TO: Whom It May Concern

FROM: Diane Desotelle, St. Louis River Area of Concern Coordinator
Susan Johnson, Superfund Project Leader

RE: MPCA Disclaimer for this Report – Sediment Investigation Report, Lower St. Louis River, Fond du Lac Dam to Kingsbury Bay by Somat Engineering, August 2012

DATE: April 12, 2013

The study for this report was funded by Minnesota's Clean Water Legacy Act and the US Army Corps of Engineers as part of the sediment investigation work in the St. Louis River.

The values and analysis presented in the report is considered preliminary as the MPCA is aware of some data discrepancies. Since the date of this report, the calculated values and analysis have been modified as part of the MPCA data interpretation effort. In particular, calculated values and summations have been modified to reflect appropriate treatment of non-detect values. The outcome of this report in addition to MPCA's modifications will be included as part of the sediment database for the St. Louis River Area of Concern. Any mention of trade names or commercial products does not constitute endorsement or recommendation for use by the MPCA.

SEDIMENT INVESTIGATION REPORT

LOWER ST. LOUIS RIVER
FOND DU LAC DAM TO KINGSBURY BAY

DULUTH, ST. LOUIS COUNTY, MINNESOTA

USACE Contract No. W911XK-10-C-0024

Prepared for:

US Army Corps
of Engineers

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LIST OF ACRONYMS

%	Percent
AOC	Area of Concern
C	Celsius, degrees
COPC	Contaminants of Potentially Concern
COE	U.S. Army Corps of Engineers – Detroit District
DRO	Diesel Range Organics
EDD	Electronic Data Deliverable
ESB	Equilibrium Partitioning Sediment Benchmark
ESBTU	Equilibrium Partitioning Sediment Benchmark Toxic Unit
FCV	Final Chronic Value
GIS	Geographic Information System
GPS	Global Positioning System
LCS	Laboratory Control sample
LWD	Low Water Datum
MS/MSD	Matrix spikes/matrix spike duplicates
MPCA	Minnesota Pollution Control Agency
NOAA	National Oceanic and Atmospheric Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEC	Probable Effect Concentration
PEC-Q	Probable Effect Concentration Quotient
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
SADA	Spatial Analysis Decision Assistance
SAP	Sampling Analysis Plan
SOMAT	Somat Engineering, Inc.
SOW	Statement (or Scope) of Work
SQT	Sediment Quality Target
SSHSP	Site Specific Health and Safety Plan
SVOC	Semivolatile Organic Compound

LIST OF ACRONYMS (continued)

TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalent
TOC	Total Organic Carbon
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WHO	World Health Organization
WDTS	Water Depth at the Time of Sampling
WLTS	Water Level at the Time of Sampling

SEDIMENT INVESTIGATION REPORT
LOWER ST. LOUIS RIVER;
FOND DU LAC DAM TO KINGSBURY BAY
DULUTH, ST. LOUIS COUNTY, MINNESOTA

1.0 INTRODUCTION

Somat Engineering, Inc. (SOMAT) under contract with the United States Army Corps of Engineers (USACE) – Detroit District (COE) has completed the Sediment Investigation of the Lower St. Louis River; Fond Du Lac Dam to Kingsbury Bay (Site) located in Duluth, St. Louis County, Minnesota. This investigation was part of the ongoing work of Regulatory Agencies and Local Communities to assess and restore the environmental conditions of the St. Louis River. It was performed on behalf of the Minnesota Pollution Control Agency (MPCA) to conduct initial sediment assessment for the purpose of characterizing sediment material and to aid in assessing sediment quality in the area to resolve several issues with bottom sediment contamination. The MPCA shall determine if any regulatory measures are needed for further assessment or clean up as part of the investigation. The project area location is presented on Figure 1.1. The project study areas are presented on Figure 1.2.

The sediment investigation work was performed under the COE contract W911XK-10-0024. The general Scope of Work (SOW) was developed by the COE and MPCA and specified the planning and execution of a 150-point sediment study throughout the project study areas. The SOW was performed consistent with that described within the contract and as further presented here.

The field and laboratory analysis data and detailed assessment of sediment quality parameters were previously submitted to the COE and MPCA in April 2012. This report presents this data as well as a detailed overview of the work performed under the contract.

Project Team

The SOMAT project team that performed the detailed sediment investigation was as follows:

Team Member	Team Role
SOMAT of Detroit, MI	A-E Project Mgr, Field Team Coordination Data Review, Sediment Quality Assessment, Report preparation
Great Lakes Environmental Center (GLEC) of Traverse City, MI	Vibracore Operations
Trace Laboratories, Inc. of Muskegon, MI	Laboratory Services
Test America of West Sacramento, CA	Laboratory Services
RTI Laboratories, Inc. of Livonia, MI	Laboratory Services

The SOMAT project team implemented the sediment investigation in accordance with the project-specific Quality Assurance Project Plan (QAPP), the Work Plan, the Sampling Analysis Plan (SAP) and the Health and Safety Plan (HASP) as prepared by SOMAT and accepted by MPCA and COE. A copy of each project plan is presented in Appendix E.

1.1 INVESTIGATION AREAS

The sediment investigation was performed in the Lower St. Louis River covering approximately 1,500 acres of diverse large river system, including estuarine (undredged) river channel, river reaches, sheltered bays, and estuary flats. The study areas of the Site extended from the Fond Du Lac Dam to Kingsbury Bay. The individual target study areas along the Site are named alphabetically as follows:

Target Study Areas

Chambers Grove Reach
Cedar yard Bay
Fond Du Lac
Indian Point Waterfront
Kingsbury Bay
Minnesota Channel
Mud Lake
Munger Landing Flats
New Duluth Bay and Stretch
North Bay
Perch Lake
Rask Bay
Riverside Bay and Marina
Spirit Lake
Steelton Bay
Tallas Island Flats

The Site and target study areas are presented on Figure 1.2.

This study area has a well documented history of human activity starting with Native American settlements. It is also a unique study area because it covers a watershed within two different states and the project boundaries for this project only include areas within the State of Minnesota.

Currently the majority of the lands along the Wisconsin portion of the project boundaries consist of undeveloped forest land, with the exception of the community of Oliver, and a few residential homes adjacent to the river. The community of South Superior may also have an indirect influence on the project area due to its proximity to the Pokegama River.

The lands adjacent to the project boundary along the Minnesota side of the river have been influenced by many human activities. The current land uses of the Minnesota side of the river consist of primarily residential communities of Fond Du Lac, New Duluth, Gary, Proctor, Duluth, and Morgan Park. Many of these communities were initially built around the local economy, which included logging, mining, shipping, and processing.

1.2 GOALS AND OBJECTIVES

As part of an overall assessment of sediment quality throughout the St. Louis River AOC, this project evaluated sediment characterization through the collection of sediment samples for comprehensive chemical and physical laboratory analysis from designated areas located in the Lower St. Louis River, Duluth Harbor. The project areas were evaluated based on a random grid pattern in accordance with the sampling locations selected through the development of the project Work Plan and as accepted by the COE and MPCA. The resultant chemical data and sediment quality assessment information will then be utilized by MPCA or other regulatory agencies to assess the risk to the public health, safety, welfare, and environment. The need for regulatory measures, further assessment, and/or clean up will be determined by the MPCA or other regulatory agencies.

1.3 REPORT ORGANIZATION

The remainder of this document contains a discussion of the methods and results from the sediment investigation including the data validation and sediment quality assessment.

- *Chapter 2* presents and overview of the project and area background including a summary of relevant previous investigations
- *Chapter 3*, presents a description of the Scope of Work (SOW),
- *Chapter 4* presents an overview of the project Work Plan and how the sediment core locations were selected for the investigation.
- *Chapter 5* presents a description of the sediment investigation methods used to complete the field work tasks within the scope of work (SOW) as well as a description of the fieldwork conducted,
- *Chapter 6* presents the analytical parameters tested and analytical methods used for the sediment core samples,
- *Chapter 7* presents a summary of the data validation performed by SOMAT,
- *Chapter 8* presents the methods and results of the sediment quality assessment, and
- *Chapter* 9 presents the cited references for this report.

2.0 PROJECT AND AREA BACKGROUND

The need for the project is rooted in the background and history of the Duluth Harbor project area as well as that of the overall St. Louis River system and the subsequent environmental regulatory framework. This project and area background is detailed under the following titled paragraphs.

2.1 PROJECT BACKGROUND

The St. Louis River is the largest U.S. tributary to Lake Superior and has a special significance in the region. It serves as a geographic boundary for Wisconsin and Minnesota, and provides coastal access to Lake Superior vital to regional shipping. This waterway provides habitat for waterfowl, fish, benthic invertebrates, as well as a venue for regional recreation. Development along the waterway over the past 130 years has contributed to the contamination of this waterway. These contaminated sediments have impaired the waterway including fish advisories, habitat impairments, and restrictions on dredging. As a result 73 miles of the St. Louis River have been designated an Area of Concern (AOC) in the Great Lakes as part of the U.S.-Canada Water Quality Agreement (Annex 2 of the 1987 Protocol). Known sediment contaminates generally include elevated concentrations of oil and grease, heavy metals including mercury, and semi-volatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs).

