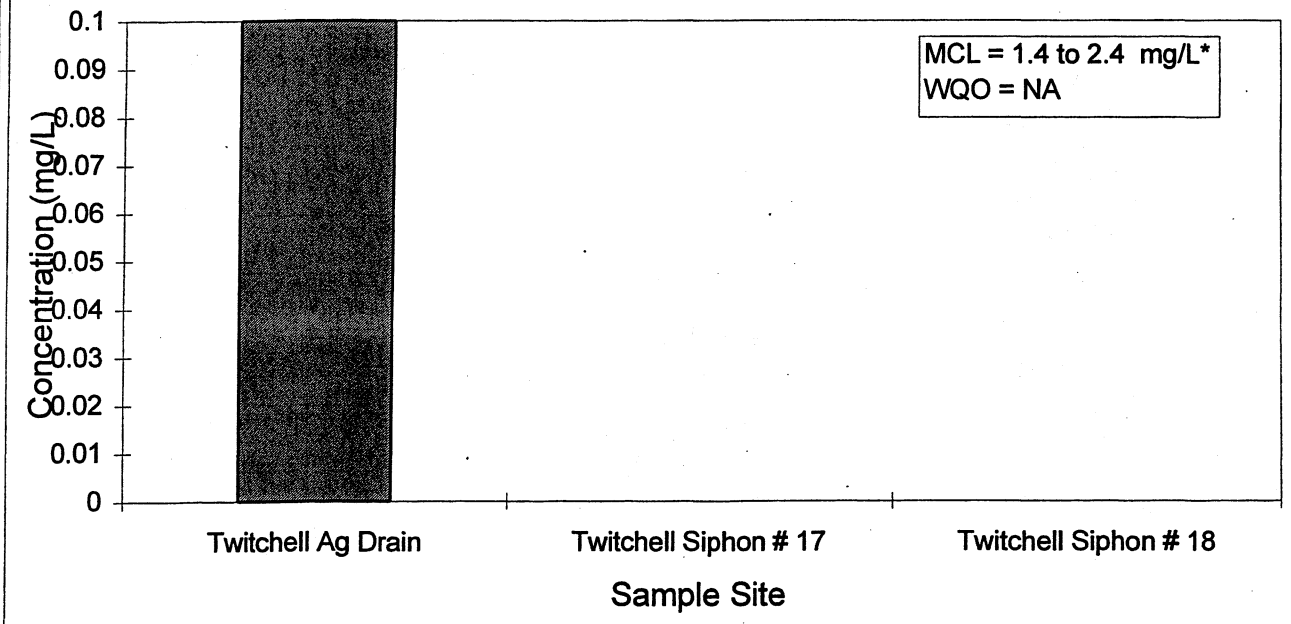


Figure 7. Fluoride Concentrations in Water Samples



* Depends on annual average of maximum daily air temperatures.

Figure 8. Magnesium Concentrations in Water Samples

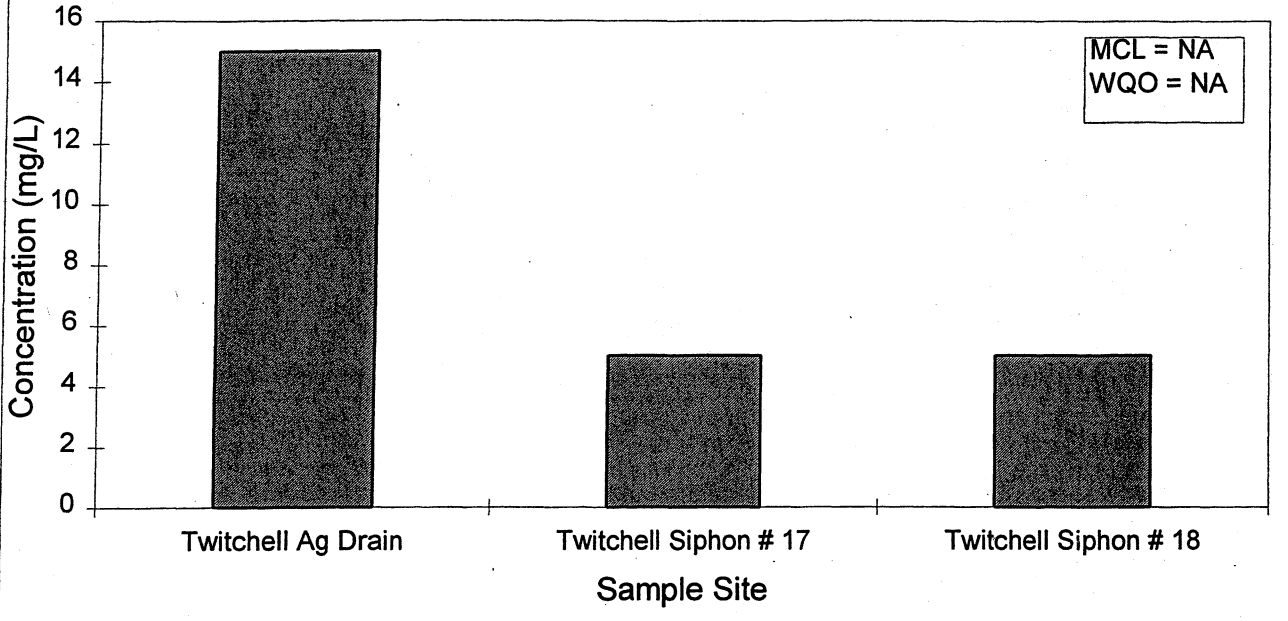


Figure 9. Nitrate Concentrations in Water Samples

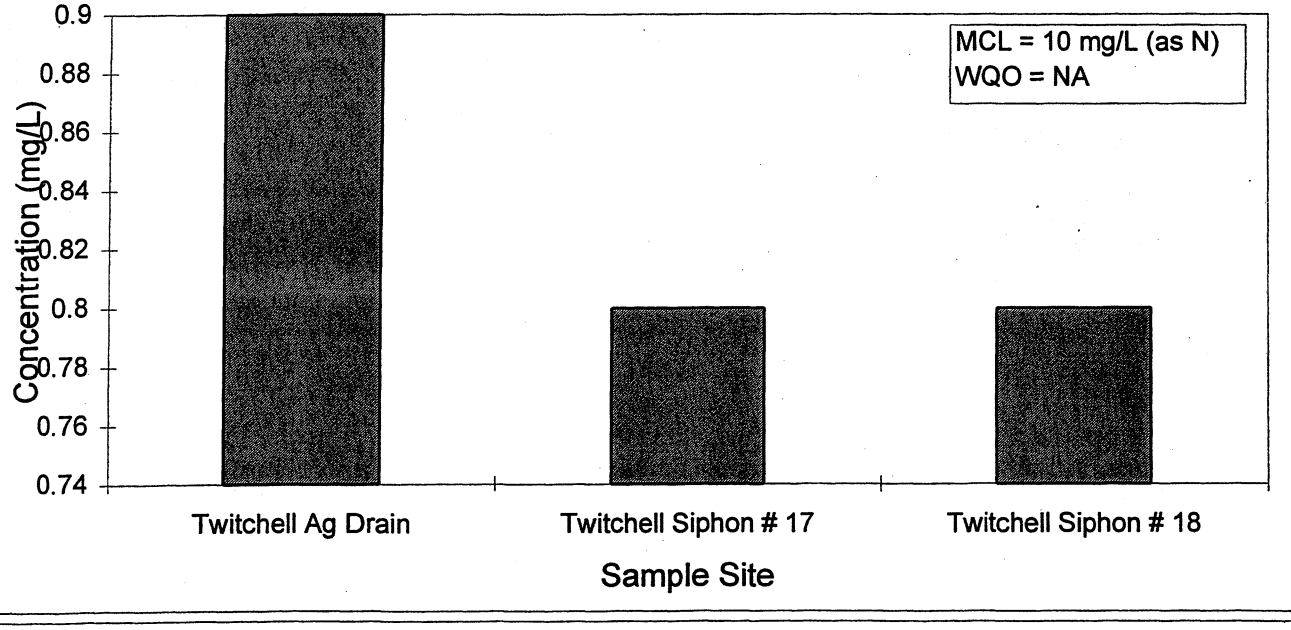


Figure 10. Potassium Concentrations in Water Samples

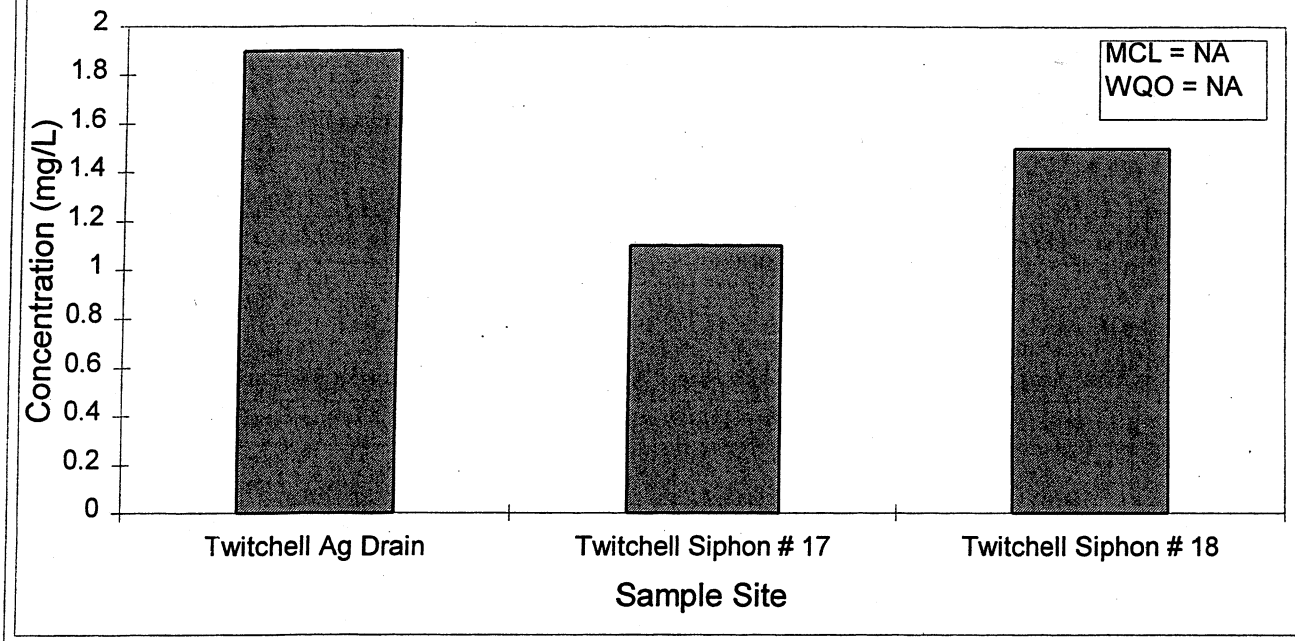


Figure 11. Sodium Concentrations in Water Samples

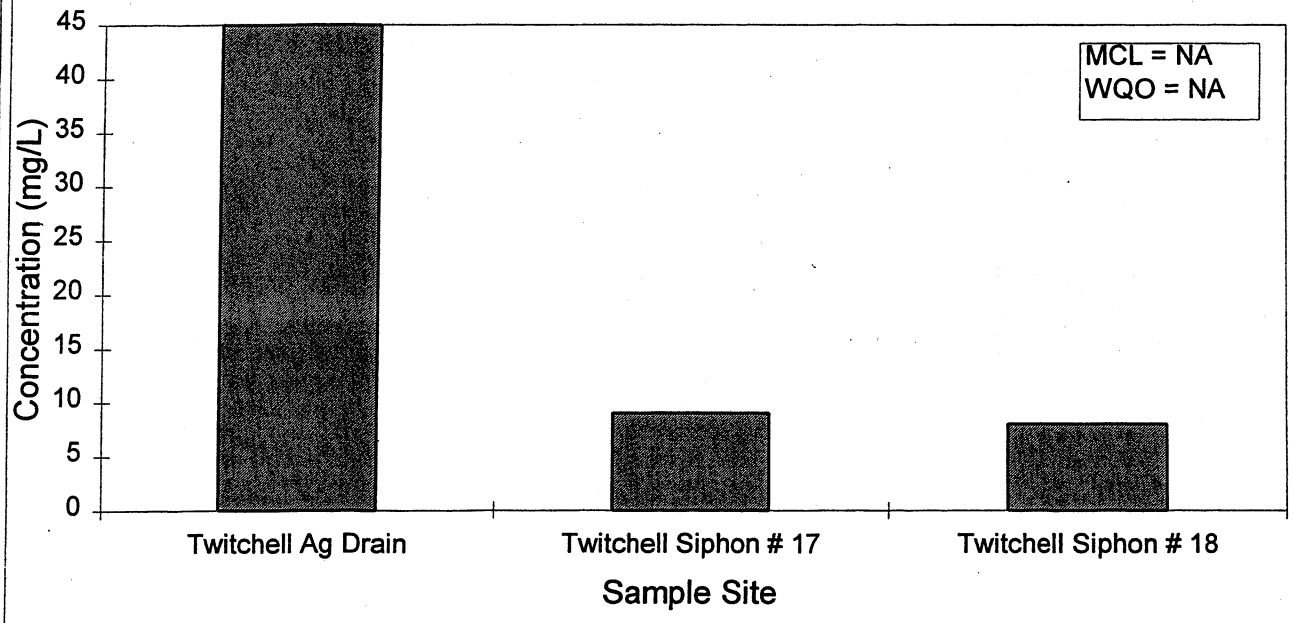


Figure 12. Sulfate Concentrations in Water Samples

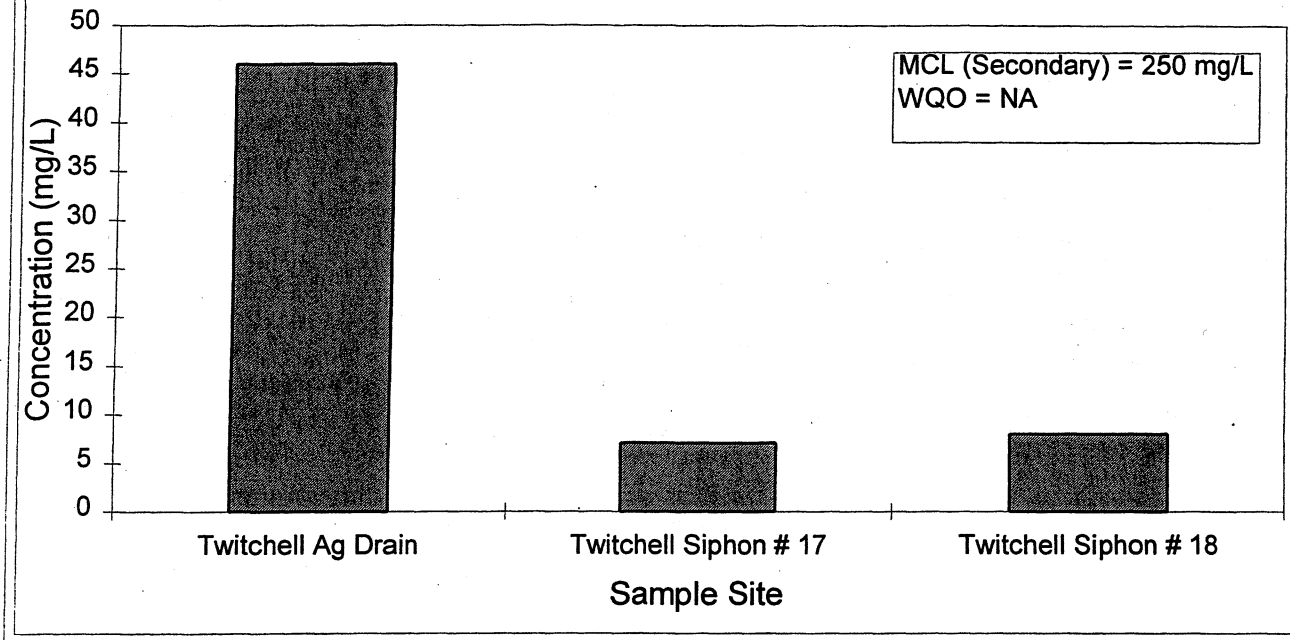


Figure 13. Hardness Concentrations in Water Samples

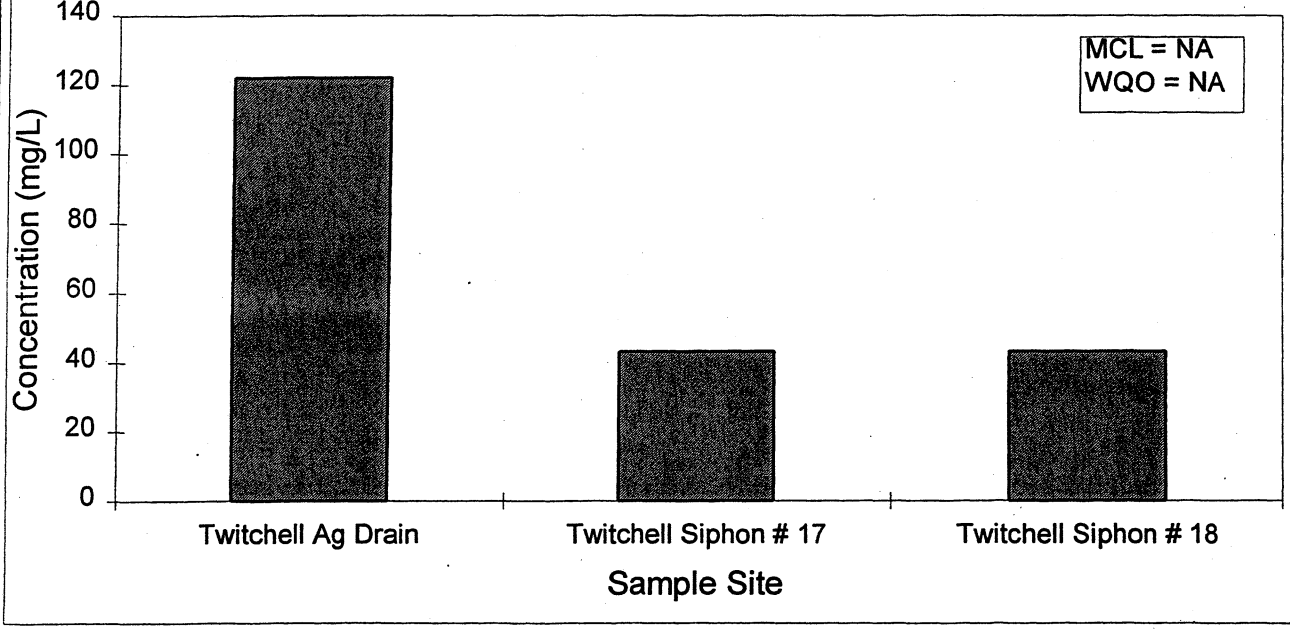


Figure 14. Total Alkalinity Concentrations in Water Samples

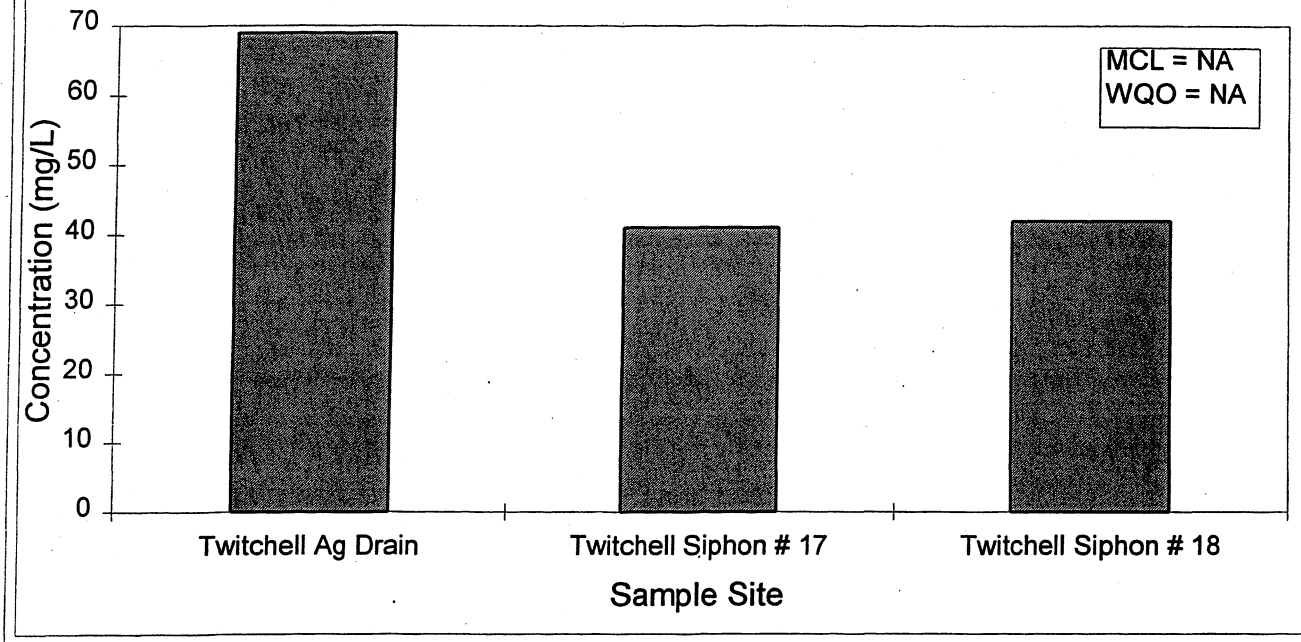
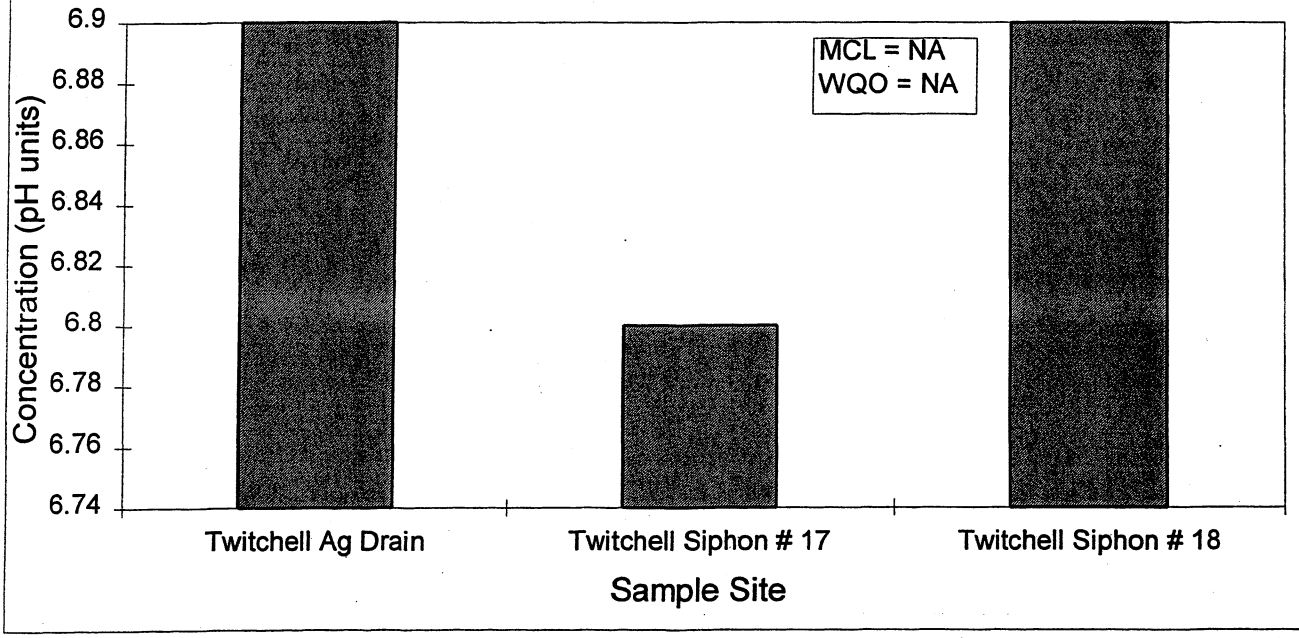


Figure 15. pH Concentrations in Water Samples



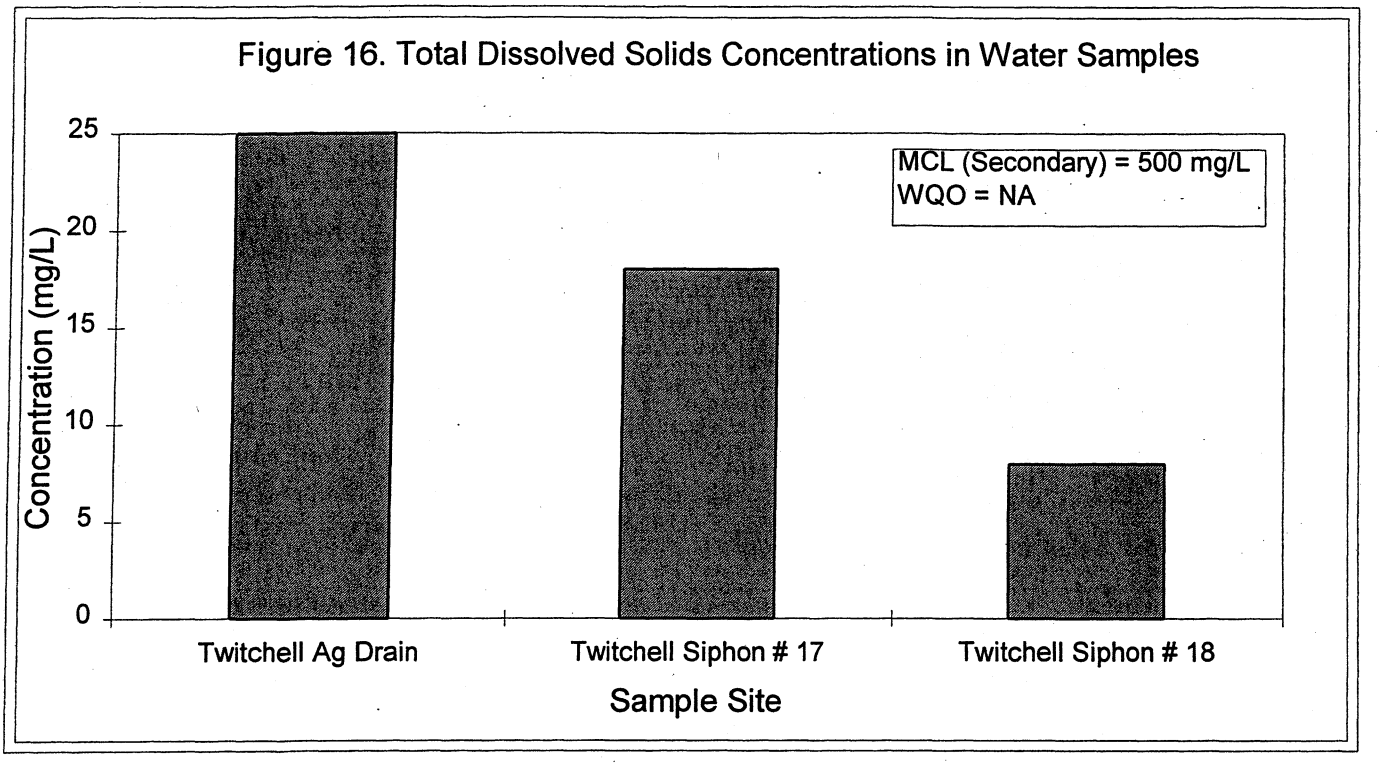


Figure 16. Total Dissolved Solids Concentrations in Water Samples
25
20
15
10
5
0
Concentration (mg/L)
MCL (Secondary) = 500 mg/L
WQO = NA
Twitchell Ag Drain
Twitchell Siphon # 17
Twitchell Siphon # 18
Sample Site

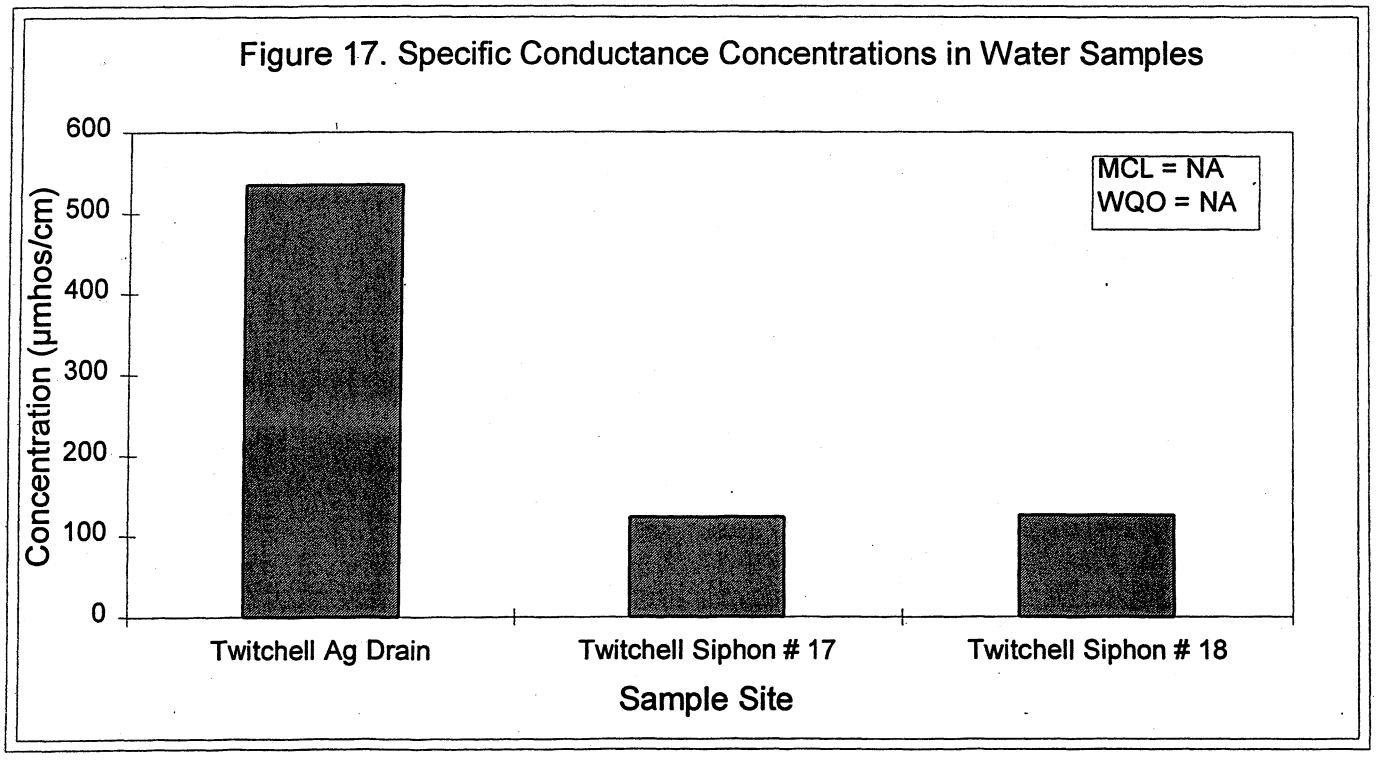


Figure 17. Specific Conductance Concentrations in Water Samples
600
500
400
300
200
100
0
Concentration (µmhos/cm)
MCL = NA
WQO = NA
Twitchell Ag Drain
Twitchell Siphon # 17
Twitchell Siphon # 18
Sample Site