The targeted study areas along the river stretch between Fond Du Lac Dam and Kingsbury Bay are located within the St. Louis River AOC. In 2004, the St. Louis River Remedial Action Committee identified “clean-up all hotspot contaminated sediment sites by 2020” a goal as part of the AOC’s delisting strategy.

2.2 AREA BACKGROUND

The portion of the Lower St. Louis River under the current investigation encompasses approximately 1,600 acres of estuarine (un-dredged river channel), river reaches, sheltered bays, and estuary flats. The area under investigation is approximately 11 nautical miles in length starting from the Fond Du Lac Dam to the eastern edge of Kingsbury Bay (Figure 1.1).

Known historical contamination contributors to the area include the US Steel Superfund Site adjacent to Spirit Lake and the St. Louis River Interlake/Duluth Tar Site (SLRIDT) Superfund Site located adjacent to Kingsbury Bay. The United States Environmental Protection Agency (USEPA) and Minnesota Pollution Control Agency (MPCA) have conducted investigations for these sites and are in the process of remediation. Additionally, bottom sediments from the Riverside Bay and a portion of Indian Point Waterfront were recently dredged and utilized in the restoration of the SLRIDT site. Also historic Sanborn Fire Insurance Map data indicated several sites of interest adjacent to the St. Louis River that potentially could have contributed to sediment contamination. These sites include numerous industrial structures at the Riverside Marina and New Duluth. Upstream contributors may include a paper mill in Cloquet, MN approximately 8 miles northwest of the western end of the Site and study area.

2.3 PREVIOUS INVESTIGATIONS

Previous environmental investigations of the Site or the surrounding areas have indicated that the contaminants of concern (COCs) generated by industrial and urban activities have been detected in the sediments in the river and the downstream Duluth Harbor. In addition to past and present industrial uses in the vicinity of the Site, these studies, listed below, served to identify the COCs for this investigation and supported the study location selection process.

- MPCA - Bioaccumulation of contaminants in the Duluth-Superior Harbor (AScI Corporation, 1999)
- MPCA - Detailed Investigation of the Minnesota Slip, MPCA Technical Document, tdr-g1-01 (Streitz and Johnson, 2005)
- MPCA - Phase IV GIS-based sediment quality database for the St. Louis River Area of Concern – Wisconsin focus (Crane 2006)
- US EPA Great Lakes National Program Office - Survey of sediment quality in the Duluth-Superior Harbor: 1993 sampling results (Schubauer-Berigan and Crane 1997)
- US EPA Great Lakes National Program Office - Sediment assessment of hot spot areas in the Duluth-Superior Harbor (Crane et al. 1997)
- US EPA Great Lakes National Program Office - Sediment Remediation Scoping Project in Minnesota Slip, Duluth Harbor (Crane et al., 2002)

- Regional Environmental Monitoring and Assessment Program (R-EMAP) - Surveying, sampling and testing: 1995 and 1996 sampling results (Breneman et al., 2000)
- US EPA Great Lakes National Program Office - Assessment of Contaminated Sediments in Slip C Duluth Harbor, Minnesota (Crane 1999)

3.0 SCOPE OF WORK

The Scope of Work (SOW) was designed as part of an assessment of sediment quality in throughout the Lower St. Louis River and Duluth Harbor. In general the SOW was developed by the COE and MPCA and specified the planning and execution of a 150-point sediment study throughout the project study areas. The key work elements of the SOW were as follows:

SOW Work Elements

- Develop Work Plan and Select Study Locations
- Field Investigation,
- Chemical and Physical Laboratory Analysis,
- Field and Laboratory Data Review,
- Sediment Quality Assessment, and
- Data and Report Presentation.

The SOW work elements are further described under the following titled paragraphs:

Work Plan

SOMAT developed the project Work Plan for the proposed 150 sediment core locations in coordination with the MPCA. The primary task in developing the Work Plan was to select and identify the locations of the 150 study points within the project boundaries. The Site review activities which supported the rationale and decision making in determining the proposed sampling locations within the defined study site boundaries were as follows:

- visual site reconnaissance,
- review of existing GIS data (provided by MPCA),
- review of existing land use and historical data,
- review of available regulatory framework, and
- review of existing literature and relevant studies.

Further details regarding the area evaluation and determination of the study points is presented in Section 4.0.

Field Investigation

The fieldwork for the sediment investigation consisted of sediment coring and sample collection at predetermined locations throughout the Site's numerous study areas consistent with the project Work Plan. The investigation fieldwork was completed in the Spring/Summer of 2011. The project areas were evaluated based on a random grid pattern. The sediment sampling was undertaken primarily using Vibracore methods from a pontoon research vessel. The sediment core collection points are presented in overview in Figure 3.1. In general, samples were obtained from two (2) sample intervals from each sediment core location and submitted to the analytical laboratories for a comprehensive list of chemical and physical analyses. The sediment sample collection and other field data activities are detailed further in Section 5.0.

Chemical and Physical Laboratory Analysis

The sediment samples were submitted via overnight currier, under proper chain of custody, to the investigation team laboratories to be analyzed for numerous chemical and physical parameters. The analysis strategy, analytical methods, laboratories, and results are further detailed in Section 5.0, and Section 6.0.

Field and Laboratory Data Review

The field and laboratory analytical results were reviewed for completeness and validated for use. The sediment coring and sampling data and other field measurements were recorded and used to generate sediment core logs. Measured water depths were corrected to the low water datum elevation. Section 7.0 presents the detailed analytical data review and validation.

Sediment Quality Assessment

The validated chemical analytical results were used to develop and assess selected sediment quality parameters as selected by COE and MPCA. Section 8.0 presents the detailed description of the sediment quality parameters, the calculation methods, and the assessment results by parameter and by analyte where appropriate.

Data and Report Presentation

This report was prepared to present the culmination of work performed and includes the work plan sample location determination, the field sediment coring and sampling activities, the laboratory analysis and data validation, a detailed assessment of sediment quality parameters, and a comprehensive database set. The validated field and laboratory chemical and physical analysis data, along with the detailed database set were previously submitted to the COE and MPCA in April 2012. The validated data and detailed database set was also submitted to the National Oceanic and Atmospheric Administration (NOAA) in May 2012 and accepted in July 2012 for incorporation into their NOAA Query Manager regional database.

4.0 SEDIMENT CORE LOCATIONS

One hundred fifty (150) sediment core locations were selected within the project boundaries in coordination with the MPCA. The project boundaries were clearly defined using ArcView GIS (geographic information system), existing Topographic and Navigation Maps, and satellite imagery. The number of samples assigned to each study area within the project boundaries was based on the results of the site reconnaissance and literature review. The following were taken into consideration in selecting the sample locations.

- visual site reconnaissance
- review of existing GIS data provided by the MPCA
- review of existing land use data
- review of available regulatory framework, and
- review of relevant studies.

4.1 SITE RECONNAISSANCE

SOMAT performed a site reconnaissance in October of 2010. This survey included identification of deposition areas, current land use and accessibility to the project study areas. The project Work Plan (Appendix E) also details the methodology and the findings of this survey.

The Site reconnaissance was performed by touring both the land side as well as on the water with SOMAT team member Great Lakes Environmental Center (GLEC). On the waterway the area was traversed via the GLEC research vessel. The team navigated the entire length of the project boundaries that were accessible with the vessel, from the Grassy Point Swing Rail Bridge to the Fond Du Lac Dam. During the reconnaissance the team noted areas for access on and off the water and those that would present accessibility difficulties during sampling. The stream flow and depth were observed and areas of likely sediment deposition were noted. Throughout the tour the team visually observed the current land use, examined the area for signs and indications of historical land use, and identified boat access and locations to stage the sample processing activities.

During the site reconnaissance on the water the bottom sediments were periodically probed to ascertain the approximate composition for future core sampling. It was observed that a majority of the river bottom from Fond Du Lac to the Fond Du Lac dam was composed of coarse grained sand, gravel, cobble and/or boulders with little to no soft sediment encountered. The water flow was also observed to be considerably higher than that observed throughout the downstream areas. In this part of the river, sediment deposition would be anticipated to occur in isolated areas with lower stream velocities. These isolated areas, if any, would likely be routinely flushed downstream during seasonal flooding. Continuous core sampling in this area would not be feasible given the observed bottom conditions and the proposed sampling methods. With these considerations, the area from Fond Du Lac Dam to the Evergreen Memorial Highway Bridge was *removed* from the sediment coring and sampling plan during this phase.

No other study areas were eliminated from within the project boundaries due to the site reconnaissance observations.