Figure 18. Arsenic Concentrations in Water Samples

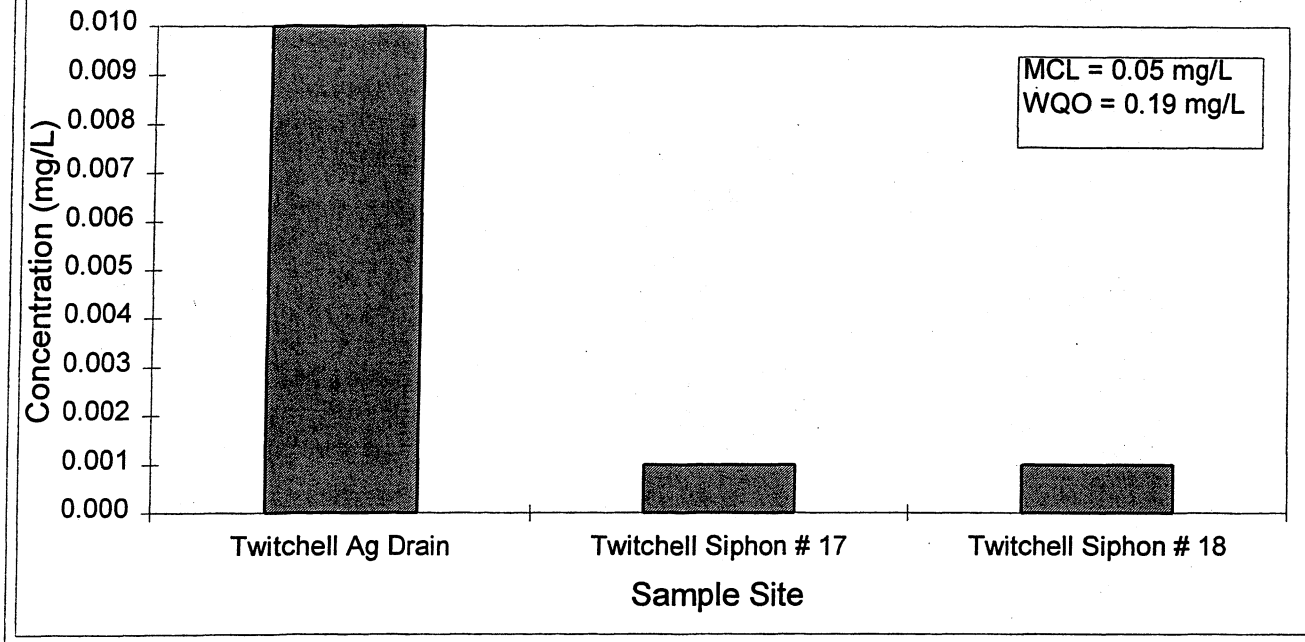


Figure 19. Nickel Concentrations in Water Samples

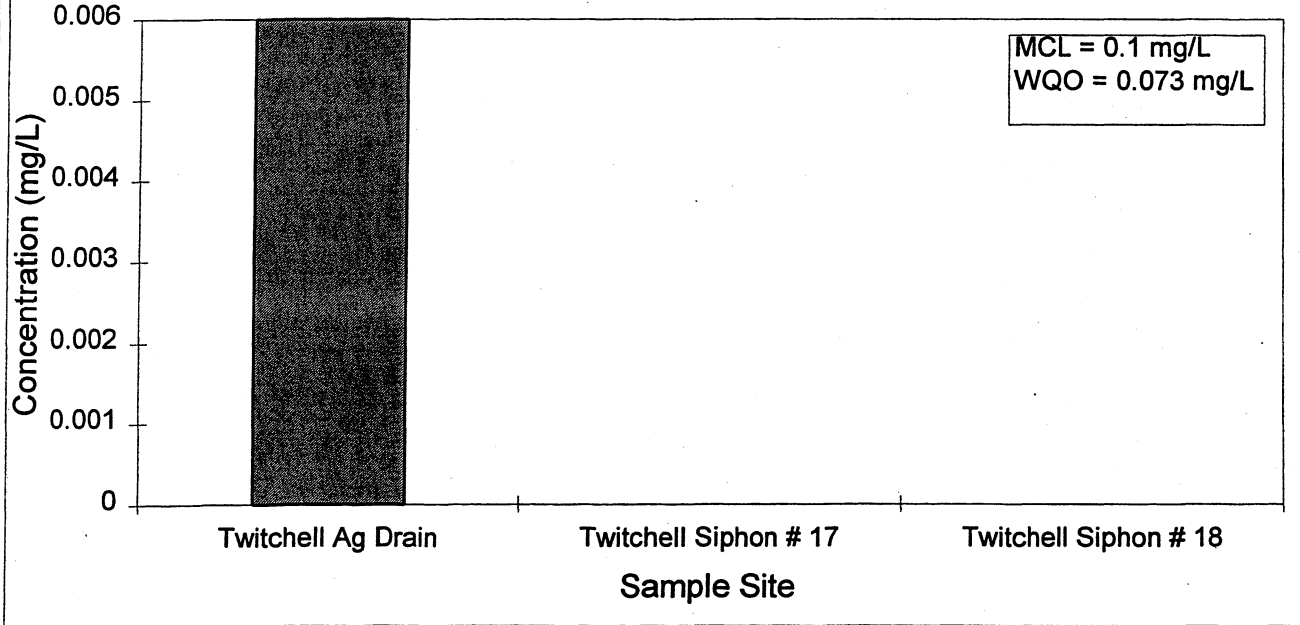


Figure 20. Zinc Concentrations in Water Samples

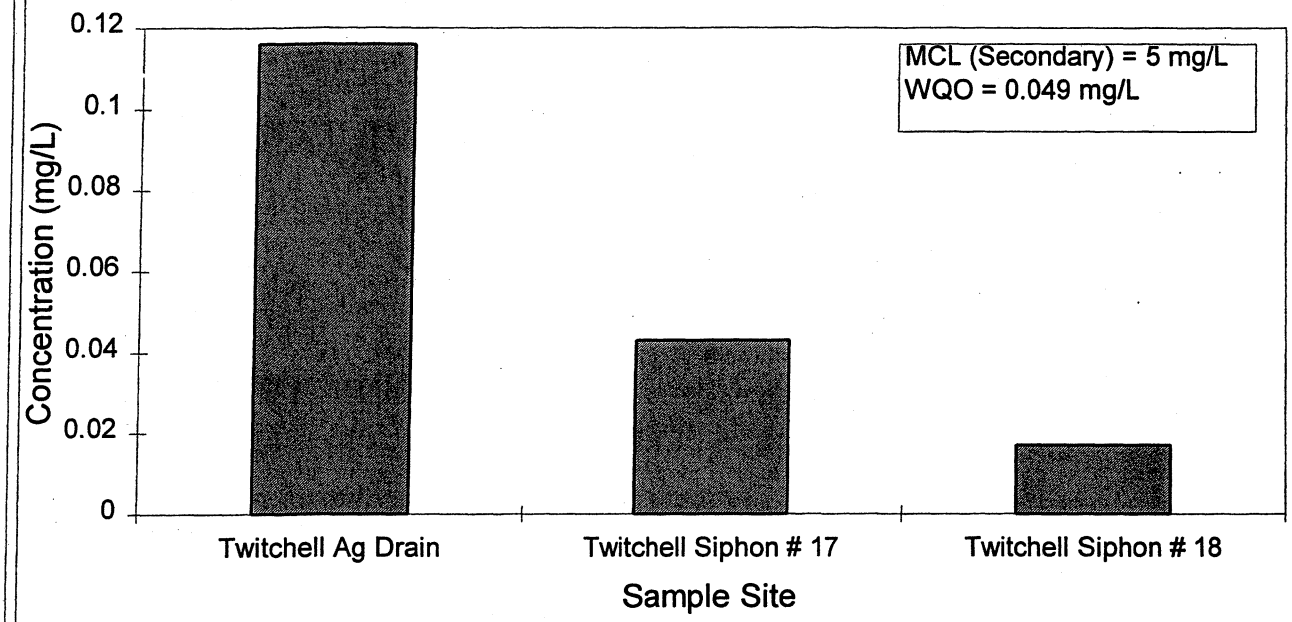


Figure 21. Grain Size Distribution for Island Soil Site A

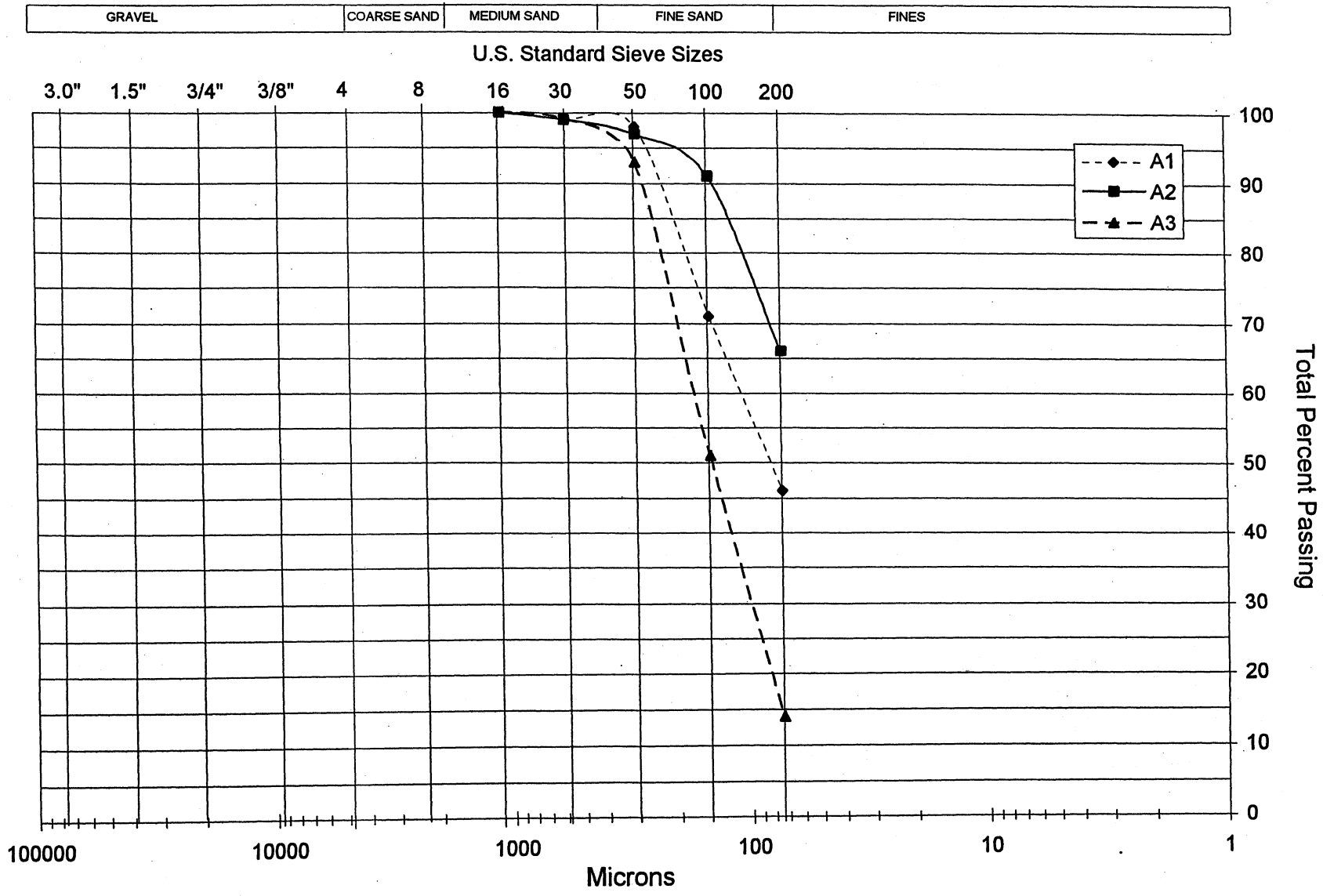


Figure 22. Grain Size Distribution for Island Soil Site B

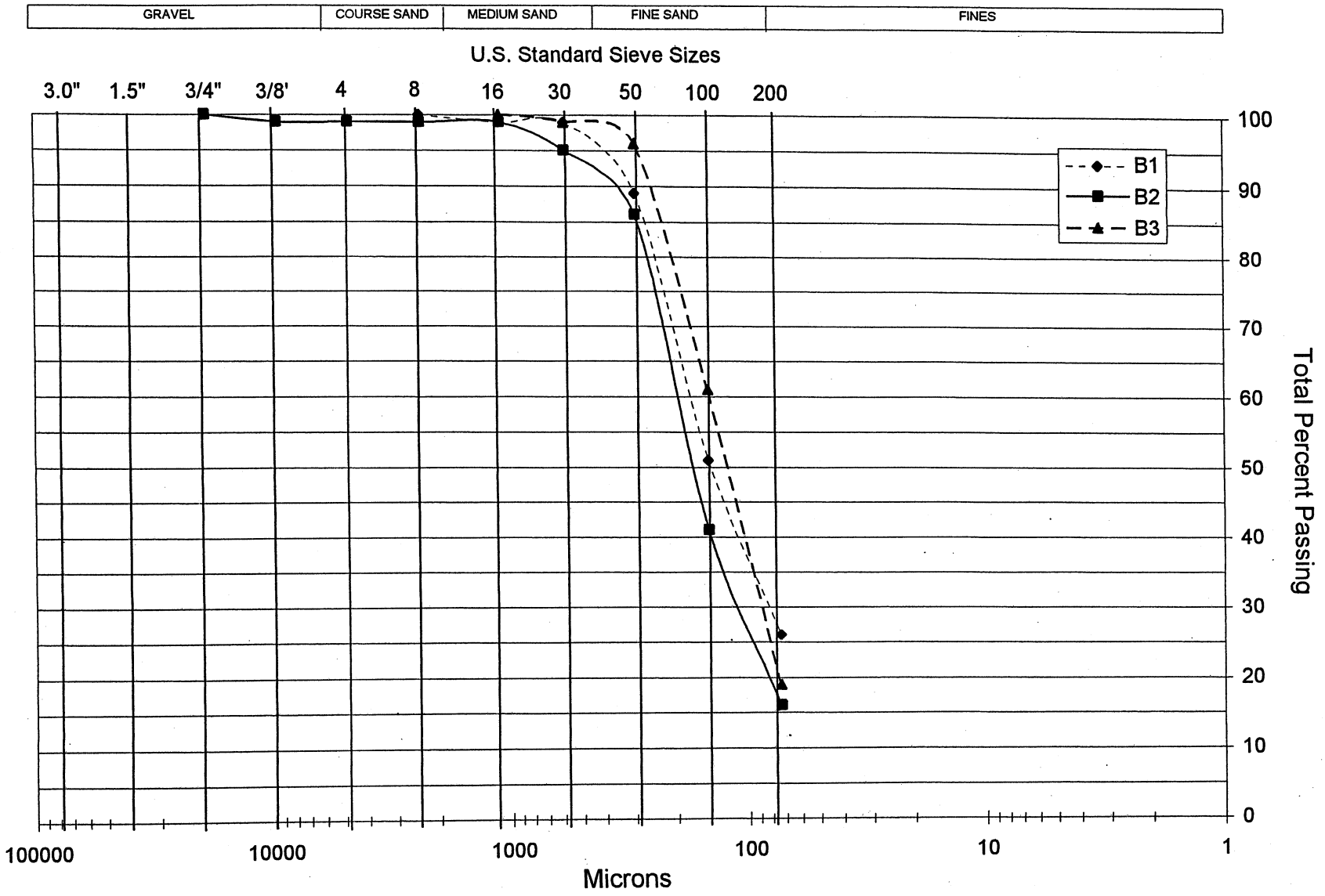


Figure 23. Grain Size Distribution for Island Soil Site C

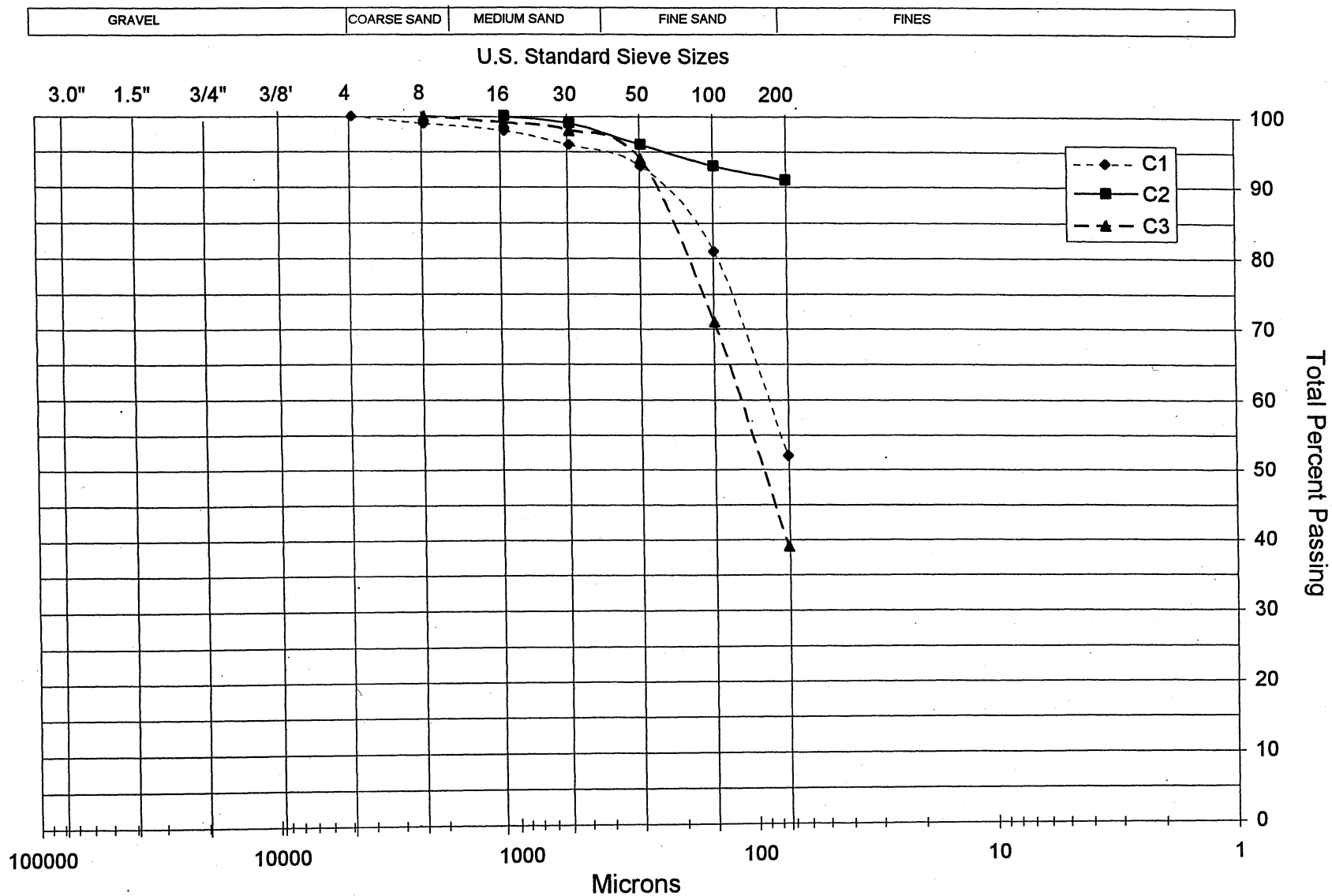


Figure 24. Grain Size Distribution for Island Soil Site D

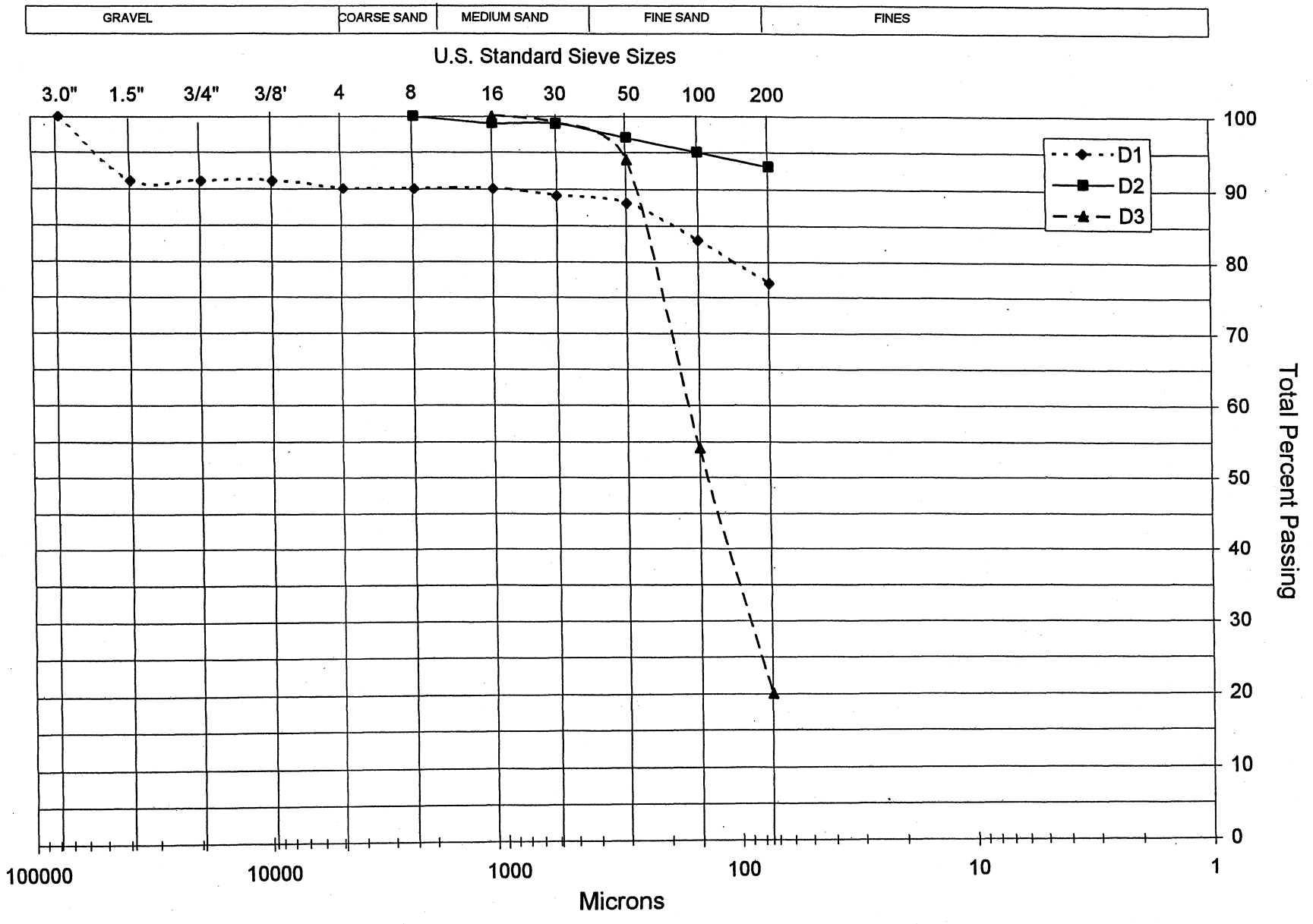


Figure 25. Grain Size Distribution for Island Soil Site E

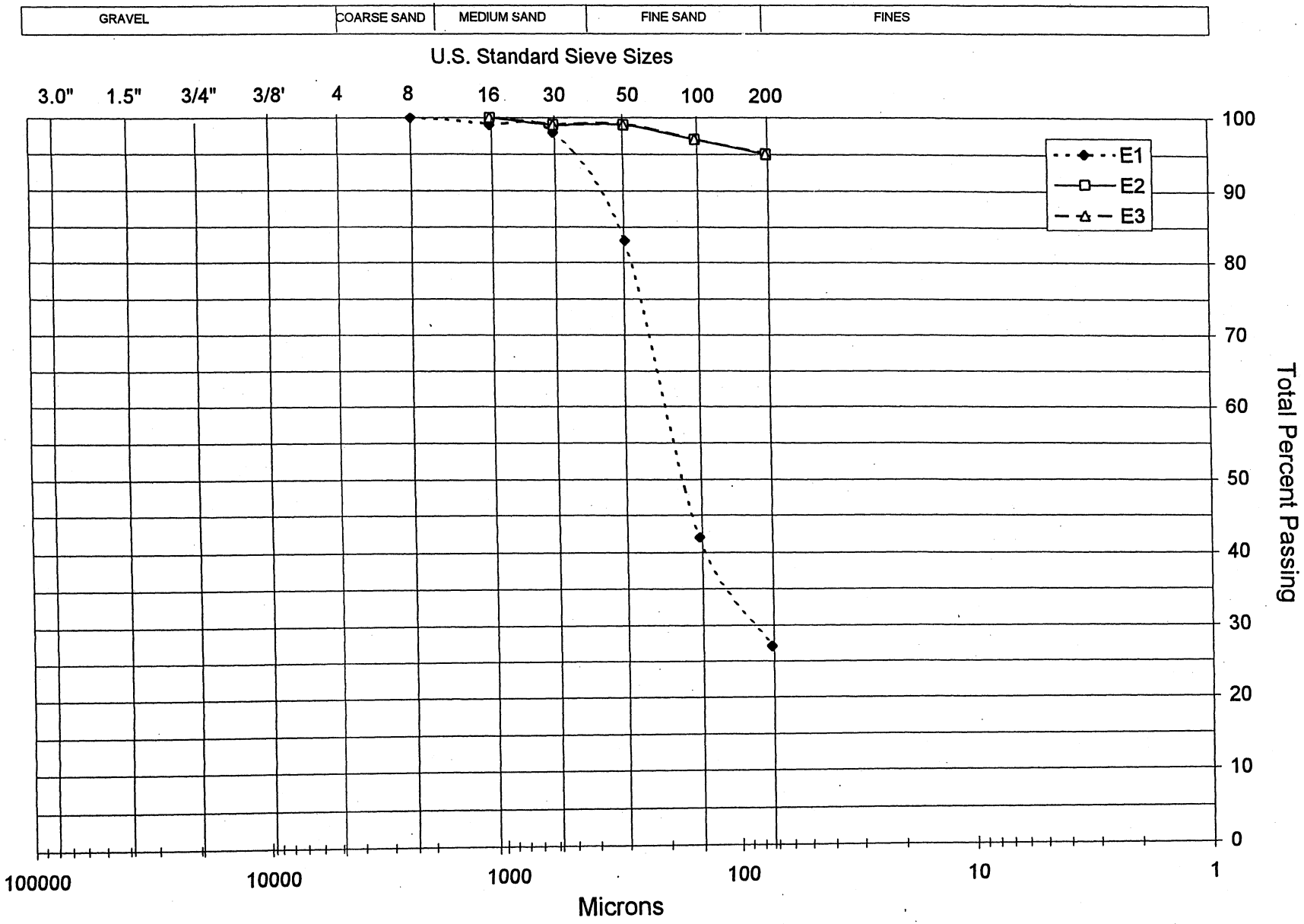


Figure 26. Grain Size Distribution for Island Soil Site F

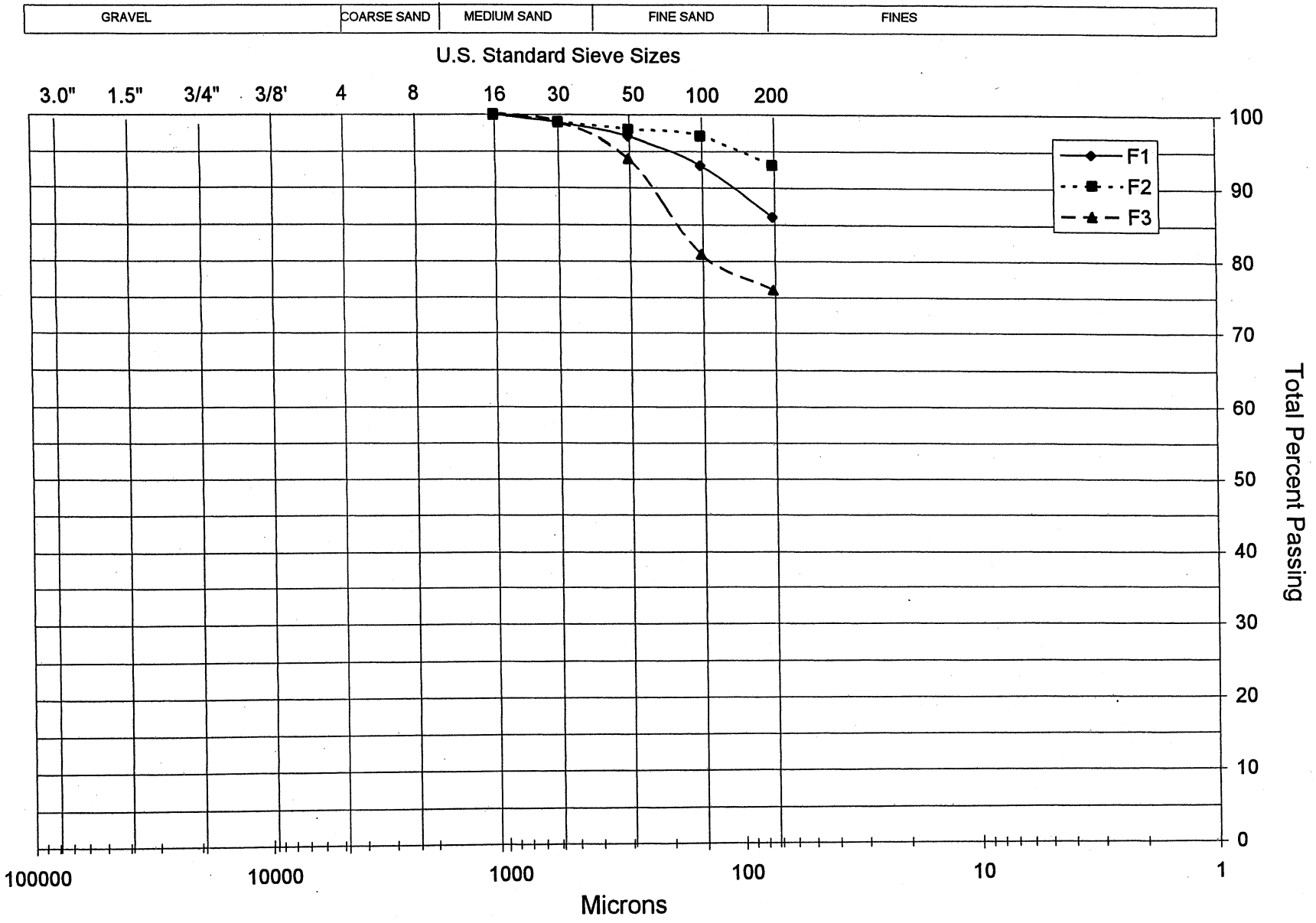


Figure 27. Grain Size Distribution for Island Soil Site G

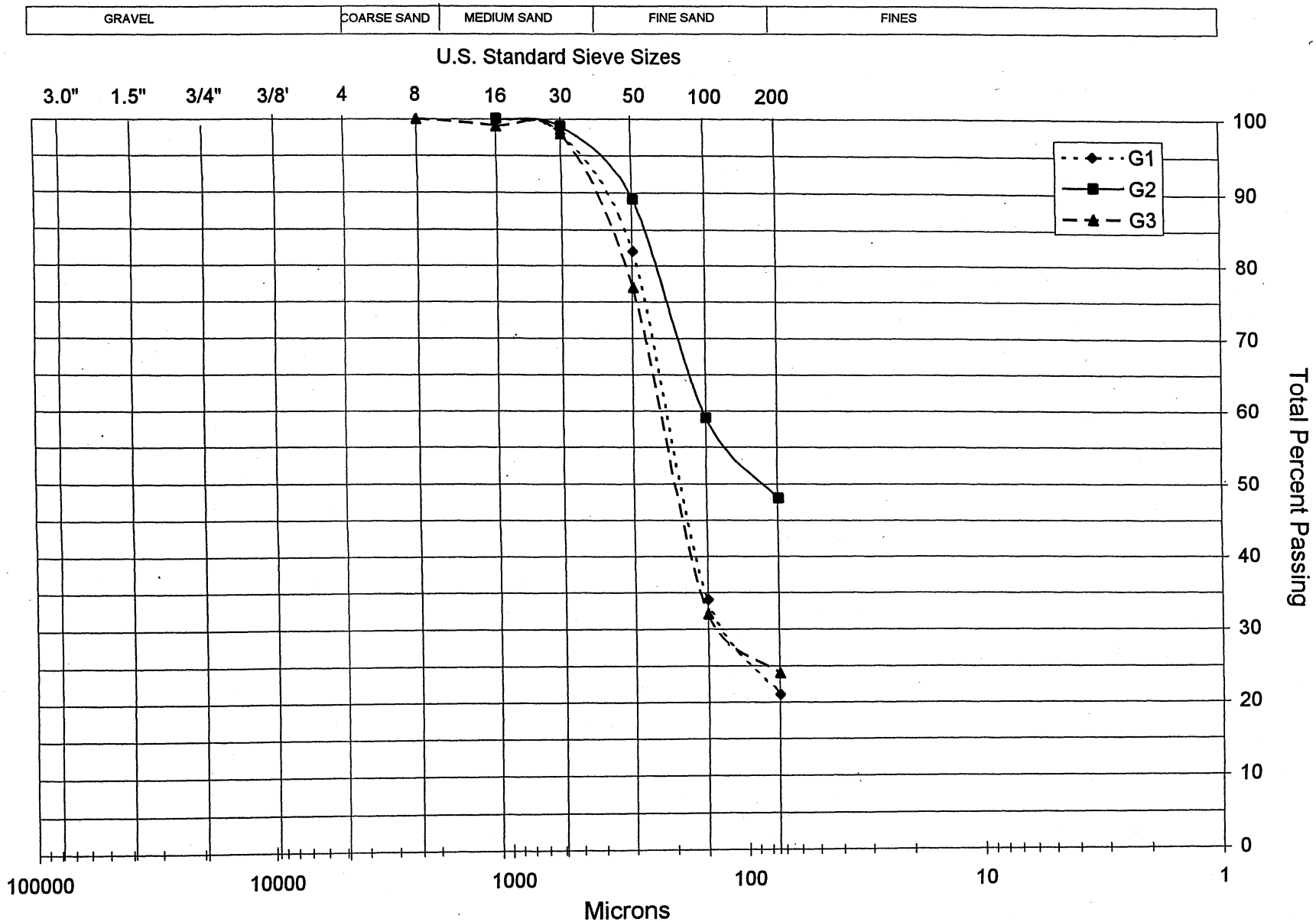


Figure 28. Specific Conductance in Island Soil Samples

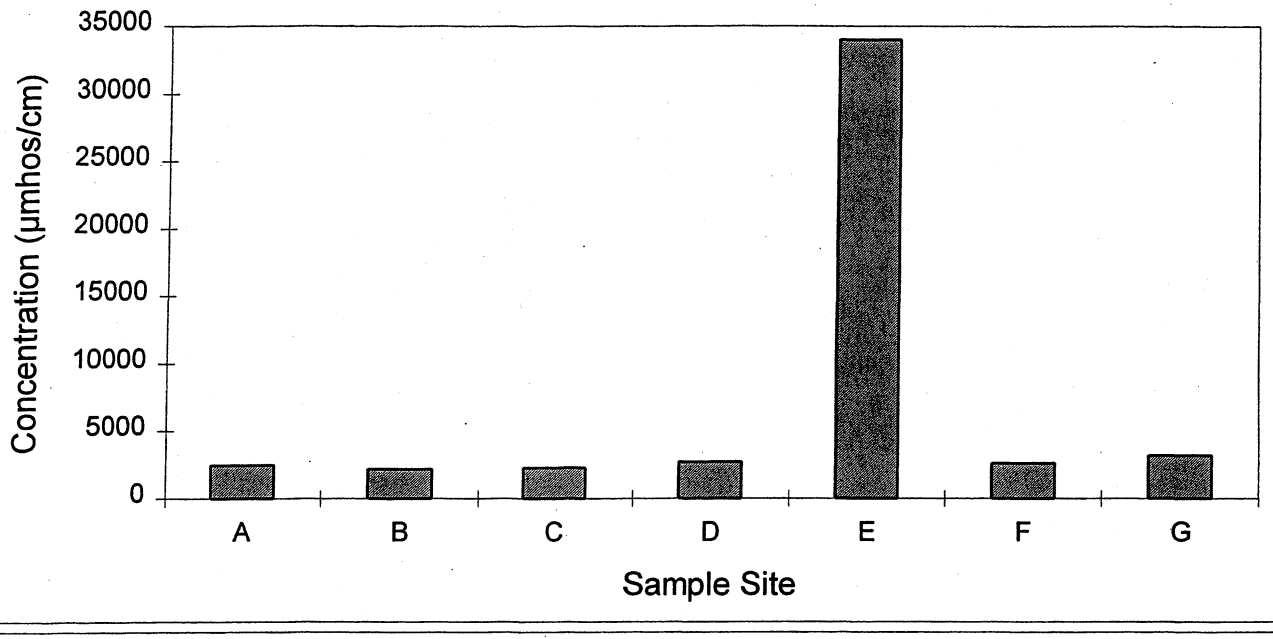


Figure 29. Moisture Concentrations in Island Soil Samples

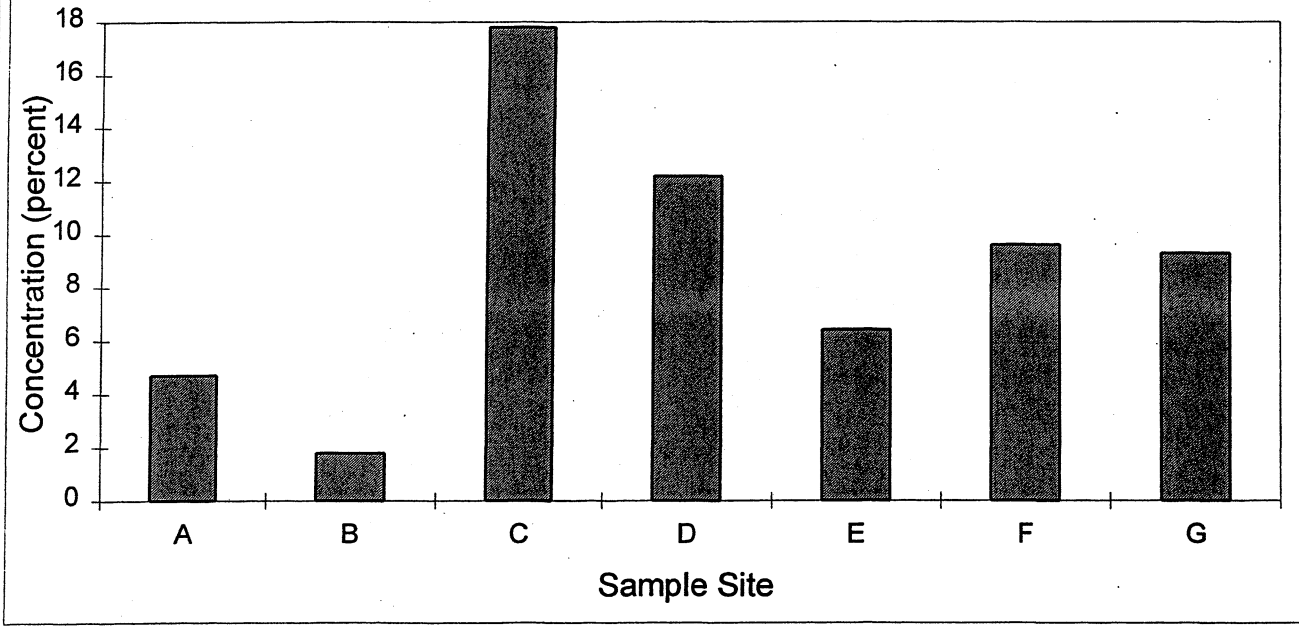


Figure 30. Net Acid Base Potential Island Soil Samples

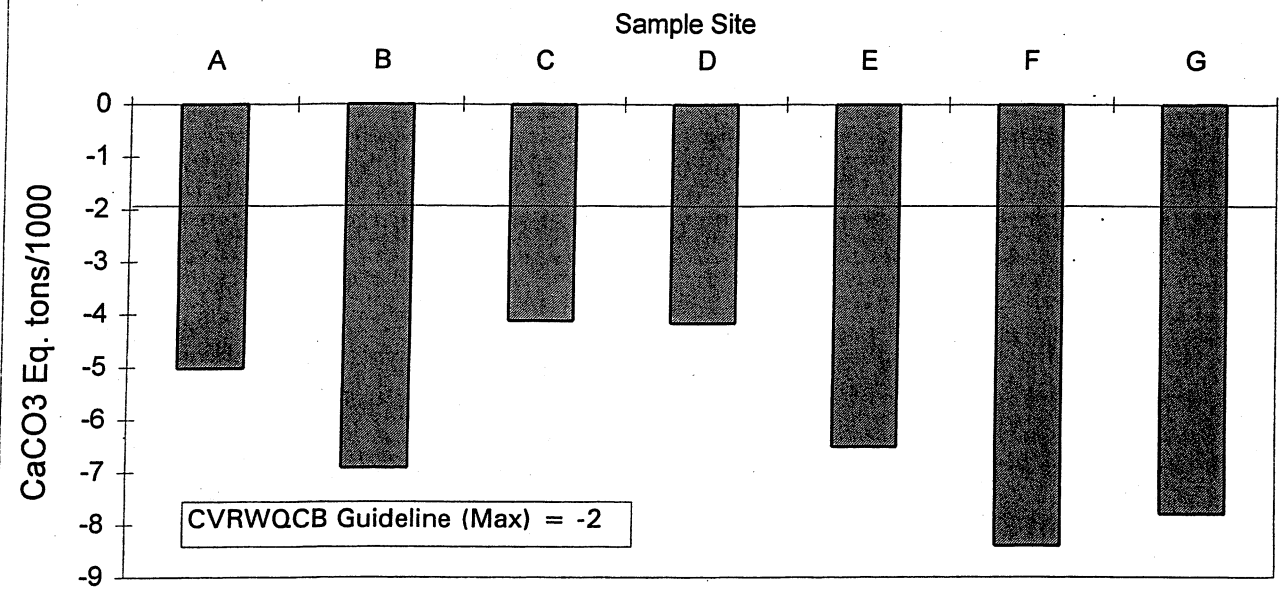


Figure 31. Total Volatile Solids Concentrations in Island Soil Samples

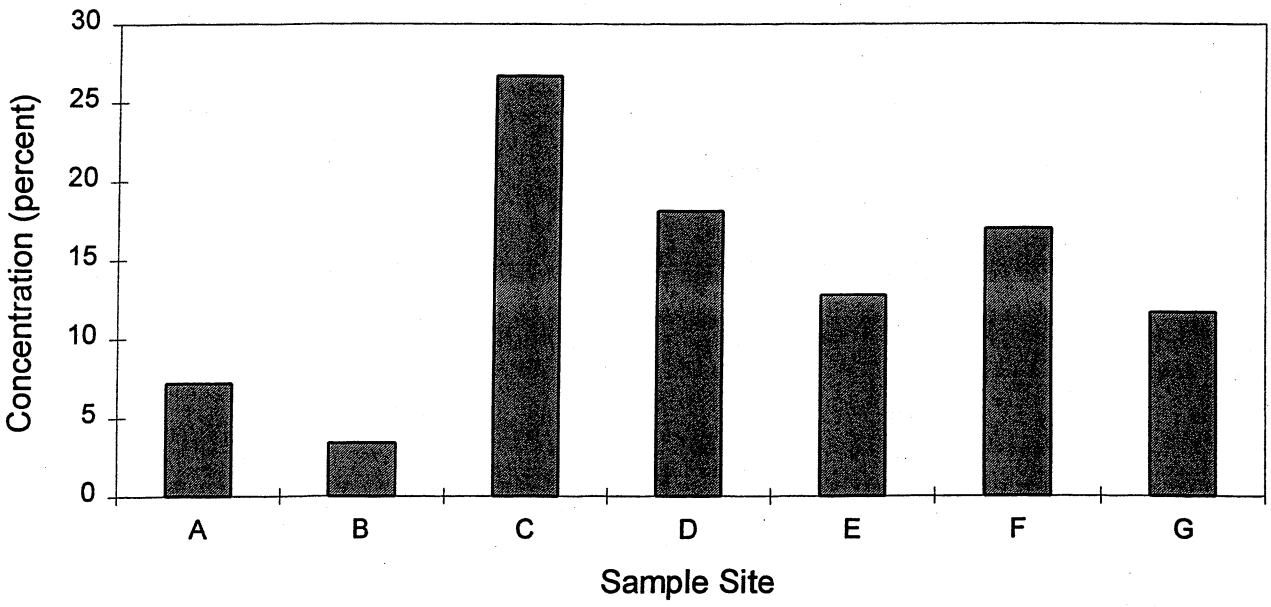


Figure 32. Total Organic Carbon Concentrations in Island Soil Samples

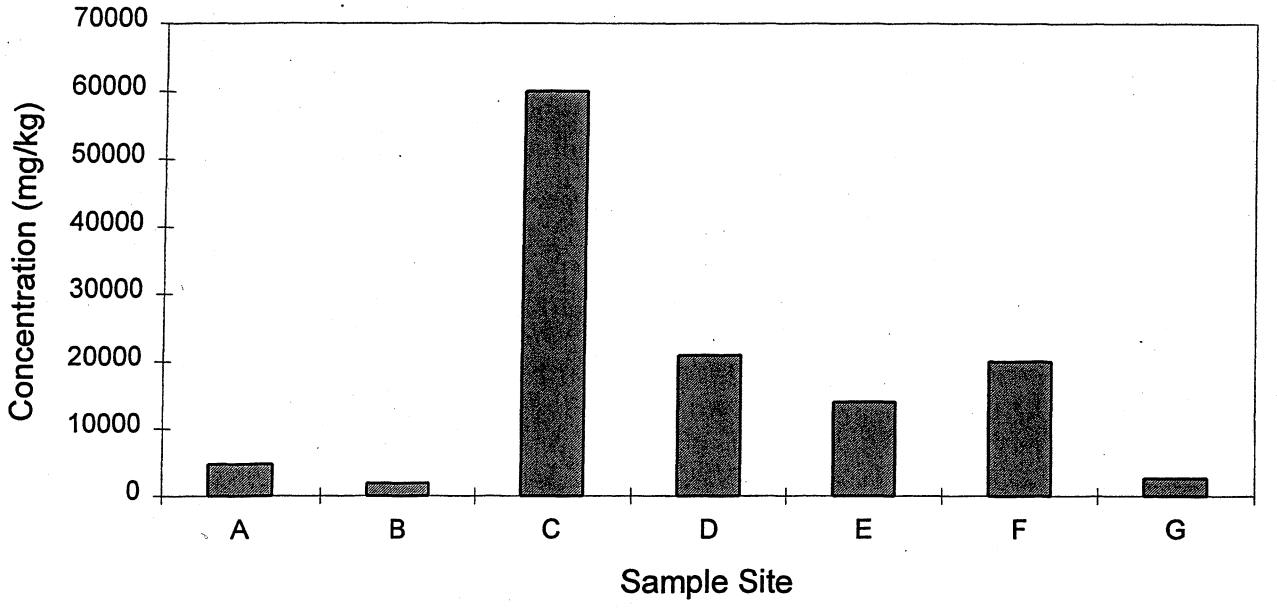


Figure 33. Total Oil and Grease Concentrations in Island Soil Samples

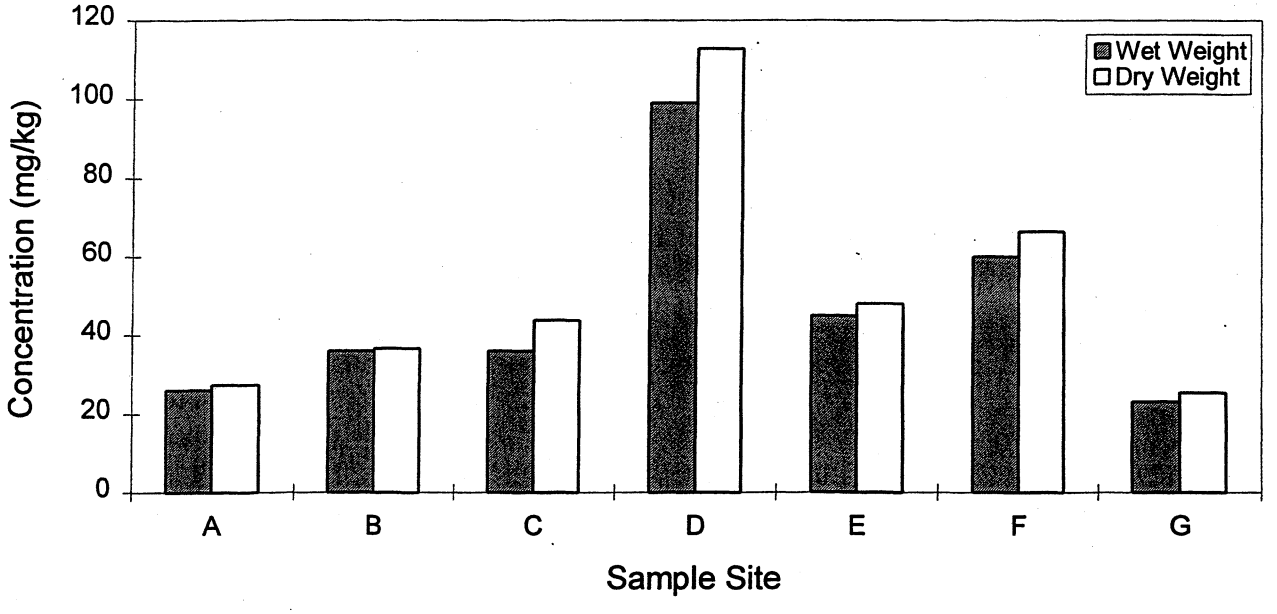


Figure 34. Arsenic Concentrations in Island Soil Samples

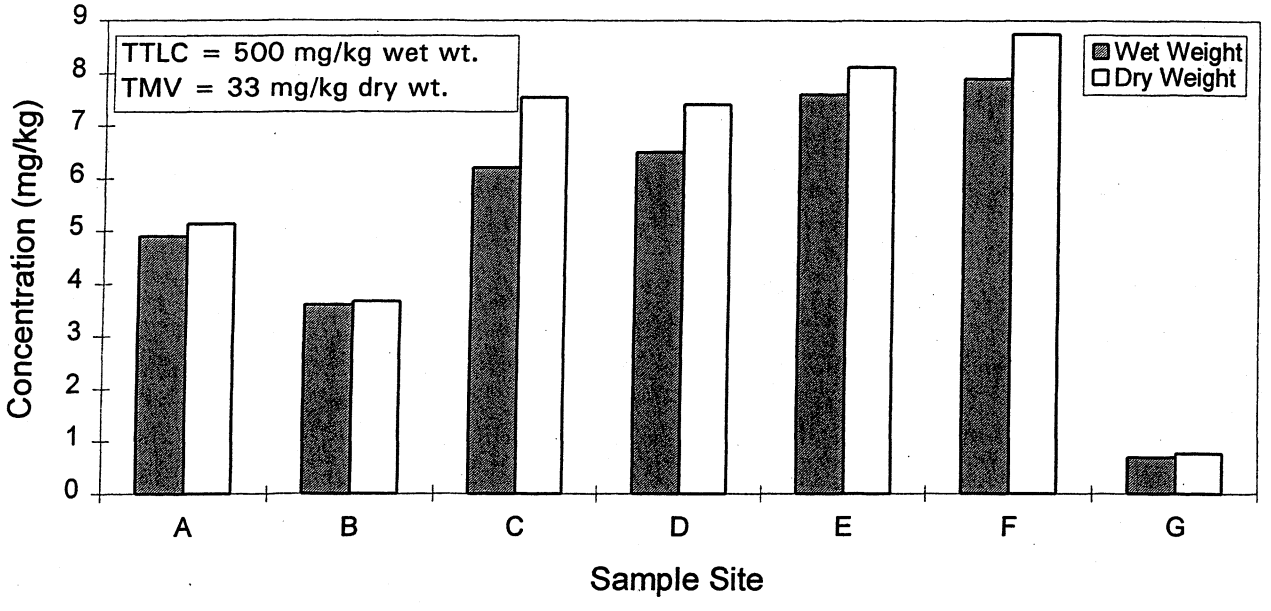


Figure 35. Chromium Concentrations in Island Soil Samples

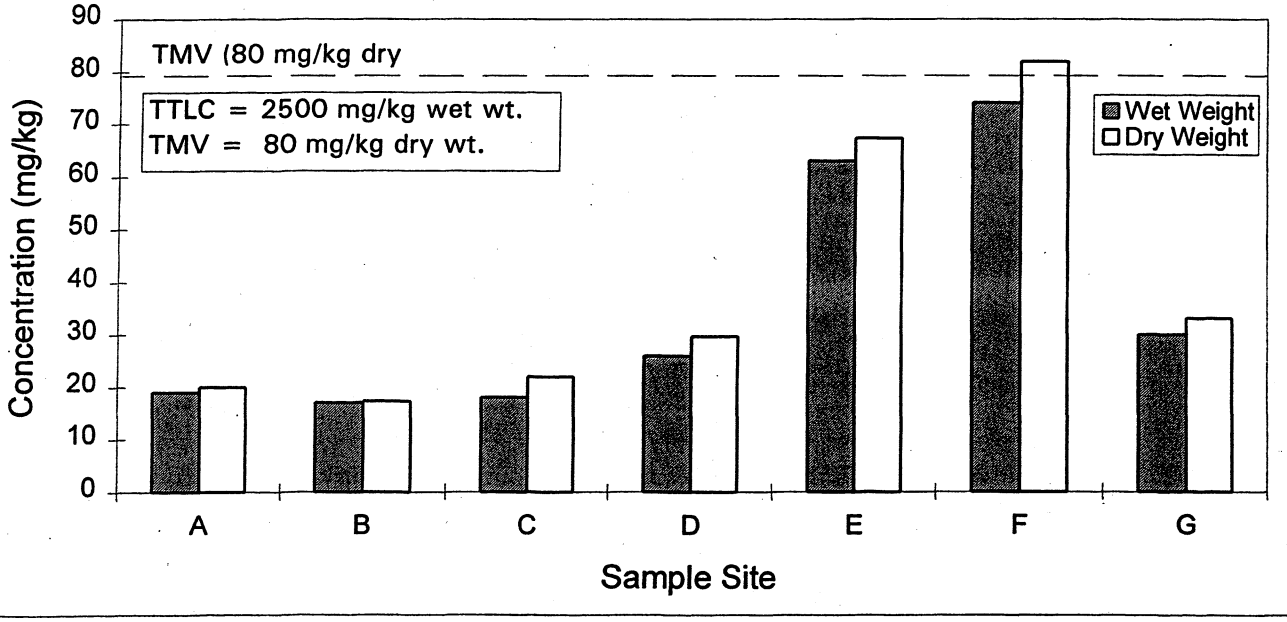


Figure 36. Copper Concentrations in Island Soil Samples

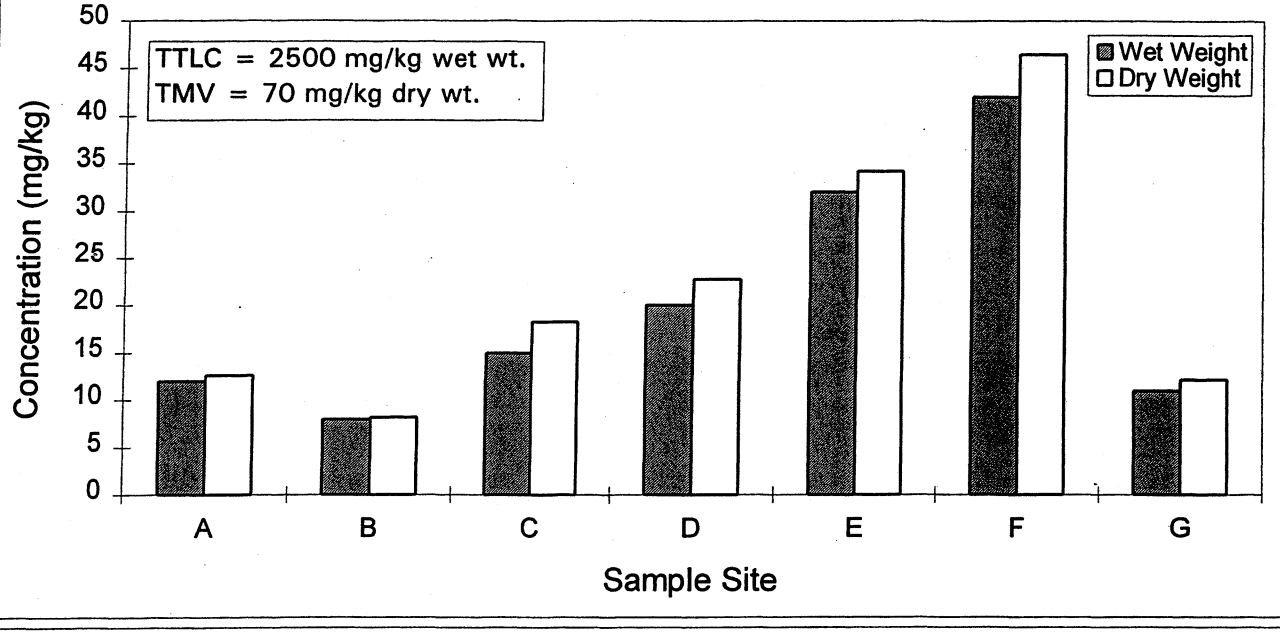


Figure 37. Lead Concentrations in Island Soil Samples

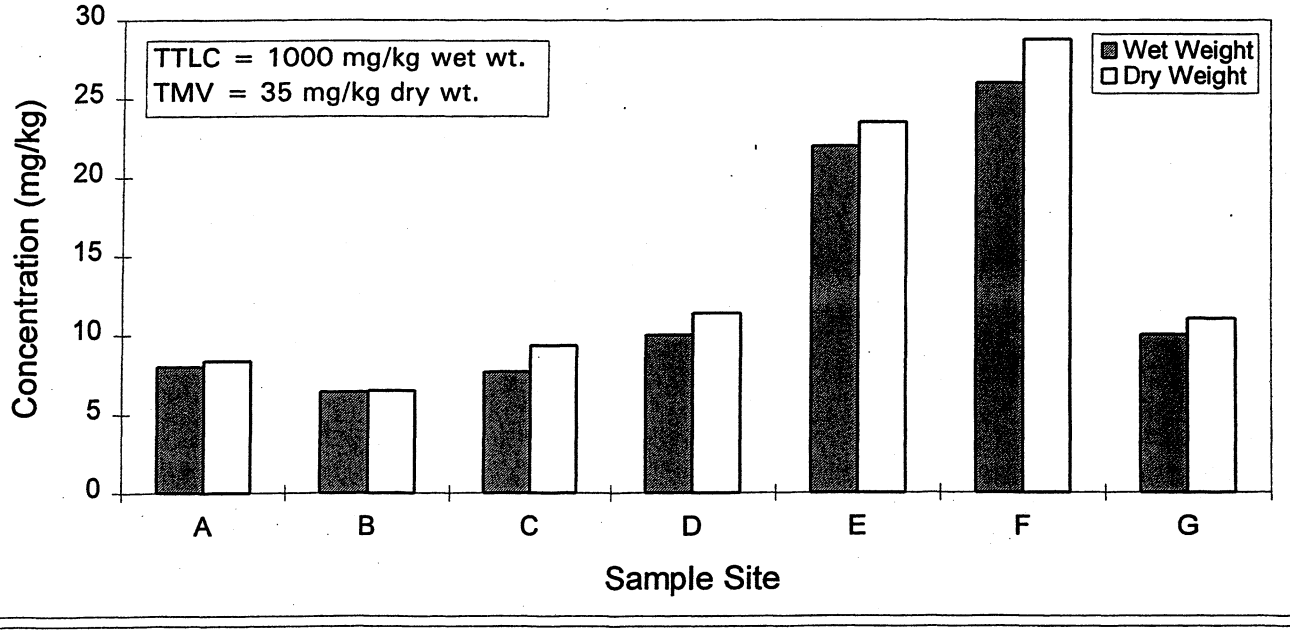


Figure 38. Mercury Concentrations in Island Soil Samples

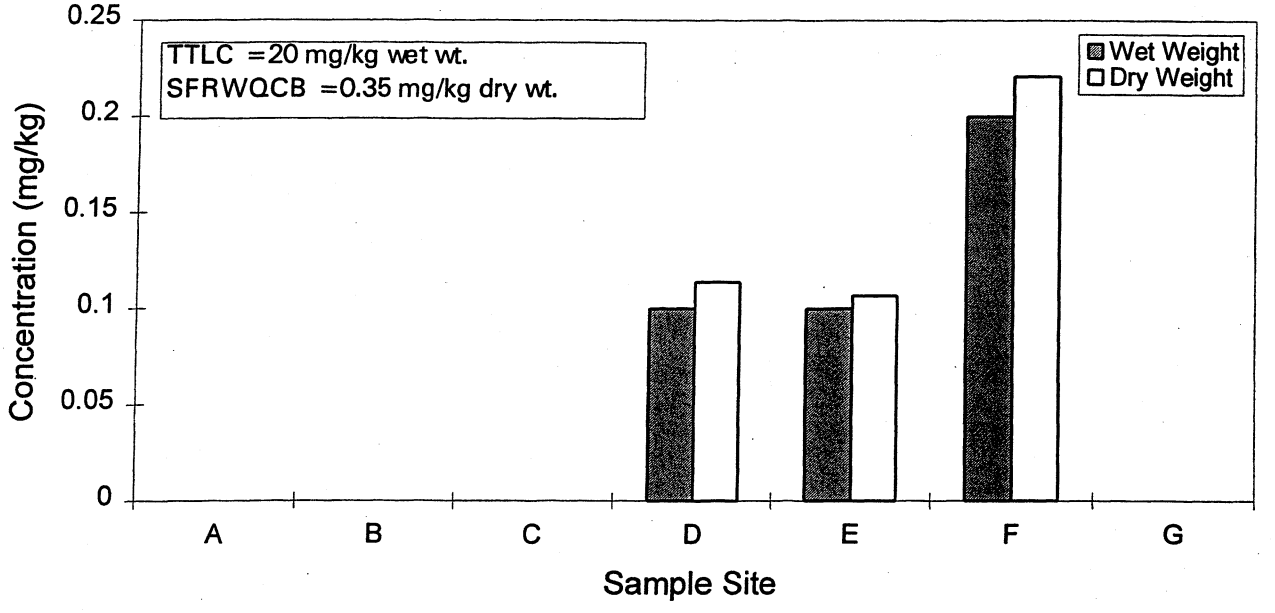


Figure 39. Nickel Concentrations in Island Soil Samples

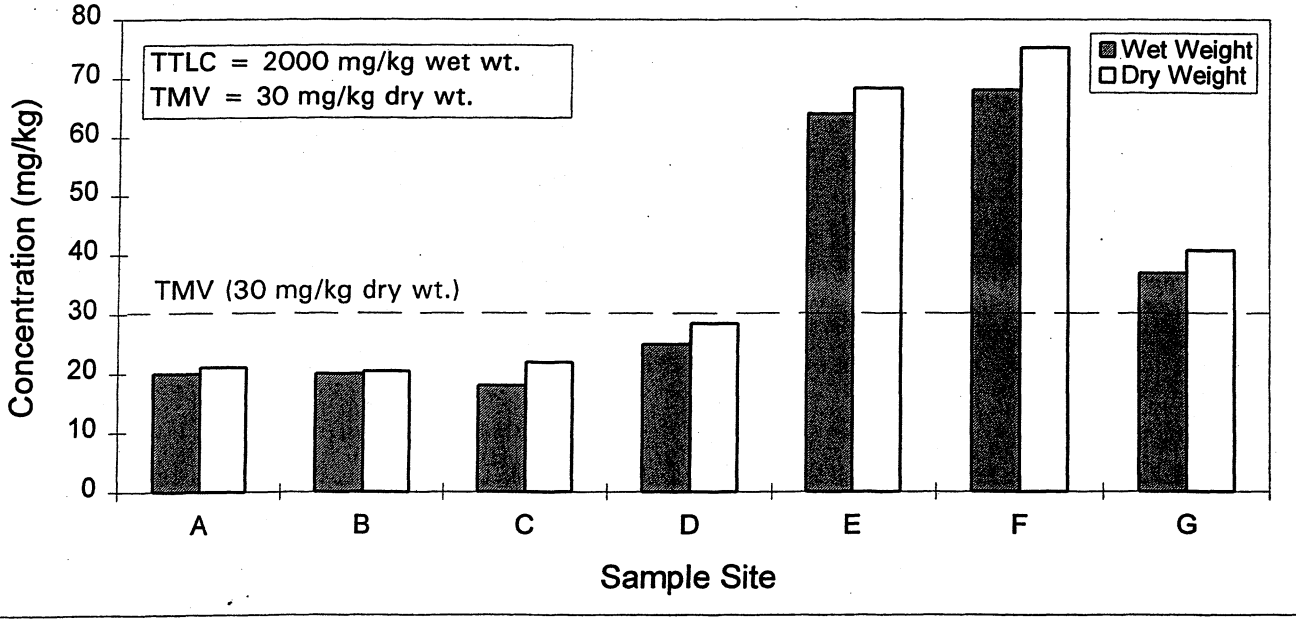


Figure 40. Selenium Concentrations in Island Soil Samples

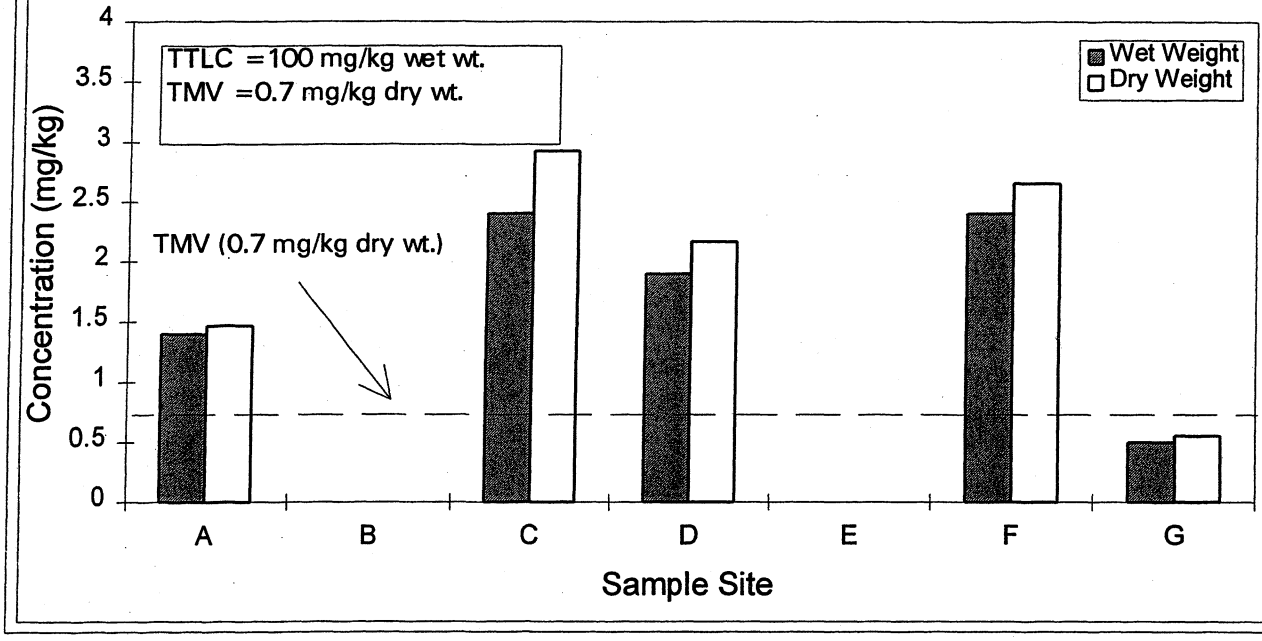


Figure 41. Zinc Concentrations in Island Soil Samples

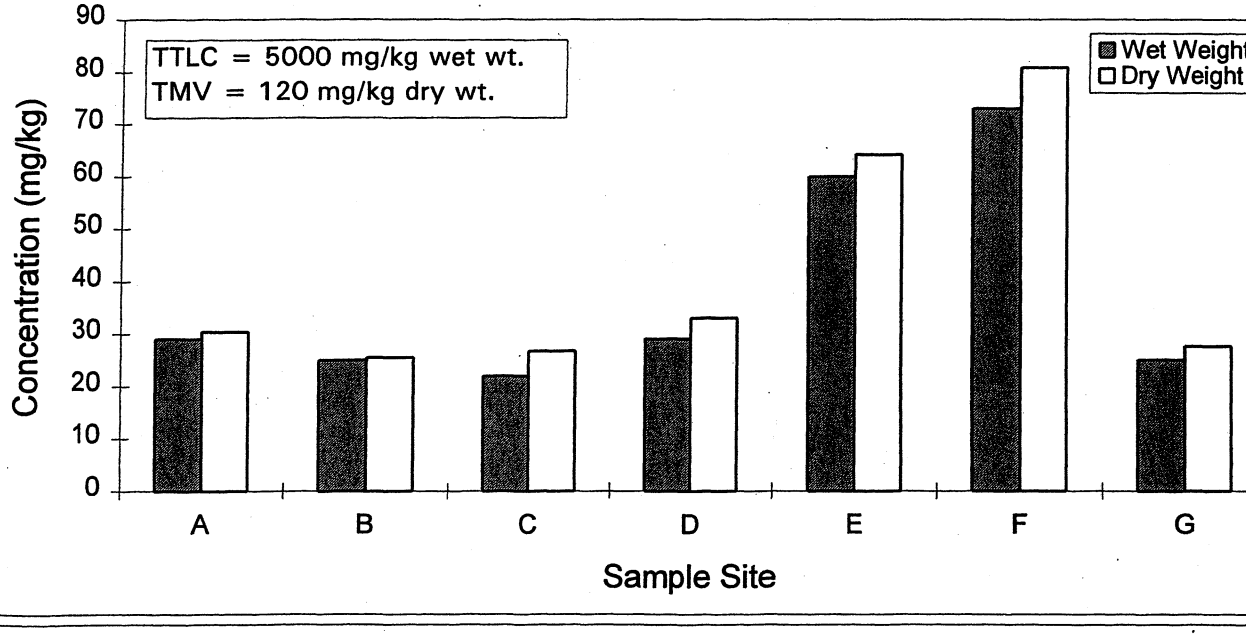


Figure 42. Soluble Arsenic Concentrations in Island Soil Samples

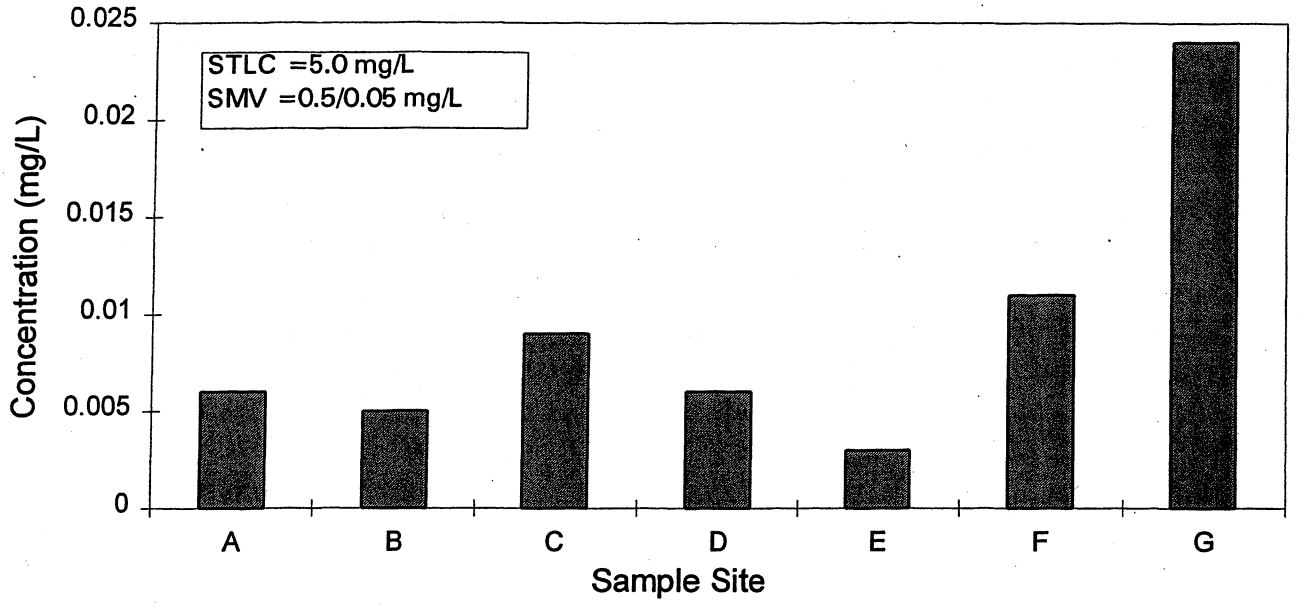


Figure 43. Soluble Chromium Concentrations in Island Soil Samples

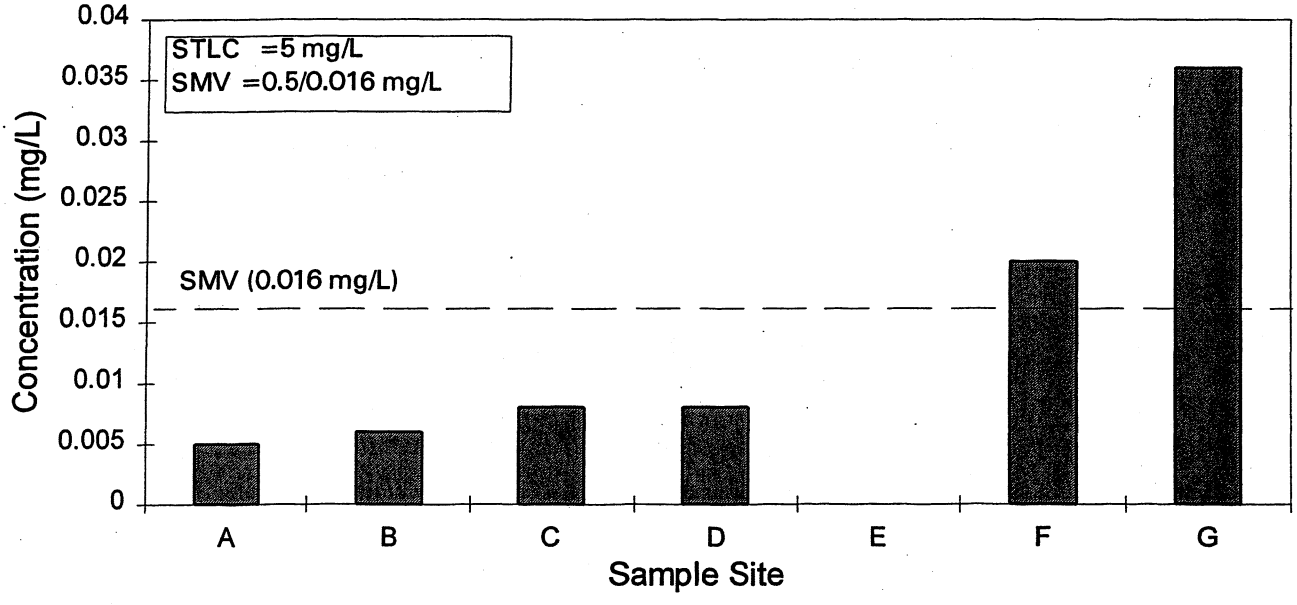


Figure 44. Soluble Copper Concentrations in Island Soil Samples

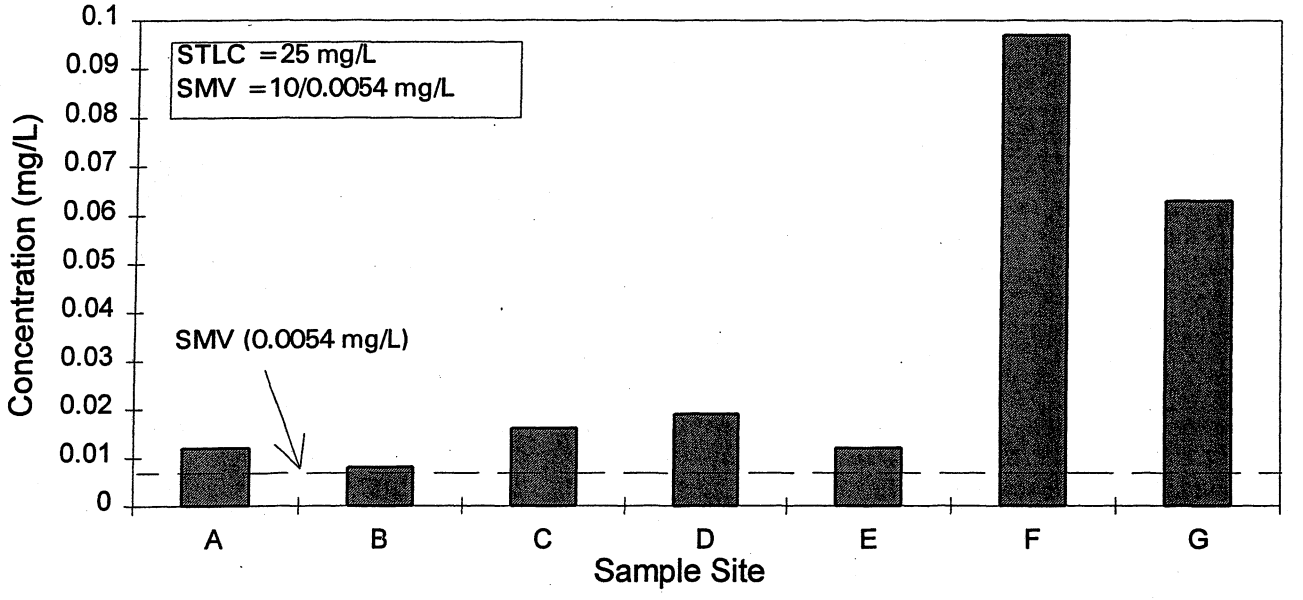