4.2 EXISTING GIS DATA

In support of the development of the project Work Plan and the selection of sediment core and sampling locations, SOMAT met with the MPCA in Duluth, Minnesota in October of 2010. In addition to reviewing the project goals and objectives, the proposed sampling approach and any ongoing and previous studies in the project area, a compellation of existing GIS data from previous studies in the area was provided by MPCA to SOMAT for use in this study. This data included geographical information, historical information, habitat information, as well as analytical results from previous investigations. More specifically, the geographical information considered during this study obtained from the data provided by MPCA included the following:

- Land Use Information
- Lower St. Louis River Habitat Plan
- Historical Sanborn Data
- USEPA Inland Sensitivity Atlas Data
- Water Quality Data

- Water Use Information
- NOAA Navigation Charts

4.3 EXISTING AND HISTORICAL LAND USE DATA

The project study area has a well documented history of human activity starting with Native American settlements. It is also a unique study area because it covers a watershed within two different states and the project boundaries for this project only include areas within the state of Minnesota. SOMAT did, however, take into consideration land use information from both states. Also considered were current and historical land uses upstream of the project boundary.

Wisconsin

Currently the majority of the lands along the Wisconsin portion of the project boundaries consist of undeveloped forest land, with the exception of the small community of Oliver, and a few residential homes adjacent to the river. The community of South Superior may also have an indirect influence on the project area due to its proximity to the Pokegama River.

Minnesota

The lands adjacent to the project boundary along the Minnesota side of the river have been influenced by numerous human activities. The current land uses of the Minnesota side of the river consist of primarily residential communities of Fond Du Lac, New Duluth, Gary, Proctor, Duluth, and Morgan Park. Many of these communities were built around the local economy, which included logging, mining, shipping, and processing.

Known historical contamination contributors to the area include the US Steel Superfund Site adjacent to Spirit Lake and the St. Louis River Interlake/Duluth Tar Site (SLRIDT) Superfund Site located adjacent to Kingsbury Bay. The USEPA and MPCA have already conducted investigations for these sites and are in the process of remedial design. These specific areas are not included in this investigation but their proximity to this study area has been taken into consideration during this sample selection process to help identify the presence of any potential contamination. Additionally, bottom sediments from Riverside Bay and a portion of Indian Point Waterfront were recently dredged and utilized in the restoration of the SLRIDT site. Therefore, these areas were also *removed* from the study during the sample selection process.

Historical Sanborn Fire Insurance Maps data indicated several sites of interest adjacent to the St. Louis River that could have potentially contributed to sediment contamination. These sites include numerous current and former industrial structures at the Riverside Marina and in New Duluth. This information was taken into consideration in the sample selection processes.

4.4 REGULATORY FRAMEWORK

A search and review of the existing regulatory framework within the study area for potential contribution sources and to sediment contamination and potential discharge areas yielded the following information:

<u>Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)</u>

- US Steel, and
- Lakehead Blacktop - H_2S release.

<u>Toxic Release Inventory (TRI)</u>

- ME International,
- Duluth Brass Manufacturing,
- A E Stanley Manufacturing Company,
- Duluth Brass & Aluminum Company,
- Stora Enso North America - Paper Mill, and
- Murphy Oil USA Inc.

<u>National Pollutant Discharge Elimination System (NPDES)</u>

- ME International,
- Murphy Oil USA Inc.,
- A E Stanley Manufacturing Company,
- Duluth Missabe & Iron Range Railway Company, and

- Seaway Port Authority of Duluth.

Resource Conservation and Recovery Act (RCRA) Large Quantity Generator

- DM&IR Railway- Proctor Yard, and
- Dynamic Structural Steel.

Assessment, Cleanup and Redevelopment Exchange System (ACRES)

- United Atlas Cement, and
- Spirit Lake Marine, Inc.

The information found was evaluated to determine the potential impact on the study site and incorporated into the consideration during core and sample location selection.

4.5 RELEVANT PAST STUDIES

Past sediment and water quality and other relevant environmental studies were referenced to assist in identifying the contaminants of concern (COCs) for this investigation and support the study location selection process. These studies indicated that the COCs generated by industrial and urban activities have been detected in the sediments in the River and the downstream Duluth Harbor. The list of these previous environmental investigations was presented above in Section 2.3.

4.6 SELECTED CORE SAMPLE LOCATIONS

SOMAT considered several alternative sample location designs during selection of the 150 sediment core locations. It was concluded that a *stratified random sampling method* would best fit the project objectives. This method helps to identify contamination in areas previously unknown.

The first step in the sample selection process was to clearly define the project boundaries. This was done using GIS software and existing Topographic and Navigation Maps as well as current satellite imagery. Once the investigation boundary was clearly defined it was then subdivided into the study areas listed below and shown in Figure 1.2. A number of sample points were then assigned to each study area based on the Project Site Review and geographical size relative to the total area of the investigation. With the known number of sample points for each study area a simple random grid was applied to each study area using SADA (Spatial Analysis Decision Assistance), a program developed to aid in site assessment. In addition, previous sample locations known to date, as presented in the background information provided by MPCA, were reviewed to avoid selecting locations in areas previously sampled. The selected core locations and coordinates are included in Table 1.1 and presented on Figure 3.1.

After careful review of existing data, existing studies, and the site area reconnaissance the distribution of the 150 sample locations within each specific project study area were determined as presented in the table below. The selected target sediment core and sampling locations were reviewed and accepted by USACE and MPCA.

Distribution of Sediment Core Locations

Study Area Name	Number of Core Locations
Chambers Grove Reach	1
Cedar Yard Bay	2
Fond Du Lac Stretch	4
Indian Point Waterfront	6
Kingsbury Bay	5
Minnesota Channel	3
Mud Lake	16
Munger Landing	6
New Duluth Bay and Stretch	15
North Bay	6
Perch Lake	3
Rask Bay	11
Riverside Marina	5
Spirit Lake	54
Steelton Bay	8
Tallas Island Flats	5
Total Sediment Core Locations	**150**

5.0 SEDIMENT CORING AND SAMPLING

The sediment coring and sampling field activities were performed in accordance with the project Work Plan, QAPP and SAP, and as accepted by MPCA. A copy of each project plan is included in Appendix E. The field methodologies used to complete the designated work tasks are presented under the following titled paragraphs.

5.1 FIELD METHODOLOGY

The following section summarizes the field methods used to obtain continuous sediment cores and collect surface and subsurface sediment samples for the Lower St. Louis River sediment investigation. These cores were collected to evaluate the general presence of contaminants within the various study areas at the Site. The sediment core sampling methods included the use of Vibracore and Wildco coring/sampling devices. The sample locations were determined by the MPCA/COE. The coordinates of the sediment core sample points were located by using a handheld Garmin 300 GPS receiver and are presented in Table 1.1, Sample Summary. The general locations of the sediment core samples are shown in Figure 3.1. Detailed sediment sample location diagrams, by specific study areas, are presented in Section 8.0, Sediment Quality Assessment and associated figures.

5.1.1 Vibracore Sampling

A Vibracore sampling device was used for collecting sediment cores during 2011 sampling event. The vibracore was selected as a highly effective sampling method for obtaining continuous core lengths of soft sediment. The vibracore unit works by high frequency vibration powered by compressed air. The unit is suspended from a 15 feet tall aluminum tripod equipped with an electric winch and pulley systems for raising and lowering the head unit. In addition to the vibration, the head unit and attached sampling tube are advanced with a 300 pound weight. The tripod-mounted vibracore unit was deployed on a pontoon boat during the open water sample collection event.

The vibration frequency of the vibracore is adjustable, allowing the operator to tune into the natural frequency of the strata being sampled, control the rate of penetration, and collect consistent and intact samples. The vibracore unit advances a continuous clear plastic or stainless steel core tubing. Once the tubing and sample is retrieved to the surface the tubing is drained, capped and transferred to shore for logging and sample processing. Because of its light weight and portability, the equipment can also be readily mounted on a sled mounted tripod and easily moved over ice during winter conditions.

The core samples were obtained by lowering the vibrating head of the vibracore with an attached twelve (12) feet long, four (4) inch internal diameter, cellulose acetate butyrate liner with interior material catcher, into the sediment until refusal.

Vibracore sampling on ice in Superior Bay

Upon refusal, the entire vibracore apparatus was lifted until the lead portion of the collection tube was just below the water surface. Two to four holes were drilled into the tube just above the top of the trapped sediment to drain the water column trapped above the sediment core. While the water column was draining, a plastic cap was fitted to the end of the core tube which was still below the water surface. These steps were used to prevent "core blowouts" of the water column overburden in the collection tube, prematurely forcing the sediment material out of the bottom of the collection tube. Once the water column was drained, the collection tube was removed from the head unit. The core length was measured and the tube was cut just above the top of the sediment. The top of the tube was then capped and both capped ends were then taped. The collected core was labeled and taken to the on-shore mobile laboratory for processing. In order to obtain sufficient sediment material to fulfill the sampling requirements for the requested chemical analyses, multiple sediment cores were collected at each location.

5.1.2 Wildco Sampling

In the case of vibracore refusal or difficult or unsatisfactory recovery, a Wildco sediment core sampler was employed as an alternative sample collection device. The Wildco sediment core sampler consists of a two inch diameter No. 304 stainless steel core tube and a screw-on Lexan™ nose piece. A plastic eggshell-type core catcher was used to hold the sediment sample intact during extraction, and a CAB liner was used to receive the sample. The sediment was retained in the liner with both the core catcher and check valve contained within the core sampler. Galvanized steel extensions were used to collect samples at water depths up to thirty (30) feet deep and extend up to four (4) feet into the underlying sediment. Extensions to collect sediment core samples up to 48 inches long were used, if required.