Figure 45. Soluble Lead Concentrations in Island Soil Samples

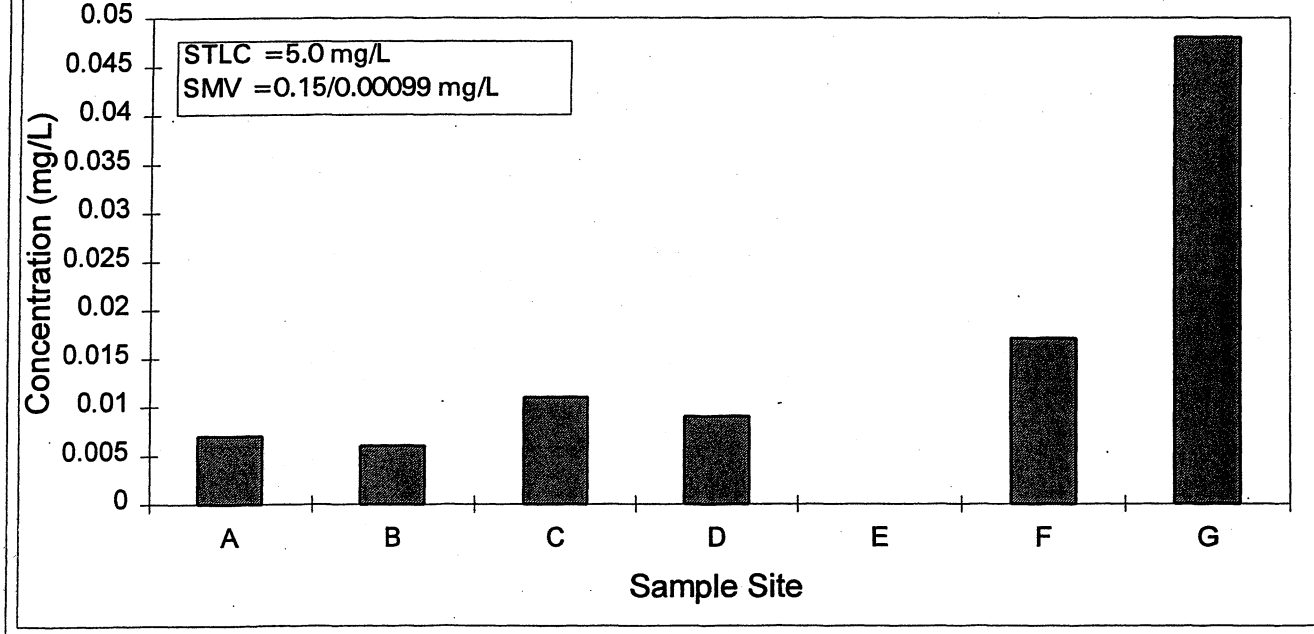


Figure 46. Soluble Nickel Concentrations in Island Soil Samples

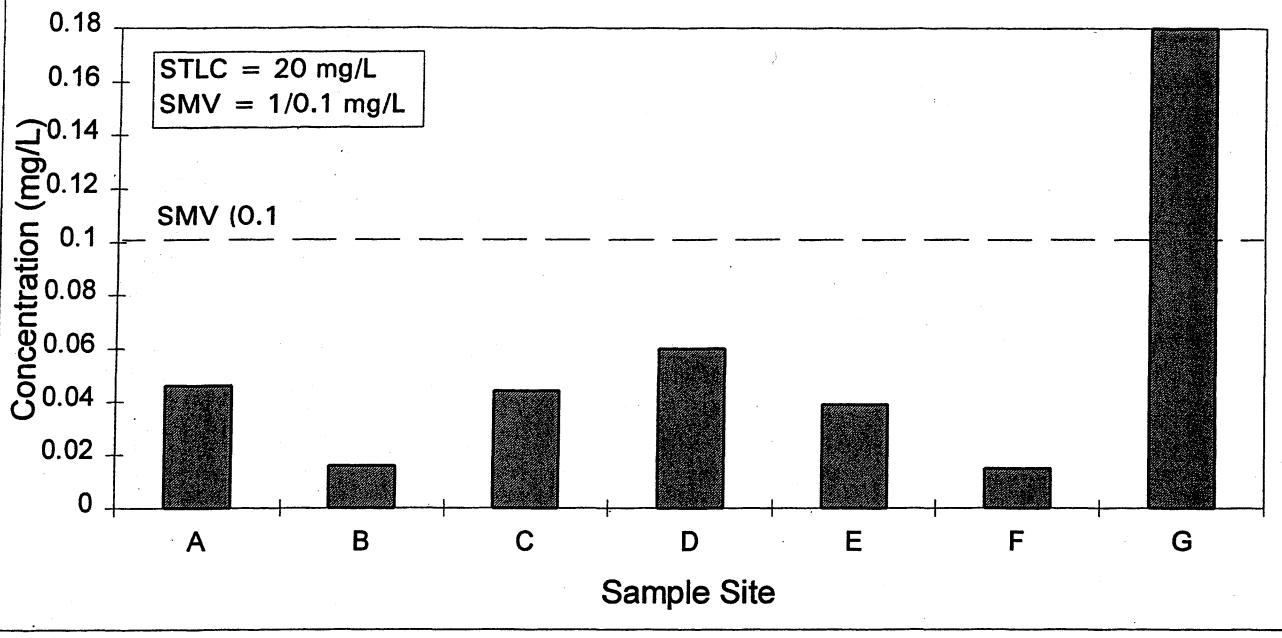


Figure 47. Soluble Selenium Concentrations in Island Soil Samples

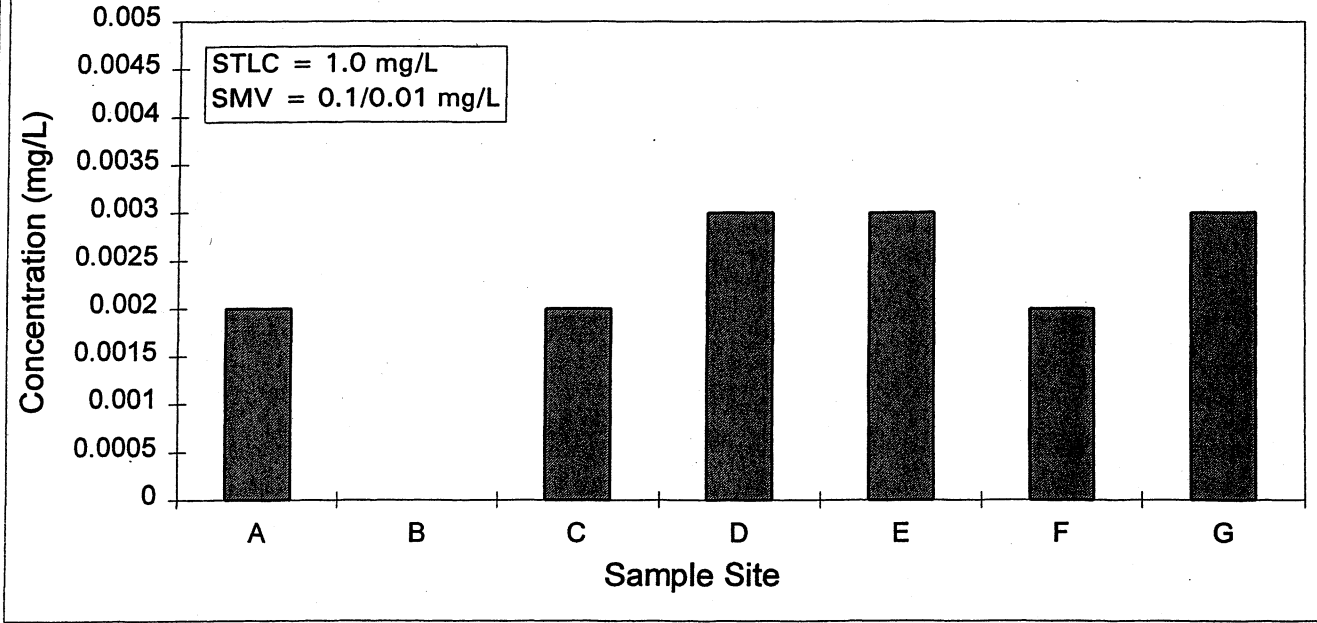


Figure 48. Soluble Zinc Concentrations in Island Soil Samples

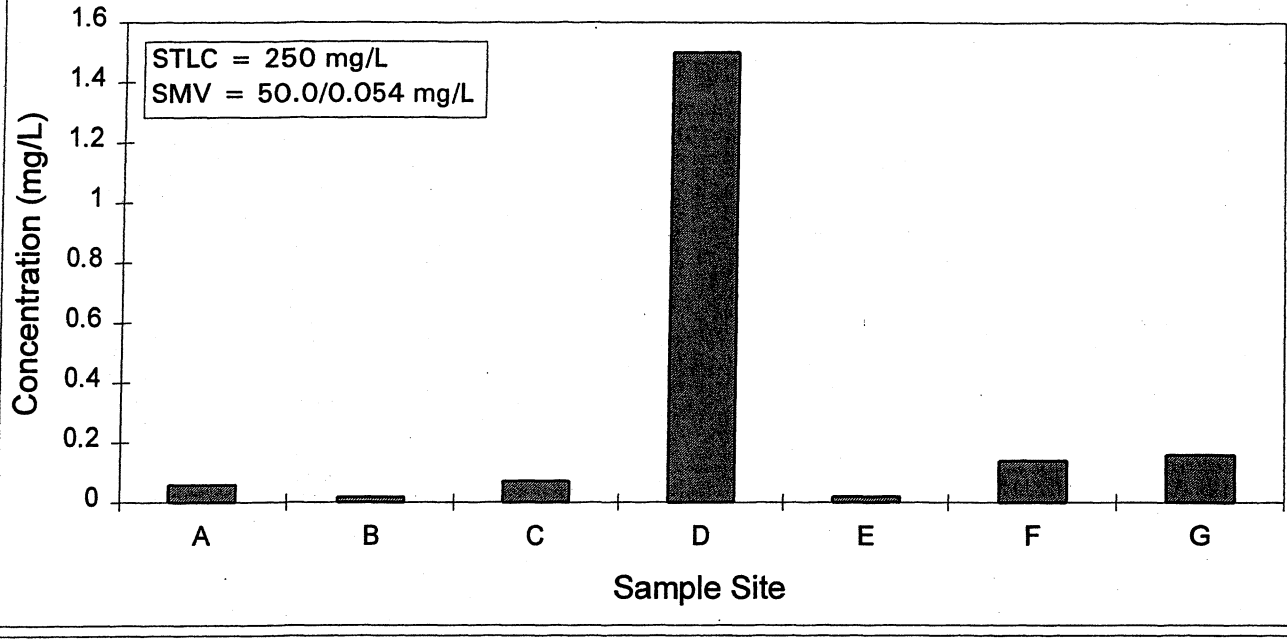


Figure 49. Soluble Total Dissolved Solids Concentrations in Island Soil Samples

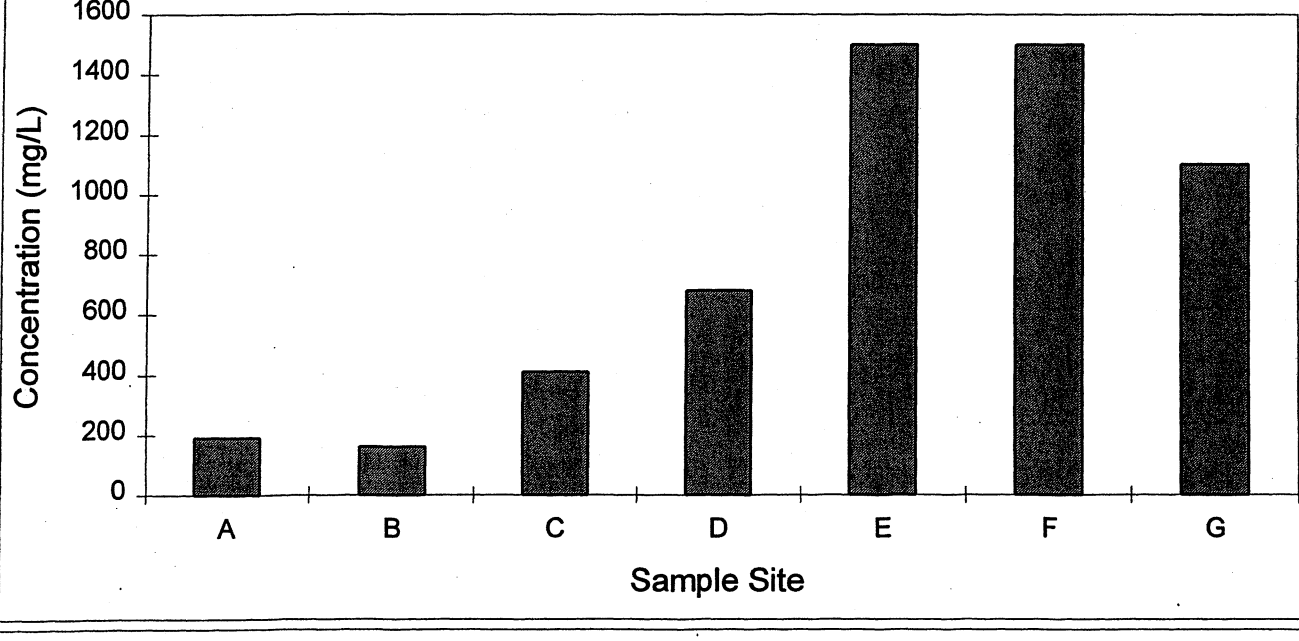


Figure 50. Soluble pH Concentrations in Island Soil Samples

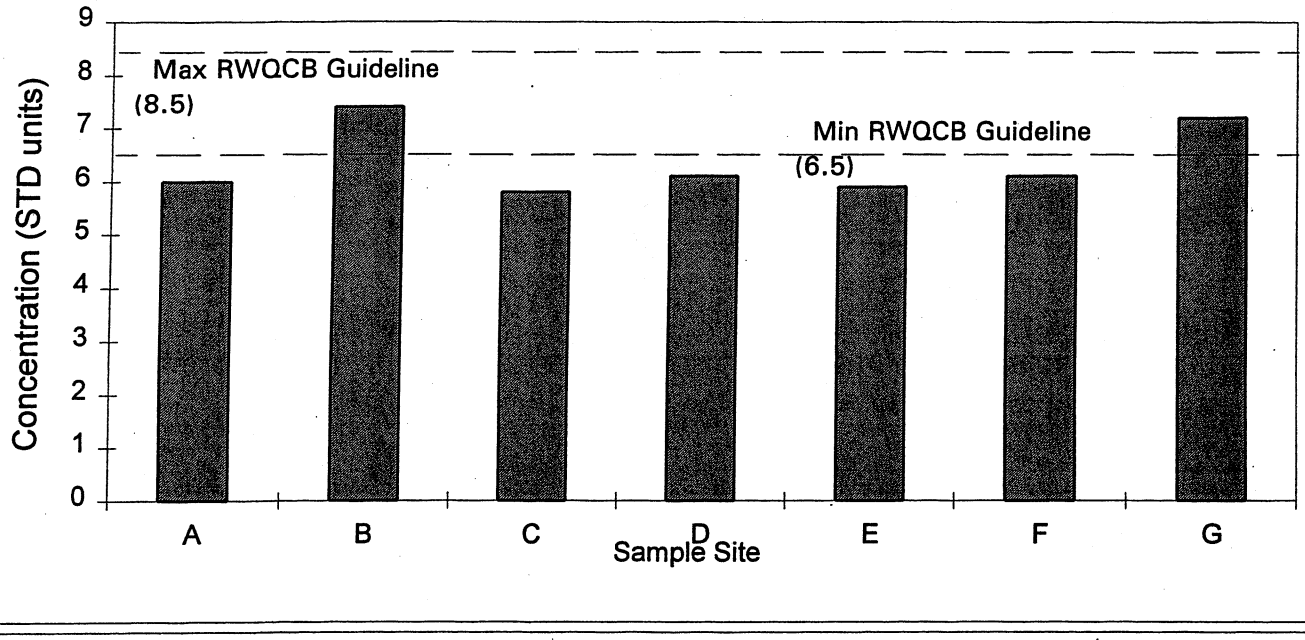


Figure 51. Soluble Specific Conductance in Island Soil Samples

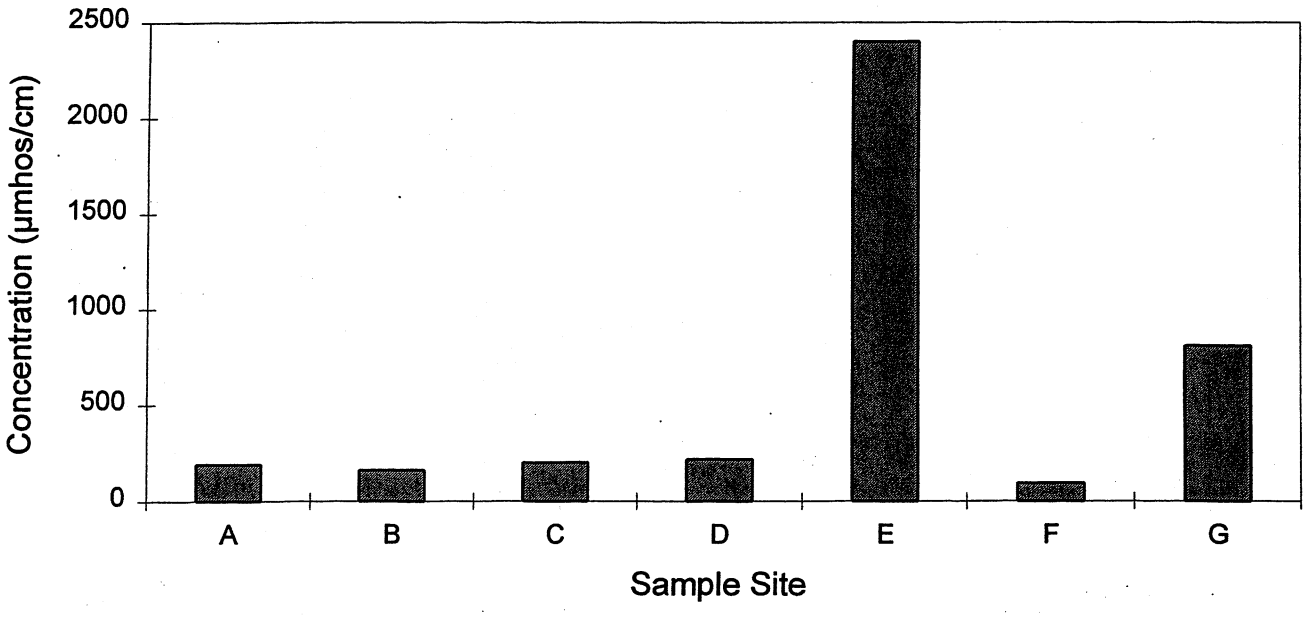


Figure 52. Grain Size Distribution for Levee Soil Site A

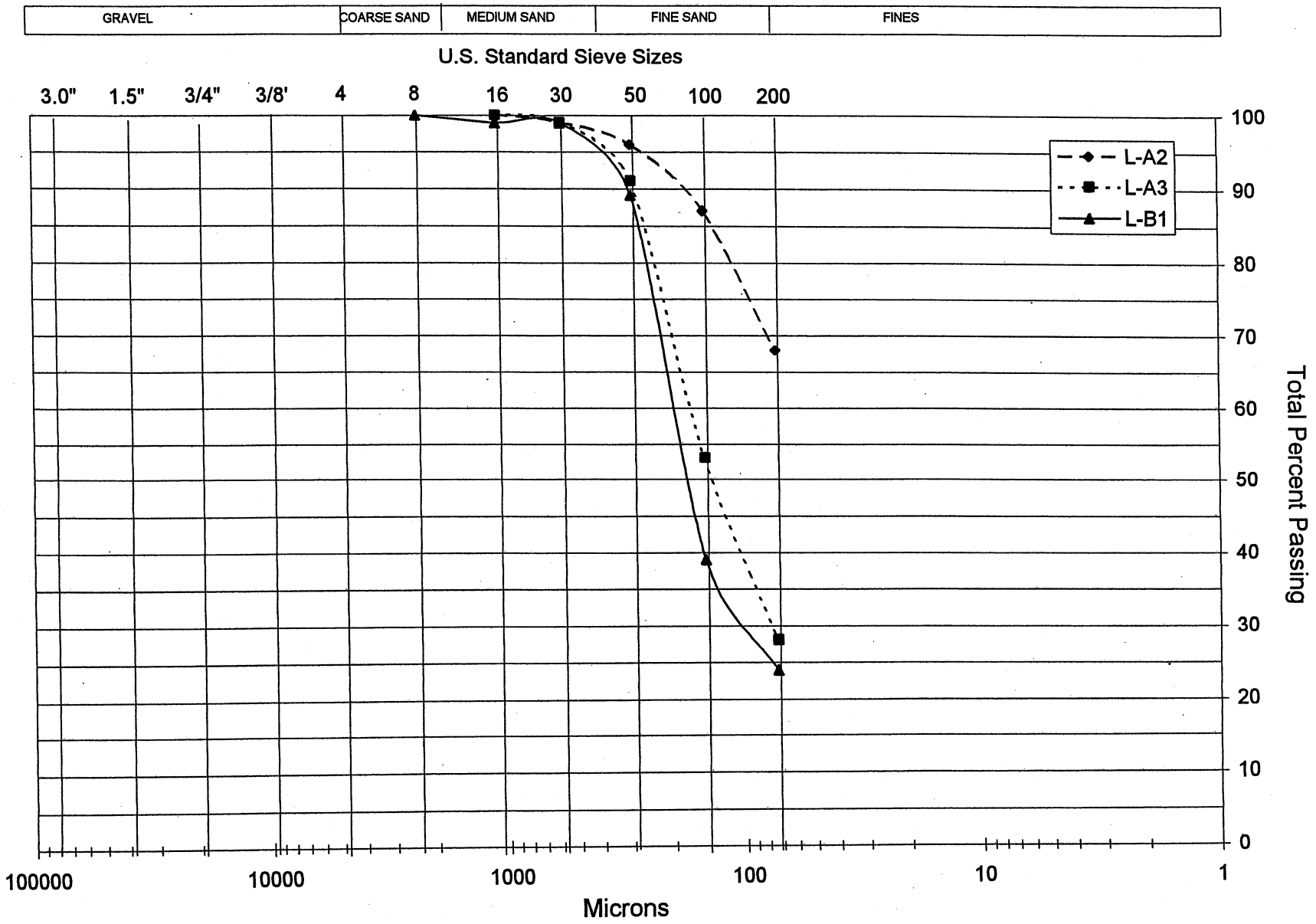


Figure 53. Grain Size Distribution for Levee Soil Site B

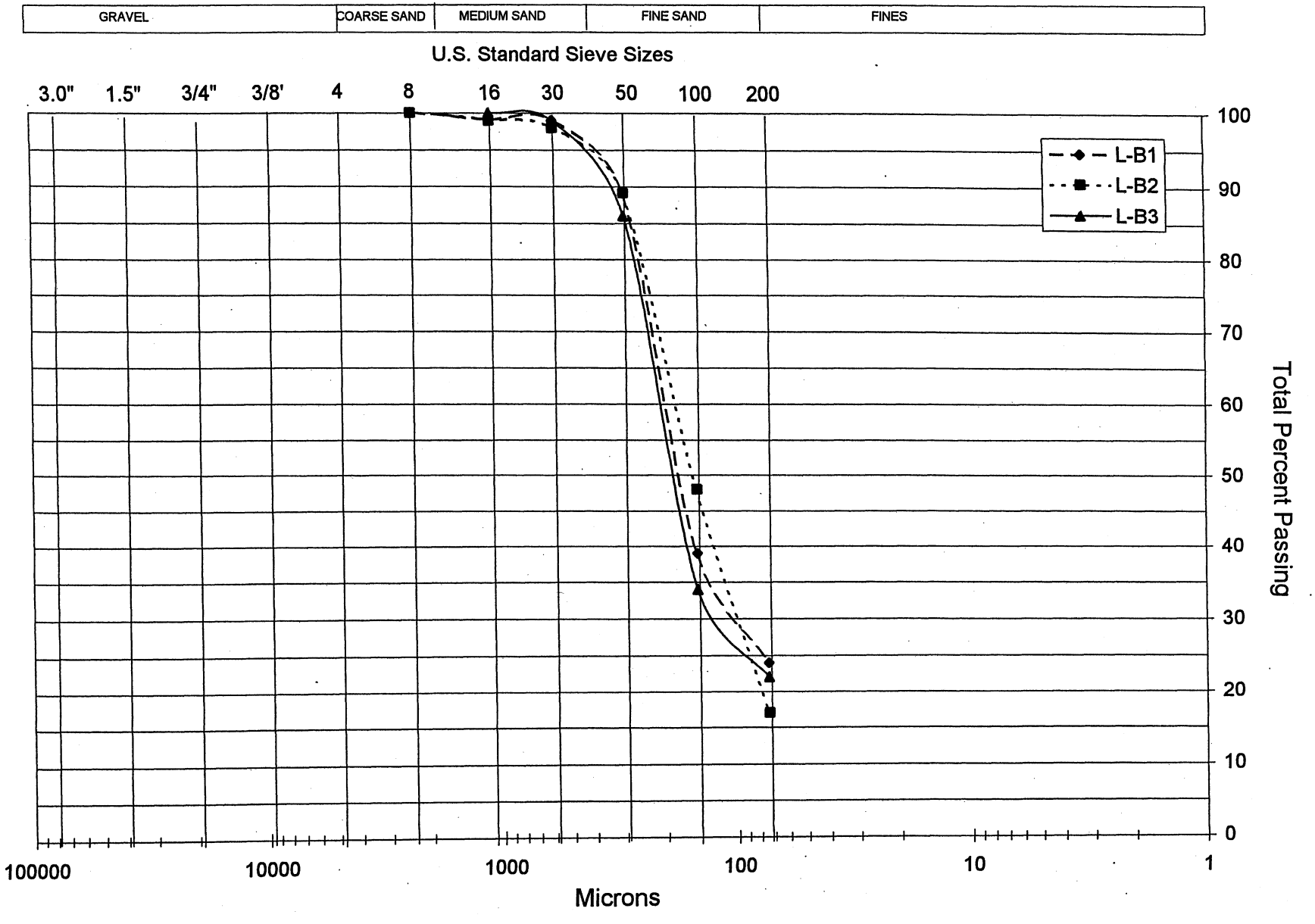


Figure 54. Grain Size Distribution for Levee Soil Site C

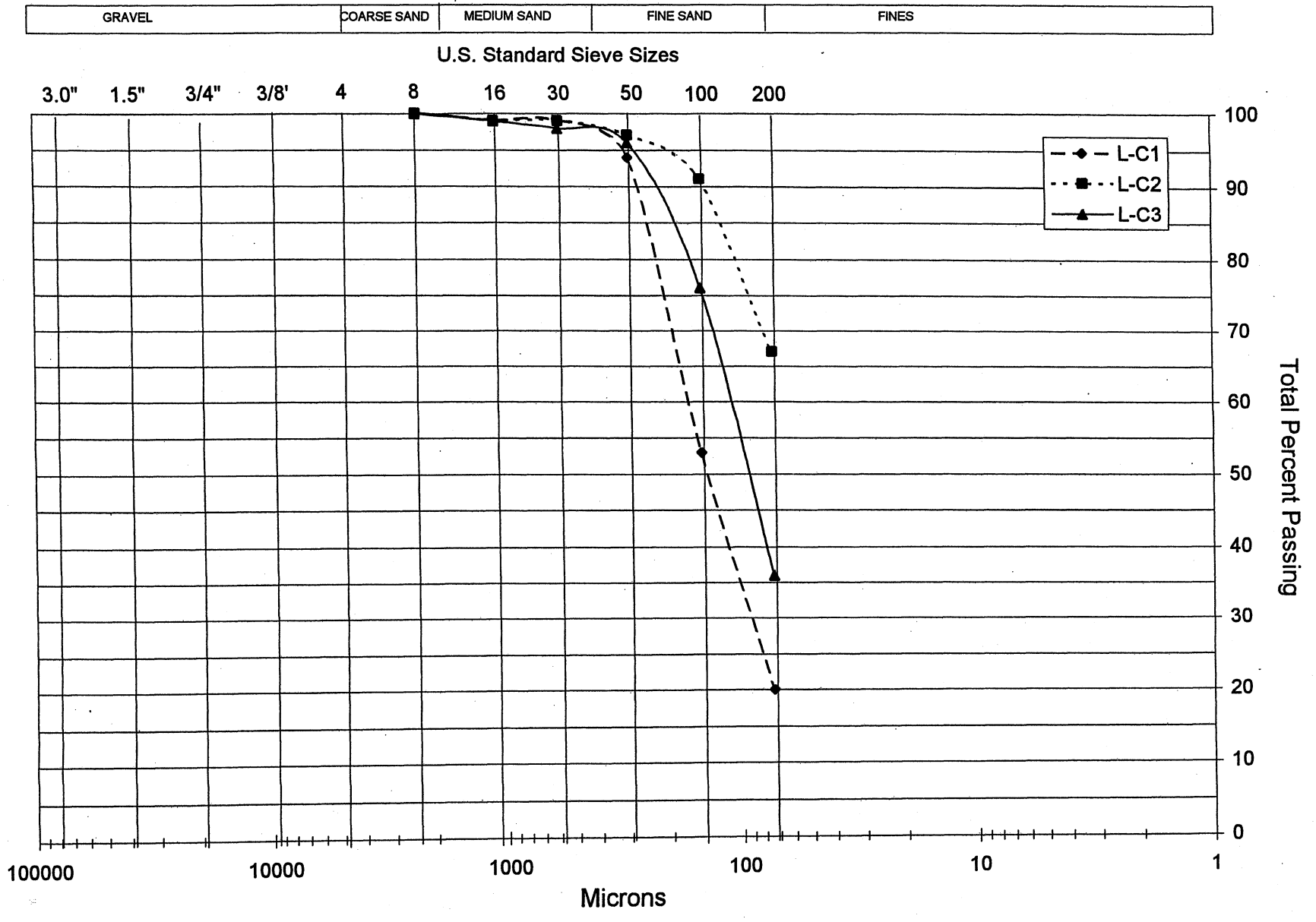


Figure 55. Grain Size Distribution for Levee Soil Site D

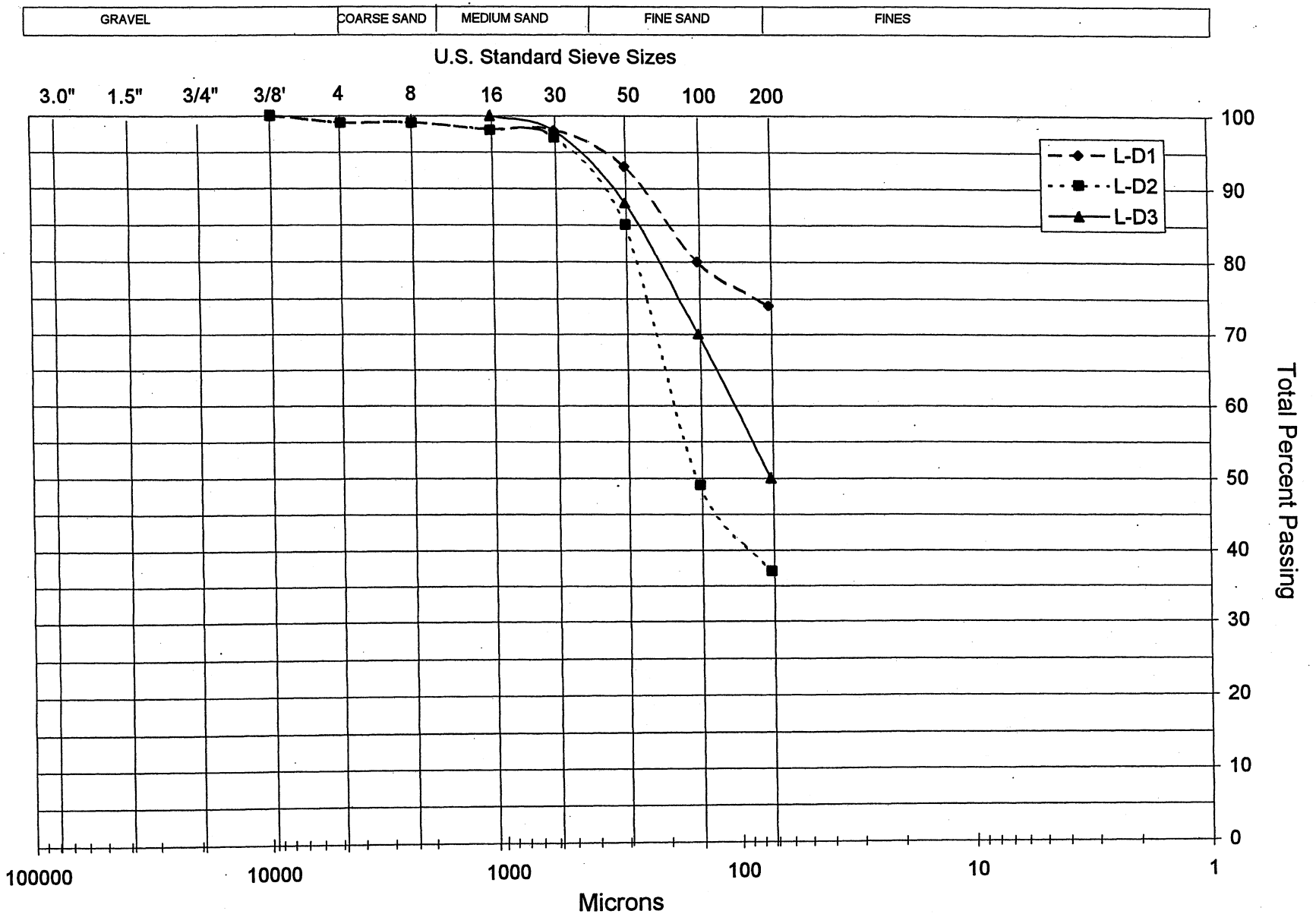


Figure 56. Grain Size Distribution for Levee Soil Site E

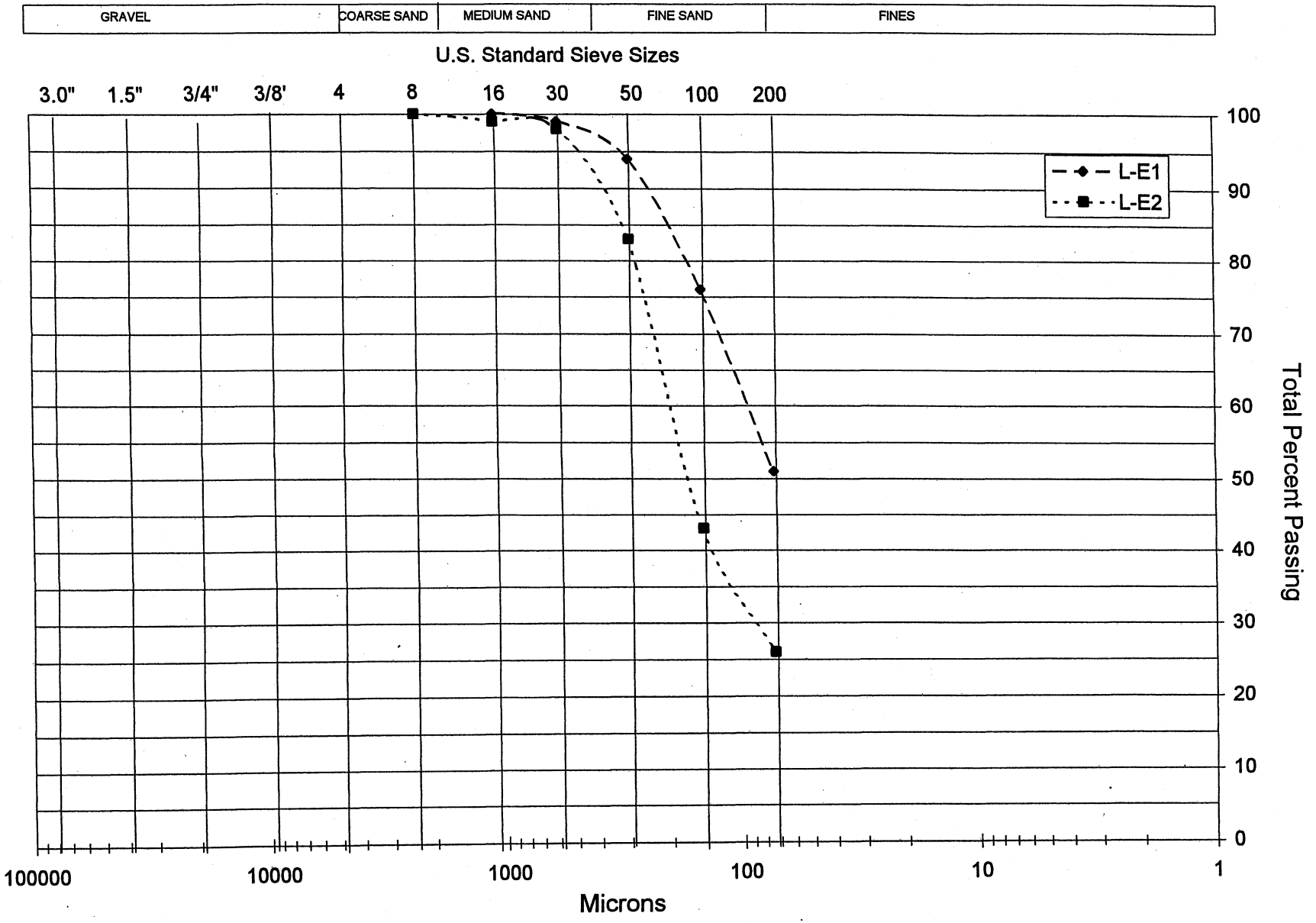


Figure 57. Moisture Concentrations in Levee Soil Samples

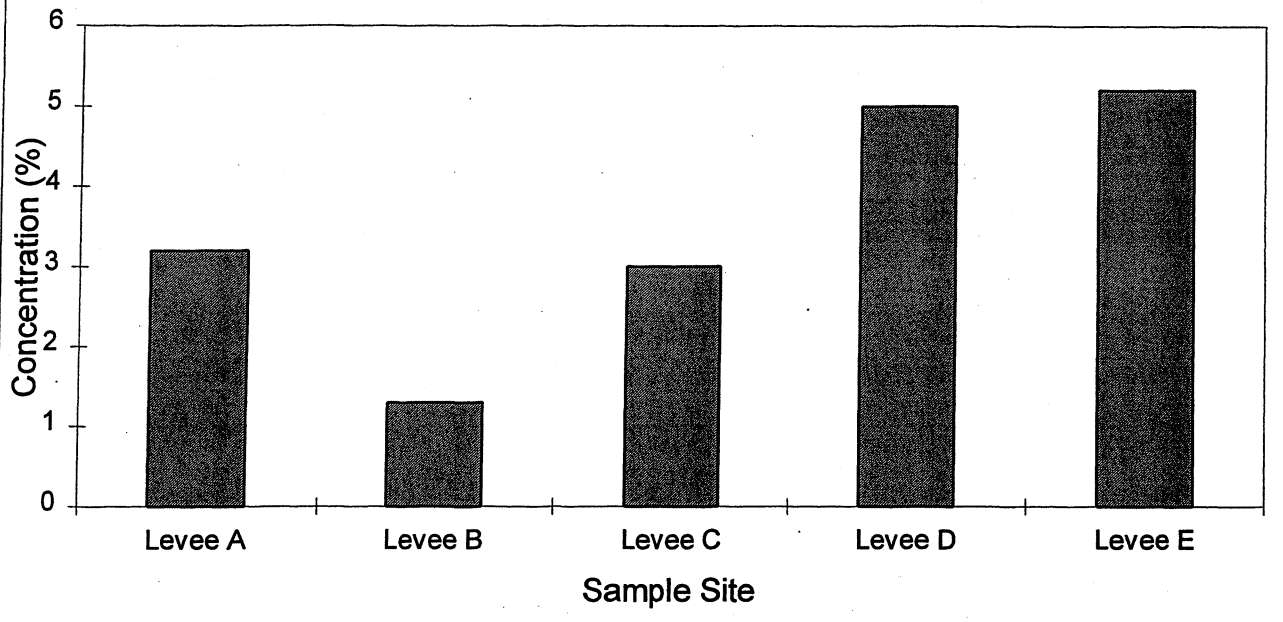
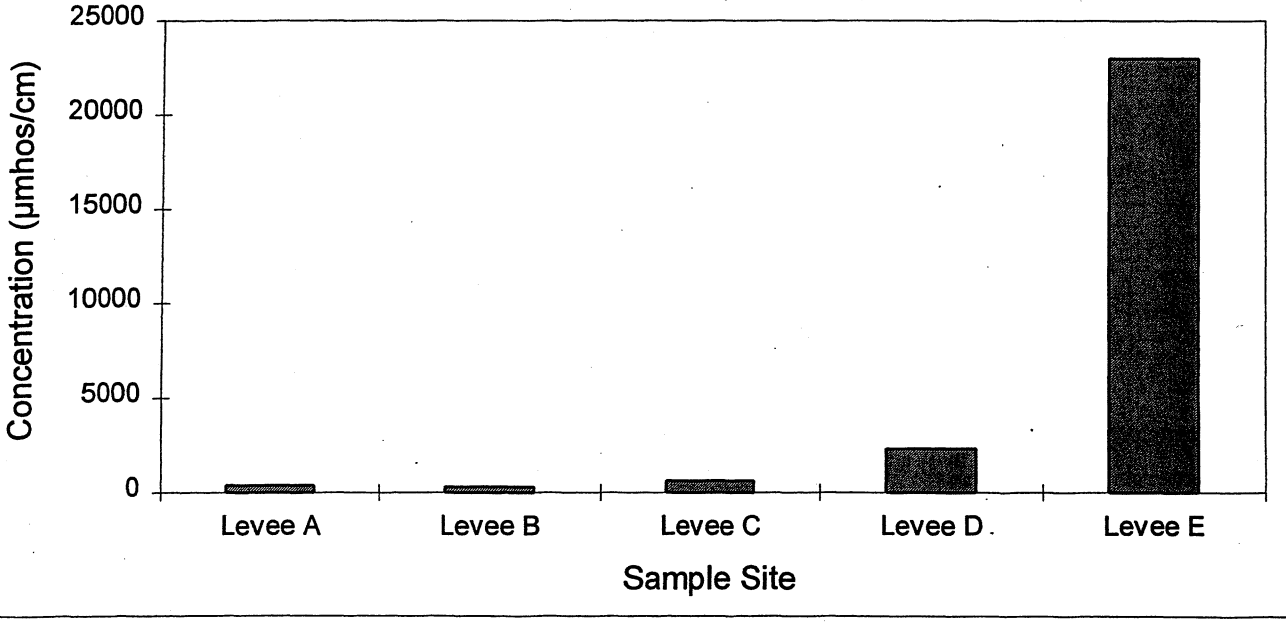