5.1.3 Sample Logs

Once extracted, the sediment core samples collected at each station were photographed and a field log was prepared following the requirements and procedures in the SOW and the QAPP. Before each core tube was opened, the MPCA-designated sample intervals were measured and marked on each tube. Information recorded in the sediment core logs included the following:

- names of the sampling team,
- weather conditions,
- latitude and longitude of the actual sample location,
- the water depths recorded at the time of investigation (corrected to the Low Water Datum),
- ice thickness (if collected during winter),
- type of sampling equipment used,
- sample collection date,
- time of sample collection,
- number of cores or grabs and attempts at each location,
- station/core identification number,
- length of each core retrieved and depth probed,
- identification number of the sample photograph, and
- a description, measurement, and identification of the material of each core retrieved according to ASTM D 2488, "Standard Practice for Description and Identification of Soils (Visual - Manual Procedure)" with descriptive terminology of all material recovered with

particular attention to organic components such as wood sticks, leaves, wood chips, presence of visible oil, and etc.

The sediment core photographs are presented on the respective Sediment Core Logs in Appendix A.

5.1.4 Sample Preparation and Handling

Mobile sediment core and sample processing station

The sediment cores were cut at the marked target sample intervals. Samples were prepared for laboratory analysis by mixing sample interval material from multiple cores recovered at a particular sampling location, but from the same depth range, to meet the quantity requirement of sample for analytical testing. Each sample was transferred from the liner to a stainless steel mixing bowl thoroughly decontaminated and washed with distilled water. Large stones and aquatic vegetation were removed from the samples. Samples were then homogenized by hand mixing with a large stainless steel spoon. Once thoroughly homogenized, the samples were transferred into pre-decontaminated/sterilized and individually labeled sample containers made of borosilicate glass with Teflon linings. The sample containers were provided by the analytical laboratories. Chain-of-custody over samples was produced and maintained at all times. The samples were stored at 4^{o}C in dark until transported to the laboratory for physical and chemical analysis. Sample packaging, shipping, and chain-of-custody were performed in accordance with the QAPP and the guidelines as listed in the USACE (1986). Samples of this project were considered to be ‘low level’ environmental samples for safety, packaging, and shipping purposes.

5.2 WATER DEPTHS AND LOW WATER DATUM

The depth of the water at each sediment core location was measured at the time of core collection. Later, each measured water depth in the field, or, Water Depth at Time of Sampling (WDTS), was then corrected to the Low Water Datum (LWD) using the National Oceanic and Atmospheric Administration (NOAA) Water Level at Time of Sampling (WTLS) method as follows:

- WLTS was obtained from the Center for Operational Oceanographic Products and Services, a division of NOAA. The WLTS plots for a particular day and time for Water Level Station No. 9099064 located in Duluth, Minnesota were used in this investigation. For this station, the LWD is given as 601.1 feet above mean sea level. The difference between WLTS and LWD is the depth correction (+/-) to be applied to the WDTS to obtain the LWD corrected water depth.

The corrected WDTS data were recorded on the respective sediment core logs, Appendix C, and in the Analytical Database presented in Appendix D.

5.3 FIELD SEDIMENT CORES AND SAMPLES SUMMARY

Three hundred twenty five (325) core samples were collected at the selected 150 locations. One surface sediment sample (i.e., generally 0-0.5 feet depth interval) and one at-depth sample were collected at each location. The following table shows the number of core samples collected at each study area. The quantity of sediment samples shown also includes the Quality Assurance/Quality Control (QA/QC) samples as described in the project QAPP (Appendix E).

Study Areas and Number of Sediment Cores Collected

Study Area	Number of Core Locations	Number of Sediment Samples (including field duplicates)
Chambers Grove Reach	1	2
Cedar Yard Bay	2	4
Fond Du Lac Stretch	4	8
Indian Point Waterfront	6	14
Kingsbury Bay	5	12

Minnesota Channel	3	6
Mud Lake	16	30
Munger Landing	6	14
New Duluth Bay and Stretch	15	30
North Bay	6	12
Perch Lake	3	8
Rask Bay	11	22
Riverside Marina	5	10
Spirit Lake	54	124
Steelton Bay	8	17
Tallas Island Flats	5	12
Total	**150**	**325**

The core samples were documented and processed following the project QAPP. The sediment core logs with photographs are presented in Appendix A.

6.0 LABORATORY ANALYSIS

The laboratory analyses of the sediment samples were performed in accordance with the Work Plan, the SAP, the QAPP, and as directed by MPCA/USACE. A copy of these Project Plans is presented in Appendix E. The blended/homogenized sediment samples were submitted to the analytical laboratories for chemical and physical analysis. The total sample set, 325 samples, were analyzed for metals, total organic carbon (TOC), polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, polychlorinated biphenyls (PCBs), particle size, and water content. Of the total sample set, one hundred sixty one (161) samples were also analyzed for other additional parameters including diesel range organics (DRO), semi-volatile organic compounds (SVOCs), black carbon, and dioxins/furans.

The analytical parameters tested, analytical methods used and number of core samples, including QA/QC samples, are summarized as follows:

Analytical Parameters and Test Methods

Parameter	Method of Analysis	Sample Quantity
Black Carbon	Gustafson/Lloyd Kahn	162
Dioxins/Furans	SW-846/1613B	161
DRO	SW-846/8015B WI	161
Metals	SW-846/6020	325
Particle Size	ASTM D422	325
Percent Moisture	ASTM D2216	325
PCBs (Aroclors)	SW-846/8082	300
PAHs (expanded list + alkylated PAHs)	SW-846/8270D	325
Pesticides	SW-846/8081	161
SVOCs	SW-846/8270D	162
TOC	SW-846/9060	325

Three USACE-approved analytical chemical laboratories used to analyze the sediment samples was as follows.

- RTI Laboratories:
  - SVOCs, Black Carbon, DRO, PAHs, TOC, and metals
- Trace Analytical:
  - Pesticides and PCBs
- Test America:
  - Dioxins

The USACE-approved physical laboratory used to analyze the sediment samples was as follows:

- SOMAT:
  - Grain size distribution and water content

The laboratory chemical and physical analysis reports, and the respective chains of custody, are presented in Appendix B and were initially submitted to the COE and MPCA in April 2012.

7.0 DATA VALIDATION

This section summarizes the data validation procedure and findings for the chemical testing performed for Lower St. Louis River Sediment Investigation.

Upon receipt of laboratory analytical sediment data, SOMAT conducted a quality assurance review and data validation of all data sets. Consistent with the QAPP (Appendix E), the guideline used for data validation including the assignment of qualifiers was as follows:

- *MPCA (2011a) "Laboratory Quality Control and Data Policy"* Minnesota Pollution Control Agency, St. Paul, Minnesota, Document number: p-eao2-09a, July 2011.
- *MPCA (2011b) "Laboratory Data Review Checklist Guidance"* Minnesota Pollution Control Agency, St. Paul, Minnesota, Document number: p-eao2-11a, September 2011.

A copy of these guidance documents are included in Appendix C.

The laboratory analytical reports and electronic data deliverables (EDDs) were reviewed for the following:

- holding times,
- reporting limits,
- surrogate recovery,
- laboratory control sample (LCS) recovery,
- matrix spike/matrix spike duplicate (MS/MSD) recovery,
- method blank contamination, and
- relative percent difference (RPD) of field duplicates.

Other data review and validation considerations were made and applied as follows:

- Following guidance from the MPCA project manager, a deviation from the MPCA (1998) was made for the validation qualifiers applied for the nondetected data where the surrogate recoveries are less than 30%. Instead of rejecting such data according to the MPCA (1998) the data were considered estimated and qualified using the "J" qualifier,

- The SOMAT data quality manager did not assign qualifiers to the sample results based on MS/MSD recoveries following MPCA (1998),
- Where laboratory reports make method references to EPA SW-846 8270 (SVOC analysis) with versions such as 8270C and 8270D, the SOMAT data quality manager verified that these modified method references maintain the same specific method analysis procedures (i.e., the modifications are not related to that part of the method that dictates the analytical process). Therefore, the analytical results between the modified method references are considered to be achieved through the same method.
- The analytical laboratory used a manual integration method to estimate alkylated PAHs. The SOMAT data quality manager confirmed this method as acceptable.

The quality assurance (QA) data review for each data set/report was documented in separate data validation memoranda presented in Appendix C. The results of the review indicated that the data were of acceptable quality and were useful for the intended purposes.

2012 Data Submittal to COE/MPCA

The validated analytical data and data information were assembled into one single database (MS Access), a copy of which is presented in Appendix D and which was initially submitted to the COE and MPCA on April 12, 2012, along with the sediment quality assessment results (Section 8.0).

2012 Data Submittal to NOAA

On May 11, 2012, the validated data/data information database was also submitted to the National Oceanic and Atmospheric Administration (NOAA) for inclusion into the NOAA Query Manager database system. NOAA has accepted and incorporated the database set into their system.

8.0 DATA ANALYSIS FOR SEDIMENT QUALITY ASSESSMENT

Analysis of the laboratory data was performed to determine parameters to aid in sediment quality assessment. The following parameters were selected by MPCA for this purpose:

Sediment Quality Assessment Parameters

- Mean probable effect concentration quotients (mean PEC-Qs),
- Minnesota Level I and Level II sediment quality targets (SQTs),
- Total of Priority PAHs, EPA PAH-16, and EPA PAH-34,
- Equilibrium partitioning sediment benchmark toxic units (ESBTU) of total PAHs, and
- Dioxin (TCDD) toxicity equivalent concentrations.

The sediment quality assessment results, along with the validated analytical data and data information, were assembled into one single database (MS Access), a copy of which is presented in Appendix D and which was initially submitted to the COE and MPCA on April 12, 2012.

The following sections detail the sediment quality assessment methods and the results for this project.

8.1 ASSESSMENT OF SEDIMENT QUALITY USING MEAN PEC-Q

As one way to evaluate sediment quality, mean PEC-Q provides a sediment assessment tool that distills data from a mixture of contaminants into one unit less index (MPCA 2007). The concept of mean PEC-Qs is derived as follows:

The lower and upper effect levels at which toxicity to benthic-dwelling organisms are predicted to be unlikely and probable, respectively, are established by the USEPA through several researches. The upper effect level concentration is referred to as the *probable effect concentration* (PEC). Toxicity of a contaminant to sediment dwelling organisms or benthic invertebrates can be predicted by using the PEC of the contaminant.

To predict the toxicity for *mixtures* of various contaminants in sediments, the concentration of each contaminant is divided by its corresponding PEC. The resulting values are called PEC-Quotients (PEC-Qs). The individual PEC-Qs are summed and divided by the number of PEC-Qs to yield a mean PEC-Q. The mean PEC-Q values can then be used to predict the toxicity of a mixture of contaminants in sediment samples.

According to MPCA (2007), at mean PEC-Q values less than 0.1, harmful effects on benthic invertebrates are unlikely to be observed. At mean PEC-Q greater than 0.6, harmful effects on sediment-dwelling organisms are likely to be frequently or always observed.

The method, assumptions, and parameters used in calculating mean PEC-Qs at the data points within the sixteen study areas are briefly discussed below.

8.1.1 Method, Parameters, and Assumptions

The mean PEC-Qs were calculated using the procedures recommended and outlined in by MPCA (2007) for the integration of total PAHs, total PCBs, and selected metals. In brief, mean PEC-Qs were calculated as described in the below text box.

Mean PEC-Q Calculation Method

$$mean\ PEC-Q = \frac{mean\ PEC-Q_{metals} + PEC-Q_{TotalPAHs} + PEC-Q_{PCBs}}{n}$$

where *n* is the number of classes of chemicals (i.e., 1 to 3),

$$mean\ PEC-Q_{metals} = \frac{\sum individual\ metal\ PEC-Qs}{n'}$$

where *n′* is the number of metals with reliable PECs (i.e., 1 to 7), and

$$PEC-Q\ (of\ \ PAHs\ or\ PCBs\ or\ individual\ metals) = \frac{chemical\ concentration\ (in\ dry\ wt)}{corresponding\ PEC\ value}$$

Only contaminants with reliable probable effect concentrations (PECs) were used in calculating mean PEC-Qs. The contaminants and corresponding PECs used in this analysis were those presented in USEPA (2000) and are summarized in the table below.

Probable Effect Concentrations (PEC)

Contaminant	PEC (mg/kg dry weight)
Arsenic	33
Cadmium	4.98
Chromium	111
Copper	149
Lead	128
Nickel	48.6
Zinc	459
Total PAHs	22.8
Total PCBs	0.676

The total PAH concentration is the summation of the 13 priority PAH concentrations. The 13 priority PAHs (MPCA, 2007) include 2-methylnaphthalene, acenaphthelene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorine, naphthalene, phenanthrene, and pyrene.

The total PCB concentration is the summation of the seven (7) PCB Aroclors (MPCA, 2007).

Consistent with MPCA instructions, the nondetect concentrations were assumed as zero (for mean PEC-Q calculation) for analytes where all the concentrations are nondetect within a study area. Where an analyte was detected in more than one sample within a study area, the nondetects for that analyte were assumed as one-half of the reporting limit for mean PEC-Q calculation.

8.1.2 Results of the Mean PEC-Q Analysis

An overall summary of the mean PEC-Q results is presented in Table 8.1. Mean PEC-Qs of all sample locations in each of the sixteen study areas is presented in Tables 8.2 through 8.16. In addition, Table 8.17 presents the concentration of individual Aroclors used to calculate total PCBs. The maps showing the sediment sample locations of each study area and risk levels based on the mean PEC-Q are presented in Figures 8.1 through 8.14. Such maps were not generated for the Cedar Yard Bay and Chambers Grove Reach areas due to the availability of two or less sample locations.

8.1.3 Discussion: Sediment Quality Based on Mean PEC-Qs

For risk evaluation purposes, sediment samples were categorized into three groups based on the mean PEC-Q value consistent with MPCA (2007) with as shown below:

- Low risk group: Samples with mean PEC-Qs below 0.1;
- Moderate risk group: Samples with mean PEC-Qs of >0.1 and < 0.6; and
- High risk group: Samples with mean PEC-Qs of > 0.6.

Surface Sediment Samples:

Mean PEC-Qs were calculated for the 169 surface (i.e., 0-0.5ft) sediment samples collected at the sixteen study areas. As presented in the Table 8.1, only 2% of the surface sediment samples show potential high risk to the sediment dwelling organisms (i.e., mean PEC-Q > 0.6). About 28% of the surface sediment samples show low risk to the sediment dwelling organisms (i.e., mean PEC-Q < 0.1). The remaining sediment samples indicate moderate risk to the sediment dwelling organism.

At-Depth Sediment Samples:

Mean PEC-Qs were calculated for the 156 sediment samples at depth (i.e., depth > 0.5 ft) collected at the sixteen study areas. As presented in the Table 8.1, about 5% of the sediment samples show potential high risk to the sediment dwelling organisms (i.e., mean PEC-Q > 0.6). About 37% of the surface sediment samples show low risk to the sediment dwelling organisms (i.e., mean PEC-Q < 0.1). The remaining sediment samples indicate moderate risk to the sediment dwelling organism.

The number of sediment samples in each risk category of the sixteen study areas is summarized in Figure 8.15.

The results of mean PEC-Qs of individual study areas are discussed below:

Chambers Grove Reach (*refer to Table 8.2*): one (1) surface sediment samples and 1 at-depth sediment samples were collected at Chambers Grove Reach area. All samples indicated low risk to the benthic dwelling organisms.

Cedar yard Bay (*refer to Table 8.2*): Two (2) surface sediment samples and 2 at-depth sediment samples were collected at Cedar Yard Bay area. According to mean PEC-Qs, all sediment samples indicated moderate risk. None of the mean PEC-Q values calculated for Cedar Yard Bay area were above 0.3.

Fond Du Lac Stretch (*refer to Table 8.3 and Figure 8.1*): Four (4) surface sediment samples and 4 at-depth sediment samples were collected at Fond Du Lack Stretch. According to mean PEC-Qs, the sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for this area were above 0.12.

Indian Point Waterfront (*refer to Table 8.4 and Figure 8.2*): Seven (7) surface sediment samples and 7 at-depth sediment samples were collected in Indian Point Waterfront area. The samples show moderate to high risk to sediment dwelling organisms. Only the mean PEC-Q values calculated for at-depth samples at IPW-2 location were above 0.6.

Kingsbury Bay (*refer to Table 8.5 and Figure 8.3*): Six (6) surface sediment samples and six (6) at-depth sediment samples were collected at Kingsbury Bay area. All samples except the at-depth sample at KB-4 show moderate risk to sediment dwelling organisms. Mean PEC-Q value calculated for at-depth sample at KB-4 were below 0.1.

Minnesota Channel (*refer to Table 8.6 and Figure 8.4*): Three (3) surface sediment samples and 3 at-depth sediment samples were collected at Minnesota Channel. The sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the Cargill Slip B were above 0.2.

Mud Lake (*refer to Table 8.7 and Figure 8.5*): Seventeen (17) surface sediment samples and 13 at-depth sediment samples were collected at Mud Lake. The sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the Mud Lake were above 0.4.

Munger Landing (*refer to Table 8.8 and Figure 8.6*): Seven (7) surface sediment samples and 7 at-depth sediment samples were collected at Munger Landing. The at-depth sediment samples show moderate to high risk to sediment dwelling organisms except for the at-depth samples at MLA-5 and MLA-6. The mean PEC-Q values calculated for the surface sediment samples indicated moderate risk.

New Duluth Stretch (*refer to Table 8.9 and Figure 8.7*): Fifteen (15) surface sediment samples and 15 at-depth sediment samples were collected at New Duluth Stretch. The sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the New Duluth Stretch were above 0.2.