Figure 58. Specific Conductance in Levee Soil Samples



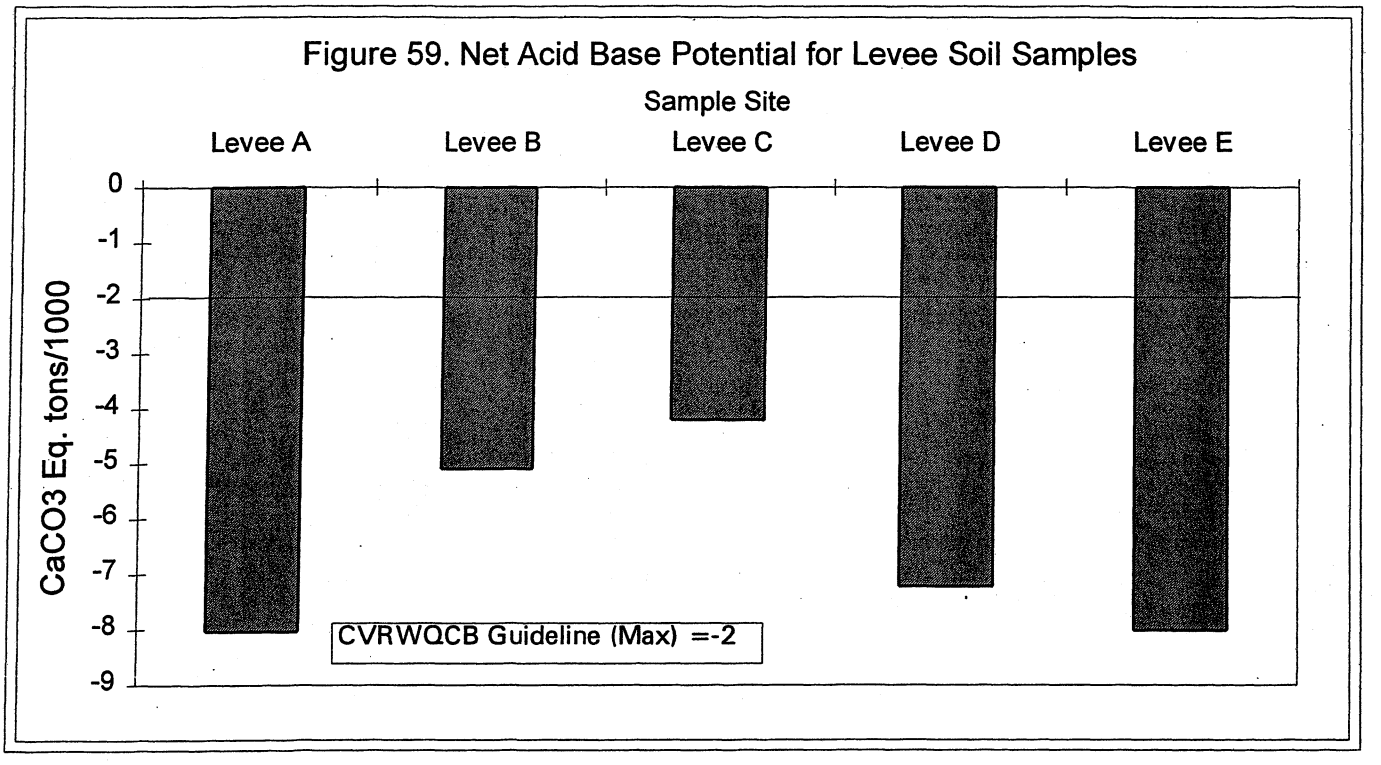


Figure 59. Net Acid Base Potential for Levee Soil Samples
Sample Site
Levee A
Levee B
Levee C
Levee D
Levee E
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
CaCO3 Eq. tons/1000
CVRWQCB Guideline (Max) =-2

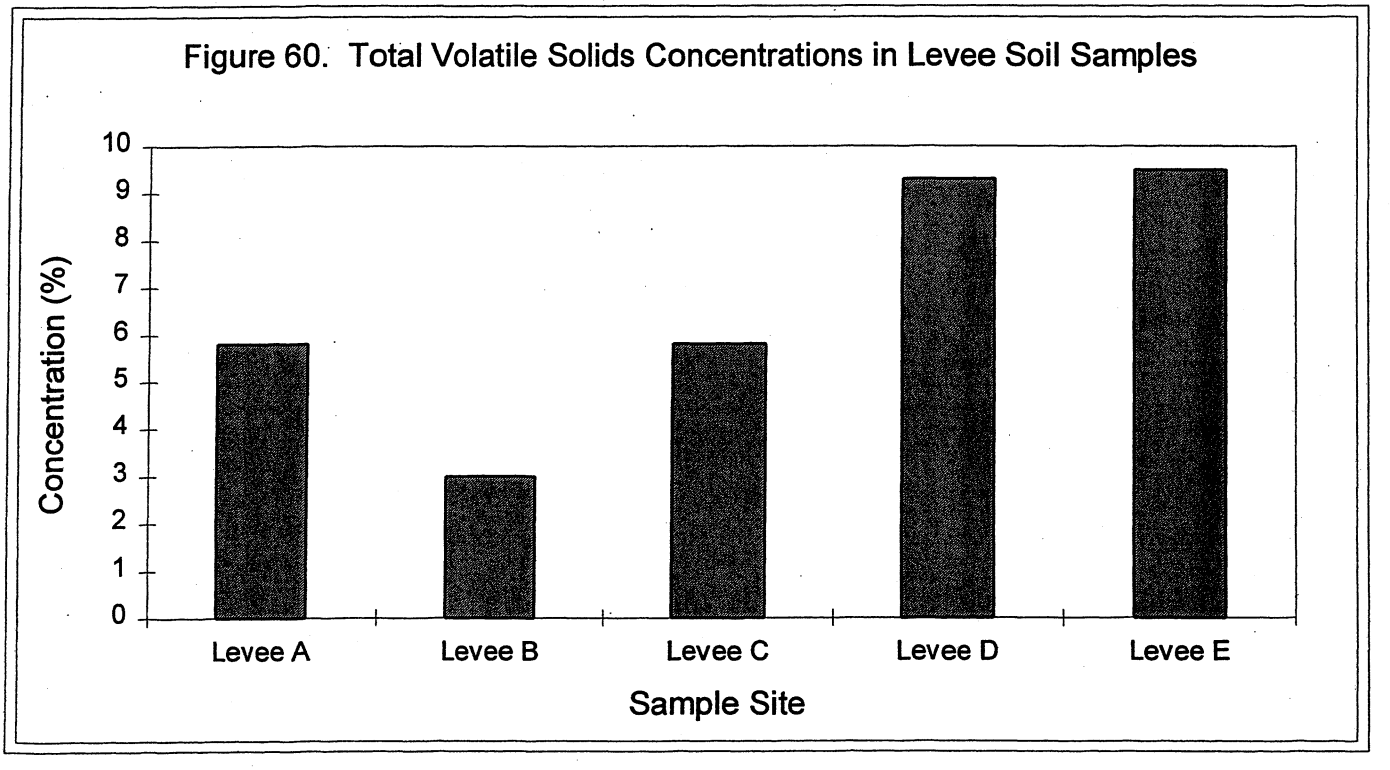


Figure 60. Total Volatile Solids Concentrations in Levee Soil Samples
10
9
8
7
6
5
4
3
2
1
0
Concentration (%)
Levee A
Levee B
Levee C
Levee D
Levee E
Sample Site

Figure 61. Total Organic Carbon Concentrations in Levee Soil Samples

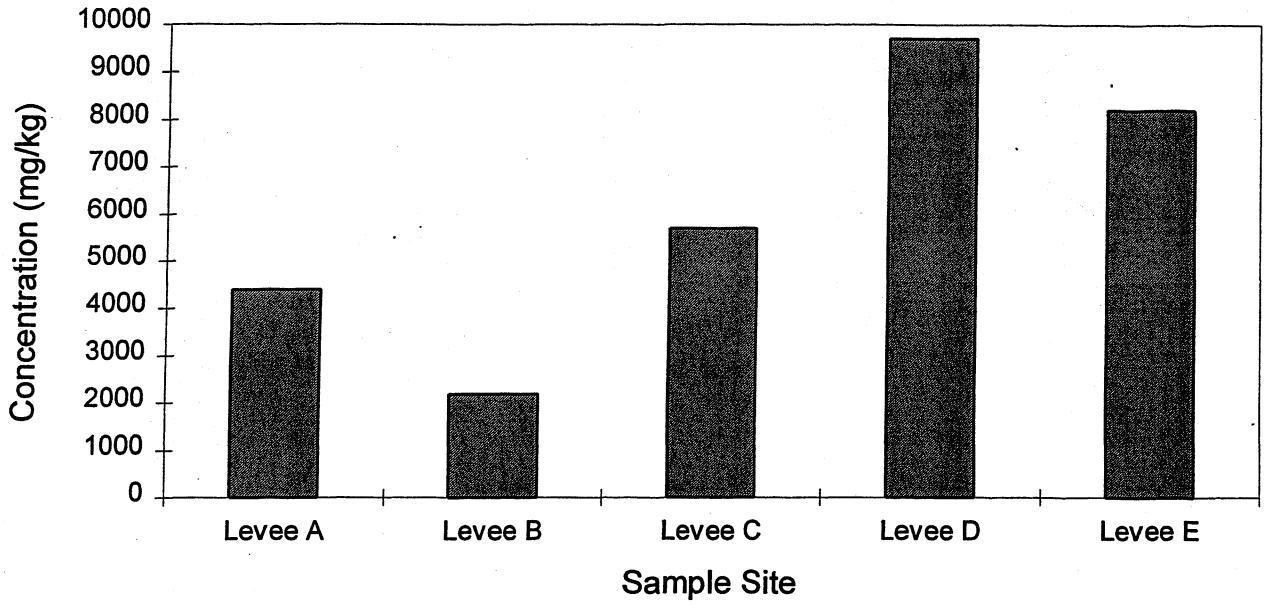


Figure 62. Total Oil and Grease Concentrations in Levee Soil Samples

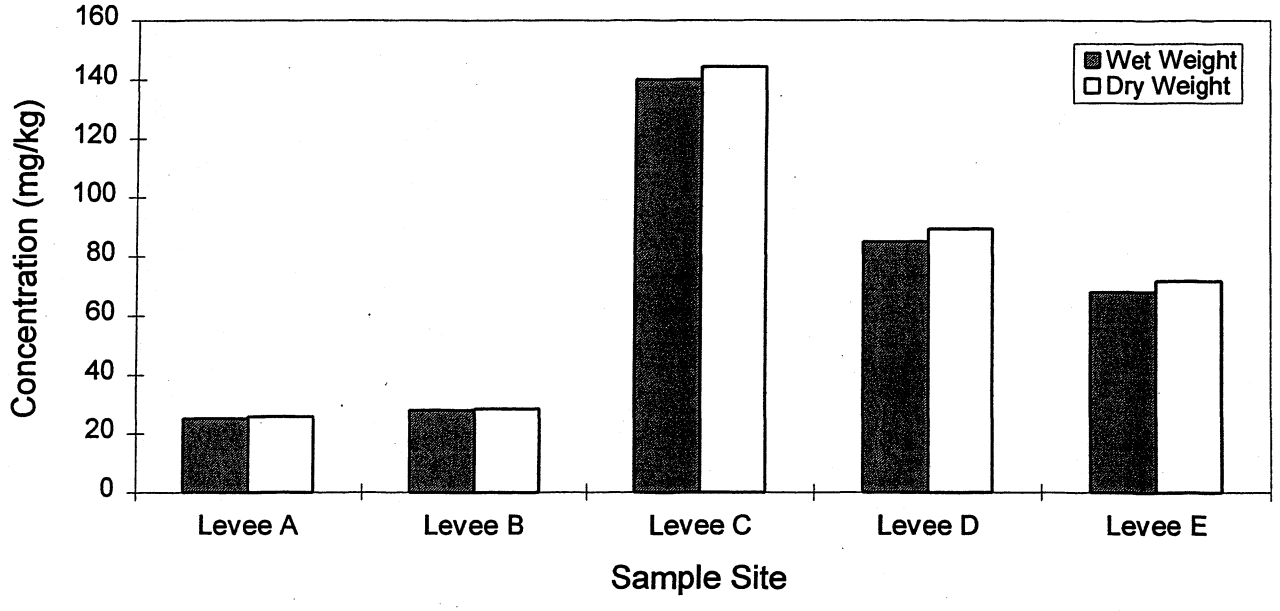


Figure 63. Chromium Concentrations in Levee Soil Samples

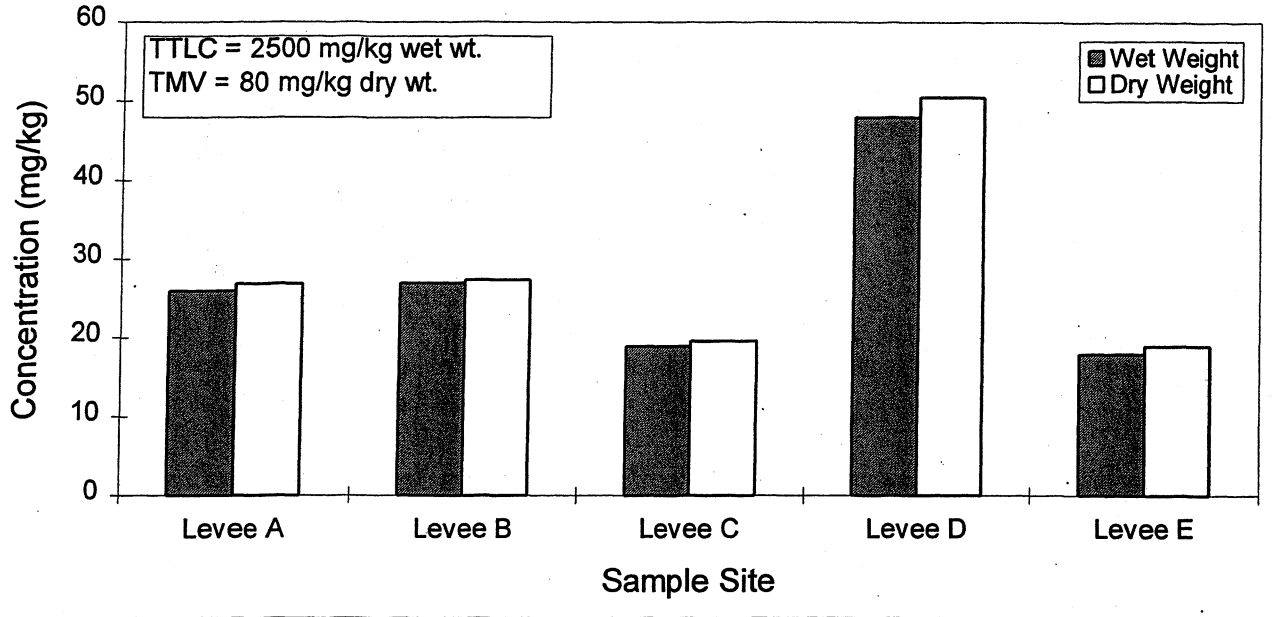


Figure 64. Copper Concentrations in Levee Soil Samples

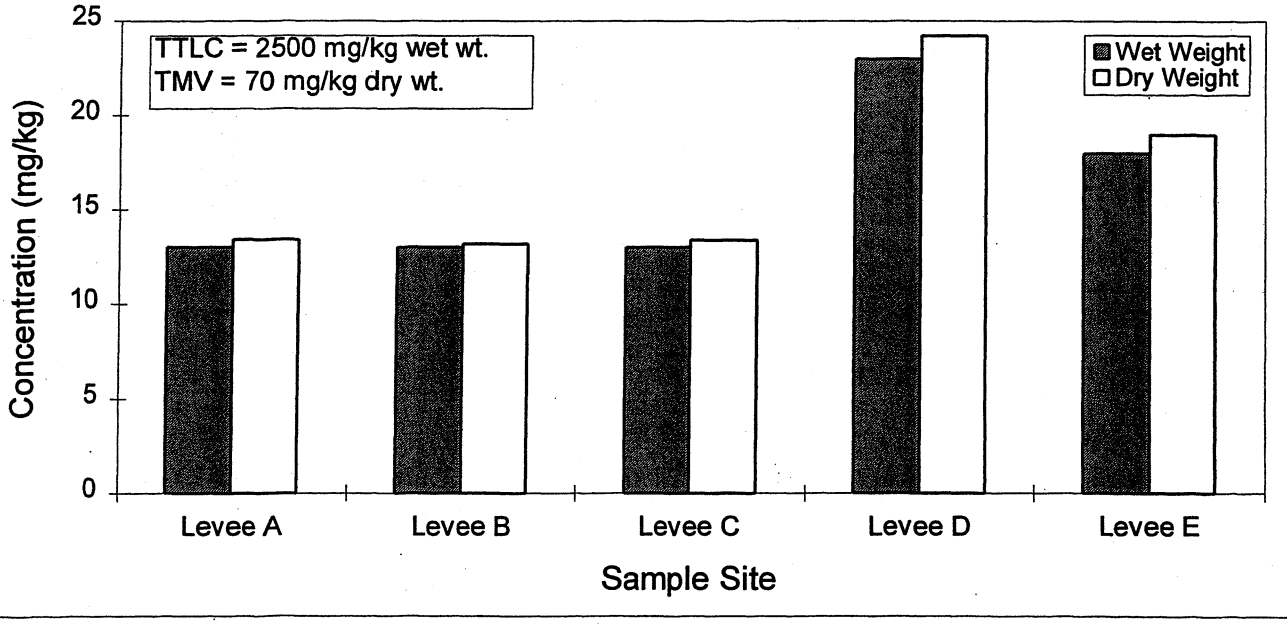


Figure 65. Lead Concentrations in Levee Soil Samples

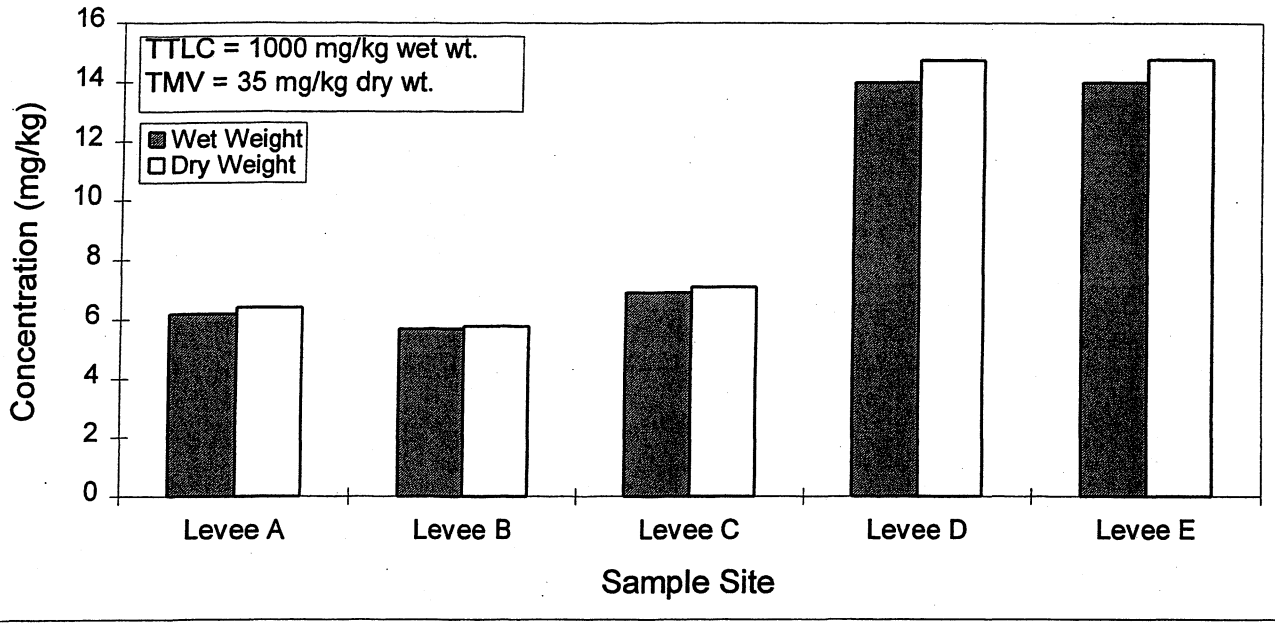


Figure 66. Zinc Concentrations in Levee Soil Samples

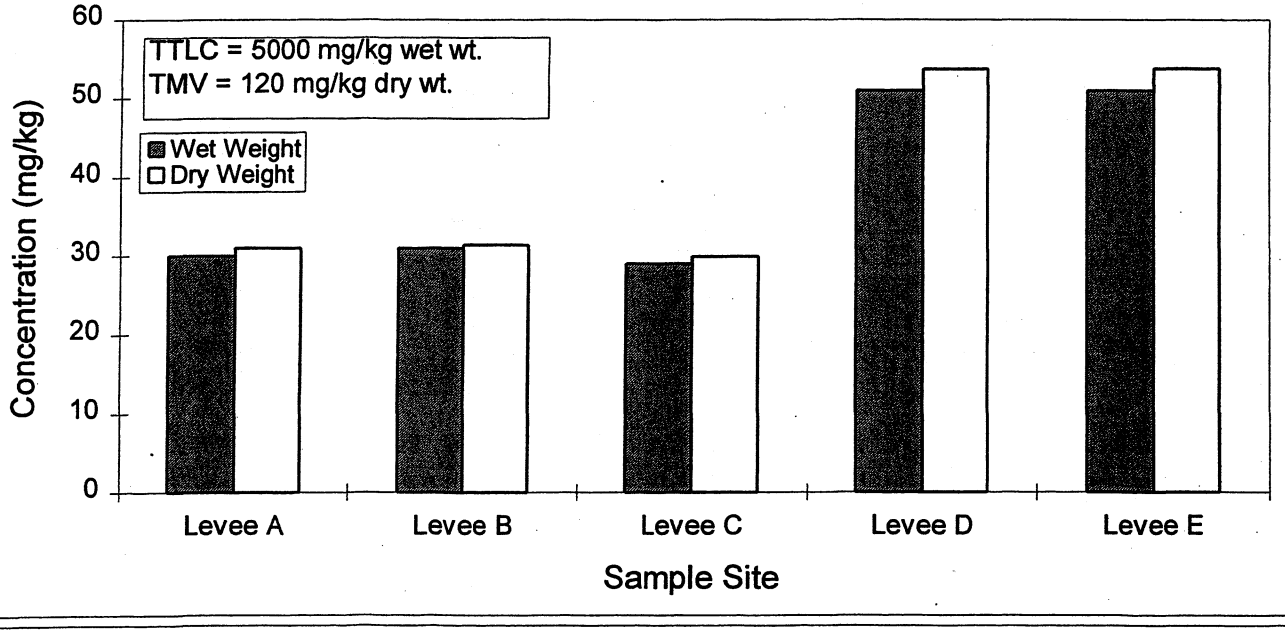


Figure 67. Arsenic Concentrations in Levee Soil Samples

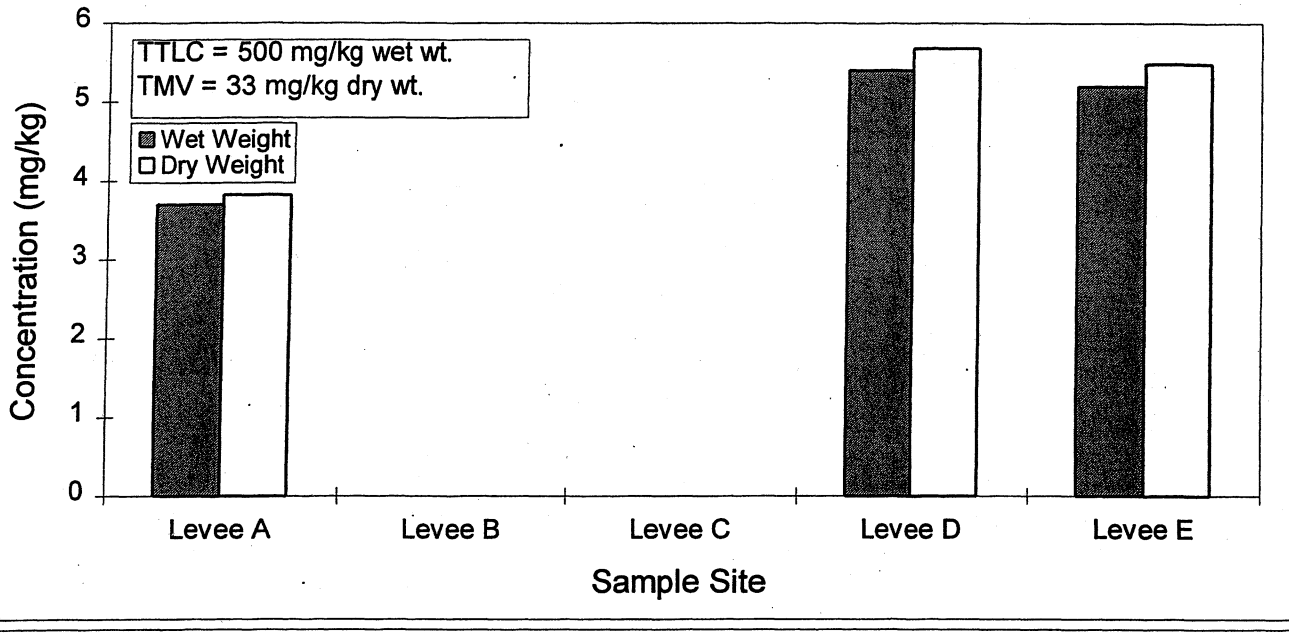


Figure 68. Mercury Concentrations in Levee Soil Samples

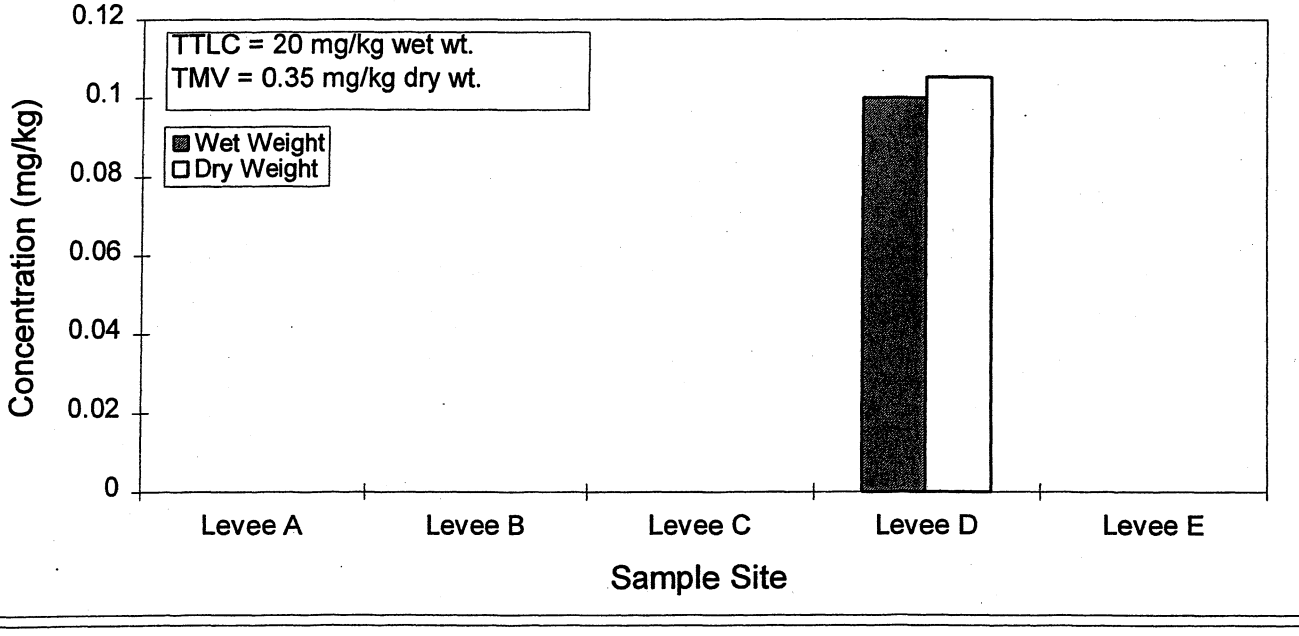


Figure 69. Nickel Concentrations in Levee Soil Samples

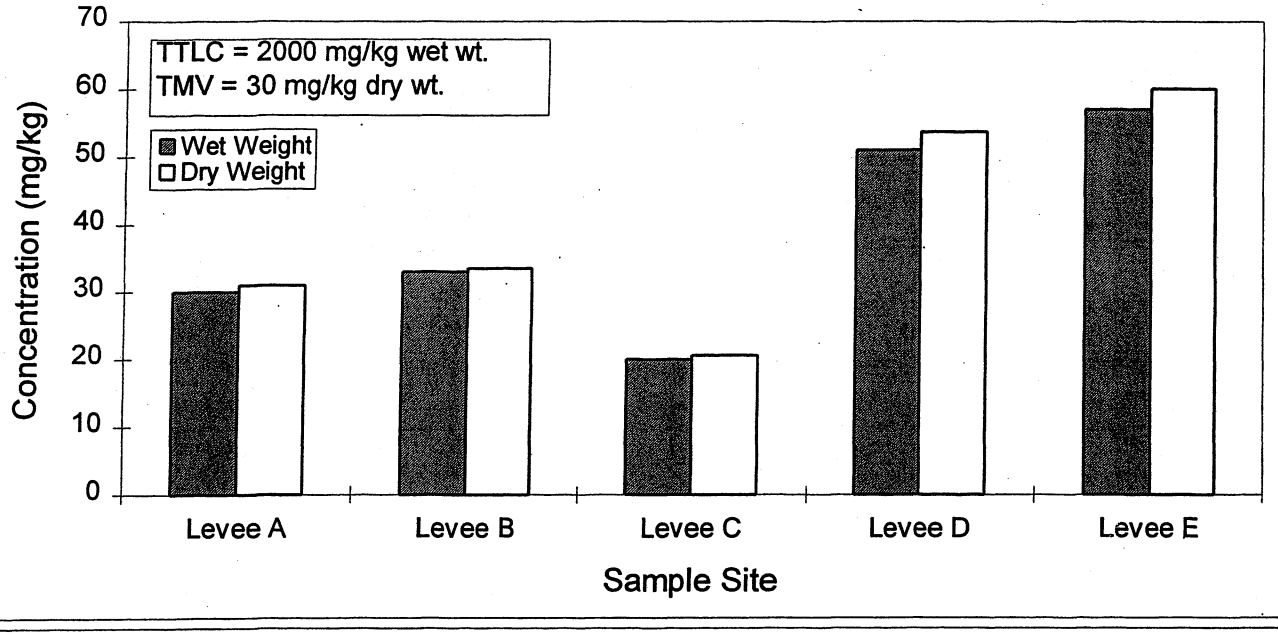


Figure 70. Selenium Concentrations in Levee Soil Samples

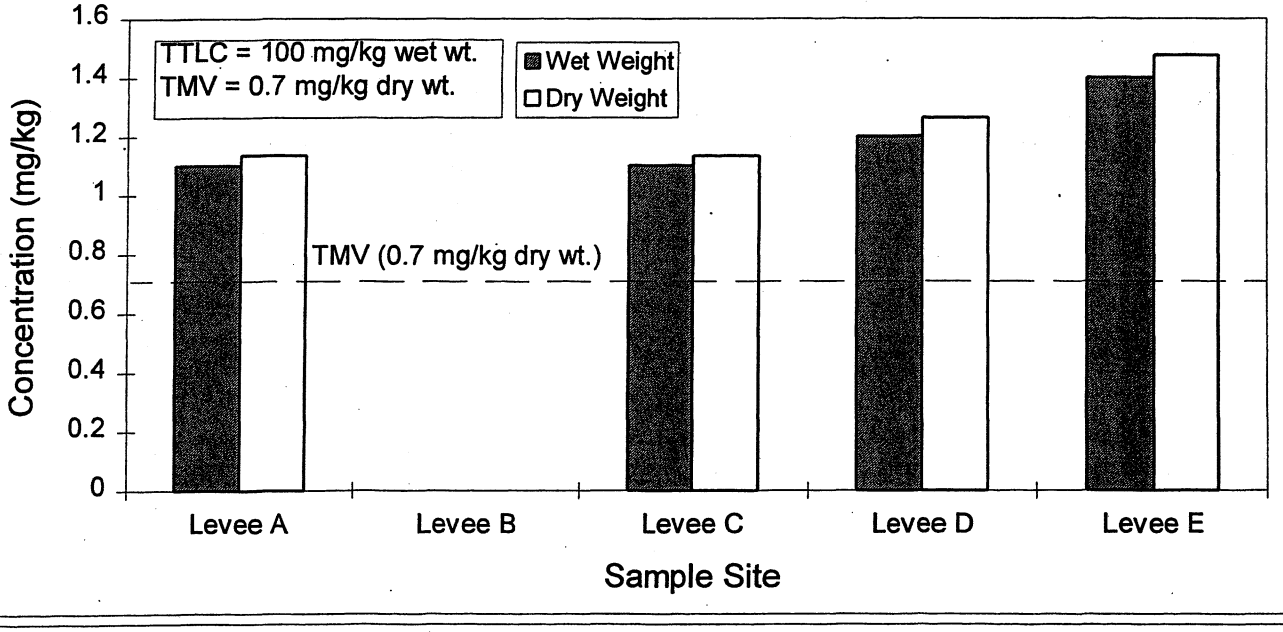


Figure 71. Soluble Arsenic Concentrations in Levee Soil Samples

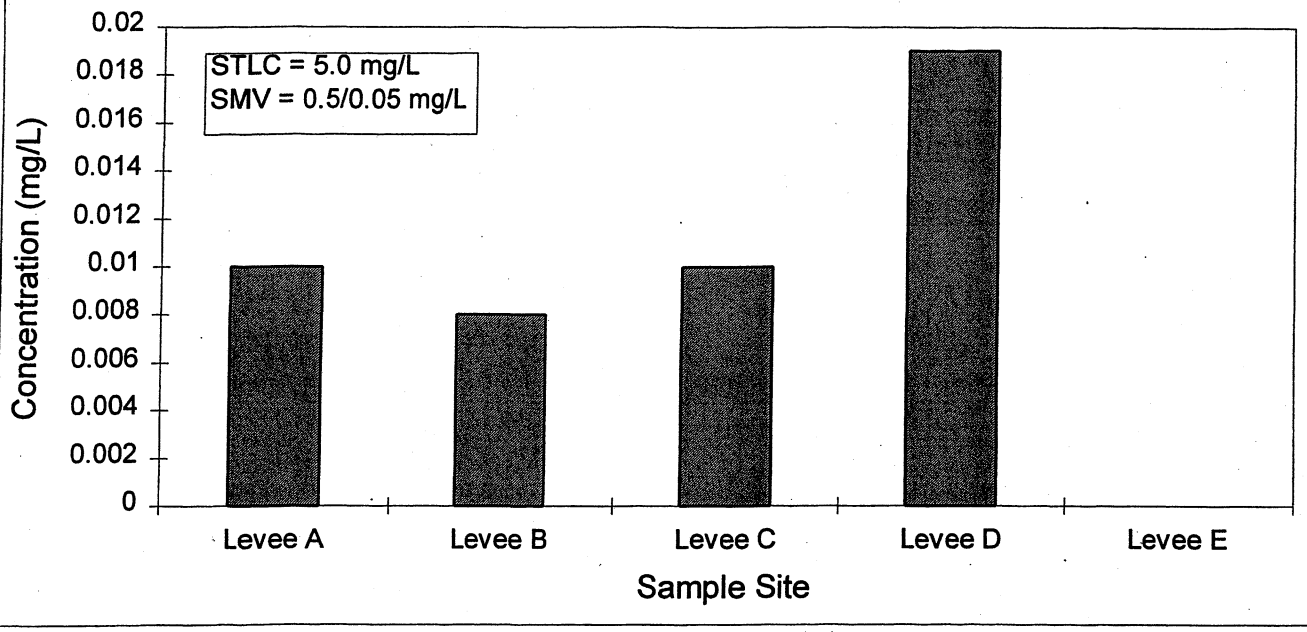


Figure 72. Soluble Chromium Concentrations in Levee Soil Samples

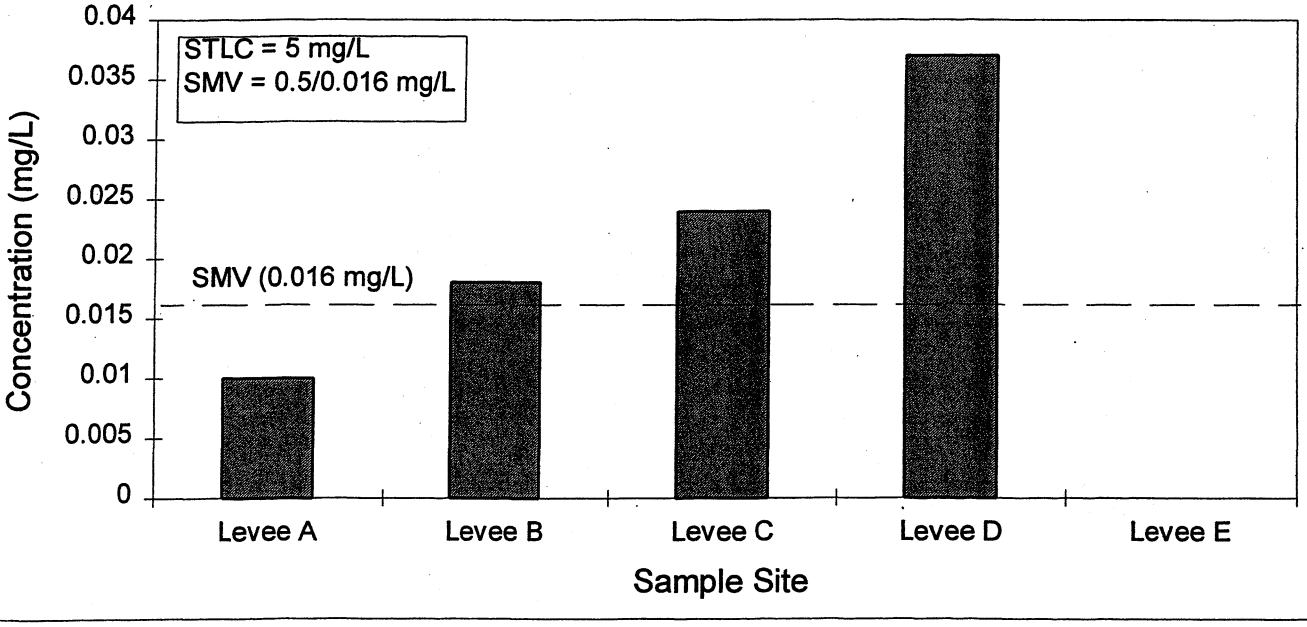


Figure 73. Soluble Copper Concentrations in Levee Soil Samples

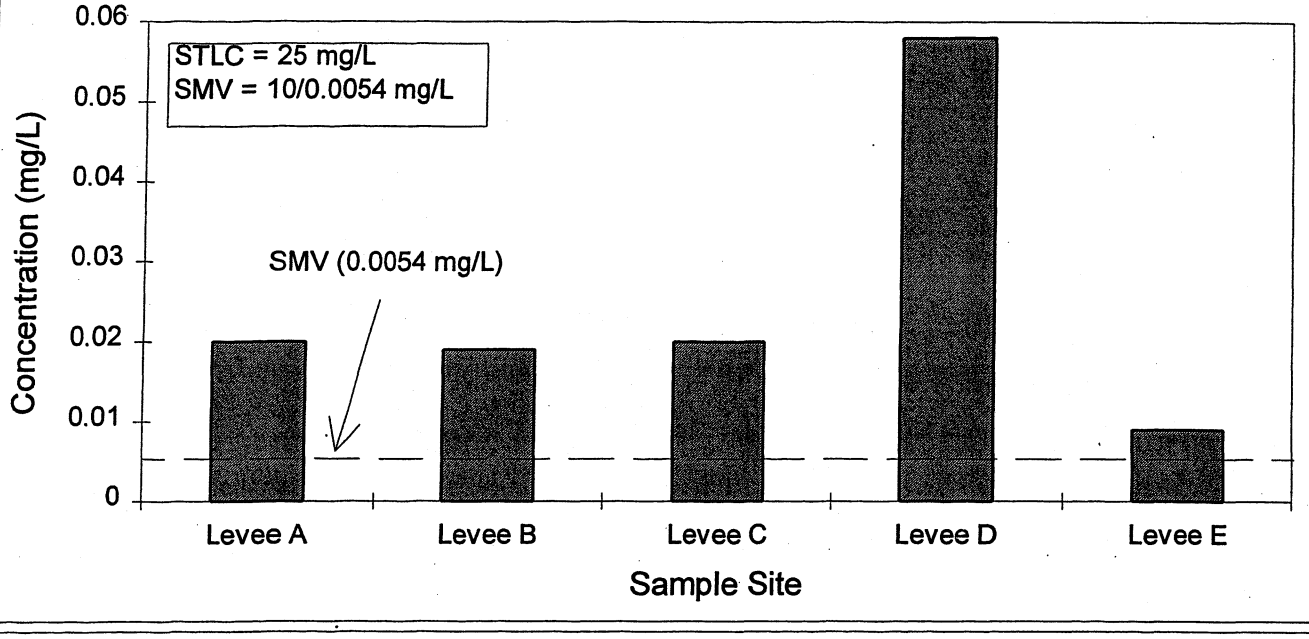


Figure 74. Soluble Lead Concentrations in Levee Soil Samples

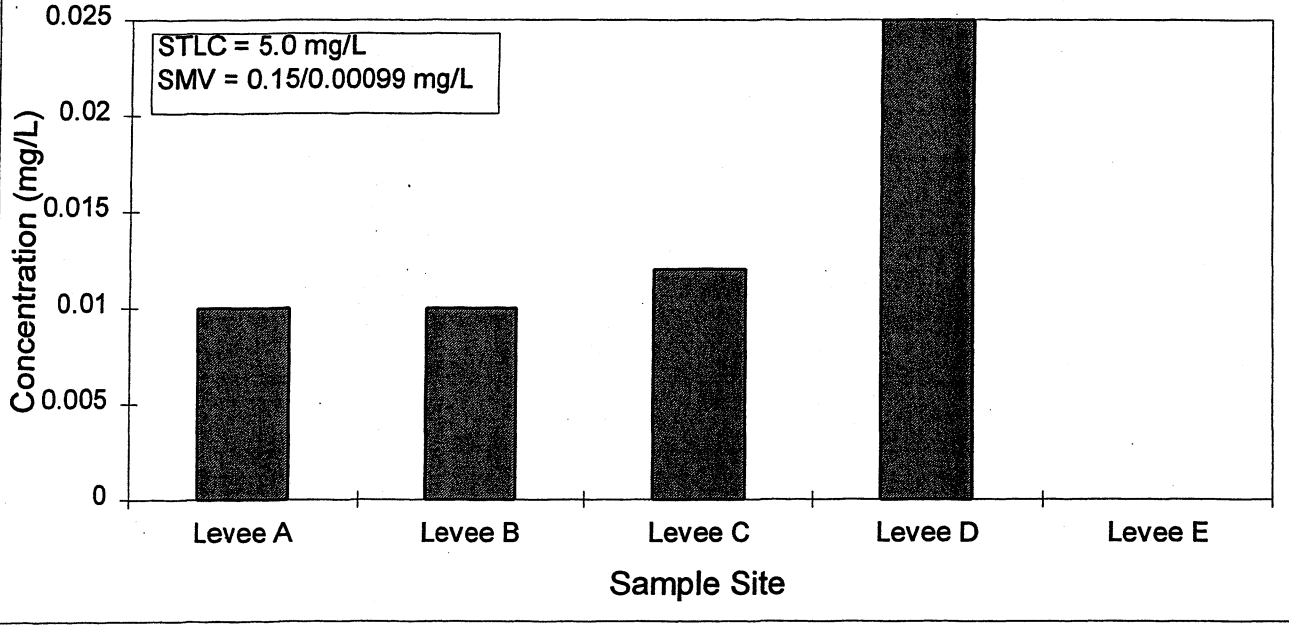


Figure 75. Soluble Nickel Concentrations in Levee Soil Samples

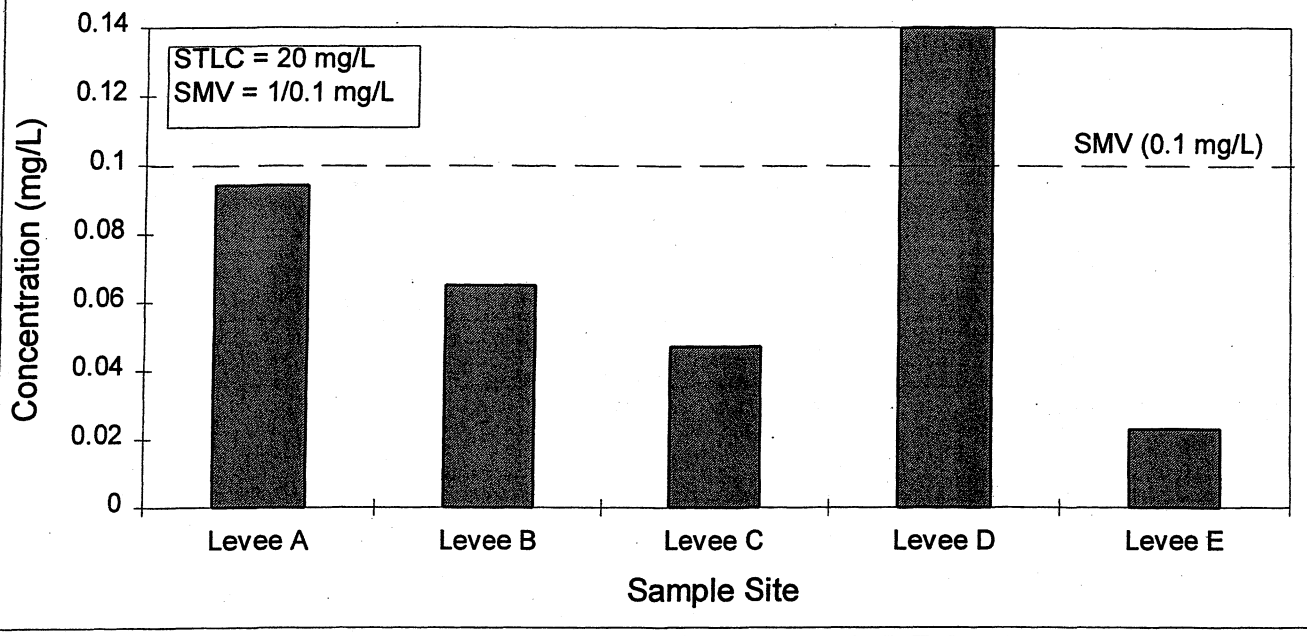


Figure 76. Soluble Selenium Concentrations in Levee Soil Samples

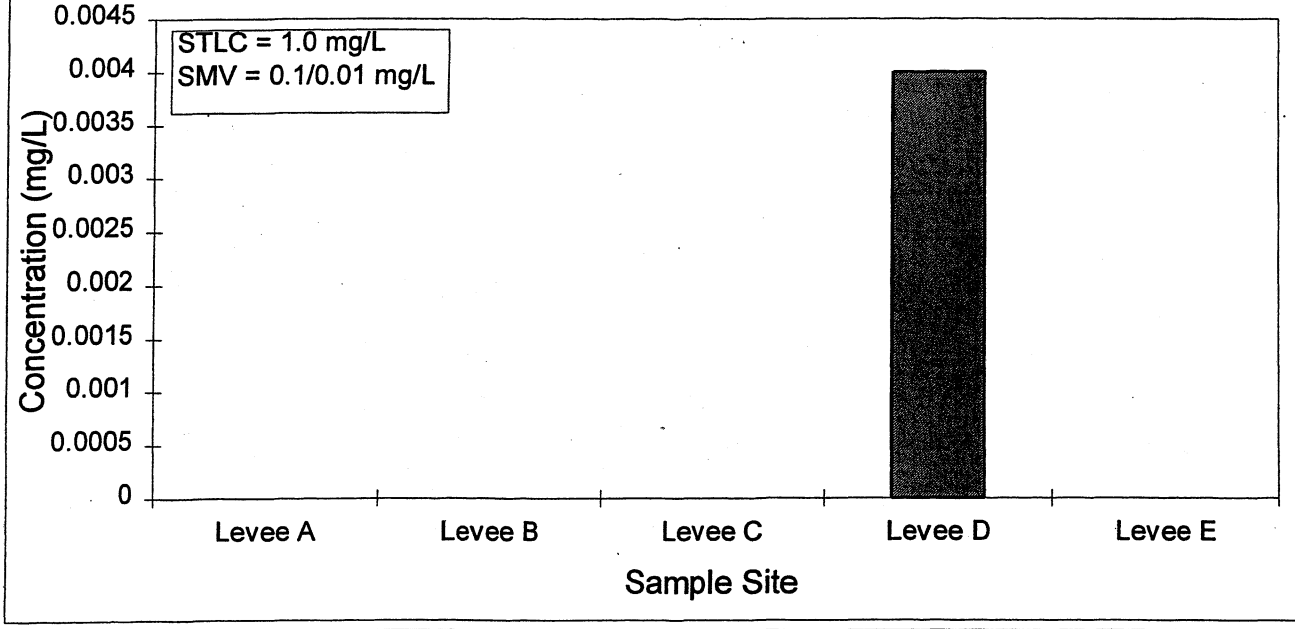


Figure 77. Soluble Zinc Concentrations in Levee Soil Samples

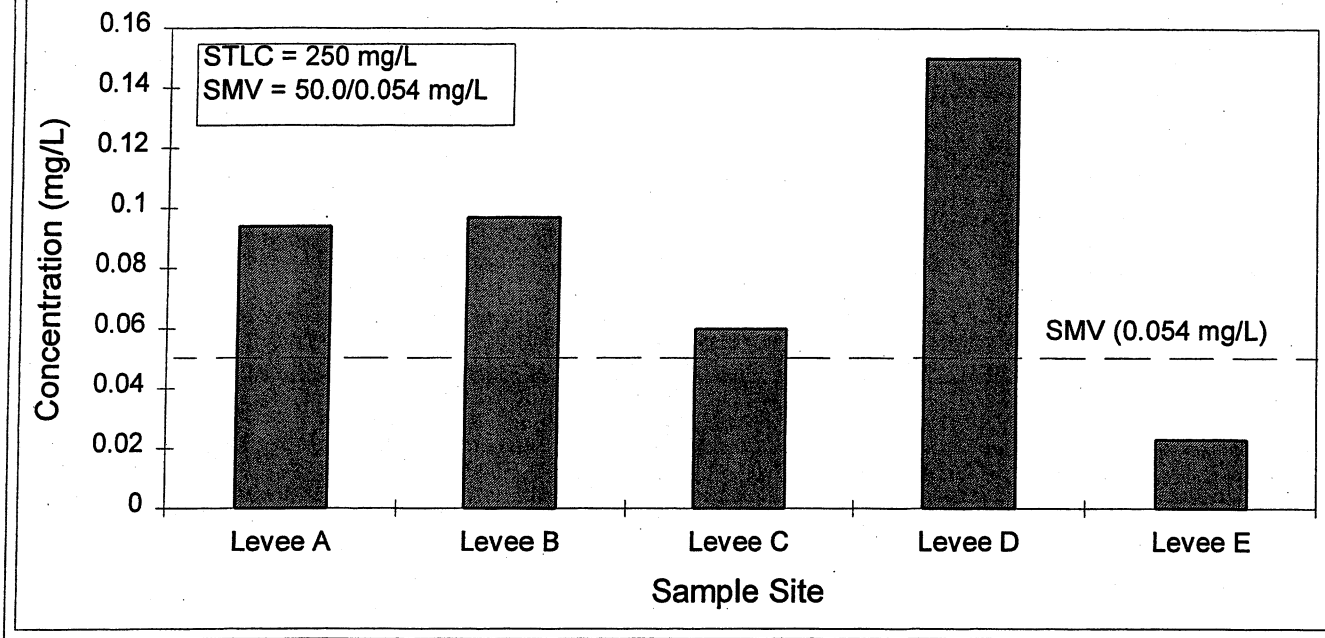


Figure 78. Soluble Total Dissolved Solids Concentrations in Levee Soil Samples

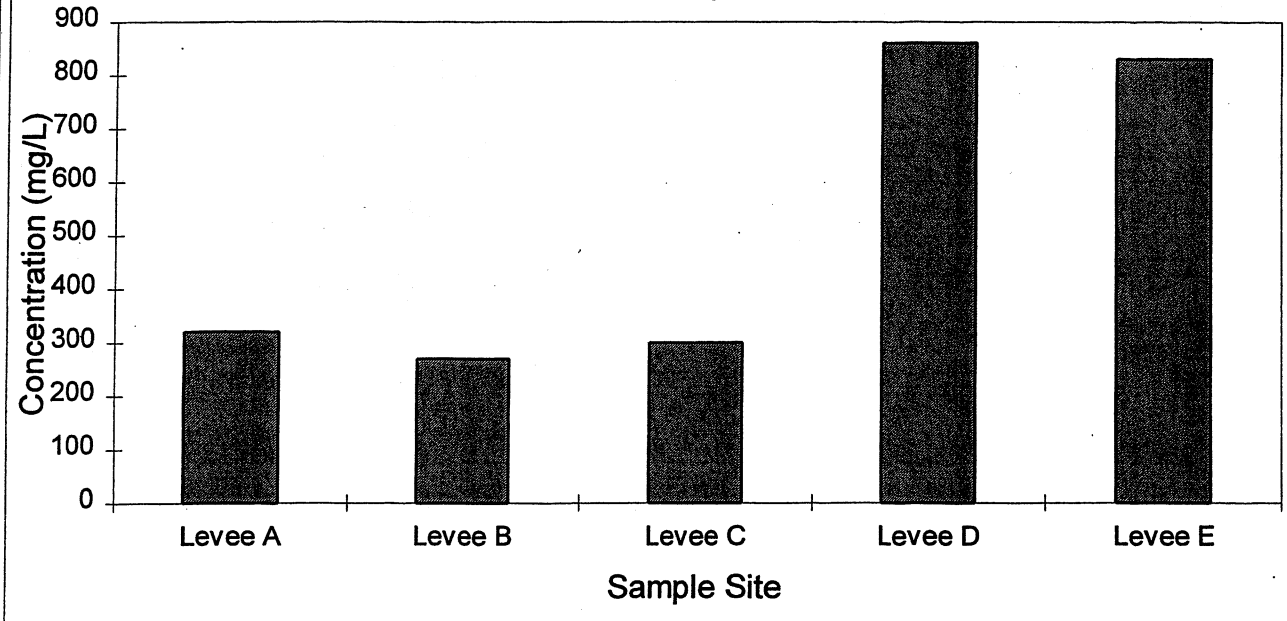


Figure 79. Soluble pH Concentrations in Levee Soil Samples

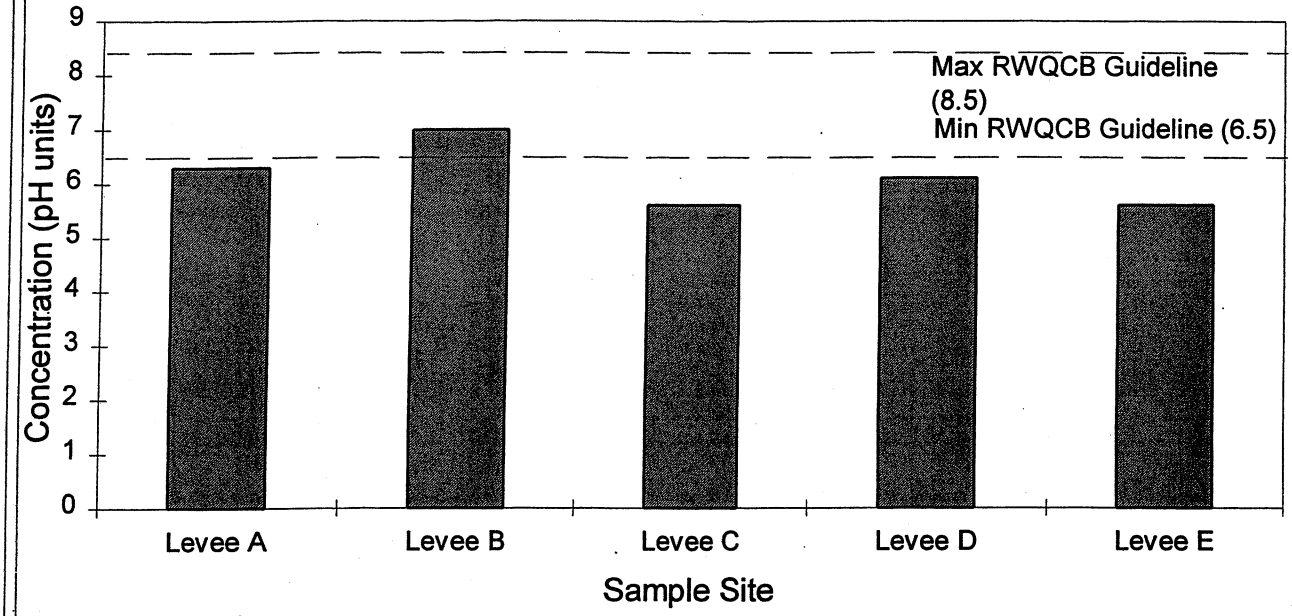
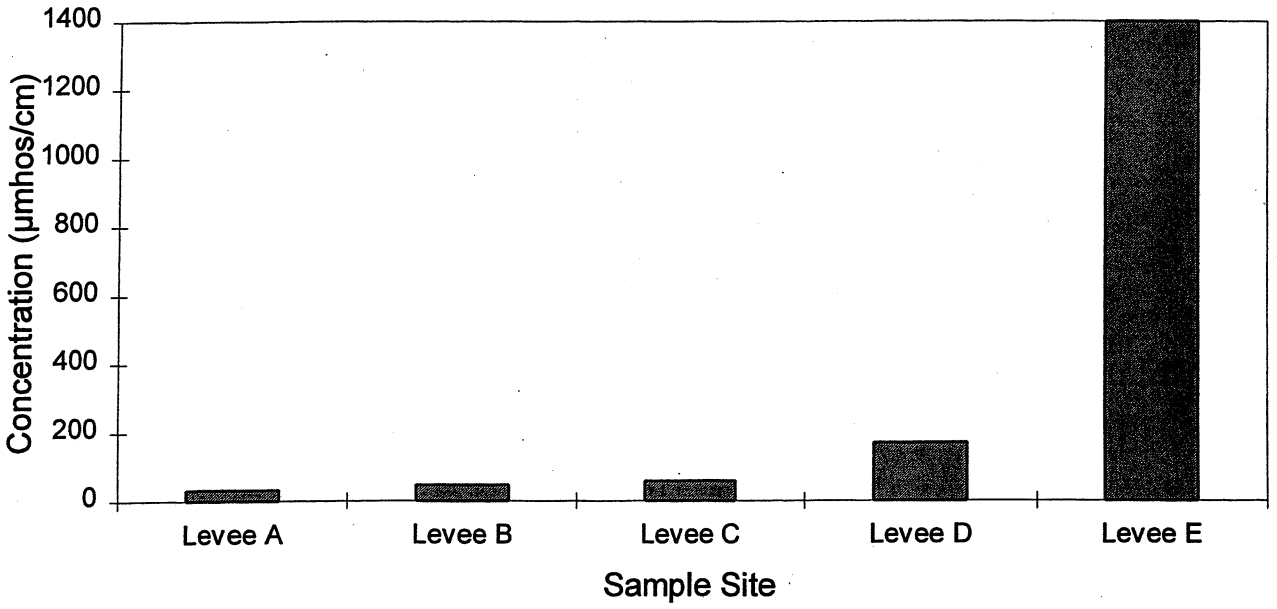


Figure 80. Soluble Specific Conductance in Levee Soil Samples



Appendix B

Tables

Table 1. Parameters for Chemical Analysis of Background Receiving and Main Drain Water Samples (*Continued*)

Constituent	EPA Test Method	DWR Reporting Limit (units in mg/L unless otherwise noted)
General Water Parameters		
Estimated Flow[1] (cfs)		
Flow Direction[1]		
Estimated Flow Velocity[1] (fps)		
Turbidity[2] (NTU's)		
Dissolved Oxygen[2]		
Temperature[2] (°F)		
pH[2] (units)		0.1 pH unit
Total Dissolved Solids	160.1	1
Suspended Solids	160.2	0.1
Specific Conductance (μmhos/cm)	120.1	1.0
Hardness (mg/L as $CaCO_3$)	130.2	N/A
Total Organic Carbon	415.1	1
Total Alkalinity	310.1	1
General Minerals		
Chloride	325.2	1
Bromide	300.0	0.010
Total Sulfide	376.1	
Soluble Sulfide	376.1	
Sulfate	375.2	1
Fluoride	340.2	0.1
Sodium	273.1	1
Magnesium	242.1	1

Table 1. Parameters for Chemical Analysis of Background Receiving and Main Drain Water Samples (*Continued*)

Constituent	EPA Test Method	DWR Reporting Limit (units in mg/L unless otherwise noted)
Potassium	258.1	0.1
Calcium	215.1	1
Boron	USGS I-2115-85	0.1
Trace Elements and Metals		
Arsenic	206.2	0.001
Cadmium	213.2	0.005
Chromium	218.2	0.005
Copper	220.2	0.005
Lead	239.2	0.005
Mercury	245.1	0.001
Nickel	249.2	0.005
Selenium	270.3	0.001
Silver	272.2	0.005
Thallium	279.2	0.002
Zinc	289.2	0.005

[1] Flow measurements will be taken at Sample Locations NV-1 and OR-1 as shown on Figure 1

[2] Parameters will be measured using field equipment

Table 2. Parameters for Chemical Analysis of Background Soil Samples
(*Continued*)

Parameter	EPA Method	BSK Reporting Limit (mg/kg)
Trace Metals		
Ag	272.2	0.05
As	206.2	0.4
Cd	213.2	0.5
Cr	218.2	1.0
Cu	220.2	0.4
Hg	245.1/245.2	0.1
Ni	249.2	0.1
Pb	239.2	0.1
Se	270.2	0.4
Tl	279.2	1
Zn	200.7	0.4
Soluble Metals (DI WET)		(mg/L)
Ag	200.7	0.005
As	206.2	0.002
Cd	200.7	0.005
Cr	200.7	0.005
Cu	200.7	0.005
Hg	245.1/245.2	0.0002
Ni	249.2	0.005
Pb	239.2	0.005
Se	270.2	0.002
Tl	279.2	5

Table 2. Parameters for Chemical Analysis of Background Soil Samples (*Continued*)

Parameter	EPA Method	BSK Reporting Limit (mg/kg)
Zn	200.7	0.003
Conventional		
Specific Conductance	120.1	1.0 μmhos/cm
Total Dissolved Solids[5]		5 mg/L
pH[5]	pH units	0.1
Total Organic Carbon	415.1	10
Oil and Grease	9071	50
Total Volatile Solids	160.1	0.01%
Acid Generation Potential	Subcontracted	
Grain Size Analysis	ASTM Method D-422	0.1% (to be analyzed by DWR's soil lab)
Moisture Content	ASTM Method D-2216	0.01%
Organic Compounds		
Phthalate Esters	8060	0.01
Polycyclic Aromatic Hydrocarbons[1]	8310	0.02
Polychlorinated Biphenyl[2]	8080	0.02-0.07
Pesticides[3]	8080	0.001-0.002
Butyltins[4]	GC FPD	0.001

1 All compounds on EPA Method 610 list.
2 Reported as Aroclor equivalents 1242, 1248, 1254, 1260 and total PCB.
3 All compounds on EPA Method 608 list.
4 Mono-, Di-, and Tributyltin.
5 Measured after DI WET extraction on all samples

Table 3. Data Quality Assessment Summary

QC Sample Type	Assessment of Results	Effect on Data Quality
Laboratory QC - Soil Samples		
Method Blanks	All method blank results were not-detectable.	No results were qualified for laboratory contamination.
Matrix Spikes	Four matrix spikes (EPA 6010 & 8100) were outside of the laboratory control limits.	No results were qualified for matrix bias. Qualifications for matrix spikes are based on judgement only.
Surrogate Spikes	All surrogate recoveries were within laboratory control limits.	No results were qualified as estimates due to surrogate recovery.
Laboratory Control Samples	Low recovery was found for three EPA Method 6010 analytes.	No sample results were qualified as estimates.
Matrix Spike Duplicates	No samples had RPDs outside of laboratory limits.	No results qualified for laboratory variability.
Laboratory Control Sample Duplicates	No RPDs were exceeded.	No results were qualified as estimates.
Sample Integrity	All samples were properly preserved and analyzed within maximum holding times.	No results were qualified as estimated due to sample integrity.
Field QC		
Field Blanks (water)	All analyses in unfiltered and filtered blanks were not-detectable.	No water samples qualified.

Table 4. Water Quality Standards

Constituent	Water Quality Objective (μg/L)	RWQCB Approved EPA Method	Drinking Water Primary MCL (mg/L)
Trace Metals and Inorganics			
Aluminum			1
Antimony			0.006
Arsenic	190	206.3	0.05
Barium			1
Beryllium			0.004
Cadmium	0.55	213.2	0.005
Chloride			
Chromium	11	218.2	0.05
Copper	5.4	220.2	1.3
Cyanide	5.2	335.2 or 335.3	0.2
Fluoride			1.4-2.4[a]
Iron			
Lead	0.99	239.2	0.015
Manganese			0.05[b]
Mercury			0.002
Nickel	73	200.7	0.1
Nitrate			10
Nitrite			1
Total Nitrate and Nitrite			10
pH			6.5-8.5[b]
Selenium	5.0	270.3	0.05
Silver			0.1[b]

Table 4. Water Quality Standards, (*Continued*)

Constituent	Water Quality Objective (μg/L)	RWQCB Approved EPA Method	Drinking Water Primary MCL (mg/L)
Sulfate			250[b]
TBT	0.02		
Thallium			0.002
Total Dissolved Solids (TDS)			500[b]
Turbidity			0.5-1 NTU[c]
Zinc	49	200.7	5.0[b]
Organics			
Alachlor			0.002
Aldrin			
Atrazine			0.003
BHC - alpha			
BHC - beta			
BHC - delta			
BHC - gamma	0.08**		0.0002
Captan			
Chlordane	0.0043**		0.0001
Chlorothalonil			
Chlorpropham			
Chlorpyrifos			
DCPA			
4,4 DDD	0.001**		
4,4 DDE	0.001**		
4,4 DDT	0.001**	608	

Table 4. Water Quality Standards, (*Continued*)

Constituent	Water Quality Objective (μg/L)	RWQCB Approved EPA Method	Drinking Water Primary MCL (mg/L)
Dichloran			
Dicofol			
Dieldrin	0.0019	608	
Diuron			
Endosulfan I	0.056	608	
Endosulfan II	0.056	608	
Endosulfan Sulfate	0.056	608	
Endrin	0.0023	608	0.002
Endrin Aldehyde			
Heptachlor	0.0038	608	0.00001
Heptachlor Epoxide			0.00001
Methoxychlor			0.04
PCB's (total)	0.014**	608	0.0005
PCNB			
Simazine			0.004
Thiobencarb			0.07
Toxaphene	0.0002	608	0.003

* - Submit Test Method for Approval
** - Daily Average
MFL - Million Fibers per Liter
[a] - Depends on annual average of maximum daily air temperatures
[b] - Secondary MCL
[c] - 1 NTU (Nephelometric Turbidity Unit); monthly average, 5 NTU two-day consecutive average

Table 5. Sediment Standards and Criteria

Contaminants	California Code of Regulations,		SFRWQCB Criteria	CVRWQCB General Order Waste Discharge Requirements		
	TTLC (wet wt.)	STLC (mg/L)	(mg/kg dry weight)	Dryside Disposal TMV (mg/kg)*	No discharge to the river SMV (mg/L)	With decant water discharge to the river SMV (mg/L)
Trace Metals and Inorganics						
Arsenic	500	5.0	33	33	0.5	0.05
Cadmium	100	1.0	5.0	5	0.005	0.0005
Chromium	2500	5	220	80	0.5	0.016
Copper	2500	25	90	70	10	0.0054
Lead	1000	5.0	50	35	0.15	0.00099
Mercury	20	0.2	0.35	0.35	0.02	0.002
Nickel	2000	20	140	30	1	0.1
Selenium	100	1.0	0.7	0.7	0.1	0.01
Silver	500	5	1.0	1	0.5	0.00084
Thallium				5	0.02	0.002
Zinc	5000	250	160	120	50.0	0.054
Organics						
Aldrin	1.4	0.14				
BHC - alpha						
BHC - beta						
BHC - gamma						
BHC - delta						
Dieldrin	8.0	0.08		1.1		0.0000019

Table 5. Sediment Standards and Criteria, (*Continued*)

Contaminants	California Code of Regulations,		SFRWQCB Criteria	CVRWQCB General Order Waste Discharge Requirements		
	TTLC (wet wt.)	STLC (mg/L)	(mg/kg dry weight)	Dryside Disposal TMV (mg/kg)*	No discharge to the river SMV (mg/L)	With decant water discharge to the river SMV (mg/L)
DDE	1.0	0.1				
DDD	1.0	0.1				
DDT	1.0	0.1	0.003	2.4		0.000001
Tributyltin				0.2		0.000026
Endosulfan Sulfate						
Endosulfan I						
Endosulfan II						
Endrin	0.2	0.02				
Endrin Aldehyde						
Methoxychlor	100	10				
PCB (total)	50	5.0	0.05			
PCB - 1016						
PCB - 1248						
PCB - 1254						
PCB - 1260						
Toxaphene	5	0.5				
Total PAH's			4			

* Total Maximum dry weight normalized as Organic Carbon (OC) (mg/kg dry weight divided by dissolved organic carbon).

TTLC: California Department of Toxic Substances and Control - Total Threshold Limit Concentrations. The TTLC's are standards set by the California Code of Regulations, Title 22, Chapter 11. The TTLC represents the total concentration of a constituent that may be present before a waste is classified as a hazardous waste.

STLC: California Department of Toxic Substances and Control - Soluble Threshold Limit Concentrations. As with the TTLC's, the STLC's are a set of standards set by the California Code of Regulations, Title 22, Chapter 11. The STLC represents the amount of a constituent that may be present in the waste extract, as determined using the Waste Extraction Test (CCR, Title 22, Division 4.5, Chapter 11, Appendix II) before a waste is classified as a hazardous waste.

San Francisco Bay RWQCB Criteria: San Francisco Bay Regional Water Quality Control Board - Disposal Option Sediment Screening Criteria for Levee Restoration. These criteria provide sediment screening criteria for the beneficial reuse of dredged material such as levee restoration. The criteria are set for the protection of biological organisms.

CVRWQCB General Order Waste Discharge Requirements: Central Valley Regional Water Quality Control Board- Draft General Order Waste Discharge Requirements for Dredging Activities Associated with Maintenance and New Construction Projects in the Delta. These draft criteria set maximum dredge sediment values for several constituents. Sediments with constituent values below the criteria are considered inert.