North Bay (*refer to Table 8.10 and Figure 8.8*): Six (6) surface sediment samples and six (6) at-depth sediment samples were collected at North Bay area. All the sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for this area were above 0.25.

Perch Lake (*refer to Table 8.11 and Figure 8.9*): Four (4) surface sediment samples and four (4) at-depth sediment samples were collected at Perch Lake. The samples indicted a moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the Perch Lake samples were above 0.31.

Rask Bay (*refer to Table 8.12 and Figure 8.10*): Eleven (11) surface sediment samples and 11 at-depth sediment samples were collected at Rask Bay area. The sediment samples indicated low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the Rask Bay samples were above 0.19.

Riverside Marina (*refer to Table 8.13 and Figure 8.11*): Five (5) surface sediment samples and 5 at-depth sediment samples were collected at Riverside Marina. The sediment samples show moderate to high risk to sediment dwelling organisms except for one surface sample with low risk (i.e., at RSM-5).

Spirit Lake (*refer to Table 8.14 and Figure 8.12*): Sixty five (65) surface sediment samples and fifty nine (59) at-depth sediment samples were collected at Spirit Lake. All the surface sediment samples show low to moderate risk to sediment dwelling organisms. The at-depth samples also show low to moderate risk except for 4 at-depth samples with mean PEC-Q values greater than 0.6.

Steelton Bay (*refer to Table 8.15 and Figure 8.13*): Ten (10) surface sediment samples and 7 at-depth sediment samples were collected at Steelton Bay area. The sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the Steelton Bay area samples were above 0.24.

Tallas Island Flats (*refer to Table 8.16 and Figure 8.14*): Six (6) surface sediment samples and 6 at-depth sediment samples were collected at Tallas Island Flats. The sediment samples show low to moderate risk to sediment dwelling organisms. None of the mean PEC-Q values calculated for the Tallas Island Flats samples were above 0.12.

8.2 ASSESSMENT OF SEDIMENT QUALITY USING MPCA LEVEL I AND LEVEL II SQTS

Sediment quality targets (SQTs) have been established by the MPCA for use in managing sediment quality issues in the St. Louis River AOC (MPCA 2007). In recognition of the challenges and complexities that are associated with the sediment management in the St. Louis River AOC two different SQT Levels were developed. The Level I SQTs are to identify contaminant concentrations *below* which harmful effects on sediment-dwelling organisms are *unlikely* to be observed. The Level II SQTs are to identify contaminant concentrations *above* which harmful effects on sediment-dwelling organisms are *likely* to be observed. The data from this investigation was compared to the MPCA SQT Levels to evaluate sediment quality, as discussed below:

8.2.1 Method, Parameters, and Assumptions

The contaminant concentrations of each sample location were compared against MPCA Level I and Level II SQTs to aid in assessing sediment quality. The contaminant and corresponding SQTs used in the analysis per MPCA (2007) are summarized in the table below.

Level 1 and Level II SQT Concentrations (MPCA, 2007)

Substance	Level I SQT	Level II SQT
Metals (in mg/kg dry weight)		
Arsenic	9.8	33
Cadmium	0.99	5
Chromium	43	110
Copper	32	150
Lead	36	130
Mercury	0.18	1.1
Nickel	23	49
Zinc	120	460
Total PAHs (in µg/kg dry weight)	1600	23000
2-Methylnaphthalene,	20	200
Acenaphthelene	6.7	89
Acenaphthylene	5.9	130
Anthracene	57	850
Fluorine	77	540
Naphthalene	180	560
Phenanthrene	200	1200
Benz(a)anthracene	110	1100
Benzo(a)pyrene	150	1500
Chrysene	170	1300
Dibenz(a,h)anthracene	33	140
Fluoranthene	420	2200
Pyrene	200	1500
Total PCBs (in µg/kg dry weight)	60	680

Level 1 and Level II SQT Concentrations (MPCA, 2007)

Substance	Level I SQT	Level II SQT
Dioxins (in ng TEQ/kg dry weight)		
Polychlorinated dibenzo-p-dioxins/dibenzo furans	0.85	21.5

Note: Pesticide is not detected in the sixteen study areas and hence the SQTs are not included in this table.

The total PAHs is the summation of the 13 priority PAH concentrations and the total PCBs is the summation of the seven PCB Aroclor concentrations. A detailed discussion on the estimation of toxicity equivalent (TEQ) concentration of dioxins is provided in the Section 8.5.

Consistent with MPCA instructions, the nondetect concentrations were assumed as zero (for SQT comparison) for analytes where all the concentrations are nondetect within a study area. Where an analyte was detected in more than one sample within a study area, the nondetects for that analyte were assumed as one-half of the reporting limit.

8.2.2 Results of the SQT Comparison

The summary of the SQT comparison to the analytical data from the sample locations at each of the sixteen study areas is presented in Tables 8.18 through 8.32.

Also, Figures 8.16 through 8.29 graphically present the comparison of the contaminant concentration to the SQT Level I and Level II concentrations of the surface sediment sample interval of each study area except for the Cedar Yard Grove and Chambers Grove Reach areas (comparison to the at-depth sample data were not presented in this manner because of the varying and inconsistent sample intervals). Each of these figures consists of a separate figure for the individual metals, total PAHs, and total PCBs. These figures were not generated for the Cedar Yard Grove and Chambers Grove Reach areas due to the limited number of (1 or 2) surface samples.

In addition, maps showing the sediment sample locations of each study area and risk levels based on the SQT Level I and Level II concentrations are presented in Figures 8.30 through 8.44. Each of these maps consists of a separate figure for the individual metals, dioxins (TCDD equivalent), total

PAHs, and total PCBs. These maps were not generated for the Cedar Yard Grove and Chambers Grove Reach areas due to the limited number of (1 or 2) surface samples obtained.

8.2.3 Discussion: Sediment Quality Based on MPCA SQT Level I and Level II Comparison

For risk evaluation purposes, sediment samples were categorized into three groups based on the measured contaminant concentration as shown below:

- Low risk group: Samples with contaminant concentration below SQT Level I,
- Moderate risk group: Samples with contaminant concentration between SQT Level I and Level II, and
- High risk group: Samples with contaminant concentration above SQT Level II.

In general, concentrations of metals, total PAHs (PAH_{13}), and total PCBs were well below the SQT Level II concentration. PCBs were only detected in all the samples collected at Munger Landing and three (3) samples collected at Spirit Lake. A summary of the SQT comparison including specific exceedance of SQT Level II is presented as follows:

<u>Inorganics:</u> In general, the detected concentrations of inorganics were below SQT Level II and not likely to be considered high risk to the sediment dwelling organisms except for the following:

- Kingsbury Bay (*refer to Table 8.21, Figure 8.18, and Figure 8.32*): The concentration of Nickel exceeded the SQT Level II concentration in one surface sample (0-0.5 ft).

- Munger Landing (*refer to Table 8.24, Figure 8.21, and Figure 8.35*): The concentration of lead and zinc exceeded the SQT Level II concentration in 2 at-depth sediment samples (>0.5 ft).

- Perch Lake (*refer to Table 8.21, Figure 8.24, and Figure 8.38*): The concentration of lead exceeded the SQT Level II concentration in 2 at-depth samples including a duplicate sample.

- Riverside Marina (*refer to Table 8.29, Figure 8.26, and Figure 8.40*): The concentration of copper, lead, and Cadmium exceeded the SQT Level II concentration in 1 surface sediment sample collected at RSM-1 location.

Priority PAHs (PAH_{13}): In general, the detected concentrations of total priority PAHs (PAH_{13}) were well below SQT Level II and not likely to be considered high risk to the sediment dwelling organisms except for the following:

- Munger Landing (*refer to Table 8.24, Figure 8.21, and Figure 8.35*): Total PAHs exceeded the SQT Level II concentration in only one (1) at-depth sediment sample.

- Spirit Lake (*refer to Table 8.30, Figure 8.27 and Figure 8.41*): The concentration of total PAHs exceeded the SQT Level II concentration in 3 at-depth sediment samples including a field duplicate sample.

Total PCBs: PCBs were detected in all the samples collected at Munger Landing and three samples of Spirit Lake. The detected concentrations of total PCBs were below SQT Level II and not likely to be considered high risk to the sediment dwelling organisms.

Polychlorinated dibenzo-p-dioxins/dibenzo furans (PCDD/Fs): The detected concentrations of Dioxins were below SQT Level II except for the following:

- Indian Point Waterfront (*refer to Table 8.20, Figure 8.17, and Figure 8.31*): Six (6) samples were analyzed for dioxins. Dioxin concentration of one surface sediment sample (i.e., <0.5ft) exceeded the SQT Level II.

- Kingsbury Bay (*refer to Table 8.21, Figure 8.18, and Figure 8.32*): Eight (8) samples were analyzed for dioxins. Dioxin concentration of one at-depth sediment sample (i.e., > 0.5ft) exceeded the SQT Level II.