Table 6. Soil Classification for Island Samples

Sample Site	Sample Number	Group Name
A	A1	Silty Sand
	A2	Fine-grained
	A3	Silty Sand
B	B1	Silty Sand
	B2	Silty Sand
	B3	Silty Sand
C	C1	Fine-grained
	C2	Fine-grained
	C3	Silty Sand
D	D1	Fine-grained
	D2	Fine-grained
	D3	Silty Sand
E	E1	Silty Sand
	E2	Fine-grained
	E3	Fine-grained
F	F1	Fine-grained
	F2	Fine-grained
	F3	Fine-grained
G	G1	Silty Sand
	G2	Silty Sand
	G3	Silty Sand

Table 7. Soil Classification for Levee Samples

Sample Site	Sample Number	Group Name
L-A	L-A1	Silty Sand
	L-A2	Fine-grained
	L-A3	Silty Sand
L-B	L-B1	Silty Sand
	L-B2	Silty Sand
	L-B3	Silty Sand
L-C	L-C1	Silty Sand
	L-C2	Fine-grained
	L-C3	Silty Sand
L-D	L-D1	Fine-grained
	L-D2	Silty Sand
	L-D3	Fine-grained
L-E	L-E1	Fine-grained
	L-E2	Silty Sand

Appendix C

Twitchell Island Water Quality Data

Twitchell Island Water Data

1/18/96

DWR Site	Date	Analyte Name	Result	Units	Detection Limit
Twitchell Ag Drain	8/7/95	Alkalinity	69	mg/L	1
Twitchell Siphon # 17	8/7/95	Alkalinity	41	mg/L	1
Twitchell Siphon # 18	8/7/95	Alkalinity	42	mg/L	1
Twitchell Ag Drain	8/7/95	Arsenic	0.010	mg/L	0.001
Twitchell Siphon # 17	8/7/95	Arsenic	0.001	mg/L	0.001
Twitchell Siphon # 18	8/7/95	Arsenic	0.001	mg/L	0.001
Twitchell Ag Drain	8/7/95	Boron	0.2	mg/L	0.1
Twitchell Siphon # 17	8/7/95	Boron	0	mg/L	0.1
Twitchell Siphon # 18	8/7/95	Boron	0	mg/L	0.1
Twitchell Ag Drain	8/7/95	Cadmium	0	mg/L	0.005
Twitchell Siphon # 17	8/7/95	Cadmium	0	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Cadmium	0	mg/L	0.005
Twitchell Ag Drain	8/7/95	Calcium	24	mg/L	1
Twitchell Siphon # 17	8/7/95	Calcium	9	mg/L	1
Twitchell Siphon # 18	8/7/95	Calcium	9	mg/L	1
Twitchell Ag Drain	8/7/95	Chloride	84	mg/L	1
Twitchell Siphon # 17	8/7/95	Chloride	5	mg/L	1
Twitchell Siphon # 18	8/7/95	Chloride	3	mg/L	1
Twitchell Ag Drain	8/7/95	Chromium	0	mg/L	0.005
Twitchell Siphon # 17	8/7/95	Chromium	0	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Chromium	0	mg/L	0.005
Twitchell Ag Drain	8/7/95	Copper	0	mg/L	0.005
Twitchell Siphon # 17	8/7/95	Copper	0	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Copper	0	mg/L	0.005
Twitchell Ag Drain	8/7/95	Dissolved Oxygen	4.6	mg/L	0.1
Twitchell Siphon # 17	8/7/95	Dissolved Oxygen	7.8	mg/L	0.1
Twitchell Siphon # 18	8/7/95	Dissolved Oxygen	7.3	mg/L	0.1
Twitchell Ag Drain	8/7/95	Electrical Conductivity	535	µmhos/cm	1
Twitchell Siphon # 17	8/7/95	Electrical Conductivity	123	µmhos/cm	1
Twitchell Siphon # 18	8/7/95	Electrical Conductivity	126	µmhos/cm	1
Twitchell Ag Drain	8/7/95	Fluoride	0.1	mg/L	0.1
Twitchell Siphon # 17	8/7/95	Fluoride	0	mg/L	0.1
Twitchell Siphon # 18	8/7/95	Fluoride	0	mg/L	0.1
Twitchell Siphon # 17	8/7/95	Hardness	43	mg/L	1
Twitchell Siphon # 18	8/7/95	Hardness	43	mg/L	1
Twitchell Ag Drain	8/7/95	Hardness	122	mg/L	1
Twitchell Ag Drain	8/7/95	Lead	0	mg/L	0.005
Twitchell Siphon # 17	8/7/95	Lead	0	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Lead	0	mg/L	0.005
Twitchell Ag Drain	8/7/95	Magnesium	15	mg/L	1
Twitchell Siphon # 17	8/7/95	Magnesium	5	mg/L	1
Twitchell Siphon # 18	8/7/95	Magnesium	5	mg/L	1
Twitchell Ag Drain	8/7/95	Mercury	0	mg/L	0.001
Twitchell Siphon # 17	8/7/95	Mercury	0	mg/L	0.001
Twitchell Siphon # 18	8/7/95	Mercury	0	mg/L	0.001
Twitchell Ag Drain	8/7/95	Nickel	0.006	mg/L	0.005

Twitchell Island Water Data

1/18/96

DWR Site	Date	Analyte Name	Result	Units	Detection Limit
Twitchell Siphon # 17	8/7/95	Nickel	0	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Nickel	0	mg/L	0.005
Twitchell Ag Drain	8/7/95	Nitrate	0.9	mg/L	0.1
Twitchell Siphon # 17	8/7/95	Nitrate	0.8	mg/L	0.1
Twitchell Siphon # 18	8/7/95	Nitrate	0.8	mg/L	0.1
Twitchell Ag Drain	8/7/95	pH	6.9	pH units	0.1
Twitchell Siphon # 17	8/7/95	pH	6.8	pH units	0.1
Twitchell Siphon # 18	8/7/95	pH	6.9	pH units	0.1
Twitchell Ag Drain	8/7/95	Potassium	1.9	mg/L	0.1
Twitchell Siphon # 17	8/7/95	Potassium	1.1	mg/L	0.1
Twitchell Siphon # 18	8/7/95	Potassium	1.5	mg/L	0.1
Twitchell Ag Drain	8/7/95	Selenium	0	mg/L	0.001
Twitchell Siphon # 17	8/7/95	Selenium	0	mg/L	0.001
Twitchell Siphon # 18	8/7/95	Selenium	0	mg/L	0.001
Twitchell Ag Drain	8/7/95	Silver	0	mg/L	0.005
Twitchell Siphon # 17	8/7/95	Silver	0	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Silver	0	mg/L	0.005
Twitchell Ag Drain	8/7/95	Sodium	45	mg/L	1
Twitchell Siphon # 17	8/7/95	Sodium	9	mg/L	1
Twitchell Siphon # 18	8/7/95	Sodium	8	mg/L	1
Twitchell Siphon # 17	8/7/95	Sulfate	7.1	mg/L	1
Twitchell Siphon # 18	8/7/95	Sulfate	8	mg/L	1
Twitchell Ag Drain	8/7/95	Sulfate	46	mg/L	1
Twitchell Ag Drain	8/7/95	Total Dissolved Solids	25	mg/L	1
Twitchell Siphon # 17	8/7/95	Total Dissolved Solids	18	mg/L	1
Twitchell Siphon # 18	8/7/95	Total Dissolved Solids	8	mg/L	1
Twitchell Ag Drain	8/7/95	Temperature	22.4	°C	0.1
Twitchell Siphon # 17	8/7/95	Temperature	24.4	°C	0.1
Twitchell Siphon # 18	8/7/95	Temperature	25.4	°C	0.1
Twitchell Ag Drain	8/7/95	Thallium	0	mg/L	0.002
Twitchell Siphon # 17	8/7/95	Thallium	0	mg/L	0.002
Twitchell Siphon # 18	8/7/95	Thallium	0	mg/L	0.002
Twitchell Ag Drain	8/7/95	Time	12:39		
Twitchell Siphon # 17	8/7/95	Time	13:55		
Twitchell Siphon # 18	8/7/95	Time	12:25		
Twitchell Ag Drain	8/7/95	Turbidity	52		
Twitchell Siphon # 17	8/7/95	Turbidity	35.2		
Twitchell Siphon # 18	8/7/95	Turbidity	13		
Twitchell Ag Drain	8/7/95	Zinc	0.116	mg/L	0.005
Twitchell Siphon # 17	8/7/95	Zinc	0.043	mg/L	0.005
Twitchell Siphon # 18	8/7/95	Zinc	0.017	mg/L	0.005

Appendix D

Twitchell Island Soil Quality Data

Twitchell Island Soil Data

1/18/96

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
			0			
A	C52134,35,36	Moisture	4.7	4.932	%	0.01
B	C52137,38,39	Moisture	1.8	1.833	%	0.01
C	C52140,41,42	Moisture	17.8	21.655	%	0.01
D	C52143,44,45	Moisture	12.2	13.895	%	0.01
E	C52146,47,48	Moisture	6.4	6.838	%	0.01
F	C52149,50,51	Moisture	9.6	10.619	%	0.01
G	C52152,53,54	Moisture	9.3	10.254	%	0.01
L-A	C52155,56,57	Moisture	3.2	3.306	%	0.01
L-B	C52158,59,60	Moisture	1.3	1.317	%	0.01
L-C	C52161,62,63	Moisture	3	3.093	%	0.01
L-D	C52164,65,66	Moisture	5	5.263	%	0.01
L-E	C52167,68	Moisture	5.2	5.485	%	0.01
A	C52134,35,36	Acid Potential	0.15	0.157	CaCO3 tons/1000	
B	C52137,38,39	Acid Potential	0.73	0.743	CaCO3 tons/1000	
C	C52140,41,42	Acid Potential	0.07	0.085	CaCO3 tons/1000	
D	C52143,44,45	Acid Potential	0.03	0.034	CaCO3 tons/1000	
E	C52146,47,48	Acid Potential	0.14	0.150	CaCO3 tons/1000	
F	C52149,50,51	Acid Potential	0.9	0.996	CaCO3 tons/1000	
G	C52152,53,54	Acid Potential	0.58	0.639	CaCO3 tons/1000	
L-A	C52155,56,57	Acid Potential	0.33	0.341	CaCO3 tons/1000	
L-B	C52158,59,60	Acid Potential	0.33	0.334	CaCO3 tons/1000	
L-C	C52161,62,63	Acid Potential	0.11	0.113	CaCO3 tons/1000	
L-D	C52164,65,66	Acid Potential	0.17	0.179	CaCO3 tons/1000	
L-E	C52167,68	Acid Potential	0.37	0.390	CaCO3 tons/1000	
A	C52134,35,36	Neutralization Potential	5.17	5.425	CaCO3 tons/1000	
B	C52137,38,39	Neutralization Potential	7.64	7.780	CaCO3 tons/1000	
C	C52140,41,42	Neutralization Potential	4.19	5.097	CaCO3 tons/1000	
D	C52143,44,45	Neutralization Potential	4.2	4.784	CaCO3 tons/1000	
E	C52146,47,48	Neutralization Potential	6.65	7.105	CaCO3 tons/1000	
F	C52149,50,51	Neutralization Potential	9.3	10.288	CaCO3 tons/1000	

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
G	C52152,53,54	Neutralization Potential	8.37	9.228	CaCO3 tons/1000	
L-A	C52155,56,57	Neutralization Potential	8.36	8.636	CaCO3 tons/1000	
L-B	C52158,59,60	Neutralization Potential	5.42	5.491	CaCO3 tons/1000	
L-C	C52161,62,63	Neutralization Potential	4.31	4.443	CaCO3 tons/1000	
L-D	C52164,65,66	Neutralization Potential	7.39	7.779	CaCO3 tons/1000	
L-E	C52167,68	Neutralization Potential	8.38	8.840	CaCO3 tons/1000	
A	C52134,35,36	Dibutyltin	0	0.000	ug/kg	
B	C52137,38,39	Dibutyltin	0	0.000	ug/kg	
C	C52140,41,42	Dibutyltin	0	0.000	ug/kg	
D	C52143,44,45	Dibutyltin	0	0.000	ug/kg	
E	C52146,47,48	Dibutyltin	0	0.000	ug/kg	
F	C52149,50,51	Dibutyltin	0	0.000	ug/kg	
G	C52152,53,54	Dibutyltin	0	0.000	ug/kg	
L-A	C52155,56,57	Dibutyltin	0	0.000	ug/kg	
L-C	C52161,62,63	Dibutyltin	0	0.000	ug/kg	
L-D	C52164,65,66	Dibutyltin	0	0.000	ug/kg	
L-E	C52167,68	Dibutyltin	0	0.000	ug/kg	
Levee 456	C52158,59,60	Dibutyltin	0	0.000	ug/kg	
A	C52134,35,36	Monobutyltin	1	1.049	ug/kg	
B	C52137,38,39	Monobutyltin	0	0.000	ug/kg	
C	C52140,41,42	Monobutyltin	0	0.000	ug/kg	
D	C52143,44,45	Monobutyltin	0	0.000	ug/kg	
E	C52146,47,48	Monobutyltin	0	0.000	ug/kg	
F	C52149,50,51	Monobutyltin	2	2.212	ug/kg	
G	C52152,53,54	Monobutyltin	6	6.615	ug/kg	
L-A	C52155,56,57	Monobutyltin	0	0.000	ug/kg	
L-C	C52161,62,64	Monobutyltin	0		ug/kg	
L-D	C52164,65,66	Monobutyltin	0	0.000	ug/kg	
L-E	C52167,68	Monobutyltin	0	0.000	ug/kg	
Levee 456	C52158,59,60	Monobutyltin	0	0.000	ug/kg	
A	C52134,35,36	Tetrabutyltin	0	0.000	ug/kg	
B	C52137,38,39	Tetrabutyltin	0	0.000	ug/kg	
C	C52140,41,42	Tetrabutyltin	0	0.000	ug/kg	
D	C52143,44,45	Tetrabutyltin	0	0.000	ug/kg	

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
E	C52146,47,48	Tetrabutyltin	0	0.000	ug/kg	
F	C52149,50,51	Tetrabutyltin	0	0.000	ug/kg	
G	C52152,53,54	Tetrabutyltin	0	0.000	ug/kg	
L-A	C52155,56,57	Tetrabutyltin	0	0.000	ug/kg	
L-C	C52161,62,63	Tetrabutyltin	0	0.000	ug/kg	
L-D	C52164,65,66	Tetrabutyltin	0	0.000	ug/kg	
L-E	C52167,68	Tetrabutyltin	3	3.165	ug/kg	
Levee 456	C52158,59,60	Tetrabutyltin	0	0.000	ug/kg	
A	C52134,35,36	Tributyltin	0	0.000	ug/kg	
B	C52137,38,39	Tributyltin	0	0.000	ug/kg	
C	C52140,41,42	Tributyltin	0	0.000	ug/kg	
D	C52143,44,45	Tributyltin	0	0.000	ug/kg	
E	C52146,47,48	Tributyltin	0	0.000	ug/kg	
F	C52149,50,51	Tributyltin	0	0.000	ug/kg	
G	C52152,53,54	Tributyltin	2	2.205	ug/kg	
L-A	C52155,56,57	Tributyltin	0	0.000	ug/kg	
L-C	C52161,62,63	Tributyltin	0	0.000	ug/kg	
L-D	C52164,65,66	Tributyltin	0	0.000	ug/kg	
L-E	C52167,68	Tributyltin	0	0.000	ug/kg	
Levee 456	C52158,59,60	Tributyltin	0	0.000	ug/kg	
A	C52134,35,36	Specific Conductivity (EC)	190	199.370	µmhos/cm	1.0
B	C52137,38,39	Specific Conductivity (EC)	160	162.933	µmhos/cm	1.0
C	C52140,41,42	Specific Conductivity (EC)	200	243.309	µmhos/cm	1.0
D	C52143,44,45	Specific Conductivity (EC)	220	250.569	µmhos/cm	1.0
E	C52146,47,48	Specific Conductivity (EC)	2400	2564.103	µmhos/cm	1.0
F	C52149,50,51	Specific Conductivity (EC)	93	102.876	µmhos/cm	1.0
G	C52152,53,54	Specific Conductivity (EC)	810	893.054	µmhos/cm	1.0
L-A	C52155,56,57	Specific Conductivity (EC)	32	33.058	µmhos/cm	1.0
L-B	C52158,59,60	Specific Conductivity (EC)	47	47.619	µmhos/cm	1.0
L-C	C52161,62,63	Specific Conductivity (EC)	58	59.794	µmhos/cm	1.0
L-D	C52164,65,66	Specific Conductivity (EC)	170	178.947	µmhos/cm	1.0
L-E	C52167,68	Specific Conductivity (EC)	1400	1476.793	µmhos/cm	1.0
A	C52134,35,36	Specific Conductivity (EC)	2500	2623.295	µmhos/cm	
B	C52137,38,39	Specific Conductivity (EC)	2200	2240.326	µmhos/cm	

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
C	C52140,41,42	Specific Conductivity (EC)	2300	2798.054	µmhos/cm	
D	C52143,44,45	Specific Conductivity (EC)	2700	3075.171	µmhos/cm	
E	C52146,47,48	Specific Conductivity (EC)	34000	36324.786	µmhos/cm	
F	C52149,50,51	Specific Conductivity (EC)	2600	2876.106	µmhos/cm	
G	C52152,53,54	Specific Conductivity (EC)	3200	3528.115	µmhos/cm	
L-A	C52155,56,57	Specific Conductivity (EC)	370	382.231	µmhos/cm	
L-B	C52158,59,60	Specific Conductivity (EC)	320	324.215	µmhos/cm	
L-C	C52161,62,63	Specific Conductivity (EC)	630	649.485	µmhos/cm	
L-D	C52164,65,66	Specific Conductivity (EC)	2300	2421.053	µmhos/cm	
L-E	C52167,68	Specific Conductivity (EC)	23000	24261.603	µmhos/cm	
A	C52134,35,36	Selenium (Se)	1.4	1.469	mg/Kg	0.4
B	C52137,38,39	Selenium (Se)	0	0.000	mg/Kg	0.4
C	C52140,41,42	Selenium (Se)	2.4	2.920	mg/Kg	0.4
D	C52143,44,45	Selenium (Se)	1.9	2.164	mg/Kg	0.4
E	C52146,47,48	Selenium (Se)	0	0.000	mg/Kg	0.4
F	C52149,50,51	Selenium (Se)	2.4	2.655	mg/Kg	0.4
G	C52152,53,54	Selenium (Se)	0.5	0.551	mg/Kg	0.4
L-A	C52155,56,57	Selenium (Se)	1.1	1.136	mg/Kg	0.4
L-B	C52158,59,60	Selenium (Se)	0	0.000	mg/Kg	0.4
L-C	C52161,62,63	Selenium (Se)	1.1	1.134	mg/Kg	0.4
L-D	C52164,65,66	Selenium (Se)	1.2	1.263	mg/Kg	0.4
L-E	C52167,68	Selenium (Se)	1.4	1.477	mg/Kg	0.4
A	C52134,35,36	Arsenic (As)	0.006	0.006	mg/Kg	0.002
B	C52137,38,39	Arsenic (As)	0.005	0.005	mg/Kg	0.002
C	C52140,41,42	Arsenic (As)	0.009	0.011	mg/Kg	0.002
D	C52143,44,45	Arsenic (As)	0.006	0.007	mg/Kg	0.002
E	C52146,47,48	Arsenic (As)	0.003	0.003	mg/Kg	0.002
F	C52149,50,51	Arsenic (As)	0.011	0.012	mg/Kg	0.002
G	C52152,53,54	Arsenic (As)	0.024	0.026	mg/Kg	0.002
L-A	C52155,56,57	Arsenic (As)	0.01	0.010	mg/Kg	0.002
L-B	C52158,59,60	Arsenic (As)	0.008	0.008	mg/Kg	0.002
L-C	C52161,62,63	Arsenic (As)	0.01	0.010	mg/Kg	0.002
L-D	C52164,65,66	Arsenic (As)	0.019	0.020	mg/Kg	0.002
L-E	C52167,68	Arsenic (As)	0	0.000	mg/Kg	0.002

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
A	C52134,35,36	Cadmium (Cd)	0	0.000	mg/Kg	0.005
B	C52137,38,39	Cadmium (Cd)	0	0.000	mg/Kg	0.005
C	C52140,41,42	Cadmium (Cd)	0	0.000	mg/Kg	0.005
D	C52143,44,45	Cadmium (Cd)	0	0.000	mg/Kg	0.005
E	C52146,47,48	Cadmium (Cd)	0	0.000	mg/Kg	0.005
F	C52149,50,51	Cadmium (Cd)	0	0.000	mg/Kg	0.005
G	C52152,53,54	Cadmium (Cd)	0	0.000	mg/Kg	0.005
L-A	C52155,56,57	Cadmium (Cd)	0	0.000	mg/Kg	0.005
L-B	C52158,59,60	Cadmium (Cd)	0	0.000	mg/Kg	0.005
L-C	C52161,62,63	Cadmium (Cd)	0	0.000	mg/Kg	0.005
L-D	C52164,65,66	Cadmium (Cd)	0	0.000	mg/Kg	0.005
L-E	C52167,68	Cadmium (Cd)	0	0.000	mg/Kg	0.005
A	C52134,35,36	Chromium (Cr)	0.005	0.005	mg/Kg	0.005
B	C52137,38,39	Chromium (Cr)	0.006	0.006	mg/Kg	0.005
C	C52140,41,42	Chromium (Cr)	0.008	0.010	mg/Kg	0.005
D	C52143,44,45	Chromium (Cr)	0.008	0.009	mg/Kg	0.005
E	C52146,47,48	Chromium (Cr)	0	0.000	mg/Kg	0.005
F	C52149,50,51	Chromium (Cr)	0.02	0.022	mg/Kg	0.005
G	C52152,53,54	Chromium (Cr)	0.036	0.040	mg/Kg	0.005
L-A	C52155,56,57	Chromium (Cr)	0.01	0.010	mg/Kg	0.005
L-B	C52158,59,60	Chromium (Cr)	0.018	0.018	mg/Kg	0.005
L-C	C52161,62,63	Chromium (Cr)	0.024	0.025	mg/Kg	0.005
L-D	C52164,65,66	Chromium (Cr)	0.037	0.039	mg/Kg	0.005
L-E	C52167,68	Chromium (Cr)	0	0.000	mg/Kg	0.005
A	C52134,35,36	Copper (Cu)	0.012	0.013	mg/Kg	0.005
B	C52137,38,39	Copper (Cu)	0.008	0.008	mg/Kg	0.005
C	C52140,41,42	Copper (Cu)	0.016	0.019	mg/Kg	0.005
D	C52143,44,45	Copper (Cu)	0.019	0.022	mg/Kg	0.005
E	C52146,47,48	Copper (Cu)	0.012	0.013	mg/Kg	0.005
F	C52149,50,51	Copper (Cu)	0.097	0.107	mg/Kg	0.005
G	C52152,53,54	Copper (Cu)	0.063	0.069	mg/Kg	0.005
L-A	C52155,56,57	Copper (Cu)	0.02	0.021	mg/Kg	0.005
L-B	C52158,59,60	Copper (Cu)	0.019	0.019	mg/Kg	0.005
L-C	C52161,62,63	Copper (Cu)	0.02	0.021	mg/Kg	0.005

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-D	C52164,65,66	Copper (Cu)	0.058	0.061	mg/Kg	0.005
L-E	C52167,68	Copper (Cu)	0.009	0.009	mg/Kg	0.005
A	C52134,35,36	Lead (Pb)	0.007	0.007	mg/Kg	0.005
B	C52137,38,39	Lead (Pb)	0.006	0.006	mg/Kg	0.005
C	C52140,41,42	Lead (Pb)	0.011	0.013	mg/Kg	0.005
D	C52143,44,45	Lead (Pb)	0.009	0.010	mg/Kg	0.005
E	C52146,47,48	Lead (Pb)	0	0.000	mg/Kg	0.005
F	C52149,50,51	Lead (Pb)	0.017	0.019	mg/Kg	0.005
G	C52152,53,54	Lead (Pb)	0.048	0.053	mg/Kg	0.005
L-A	C52155,56,57	Lead (Pb)	0.01	0.010	mg/Kg	0.005
L-B	C52158,59,60	Lead (Pb)	0.01	0.010	mg/Kg	0.005
L-C	C52161,62,63	Lead (Pb)	0.012	0.012	mg/Kg	0.005
L-D	C52164,65,66	Lead (Pb)	0.025	0.026	mg/Kg	0.005
L-E	C52167,68	Lead (Pb)	0	0.000	mg/Kg	0.005
A	C52134,35,36	Nickel (Ni)	0.046	0.048	mg/Kg	0.005
B	C52137,38,39	Nickel (Ni)	0.016	0.016	mg/Kg	0.005
C	C52140,41,42	Nickel (Ni)	0.044	0.054	mg/Kg	0.005
D	C52143,44,45	Nickel (Ni)	0.06	0.068	mg/Kg	0.005
E	C52146,47,48	Nickel (Ni)	0.039	0.042	mg/Kg	0.005
F	C52149,50,51	Nickel (Ni)	0.015	0.017	mg/Kg	0.005
G	C52152,53,54	Nickel (Ni)	0.18	0.198	mg/Kg	0.005
L-A	C52155,56,57	Nickel (Ni)	0.094	0.097	mg/Kg	0.005
L-B	C52158,59,60	Nickel (Ni)	0.065	0.066	mg/Kg	0.005
L-C	C52161,62,63	Nickel (Ni)	0.047	0.048	mg/Kg	0.005
L-D	C52164,65,66	Nickel (Ni)	0.14	0.147	mg/Kg	0.005
L-E	C52167,68	Nickel (Ni)	0.023	0.024	mg/Kg	0.005
A	C52134,35,36	Selenium (Se)	0.002	0.002	mg/Kg	0.002
B	C52137,38,39	Selenium (Se)	0	0.000	mg/Kg	0.002
C	C52140,41,42	Selenium (Se)	0.002	0.002	mg/Kg	0.002
D	C52143,44,45	Selenium (Se)	0.003	0.003	mg/Kg	0.002
E	C52146,47,48	Selenium (Se)	0.003	0.003	mg/Kg	0.002
F	C52149,50,51	Selenium (Se)	0.002	0.002	mg/Kg	0.002
G	C52152,53,54	Selenium (Se)	0.003	0.003	mg/Kg	0.002
L-A	C52155,56,57	Selenium (Se)	0	0.000	mg/Kg	0.002

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-B	C52158,59,60	Selenium (Se)	0	0.000	mg/Kg	0.002
L-C	C52161,62,63	Selenium (Se)	0	0.000	mg/Kg	0.002
L-D	C52164,65,66	Selenium (Se)	0.004	0.004	mg/Kg	0.002
L-E	C52167,68	Selenium (Se)	0	0.000	mg/Kg	0.002
A	C52134,35,36	Silver (Ag)	0	0.000	mg/Kg	0.005
B	C52137,38,39	Silver (Ag)	0	0.000	mg/Kg	0.005
C	C52140,41,42	Silver (Ag)	0	0.000	mg/Kg	0.005
D	C52143,44,45	Silver (Ag)	0	0.000	mg/Kg	0.005
E	C52146,47,48	Silver (Ag)	0	0.000	mg/Kg	0.005
F	C52149,50,51	Silver (Ag)	0	0.000	mg/Kg	0.005
G	C52152,53,54	Silver (Ag)	0	0.000	mg/Kg	0.005
L-A	C52155,56,57	Silver (Ag)	0	0.000	mg/Kg	0.005
L-B	C52158,59,60	Silver (Ag)	0	0.000	mg/Kg	0.005
L-C	C52161,62,63	Silver (Ag)	0	0.000	mg/Kg	0.005
L-D	C52164,65,66	Silver (Ag)	0	0.000	mg/Kg	0.005
L-E	C52167,68	Silver (Ag)	0	0.000	mg/Kg	0.005
A	C52134,35,36	Thallium (Tl)	0	0.000	mg/Kg	5
B	C52137,38,39	Thallium (Tl)	0	0.000	mg/Kg	5
C	C52140,41,42	Thallium (Tl)	0	0.000	mg/Kg	5
D	C52143,44,45	Thallium (Tl)	0	0.000	mg/Kg	5
E	C52146,47,48	Thallium (Tl)	0	0.000	mg/Kg	5
F	C52149,50,51	Thallium (Tl)	0	0.000	mg/Kg	5
G	C52152,53,54	Thallium (Tl)	0	0.000	mg/Kg	5
L-A	C52155,56,57	Thallium (Tl)	0	0.000	mg/Kg	5
L-B	C52158,59,60	Thallium (Tl)	0	0.000	mg/Kg	5
L-C	C52161,62,63	Thallium (Tl)	0	0.000	mg/Kg	5
L-D	C52164,65,66	Thallium (Tl)	0	0.000	mg/Kg	5
L-E	C52167,68	Thallium (Tl)	0	0.000	mg/Kg	5
A	C52134,35,36	Zinc (Zn)	0.058	0.061	mg/Kg	0.003
B	C52137,38,39	Zinc (Zn)	0.018	0.018	mg/Kg	0.003
C	C52140,41,42	Zinc (Zn)	0.07	0.085	mg/Kg	0.003
D	C52143,44,45	Zinc (Zn)	1.5	1.708	mg/Kg	0.003
E	C52146,47,48	Zinc (Zn)	0.02	0.021	mg/Kg	0.003
F	C52149,50,51	Zinc (Zn)	0.14	0.155	mg/Kg	0.003

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
G	C52152,53,54	Zinc (Zn)	0.16	0.176	mg/Kg	0.003
L-A	C52155,56,57	Zinc (Zn)	0.094	0.097	mg/Kg	0.003
L-B	C52158,59,60	Zinc (Zn)	0.097	0.098	mg/Kg	0.003
L-C	C52161,62,63	Zinc (Zn)	0.06	0.062	mg/Kg	0.003
L-D	C52164,65,66	Zinc (Zn)	0.15	0.158	mg/Kg	0.003
L-E	C52167,68	Zinc (Zn)	0.023	0.024	mg/Kg	0.003
A	C52134,35,36	Total Oil and Grease	26	27.282	mg/kg	20
B	C52137,38,39	Total Oil and Grease	36	36.660	mg/kg	20
C	C52140,41,42	Total Oil and Grease	36	43.796	mg/kg	20
D	C52143,44,45	Total Oil and Grease	99	112.756	mg/kg	20
E	C52146,47,48	Total Oil and Grease	45	48.077	mg/kg	20
F	C52149,50,51	Total Oil and Grease	60	66.372	mg/kg	20
G	C52152,53,54	Total Oil and Grease	23	25.358	mg/kg	20
L-A	C52155,56,57	Total Oil and Grease	25	25.826	mg/kg	20
L-B	C52158,59,60	Total Oil and Grease	28	28.369	mg/kg	20
L-C	C52161,62,63	Total Oil and Grease	140	144.330	mg/kg	20
L-D	C52164,65,66	Total Oil and Grease	85	89.474	mg/kg	20
L-E	C52167,68	Total Oil and Grease	68	71.730	mg/kg	20
A	C52134,35,36	Cadmium (Cd)	0	0.000	mg/Kg	0.5
B	C52137,38,39	Cadmium (Cd)	0	0.000	mg/Kg	0.5
C	C52140,41,42	Cadmium (Cd)	0	0.000	mg/Kg	0.5
D	C52143,44,45	Cadmium (Cd)	0	0.000	mg/Kg	0.5
E	C52146,47,48	Cadmium (Cd)	0	0.000	mg/Kg	0.5
F	C52149,50,51	Cadmium (Cd)	0	0.000	mg/Kg	0.5
G	C52152,53,54	Cadmium (Cd)	0	0.000	mg/Kg	0.5
L-A	C52155,56,57	Cadmium (Cd)	0	0.000	mg/Kg	0.5
L-B	C52158,59,60	Cadmium (Cd)	0	0.000	mg/Kg	0.5
L-C	C52161,62,63	Cadmium (Cd)	0	0.000	mg/Kg	0.5
L-D	C52164,65,66	Cadmium (Cd)	0	0.000	mg/Kg	0.5
L-E	C52167,68	Cadmium (Cd)	0	0.000	mg/Kg	0.5
A	C52134,35,36	Chromium (Cr)	19	19.937	mg/Kg	1.0
B	C52137,38,39	Chromium (Cr)	17	17.312	mg/Kg	1.0
C	C52140,41,42	Chromium (Cr)	18	21.898	mg/Kg	1.0
D	C52143,44,45	Chromium (Cr)	26	29.613	mg/Kg	1.0

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
E	C52146,47,48	Chromium (Cr)	63	67.308	mg/Kg	1.0
F	C52149,50,51	Chromium (Cr)	74	81.858	mg/Kg	1.0
G	C52152,53,54	Chromium (Cr)	30	33.076	mg/Kg	1.0
L-A	C52155,56,57	Chromium (Cr)	26	26.860	mg/Kg	1.0
L-B	C52158,59,60	Chromium (Cr)	27	27.356	mg/Kg	1.0
L-C	C52161,62,63	Chromium (Cr)	19	19.588	mg/Kg	1.0
L-D	C52164,65,66	Chromium (Cr)	48	50.526	mg/Kg	1.0
L-E	C52167,68	Chromium (Cr)	18	18.987	mg/Kg	1.0
A	C52134,35,36	Copper (Cu)	12	12.592	mg/Kg	0.4
B	C52137,38,39	Copper (Cu)	8	8.147	mg/Kg	0.4
C	C52140,41,42	Copper (Cu)	15	18.248	mg/Kg	0.4
D	C52143,44,45	Copper (Cu)	20	22.779	mg/Kg	0.4
E	C52146,47,48	Copper (Cu)	32	34.188	mg/Kg	0.4
F	C52149,50,51	Copper (Cu)	42	46.460	mg/Kg	0.4
G	C52152,53,54	Copper (Cu)	11	12.128	mg/Kg	0.4
L-A	C52155,56,57	Copper (Cu)	13	13.430	mg/Kg	0.4
L-B	C52158,59,60	Copper (Cu)	13	13.171	mg/Kg	0.4
L-C	C52161,62,63	Copper (Cu)	13	13.402	mg/Kg	0.4
L-D	C52164,65,66	Copper (Cu)	23	24.211	mg/Kg	0.4
L-E	C52167,68	Copper (Cu)	18	18.987	mg/Kg	0.4
A	C52134,35,36	Lead (Pb)	8	8.395	mg/Kg	0.1
B	C52137,38,39	Lead (Pb)	6.4	6.517	mg/Kg	0.1
C	C52140,41,42	Lead (Pb)	7.7	9.367	mg/Kg	0.1
D	C52143,44,45	Lead (Pb)	10	11.390	mg/Kg	0.1
E	C52146,47,48	Lead (Pb)	22	23.504	mg/Kg	0.1
F	C52149,50,51	Lead (Pb)	26	28.761	mg/Kg	0.1
G	C52152,53,54	Lead (Pb)	10	11.025	mg/Kg	0.1
L-A	C52155,56,57	Lead (Pb)	6.2	6.405	mg/Kg	0.1
L-B	C52158,59,60	Lead (Pb)	5.7	5.775	mg/Kg	0.1
L-C	C52161,62,63	Lead (Pb)	6.9	7.113	mg/Kg	0.1
L-D	C52164,65,66	Lead (Pb)	14	14.737	mg/Kg	0.1
L-E	C52167,68	Lead (Pb)	14	14.768	mg/Kg	0.1
A	C52134,35,36	Nickel (Ni)	20	20.986	mg/Kg	0.1
B	C52137,38,39	Nickel (Ni)	20	20.367	mg/Kg	0.1

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
C	C52140,41,42	Nickel (Ni)	18	21.898	mg/Kg	0.1
D	C52143,44,45	Nickel (Ni)	25	28.474	mg/Kg	0.1
E	C52146,47,48	Nickel (Ni)	64	68.376	mg/Kg	0.1
F	C52149,50,51	Nickel (Ni)	68	75.221	mg/Kg	0.1
G	C52152,53,54	Nickel (Ni)	37	40.794	mg/Kg	0.1
L-A	C52155,56,57	Nickel (Ni)	30	30.992	mg/Kg	0.1
L-B	C52158,59,60	Nickel (Ni)	33	33.435	mg/Kg	0.1
L-C	C52161,62,63	Nickel (Ni)	20	20.619	mg/Kg	0.1
L-D	C52164,65,66	Nickel (Ni)	51	53.684	mg/Kg	0.1
L-E	C52167,68	Nickel (Ni)	57	60.127	mg/Kg	0.1
A	C52134,35,36	Silver (Ag)	0	0.000	mg/Kg	0.05
B	C52137,38,39	Silver (Ag)	0	0.000	mg/Kg	0.05
C	C52140,41,42	Silver (Ag)	0	0.000	mg/Kg	0.05
D	C52143,44,45	Silver (Ag)	0	0.000	mg/Kg	0.05
E	C52146,47,48	Silver (Ag)	0	0.000	mg/Kg	0.05
F	C52149,50,51	Silver (Ag)	0	0.000	mg/Kg	0.05
G	C52152,53,54	Silver (Ag)	0	0.000	mg/Kg	0.05
L-A	C52155,56,57	Silver (Ag)	0	0.000	mg/Kg	0.05
L-B	C52158,59,60	Silver (Ag)	0	0.000	mg/Kg	0.05
L-C	C52161,62,63	Silver (Ag)	0	0.000	mg/Kg	0.05
L-D	C52164,65,66	Silver (Ag)	0	0.000	mg/Kg	0.05
L-E	C52167,68	Silver (Ag)	0	0.000	mg/Kg	0.05
A	C52134,35,36	Zinc (Zn)	29	30.430	mg/Kg	0.4
B	C52137,38,39	Zinc (Zn)	25	25.458	mg/Kg	0.4
C	C52140,41,42	Zinc (Zn)	22	26.764	mg/Kg	0.4
D	C52143,44,45	Zinc (Zn)	29	33.030	mg/Kg	0.4
E	C52146,47,48	Zinc (Zn)	60	64.103	mg/Kg	0.4
F	C52149,50,51	Zinc (Zn)	73	80.752	mg/Kg	0.4
G	C52152,53,54	Zinc (Zn)	25	27.563	mg/Kg	0.4
L-A	C52155,56,57	Zinc (Zn)	30	30.992	mg/Kg	0.4
L-B	C52158,59,60	Zinc (Zn)	31	31.408	mg/Kg	0.4
L-C	C52161,62,63	Zinc (Zn)	29	29.897	mg/Kg	0.4
L-D	C52164,65,66	Zinc (Zn)	51	53.684	mg/Kg	0.4
L-E	C52167,68	Zinc (Zn)	51	53.797	mg/Kg	0.4