- Mud Lake (*refer to Table 8.23, Figure 8.20, and Figure 8.34*): Fifteen (15) samples were analyzed for dioxins. Dioxin concentration of 5 surface sediment samples and 2 at-depth sediment samples (i.e., > 0.5ft) exceeded the SQT Level II.

- Munger Landing (*refer to Table 8.24, Figure 8.21, and Figure 8.35*): Eight (8) samples were analyzed for dioxins. Dioxin concentration of 3 surface sediment samples including one field duplicate sample exceeded the SQT Level II.

- New Duluth Stretch (*refer to Table 8.25, Figure 8.22, and Figure 8.36*): Fourteen (14) samples were analyzed for dioxins. Dioxin concentration of 1 at-depth (i.e., > 0.5ft) sediment sample exceeded the SQT Level II.

- North Bay (*refer to Table 8.26, Figure 8.23, and Figure 8.37*): Six (6) samples were analyzed for dioxins. Dioxin concentration of 2 at-depth sediment samples exceeded the SQT Level II.

- Rask Bay (*refer to Table 8.28, Figure 8.25, and Figure 8.39*): Twelve (12) samples were analyzed for dioxins. Dioxin concentration of 1 surface sediment samples exceeded the SQT Level II.

- Spirit Lake (*refer to Table 8.30, Figure 8.27, and Figure 8.41*): Fifty nine (59) samples were analyzed for dioxins. Dioxin concentration of 5 surface sediment samples and 6 at-depth sediment samples including 2 field duplicate samples exceeded the SQT Level II.

- Steelton Bay (*refer to Table 8.31, Figure 8.28, and Figure 8.42*): Nine (9) samples were analyzed for dioxins. Dioxin concentration of 2 surface sediment samples including 1 field duplicate samples exceeded the SQT Level II.

8.3 ASSESSMENT OF SEDIMENT QUALITY USING CONCENTRATION OF PAH

Total concentration of three (3) separate PAH groups were calculated for later use by MPCA to determine distribution of the PAH contamination in the Lower St. Louis River study area and the potential risk to the sediment dwelling organisms. For this purpose, the following PAH group totals were calculated:

- Total of MPCA 13 priority PAHs (PAH_{13});
- Total of EPA Priority Pollutant PAHs (PAH_{17}); and

- EPA total PAHs (PAH_{34}).

8.3.1 Priority PAHs (PAH_{13})

The 13 priority PAHs listed in MPCA (2007) include:

- 2-methylnaphthalene
- Acenaphthelene
- Acenaphthylene
- Anthracene
- Benz(a)anthracene
- Benzo(a)pyrene
- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Fluorine
- Naphthalene
- Phenanthrene
- Pyrene

8.3.2 EPA Priority Pollutant PAHs (PAH_{16})

EPA priority pollutant PAHs includes sixteen parent PAHs (PAH_{16}). This list includes the following PAHs in addition to the contaminants listed under 13 priority PAHs (Yan et al. 2004). However, the EPA PAH_{16} does not include 2- Methylnaphthalene which is included in the PAH_{13}.

- Benzo(b)fluoranthene;
- Benzo(k)fluoranthene;
- Benzo(ghi)perylene; and
- Indeno(1,2,3-cd)pyrene.

8.3.3 EPA Total PAHs (PAH_{34})

There are 34 parent and alkylated PAHs (PAH_{34}). The table below lists the PAH_{34} based on USEPA (2003). The individual PAHs of PAH_{34} group is listed in the table below.

EPA Total PAH List

Parent PAHs	**CAS**	***Alkylated PAHs***	***CAS****
Naphthalene	91203	C1-Naphthalenes	-
Acenaphthylene	208968	C2-Naphthalenes	-
Acenaphthene	83329	C3-Naphthalenes	-
Fluorene	86737	C4-Naphthalenes	-
Anthracene	120127	C1-Fluorenes	-
Phenanthrene	85018	C2-Fluorenes	-
Pyrene	129000	C3-Fluorenes	-
Fluoranthene	206440	C1-Phenanthrene/anthracenes	-
Benz(a)anthracene	56553	C2-Phenanthrene/anthracenes	-
Chrysene	218019	C3-Phenanthrene/anthracenes	-
Benzo(a)pyrene	50328	C4-Phenanthrenes/anthracenes	-
Perylene	198550	C1-Pyrene/fluoranthenes	-
Benzo(e)pyrene	192972	C1-Benzanthracene/chrysenes	-
Benzo(b)fluoranthene	205992	C2-Benzanthracene/chrysenes	-
Benzo(k)fluoranthene	207089	C3-Benzanthracene/chrysenes	-
Benzo(ghi)perylene	191242	C4-Benzanthracene/chrysenes	-
Dibenz(a,h)anthracene	53703		
Indeno(1,2,3-cd)pyrene	193395		

*CAS number is not available

8.3.4 Method, Parameters, and Assumptions

The total concentration of PAH_{13}, PAH_{16}, and PAH_{34} were calculated for each sediment sample by summing the relevant individual PAHs.

Consistent with MPCA instructions, the nondetect concentrations were assumed as zero for analytes where all the concentrations are nondetect within a study area. Where an analyte was detected in more than one sample within a study area, the nondetects for that analyte were assumed as one-half of the reporting limit.

8.3.5 Results of the Total PAH Concentrations

Table 8.33 presents the total PAH_{13}, PAH_{16}, and PAH_{34} of all sample locations in the sixteen study areas. In addition, Table 8.34 also presents the individual PAH concentrations.

8.3.6 Discussion: Sediment Quality Based on Total PAH Concentrations

Taking Level I and Level II SQT concentrations of PAH_{13} (i.e. 1,600 µg/kg and 23,000 µg/kg, respectively) as a reference due to unavailability of such data for PAH_{16} and PAH_{34}, occurrence of total PAH concentrations above these limits were summarized in the table below to provide an overall understanding on sediment contamination. Based on the sediment quality data of this study, the total PAHs concentrations are in the range of 1,600 µg/kg - 23,000 µg/kg for most of the sediment samples.

Summary of PAH Concentrations

Study Area	Total Number of Samples	Number of Occurrence					
		Below SQT Level I			Above SQT Level II		
		PAH_{13}	PAH_{16}	PAH_{34}	PAH_{13}	PAH_{16}	PAH_{34}
Chambers Grove Stretch	2	2	2	2			
Cydar Yard Bay	4	4	4	4			
Fond Du Lac Stretch	8	8	8	8			
Indian Point Waterfront	14	3	3	0			
Kingsbury Bay	12	3	2	0			
Minnesota Channel	6	4	4	4			
Mud Lake	30	26	20	6			
Munger Landing	14	5	3	3	1	2	2
New Duluth Stretch	30	30	30	30			
North Bay	11	11	4	4			
Perch Lake	8	7	6	6			
Rask Bay	22	22	22	15			
Riverside Marina	10	5	5	1	0	1	1
Spirit Lake	124	94	89	16	3	5	6
Steelton Bay	17	17	17	13			
Tallas Island Flats	12	12	12	11			

8.4 ASSESSMENT OF SEDIMENT QUALITY USING ESB TOXIC UNITS: PAH

For sediments, bioavailability of most contaminants is estimated using Equilibrium Partitioning Sediment Benchmarks (ESBs) for PAHs. USEPA (2003) recommends an approach for summing the toxicological contributions of mixtures of 34 PAHs in sediments (using ESBs) to determine if their concentrations in any specific sediment would be protective of benthic organisms from the direct toxicity. The total of ESB toxic units (ESBTU) can be used to assess the sediment quality of particular sediment. For a particular sediment, if the ESBTU for total PAHs (i.e., PAH_{34}) is less than or equal to 1.0, the concentration of the mixture of PAHs in the sediment is acceptable for the protection of benthic organisms. For a particular sediment, if the EESBTU is greater than 1.0, the concentration of the mixture of PAHs in the sediment may not be acceptable for the protection of benthic organisms (USEPA 2003). This methodology was used to assess toxicity of sediments (due to total PAHs) to aquatic life in this study data set and described as follows:

8.4.1 Method, Parameters, and Assumptions

To develop ESBs for sediment for PAHs, the total organic carbon (TOC) content of the sediment is required. TOC is used to normalize the PAHs per gram of organic carbon. The normalized concentration is then compared against the Final Chronic Value (FCV) for the PAHs presented in USEPA (2003). Individual PAHs concentrations (in µg/g) were divided by organic carbon fraction to obtain the normalized PAH concentration (in µg/g of organic carbon) of each PAH. An ESBTU was determined for each PAH by dividing the normalized PAH concentration by corresponding FCV found in the table below. If the normalized concentration for a specific PAH exceeds its maximum concentration listed in the table below, the maximum concentration was used instead of the normalized concentration in the ESBTU calculation.

The summation of individual ESBTUs was made as the ESBTU of total PAHs of a particular sediment sample.

The ESB analysis assumes that the total PAHs includes the 34 PAH compounds. An uncertainty factor may be needed in the event that the analyzed list did not include all 34 PAH compounds. The uncertainty factor should be chosen based on the number of PAHs analyzed, if less than 34. The level of certainty required is typically 90 or 95%. No uncertainty factor is required if all 34 PAHs are analyzed. For this data set, no uncertainty factor was applied as the analyzed PAH compound list meets the required level of certainty.