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
A	C52134,35,36	Arsenic (As)	4.9	5.142	mg/Kg	0.4
B	C52137,38,39	Arsenic (As)	3.6	3.666	mg/Kg	0.4
C	C52140,41,42	Arsenic (As)	6.2	7.543	mg/Kg	0.4
D	C52143,44,45	Arsenic (As)	6.5	7.403	mg/Kg	0.4
E	C52146,47,48	Arsenic (As)	7.6	8.120	mg/Kg	0.4
F	C52149,50,51	Arsenic (As)	7.9	8.739	mg/Kg	0.4
G	C52152,53,54	Arsenic (As)	0.7	0.772	mg/Kg	0.4
L-A	C52155,56,57	Arsenic (As)	3.7	3.822	mg/Kg	0.4
L-B	C52158,59,60	Arsenic (As)	0	0.000	mg/Kg	0.4
L-C	C52161,62,63	Arsenic (As)	0	0.000	mg/Kg	0.4
L-D	C52164,65,66	Arsenic (As)	5.4	5.684	mg/Kg	0.4
L-E	C52167,68	Arsenic (As)	5.2	5.485	mg/Kg	0.4
A	C52134,35,36	Mercury (Hg)	0	0.000	mg/Kg	0.1
B	C52137,38,39	Mercury (Hg)	0	0.000	mg/Kg	0.1
C	C52140,41,42	Mercury (Hg)	0	0.000	mg/Kg	0.1
D	C52143,44,45	Mercury (Hg)	0.1	0.114	mg/Kg	0.1
E	C52146,47,48	Mercury (Hg)	0.1	0.107	mg/Kg	0.1
F	C52149,50,51	Mercury (Hg)	0.2	0.221	mg/Kg	0.1
G	C52152,53,54	Mercury (Hg)	0	0.000	mg/Kg	0.1
L-A	C52155,56,57	Mercury (Hg)	0	0.000	mg/Kg	0.1
L-B	C52158,59,60	Mercury (Hg)	0	0.000	mg/Kg	0.1
L-C	C52161,62,63	Mercury (Hg)	0	0.000	mg/Kg	0.1
L-D	C52164,65,66	Mercury (Hg)	0.1	0.105	mg/Kg	0.1
L-E	C52167,68	Mercury (Hg)	0	0.000	mg/Kg	0.1
A	C52134,35,36	Mercury (Hg)	0	0.000	mg/Kg	0.0002
B	C52137,38,39	Mercury (Hg)	0	0.000	mg/Kg	0.0002
C	C52140,41,42	Mercury (Hg)	0	0.000	mg/Kg	0.0002
D	C52143,44,45	Mercury (Hg)	0	0.000	mg/Kg	0.0002
E	C52146,47,48	Mercury (Hg)	0	0.000	mg/Kg	0.0002
F	C52149,50,51	Mercury (Hg)	0	0.000	mg/Kg	0.0002
G	C52152,53,54	Mercury (Hg)	0	0.000	mg/Kg	0.0002
L-A	C52155,56,57	Mercury (Hg)	0	0.000	mg/Kg	0.0002
L-B	C52158,59,60	Mercury (Hg)	0	0.000	mg/Kg	0.0002
L-C	C52161,62,63	Mercury (Hg)	0	0.000	mg/Kg	0.0002

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-D	C52164,65,66	Mercury (Hg)	0	0.000	mg/Kg	0.0002
L-E	C52167,68	Mercury (Hg)	0	0.000	mg/Kg	0.0002
A	C52134,35,36	Thallium (Tl)	0	0.000	mg/Kg	1
B	C52137,38,39	Thallium (Tl)	0	0.000	mg/Kg	1
C	C52140,41,42	Thallium (Tl)	0	0.000	mg/Kg	1
D	C52143,44,45	Thallium (Tl)	0	0.000	mg/Kg	1
E	C52146,47,48	Thallium (Tl)	0	0.000	mg/Kg	1
F	C52149,50,51	Thallium (Tl)	0	0.000	mg/Kg	1
G	C52152,53,54	Thallium (Tl)	0	0.000	mg/Kg	1
L-A	C52155,56,57	Thallium (Tl)	0	0.000	mg/Kg	1
L-B	C52158,59,60	Thallium (Tl)	0	0.000	mg/Kg	1
L-C	C52161,62,63	Thallium (Tl)	0	0.000	mg/Kg	1
L-D	C52164,65,66	Thallium (Tl)	0	0.000	mg/Kg	1
L-E	C52167,68	Thallium (Tl)	0	0.000	mg/Kg	1
A	C52134,35,36	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
B	C52137,38,39	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
C	C52140,41,42	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
D	C52143,44,45	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
E	C52146,47,48	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
F	C52149,50,51	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
G	C52152,53,54	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
L-E	C52167,68	Benzyl Butyl Phthalate	0	0.000	mg/kg	0.05
A	C52134,35,36	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
B	C52137,38,39	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
C	C52140,41,42	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
D	C52143,44,45	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
E	C52146,47,48	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
F	C52149,50,51	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
G	C52152,53,54	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-B	C52158,59,60	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
L-E	C52167,68	Bis(2-ethylhexyl)Phthalate	0	0.000	mg/kg	0.05
A	C52134,35,36	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
B	C52137,38,39	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
C	C52140,41,42	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
D	C52143,44,45	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
E	C52146,47,48	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
F	C52149,50,51	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
G	C52152,53,54	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
L-E	C52167,68	Di-N-Butyl Phthalate	0	0.000	mg/kg	0.05
A	C52134,35,36	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
B	C52137,38,39	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
C	C52140,41,42	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
D	C52143,44,45	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
E	C52146,47,48	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
F	C52149,50,51	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
G	C52152,53,54	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
L-E	C52167,68	Di-N-Octyl Phthalate	0	0.000	mg/kg	0.05
A	C52134,35,36	Diethyl Phthalate	0	0.000	mg/kg	0.05
B	C52137,38,39	Diethyl Phthalate	0	0.000	mg/kg	0.05
C	C52140,41,42	Diethyl Phthalate	0	0.000	mg/kg	0.05
D	C52143,44,45	Diethyl Phthalate	0	0.000	mg/kg	0.05
E	C52146,47,48	Diethyl Phthalate	0	0.000	mg/kg	0.05
F	C52149,50,51	Diethyl Phthalate	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
G	C52152,53,54	Diethyl Phthalate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Diethyl Phthalate	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Diethyl Phthalate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Diethyl Phthalate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Diethyl Phthalate	0	0.000	mg/kg	0.05
L-E	C52167,68	Diethyl Phthalate	0	0.000	mg/kg	0.05
A	C52134,35,36	Dimethyl Phthalate	0	0.000	mg/kg	0.05
B	C52137,38,39	Dimethyl Phthalate	0	0.000	mg/kg	0.05
C	C52140,41,42	Dimethyl Phthalate	0	0.000	mg/kg	0.05
D	C52143,44,45	Dimethyl Phthalate	0	0.000	mg/kg	0.05
E	C52146,47,48	Dimethyl Phthalate	0	0.000	mg/kg	0.05
F	C52149,50,51	Dimethyl Phthalate	0	0.000	mg/kg	0.05
G	C52152,53,54	Dimethyl Phthalate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Dimethyl Phthalate	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Dimethyl Phthalate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Dimethyl Phthalate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Dimethyl Phthalate	0	0.000	mg/kg	0.05
L-E	C52167,68	Dimethyl Phthalate	0	0.000	mg/kg	0.05
A	C52134,35,36	4,4'-DDD	0	0.000	mg/kg	0.05
B	C52137,38,39	4,4'-DDD	0	0.000	mg/kg	0.05
C	C52140,41,42	4,4'-DDD	0	0.000	mg/kg	0.05
D	C52143,44,45	4,4'-DDD	0	0.000	mg/kg	0.05
E	C52146,47,48	4,4'-DDD	0	0.000	mg/kg	0.05
F	C52149,50,51	4,4'-DDD	0	0.000	mg/kg	0.05
G	C52152,53,54	4,4'-DDD	0	0.000	mg/kg	0.05
L-A	C52155,56,57	4,4'-DDD	0	0.000	mg/kg	0.05
L-B	C52158,59,60	4,4'-DDD	0	0.000	mg/kg	0.05
L-C	C52161,62,63	4,4'-DDD	0	0.000	mg/kg	0.05
L-D	C52164,65,66	4,4'-DDD	0	0.000	mg/kg	0.05
L-E	C52167,68	4,4'-DDD	0	0.000	mg/kg	0.05
A	C52134,35,36	4,4'-DDE	0	0.000	mg/kg	0.05
B	C52137,38,39	4,4'-DDE	0	0.000	mg/kg	0.05
C	C52140,41,42	4,4'-DDE	0	0.000	mg/kg	0.05
D	C52143,44,45	4,4'-DDE	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
E	C52146,47,48	4,4'-DDE	0	0.000	mg/kg	0.05
F	C52149,50,51	4,4'-DDE	0	0.000	mg/kg	0.05
G	C52152,53,54	4,4'-DDE	0	0.000	mg/kg	0.05
L-A	C52155,56,57	4,4'-DDE	0	0.000	mg/kg	0.05
L-B	C52158,59,60	4,4'-DDE	0	0.000	mg/kg	0.05
L-C	C52161,62,63	4,4'-DDE	0	0.000	mg/kg	0.05
L-D	C52164,65,66	4,4'-DDE	0	0.000	mg/kg	0.05
L-E	C52167,68	4,4'-DDE	0	0.000	mg/kg	0.05
A	C52134,35,36	4,4'-DDT	0	0.000	mg/kg	0.05
B	C52137,38,39	4,4'-DDT	0	0.000	mg/kg	0.05
C	C52140,41,42	4,4'-DDT	0	0.000	mg/kg	0.05
D	C52143,44,45	4,4'-DDT	0	0.000	mg/kg	0.05
E	C52146,47,48	4,4'-DDT	0	0.000	mg/kg	0.05
F	C52149,50,51	4,4'-DDT	0	0.000	mg/kg	0.05
G	C52152,53,54	4,4'-DDT	0	0.000	mg/kg	0.05
L-A	C52155,56,57	4,4'-DDT	0	0.000	mg/kg	0.05
L-B	C52158,59,60	4,4'-DDT	0	0.000	mg/kg	0.05
L-C	C52161,62,63	4,4'-DDT	0	0.000	mg/kg	0.05
L-D	C52164,65,66	4,4'-DDT	0	0.000	mg/kg	0.05
L-E	C52167,68	4,4'-DDT	0	0.000	mg/kg	0.05
A	C52134,35,36	a-BHC	0	0.000	mg/kg	0.05
B	C52137,38,39	a-BHC	0	0.000	mg/kg	0.05
C	C52140,41,42	a-BHC	0	0.000	mg/kg	0.05
D	C52143,44,45	a-BHC	0	0.000	mg/kg	0.05
E	C52146,47,48	a-BHC	0	0.000	mg/kg	0.05
F	C52149,50,51	a-BHC	0	0.000	mg/kg	0.05
G	C52152,53,54	a-BHC	0	0.000	mg/kg	0.05
L-A	C52155,56,57	a-BHC	0	0.000	mg/kg	0.05
L-B	C52158,59,60	a-BHC	0	0.000	mg/kg	0.05
L-C	C52161,62,63	a-BHC	0	0.000	mg/kg	0.05
L-D	C52164,65,66	a-BHC	0	0.000	mg/kg	0.05
L-E	C52167,68	a-BHC	0	0.000	mg/kg	0.05
A	C52134,35,36	Aldrin	0	0.000	mg/kg	0.05
B	C52137,38,39	Aldrin	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
C	C52140,41,42	Aldrin	0	0.000	mg/kg	0.05
D	C52143,44,45	Aldrin	0	0.000	mg/kg	0.05
E	C52146,47,48	Aldrin	0	0.000	mg/kg	0.05
F	C52149,50,51	Aldrin	0	0.000	mg/kg	0.05
G	C52152,53,54	Aldrin	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Aldrin	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Aldrin	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Aldrin	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Aldrin	0	0.000	mg/kg	0.05
L-E	C52167,68	Aldrin	0	0.000	mg/kg	0.05
A	C52134,35,36	Arochlor 1016	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1016	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1016	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1016	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1016	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1016	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1016	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1016	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1016	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1016	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Arochlor 1016	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1016	0	0.000	mg/kg	0.50
A	C52134,35,36	Arochlor 1221	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1221	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1221	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1221	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1221	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1221	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1221	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1221	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1221	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1221	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Arochlor 1221	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1221	0	0.000	mg/kg	0.50

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
A	C52134,35,36	Arochlor 1232	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1232	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1232	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1232	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1232	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1232	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1232	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1232	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1232	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1232	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Arochlor 1232	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1232	0	0.000	mg/kg	0.50
A	C52134,35,36	Arochlor 1242	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1242	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1242	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1242	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1242	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1242	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1242	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1242	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1242	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1242	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Arochlor 1242	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1242	0	0.000	mg/kg	0.50
A	C52134,35,36	Arochlor 1248	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1248	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1248	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1248	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1248	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1248	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1248	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1248	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1248	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1248	0	0.000	mg/kg	0.50

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-D	C52164,65,66	Arochlor 1248	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1248	0	0.000	mg/kg	0.50
A	C52134,35,36	Arochlor 1254	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1254	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1254	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1254	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1254	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1254	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1254	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1254	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1254	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1254	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Arochlor 1254	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1254	0	0.000	mg/kg	0.50
A	C52134,35,36	Arochlor 1260	0	0.000	mg/kg	0.50
B	C52137,38,39	Arochlor 1260	0	0.000	mg/kg	0.50
C	C52140,41,42	Arochlor 1260	0	0.000	mg/kg	0.50
D	C52143,44,45	Arochlor 1260	0	0.000	mg/kg	0.50
E	C52146,47,48	Arochlor 1260	0	0.000	mg/kg	0.50
F	C52149,50,51	Arochlor 1260	0	0.000	mg/kg	0.50
G	C52152,53,54	Arochlor 1260	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Arochlor 1260	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Arochlor 1260	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Arochlor 1260	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Arochlor 1260	0	0.000	mg/kg	0.50
L-E	C52167,68	Arochlor 1260	0	0.000	mg/kg	0.50
A	C52134,35,36	b-BHC	0	0.000	mg/kg	0.05
B	C52137,38,39	b-BHC	0	0.000	mg/kg	0.05
C	C52140,41,42	b-BHC	0	0.000	mg/kg	0.05
D	C52143,44,45	b-BHC	0	0.000	mg/kg	0.05
E	C52146,47,48	b-BHC	0	0.000	mg/kg	0.05
F	C52149,50,51	b-BHC	0	0.000	mg/kg	0.05
G	C52152,53,54	b-BHC	0	0.000	mg/kg	0.05
L-A	C52155,56,57	b-BHC	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-B	C52158,59,60	b-BHC	0	0.000	mg/kg	0.05
L-C	C52161,62,63	b-BHC	0	0.000	mg/kg	0.05
L-D	C52164,65,66	b-BHC	0	0.000	mg/kg	0.05
L-E	C52167,68	b-BHC	0	0.000	mg/kg	0.05
A	C52134,35,36	Chlordane	0	0.000	mg/kg	0.50
B	C52137,38,39	Chlordane	0	0.000	mg/kg	0.50
C	C52140,41,42	Chlordane	0	0.000	mg/kg	0.50
D	C52143,44,45	Chlordane	0	0.000	mg/kg	0.50
E	C52146,47,48	Chlordane	0	0.000	mg/kg	0.50
F	C52149,50,51	Chlordane	0	0.000	mg/kg	0.50
G	C52152,53,54	Chlordane	0	0.000	mg/kg	0.50
L-A	C52155,56,57	Chlordane	0	0.000	mg/kg	0.50
L-B	C52158,59,60	Chlordane	0	0.000	mg/kg	0.50
L-C	C52161,62,63	Chlordane	0	0.000	mg/kg	0.50
L-D	C52164,65,66	Chlordane	0	0.000	mg/kg	0.50
L-E	C52167,68	Chlordane	0	0.000	mg/kg	0.50
A	C52134,35,36	d-BHC	0	0.000	mg/kg	0.05
B	C52137,38,39	d-BHC	0	0.000	mg/kg	0.05
C	C52140,41,42	d-BHC	0	0.000	mg/kg	0.05
D	C52143,44,45	d-BHC	0	0.000	mg/kg	0.05
E	C52146,47,48	d-BHC	0	0.000	mg/kg	0.05
F	C52149,50,51	d-BHC	0	0.000	mg/kg	0.05
G	C52152,53,54	d-BHC	0	0.000	mg/kg	0.05
L-A	C52155,56,57	d-BHC	0	0.000	mg/kg	0.05
L-B	C52158,59,60	d-BHC	0	0.000	mg/kg	0.05
L-C	C52161,62,63	d-BHC	0	0.000	mg/kg	0.05
L-D	C52164,65,66	d-BHC	0	0.000	mg/kg	0.05
L-E	C52167,68	d-BHC	0	0.000	mg/kg	0.05
A	C52134,35,36	Dieldrin	0	0.000	mg/kg	0.05
B	C52137,38,39	Dieldrin	0	0.000	mg/kg	0.05
C	C52140,41,42	Dieldrin	0	0.000	mg/kg	0.05
D	C52143,44,45	Dieldrin	0	0.000	mg/kg	0.05
E	C52146,47,48	Dieldrin	0	0.000	mg/kg	0.05
F	C52149,50,51	Dieldrin	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
G	C52152,53,54	Dieldrin	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Dieldrin	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Dieldrin	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Dieldrin	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Dieldrin	0	0.000	mg/kg	0.05
L-E	C52167,68	Dieldrin	0	0.000	mg/kg	0.05
A	C52134,35,36	Endosulfan I	0	0.000	mg/kg	0.05
B	C52137,38,39	Endosulfan I	0	0.000	mg/kg	0.05
C	C52140,41,42	Endosulfan I	0	0.000	mg/kg	0.05
D	C52143,44,45	Endosulfan I	0	0.000	mg/kg	0.05
E	C52146,47,48	Endosulfan I	0	0.000	mg/kg	0.05
F	C52149,50,51	Endosulfan I	0	0.000	mg/kg	0.05
G	C52152,53,54	Endosulfan I	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Endosulfan I	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Endosulfan I	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Endosulfan I	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Endosulfan I	0	0.000	mg/kg	0.05
L-E	C52167,68	Endosulfan I	0	0.000	mg/kg	0.05
A	C52134,35,36	Endosulfan II	0	0.000	mg/kg	0.05
B	C52137,38,39	Endosulfan II	0	0.000	mg/kg	0.05
C	C52140,41,42	Endosulfan II	0	0.000	mg/kg	0.05
D	C52143,44,45	Endosulfan II	0	0.000	mg/kg	0.05
E	C52146,47,48	Endosulfan II	0	0.000	mg/kg	0.05
F	C52149,50,51	Endosulfan II	0	0.000	mg/kg	0.05
G	C52152,53,54	Endosulfan II	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Endosulfan II	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Endosulfan II	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Endosulfan II	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Endosulfan II	0	0.000	mg/kg	0.05
L-E	C52167,68	Endosulfan II	0	0.000	mg/kg	0.05
A	C52134,35,36	Endosulfan Sulfate	0	0.000	mg/kg	0.05
B	C52137,38,39	Endosulfan Sulfate	0	0.000	mg/kg	0.05
C	C52140,41,42	Endosulfan Sulfate	0	0.000	mg/kg	0.05
D	C52143,44,45	Endosulfan Sulfate	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
E	C52146,47,48	Endosulfan Sulfate	0	0.000	mg/kg	0.05
F	C52149,50,51	Endosulfan Sulfate	0	0.000	mg/kg	0.05
G	C52152,53,54	Endosulfan Sulfate	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Endosulfan Sulfate	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Endosulfan Sulfate	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Endosulfan Sulfate	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Endosulfan Sulfate	0	0.000	mg/kg	0.05
L-E	C52167,68	Endosulfan Sulfate	0	0.000	mg/kg	0.05
A	C52134,35,36	Endrin	0	0.000	mg/kg	0.05
B	C52137,38,39	Endrin	0	0.000	mg/kg	0.05
C	C52140,41,42	Endrin	0	0.000	mg/kg	0.05
D	C52143,44,45	Endrin	0	0.000	mg/kg	0.05
E	C52146,47,48	Endrin	0	0.000	mg/kg	0.05
F	C52149,50,51	Endrin	0	0.000	mg/kg	0.05
G	C52152,53,54	Endrin	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Endrin	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Endrin	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Endrin	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Endrin	0	0.000	mg/kg	0.05
L-E	C52167,68	Endrin	0	0.000	mg/kg	0.05
A	C52134,35,36	Endrin Aldehyde	0	0.000	mg/kg	0.05
B	C52137,38,39	Endrin Aldehyde	0	0.000	mg/kg	0.05
C	C52140,41,42	Endrin Aldehyde	0	0.000	mg/kg	0.05
D	C52143,44,45	Endrin Aldehyde	0	0.000	mg/kg	0.05
E	C52146,47,48	Endrin Aldehyde	0	0.000	mg/kg	0.05
F	C52149,50,51	Endrin Aldehyde	0	0.000	mg/kg	0.05
G	C52152,53,54	Endrin Aldehyde	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Endrin Aldehyde	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Endrin Aldehyde	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Endrin Aldehyde	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Endrin Aldehyde	0	0.000	mg/kg	0.05
L-E	C52167,68	Endrin Aldehyde	0	0.000	mg/kg	0.05
A	C52134,35,36	g-BHC	0	0.000	mg/kg	0.05
B	C52137,38,39	g-BHC	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
C	C52140,41,42	g-BHC	0	0.000	mg/kg	0.05
D	C52143,44,45	g-BHC	0	0.000	mg/kg	0.05
E	C52146,47,48	g-BHC	0	0.000	mg/kg	0.05
F	C52149,50,51	g-BHC	0	0.000	mg/kg	0.05
G	C52152,53,54	g-BHC	0	0.000	mg/kg	0.05
L-A	C52155,56,57	g-BHC	0	0.000	mg/kg	0.05
L-B	C52158,59,60	g-BHC	0	0.000	mg/kg	0.05
L-C	C52161,62,63	g-BHC	0	0.000	mg/kg	0.05
L-D	C52164,65,66	g-BHC	0	0.000	mg/kg	0.05
L-E	C52167,68	g-BHC	0	0.000	mg/kg	0.05
A	C52134,35,36	Heptachlor	0	0.000	mg/kg	0.05
B	C52137,38,39	Heptachlor	0	0.000	mg/kg	0.05
C	C52140,41,42	Heptachlor	0	0.000	mg/kg	0.05
D	C52143,44,45	Heptachlor	0	0.000	mg/kg	0.05
E	C52146,47,48	Heptachlor	0	0.000	mg/kg	0.05
F	C52149,50,51	Heptachlor	0	0.000	mg/kg	0.05
G	C52152,53,54	Heptachlor	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Heptachlor	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Heptachlor	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Heptachlor	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Heptachlor	0	0.000	mg/kg	0.05
L-E	C52167,68	Heptachlor	0	0.000	mg/kg	0.05
A	C52134,35,36	Heptachlor Epoxide	0	0.000	mg/kg	0.05
B	C52137,38,39	Heptachlor Epoxide	0	0.000	mg/kg	0.05
C	C52140,41,42	Heptachlor Epoxide	0	0.000	mg/kg	0.05
D	C52143,44,45	Heptachlor Epoxide	0	0.000	mg/kg	0.05
E	C52146,47,48	Heptachlor Epoxide	0	0.000	mg/kg	0.05
F	C52149,50,51	Heptachlor Epoxide	0	0.000	mg/kg	0.05
G	C52152,53,54	Heptachlor Epoxide	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Heptachlor Epoxide	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Heptachlor Epoxide	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Heptachlor Epoxide	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Heptachlor Epoxide	0	0.000	mg/kg	0.05
L-E	C52167,68	Heptachlor Epoxide	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
A	C52134,35,36	Methoxychlor	0	0.000	mg/kg	0.05
B	C52137,38,39	Methoxychlor	0	0.000	mg/kg	0.05
C	C52140,41,42	Methoxychlor	0	0.000	mg/kg	0.05
D	C52143,44,45	Methoxychlor	0	0.000	mg/kg	0.05
E	C52146,47,48	Methoxychlor	0	0.000	mg/kg	0.05
F	C52149,50,51	Methoxychlor	0	0.000	mg/kg	0.05
G	C52152,53,54	Methoxychlor	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Methoxychlor	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Methoxychlor	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Methoxychlor	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Methoxychlor	0	0.000	mg/kg	0.05
L-E	C52167,68	Methoxychlor	0	0.000	mg/kg	0.05
A	C52134,35,36	Toxaphene	0	0.000	mg/kg	0.05
B	C52137,38,39	Toxaphene	0	0.000	mg/kg	0.05
C	C52140,41,42	Toxaphene	0	0.000	mg/kg	0.05
D	C52143,44,45	Toxaphene	0	0.000	mg/kg	0.05
E	C52146,47,48	Toxaphene	0	0.000	mg/kg	0.05
F	C52149,50,51	Toxaphene	0	0.000	mg/kg	0.05
G	C52152,53,54	Toxaphene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Toxaphene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Toxaphene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Toxaphene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Toxaphene	0	0.000	mg/kg	0.05
L-E	C52167,68	Toxaphene	0	0.000	mg/kg	0.05
A	C52134,35,36	Acenaphthene	0	0.000	mg/kg	0.05
B	C52137,38,39	Acenaphthene	0	0.000	mg/kg	0.05
C	C52140,41,42	Acenaphthene	0	0.000	mg/kg	0.05
D	C52143,44,45	Acenaphthene	0	0.000	mg/kg	0.05
E	C52146,47,48	Acenaphthene	0	0.000	mg/kg	0.05
F	C52149,50,51	Acenaphthene	0	0.000	mg/kg	0.05
G	C52152,53,54	Acenaphthene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Acenaphthene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Acenaphthene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Acenaphthene	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-D	C52164,65,66	Acenaphthene	0	0.000	mg/kg	0.05
L-E	C52167,68	Acenaphthene	0	0.000	mg/kg	0.05
A	C52134,35,36	Acenaphthylene	0	0.000	mg/kg	0.05
B	C52137,38,39	Acenaphthylene	0	0.000	mg/kg	0.05
C	C52140,41,42	Acenaphthylene	0	0.000	mg/kg	0.05
D	C52143,44,45	Acenaphthylene	0	0.000	mg/kg	0.05
E	C52146,47,48	Acenaphthylene	0	0.000	mg/kg	0.05
F	C52149,50,51	Acenaphthylene	0	0.000	mg/kg	0.05
G	C52152,53,54	Acenaphthylene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Acenaphthylene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Acenaphthylene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Acenaphthylene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Acenaphthylene	0	0.000	mg/kg	0.05
L-E	C52167,68	Acenaphthylene	0	0.000	mg/kg	0.05
A	C52134,35,36	Anthracene	0	0.000	mg/kg	0.05
B	C52137,38,39	Anthracene	0	0.000	mg/kg	0.05
C	C52140,41,42	Anthracene	0	0.000	mg/kg	0.05
D	C52143,44,45	Anthracene	0	0.000	mg/kg	0.05
E	C52146,47,48	Anthracene	0	0.000	mg/kg	0.05
F	C52149,50,51	Anthracene	0	0.000	mg/kg	0.05
G	C52152,53,54	Anthracene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Anthracene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Anthracene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Anthracene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Anthracene	0	0.000	mg/kg	0.05
L-E	C52167,68	Anthracene	0	0.000	mg/kg	0.05
A	C52134,35,36	Benz(a)anthracene	0	0.000	mg/kg	0.05
B	C52137,38,39	Benz(a)anthracene	0	0.000	mg/kg	0.05
C	C52140,41,42	Benz(a)anthracene	0	0.000	mg/kg	0.05
D	C52143,44,45	Benz(a)anthracene	0	0.000	mg/kg	0.05
E	C52146,47,48	Benz(a)anthracene	0	0.000	mg/kg	0.05
F	C52149,50,51	Benz(a)anthracene	0	0.000	mg/kg	0.05
G	C52152,53,54	Benz(a)anthracene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Benz(a)anthracene	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-B	C52158,59,60	Benz(a)anthracene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Benz(a)anthracene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Benz(a)anthracene	0	0.000	mg/kg	0.05
L-E	C52167,68	Benz(a)anthracene	0	0.000	mg/kg	0.05
A	C52134,35,36	Benzo(a)pyrene	0	0.000	mg/kg	0.05
B	C52137,38,39	Benzo(a)pyrene	0	0.000	mg/kg	0.05
C	C52140,41,42	Benzo(a)pyrene	0	0.000	mg/kg	0.05
D	C52143,44,45	Benzo(a)pyrene	0	0.000	mg/kg	0.05
E	C52146,47,48	Benzo(a)pyrene	0	0.000	mg/kg	0.05
F	C52149,50,51	Benzo(a)pyrene	0	0.000	mg/kg	0.05
G	C52152,53,54	Benzo(a)pyrene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Benzo(a)pyrene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Benzo(a)pyrene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Benzo(a)pyrene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Benzo(a)pyrene	0	0.000	mg/kg	0.05
L-E	C52167,68	Benzo(a)pyrene	0	0.000	mg/kg	0.05
A	C52134,35,36	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
B	C52137,38,39	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
C	C52140,41,42	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
D	C52143,44,45	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
E	C52146,47,48	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
F	C52149,50,51	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
G	C52152,53,54	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
L-E	C52167,68	Benzo(ghi)perylene	0	0.000	mg/kg	0.05
A	C52134,35,36	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
B	C52137,38,39	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
C	C52140,41,42	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
D	C52143,44,45	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
E	C52146,47,48	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
F	C52149,50,51	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
G	C52152,53,54	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
L-E	C52167,68	Benzo(k)fluoranthene	0	0.000	mg/kg	0.05
A	C52134,35,36	Chrysene	0	0.000	mg/kg	0.05
B	C52137,38,39	Chrysene	0	0.000	mg/kg	0.05
C	C52140,41,42	Chrysene	0	0.000	mg/kg	0.05
D	C52143,44,45	Chrysene	0	0.000	mg/kg	0.05
E	C52146,47,48	Chrysene	0	0.000	mg/kg	0.05
F	C52149,50,51	Chrysene	0	0.000	mg/kg	0.05
G	C52152,53,54	Chrysene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Chrysene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Chrysene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Chrysene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Chrysene	0	0.000	mg/kg	0.05
L-E	C52167,68	Chrysene	0	0.000	mg/kg	0.05
A	C52134,35,36	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
B	C52137,38,39	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
C	C52140,41,42	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
D	C52143,44,45	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
E	C52146,47,48	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
F	C52149,50,51	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
G	C52152,53,54	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
L-E	C52167,68	Dibenz(a,h)anthracene	0	0.000	mg/kg	0.05
A	C52134,35,36	Fluoranthene	0	0.000	mg/kg	0.05
B	C52137,38,39	Fluoranthene	0	0.000	mg/kg	0.05
C	C52140,41,42	Fluoranthene	0	0.000	mg/kg	0.05
D	C52143,44,45	Fluoranthene	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
E	C52146,47,48	Fluoranthene	0	0.000	mg/kg	0.05
F	C52149,50,51	Fluoranthene	0	0.000	mg/kg	0.05
G	C52152,53,54	Fluoranthene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Fluoranthene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Fluoranthene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Fluoranthene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Fluoranthene	0.06	0.063	mg/kg	0.05
L-E	C52167,68	Fluoranthene	0	0.000	mg/kg	0.05
A	C52134,35,36	Fluorene	0	0.000	mg/kg	0.05
B	C52137,38,39	Fluorene	0	0.000	mg/kg	0.05
C	C52140,41,42	Fluorene	0	0.000	mg/kg	0.05
D	C52143,44,45	Fluorene	0	0.000	mg/kg	0.05
E	C52146,47,48	Fluorene	0	0.000	mg/kg	0.05
F	C52149,50,51	Fluorene	0	0.000	mg/kg	0.05
G	C52152,53,54	Fluorene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Fluorene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Fluorene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Fluorene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Fluorene	0	0.000	mg/kg	0.05
L-E	C52167,68	Fluorene	0	0.000	mg/kg	0.05
A	C52134,35,36	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
B	C52137,38,39	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
C	C52140,41,42	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
D	C52143,44,45	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
E	C52146,47,48	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
F	C52149,50,51	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
G	C52152,53,54	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
L-E	C52167,68	Indo(1,2,3-cd)pyrene	0	0.000	mg/kg	0.05
A	C52134,35,36	Naphthalene	0	0.000	mg/kg	0.05
B	C52137,38,39	Naphthalene	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
C	C52140,41,42	Naphthalene	0	0.000	mg/kg	0.05
D	C52143,44,45	Naphthalene	0	0.000	mg/kg	0.05
E	C52146,47,48	Naphthalene	0	0.000	mg/kg	0.05
F	C52149,50,51	Naphthalene	0	0.000	mg/kg	0.05
G	C52152,53,54	Naphthalene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Naphthalene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Naphthalene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Naphthalene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Naphthalene	0	0.000	mg/kg	0.05
L-E	C52167,68	Naphthalene	0	0.000	mg/kg	0.05
A	C52134,35,36	Phenanthrene	0	0.000	mg/kg	0.05
B	C52137,38,39	Phenanthrene	0	0.000	mg/kg	0.05
C	C52140,41,42	Phenanthrene	0	0.000	mg/kg	0.05
D	C52143,44,45	Phenanthrene	0	0.000	mg/kg	0.05
E	C52146,47,48	Phenanthrene	0	0.000	mg/kg	0.05
F	C52149,50,51	Phenanthrene	0	0.000	mg/kg	0.05
G	C52152,53,54	Phenanthrene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Phenanthrene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Phenanthrene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Phenanthrene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Phenanthrene	0	0.000	mg/kg	0.05
L-E	C52167,68	Phenanthrene	0	0.000	mg/kg	0.05
A	C52134,35,36	Pyrene	0	0.000	mg/kg	0.05
B	C52137,38,39	Pyrene	0	0.000	mg/kg	0.05
C	C52140,41,42	Pyrene	0	0.000	mg/kg	0.05
D	C52143,44,45	Pyrene	0	0.000	mg/kg	0.05
E	C52146,47,48	Pyrene	0	0.000	mg/kg	0.05
F	C52149,50,51	Pyrene	0	0.000	mg/kg	0.05
G	C52152,53,54	Pyrene	0	0.000	mg/kg	0.05
L-A	C52155,56,57	Pyrene	0	0.000	mg/kg	0.05
L-B	C52158,59,60	Pyrene	0	0.000	mg/kg	0.05
L-C	C52161,62,63	Pyrene	0	0.000	mg/kg	0.05
L-D	C52164,65,66	Pyrene	0.13	0.137	mg/kg	0.05
L-E	C52167,68	Pyrene	0	0.000	mg/kg	0.05

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
A	C52134,35,36	pH	6	6.296	STD	
B	C52137,38,39	pH	7.4	7.536	STD	
C	C52140,41,42	pH	5.8	7.056	STD	
D	C52143,44,45	pH	6.1	6.948	STD	
E	C52146,47,48	pH	5.9	6.303	STD	
F	C52149,50,51	pH	6.1	6.748	STD	
G	C52152,53,54	pH	7.2	7.938	STD	
L-A	C52155,56,57	pH	6.3	6.508	STD	
L-B	C52158,59,60	pH	7	7.092	STD	
L-C	C52161,62,63	pH	5.6	5.773	STD	
L-D	C52164,65,66	pH	6.1	6.421	STD	
L-E	C52167,68	pH	5.6	5.907	STD	
A	C52134,35,36	Total Dissolved Solids	190	199.370	mg/L	5
B	C52137,38,39	Total Dissolved Solids	160	162.933	mg/L	5
C	C52140,41,42	Total Dissolved Solids	410	498.783	mg/L	5
D	C52143,44,45	Total Dissolved Solids	680	774.487	mg/L	5
E	C52146,47,48	Total Dissolved Solids	1500	1602.564	mg/L	5
F	C52149,50,51	Total Dissolved Solids	1500	1659.292	mg/L	5
G	C52152,53,54	Total Dissolved Solids	1100	1212.789	mg/L	5
L-A	C52155,56,57	Total Dissolved Solids	320	330.579	mg/L	5
L-B	C52158,59,60	Total Dissolved Solids	270	273.556	mg/L	5
L-C	C52161,62,63	Total Dissolved Solids	300	309.278	mg/L	5
L-D	C52164,65,66	Total Dissolved Solids	860	905.263	mg/L	5
L-E	C52167,68	Total Dissolved Solids	830	875.527	mg/L	5
A	C52134,35,36	Carbon, Total Organic (TOC)	4800	5036.726	mg/Kg	5
B	C52137,38,39	Carbon, Total Organic (TOC)	1900	1934.827	mg/Kg	5
C	C52140,41,42	Carbon, Total Organic (TOC)	60000	72992.701	mg/Kg	5
D	C52143,44,45	Carbon, Total Organic (TOC)	21000	23917.995	mg/Kg	5
E	C52146,47,48	Carbon, Total Organic (TOC)	14000	14957.265	mg/Kg	5
F	C52149,50,51	Carbon, Total Organic (TOC)	20000	22123.894	mg/Kg	5
G	C52152,53,54	Carbon, Total Organic (TOC)	2700	2976.847	mg/Kg	5
L-A	C52155,56,57	Carbon, Total Organic (TOC)	4400	4545.455	mg/Kg	5
L-B	C52158,59,60	Carbon, Total Organic (TOC)	2200	2228.977	mg/Kg	5
L-C	C52161,62,63	Carbon, Total Organic (TOC)	5700	5876.289	mg/Kg	5

DWR Site	DWR Sample ID	Analyte Name	Wet Weight	Dry Weight	Units	Detection Limit
L-D	C52164,65,66	Carbon, Total Organic (TOC)	9700	10210.526	mg/Kg	5
L-E	C52167,68	Carbon, Total Organic (TOC)	8200	8649.789	mg/Kg	5
A	C52134,35,36	Total Volatile Solids	7.2	7.555	%	0.01
B	C52137,38,39	Total Volatile Solids	3.4	3.462	%	0.01
C	C52140,41,42	Total Volatile Solids	26.7	32.482	%	0.01
D	C52143,44,45	Total Volatile Solids	18.1	20.615	%	0.01
E	C52146,47,48	Total Volatile Solids	12.8	13.675	%	0.01
F	C52149,50,51	Total Volatile Solids	17	18.805	%	0.01
G	C52152,53,54	Total Volatile Solids	11.7	12.900	%	0.01
L-A	C52155,56,57	Total Volatile Solids	5.8	5.992	%	0.01
L-B	C52158,59,60	Total Volatile Solids	3	3.040	%	0.01
L-C	C52161,62,63	Total Volatile Solids	5.8	5.979	%	0.01
L-D	C52164,65,66	Total Volatile Solids	9.3	9.789	%	0.01
L-E	C52167,68	Total Volatile Solids	9.5	10.021	%	0.01