Final Chronic Value and Maximum Concentration (USEPA 2003)

PAH Name	FCV (µg/g of organic carbon)	Maximum Concentration (µg/g of organic carbon)
Acenaphthene	491	33400
Acenaphthylene	452	24000
Anthracene	594	1300
Benz(a)anthracene	841	4153
Benzo(a)pyrene	965	3840
Benzo(b)fluoranthene	979	2169
Benzo(e)pyrene	967	4300
Benzo(ghi)perylene	1095	648
Benzo(k)fluoranthene	981	1220
C1-benzanthracene/chrysenes	929	-
C1-fluorenes	611	-
C1-naphthalenes	444	-
C1-phenanthrene/anthracenes	670	-
C1-pyrene/fluoranthenes	770	-
C2-fluorenes	686	-
C2-naphthalenes	510	-
C2-phenanthrene/anthracenes	746	-
C3-benzanthracene/chrysenes	1112	-
C3-fluorenes	769	-
C3-naphthalenes	581	-
C4-benzanthracene/chrysenes	1214	-
C4-naphthalenes	657	-
C4-phenanthrenes/anthracenes	913	-
Chrysene	844	826
Dibenz(a,h)anthracene	1123	2389
Fluoranthene	707	23870
Fluorene	538	26000
Indeno(1,2,3-cd)pyrene	1115	-
Naphthalene	385	61700
Perylene	967	431
Phenanthrene	596	34300
Pyrene	697	9090

8.4.2 Results of the ESB Toxic Unit Analysis

A summary of the ESBTU calculated based on the USEPA (2003) ESB guidance is presented in Table 8.33.

8.4.3 Discussion: Sediment Quality Based on ESB Toxic Units

When the total ESBTU of a sample is greater than 1, the sediment is considered toxic to benthic organisms. Based on the sediment quality analysis, most of the sample locations show no toxic effect to the benthic community. However, the following exceptions were noted:

Summary of Occurrence of ESBTU > 1.0

Study Area	**Total Number of Samples**	**Occurrence of ESBTU > 1.0**	
		Surface sediment samples (0-0.5ft)	At-depth sediment samples (>0.5ft)
Chambers Grove Stretch	2		
Cydar Yard Bay	4		
Fond Du Lac Stretch	8		
Indian Point Waterfront	14		
Kingsbury Bay	12	1	1
Minnesota Channel	6		
Mud Lake	30	1	
Munger Landing	14		1
New Duluth Stretch	30	2	1
North Bay	11		
Perch Lake	8		
Rask Bay	22		
Riverside Marina	10		
Spirit Lake	124	3	8
Steelton Bay	17		1
Tallas Island Flats	12	1	1
Total	**324**	**8**	**13**

The 169 surface sediment samples and 155 at-depth samples collected in 2011 were analyzed for PAHs. Based on the ESBTU results, about 2.5% of the surface sediment samples and 4% of the at-depth samples indicated toxic effect to the aquatic life.

8.5 ASSESSMENT OF SEDIMENT QUALITY USING DIOXIN (TCDD) TOXICITY EQUIVALENT CONCENTRATIONS

Due to the complex nature of the low concentration mixtures of contaminants such as dioxin and furans, the concept of toxic equivalency factors, TEFs, was developed by the World Health Organization, WHO (van den Berg et al. 1998). In this concept, the toxicity of each dioxin and furan is determined relative to that of TCDD or 2,3,7,8-Tetrachlorodibenzo-p-dioxin, the most toxic form of dioxin. TCDD has a TEF of 1. The less toxic dioxins or furans have TEFs closer to zero. TEF values, in combination with measured concentrations of dioxins, can be used to calculate toxic equivalent (TEQ) concentrations in various environmental samples, including sediment. TEQs are typically calculated to estimate the general toxicity of a sample to classes of organisms (i.e., fish) by assuming that toxicities of individual chemical congeners are additive (van den Berg et al. 1998). The measured concentration of a dioxin, then, is multiplied by the corresponding TEF to obtain the TEQ concentration for that dioxin in that sample. The total TEQ concentration, then, is the sum of the individual dioxins or furans TEQ concentration values in the sample. TEQs are typically used for risk characterization and management purposes, e.g., to help prioritize areas of concern corrective action.

8.5.1 Method, Parameters, and Assumptions

The TEQ concentration of each dioxin was calculated by multiplying the dioxin concentration by the corresponding TEF. The TEQ concentration of individual dioxins were added together to calculate the total TEQ concentration of a sediment sample.

TEF values for fish presented by the World Health Organization (WHO) in van den Berg et al. (1998) were used in calculating the TEQs for this data set. The TEF values used to calculate TEQs are presented in the table below.

Toxicity Equivalent Factors - Fish

Compound	**WHO 1998 TEF** (van den Berg et al., 1998)
2,3,7,8-TCDD	1
1,2,3,7,8-PeCDD	1
1,2,3,4,7,8-HxCDD	0.5
1,2,3,6,7,8-HxCDD	0.01
1,2,3,7,8,9-HxCDD	0.01
1,2,3,4,6,7,8-HpCDD	0.001
OCDD	<0.0001
2,3,7,8-TCDF	0.05
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
1,2,3,4,7,8-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	<0.0001

The nondetect data were handled using the following methods/assumptions:

Method 1 Consistent with MPCA instructions, the nondetect concentrations were assumed as zero for analytes where all the concentrations are nondetect within a study area. Where an analyte was detected in more than one sample within a study area, the nondetects for that analyte were assumed as one-half of the reporting limit.

Method 2 Kaplan-Meier method (Helsel 2010) was used in handling data sets with nondetect concentrations. Kaplan-Meier (KM) procedure is commonly used to compute means of such data sets. An excel spreadsheet available in public domain was used to calculate KM mean of dioxin data sets with mixture of detections and nondetections. The spreadsheet used in this study is located at http://www.practicalstats.com/nada/.

8.5.2 Results of the TEQ Concentration Analysis

TEQ concentrations calculated using the three methods discussed in Section 8.5.1 are presented in Table 8.33.

8.5.3 Discussion: Sediment Quality Based on Dioxin (TCDD) TEQ Concentrations

Understanding the differences in nondetect handling methods is important in evaluation TEQ concentrations because of the potential effect of assumptions of each method. For an example, the uncertainty associated with the Method 1 described in section 8.5.1 will be significant if the reporting limit especially of dioxins with large TEF is high. Conversely, in such situations, percent difference between TEQ concentration calculated Method 2 and Method 3 is significantly small. Except for sediment samples with several nondetect dioxin data and high reporting limits, in general, the percent difference between TEQ calculated by treating nondetects using Method 1 and Method 2 describe above is small. Therefore, for simplicity and avoiding addressing possibly inflated TEQ concentrations, Somat has used TEQ concentrations calculated by treating nondetects using Kaplan-Meier method (i.e., Method 2) in presenting the following general statistics for the 161 sediment samples of the data set analyzed for dioxins.

- Maximum TCDD TEQ concentration = 107.37 pg/g
- Minimum TCDD TEQ concentration = 0.03 pg/g
- Average TCDD TEQ concentration = 14.07 pg/g
- Standard deviation = 21.57 pg/g

8.6 OTHER ANALYTES: BLACK CARBON, DROS, TOCS, AND GRAIN SIZE DATA

Currently there are very limited to no guidelines to assess sediment quality based on concentrations of black carbon, diesel range organics (DRO), total organic carbon (TOCs), and grain size data. However, TOCs of the samples were used in calculating ESBTUs as presented in Section 8.4.1. A summary of the concentrations of the above analytes and grain size data is presented in Table 8.35.

9. REFERENCES

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TABLES

Sample ID	Location	Study Area	Latitude	Longitude	Analytical Parameters	Sample Interval (ft)		Water Depth (ft)	Field Duplicate
						Upper Depth (ft)	Lower Depth (ft)		
S-E08112D-051711-CCR-001	RSM-1	Riverside Marina	46.70724	-92.20279	Extended	0	0.5	9.4	
S-E08112D-051711-CCR-002	RSM-1	Riverside Marina	46.70724	-92.20279	Extended	1.17	1.83	9.4	
S-E08112D-051711-CCR-003	RSM-2	Riverside Marina	46.70662	-92.20132	Short	0	0.5	15.2	
S-E08112D-051711-CCR-004	RSM-2	Riverside Marina	46.70662	-92.20132	Short	1.67	2.5	15.2	
S-E08112D-051711-CCR-005	RSM-3	Riverside Marina	46.706549	-92.20335	Short	0	0.5	10.6	
S-E08112D-051711-CCR-006	RSM-3	Riverside Marina	46.706549	-92.20335	Short	0.5	1	10.6	
S-E08112D-051711-CCR-007	RSM-4	Riverside Marina	46.70618	-92.20244	Extended	0	0.5	15	
S-E08112D-051711-CCR-008	RSM-4	Riverside Marina	46.70618	-92.20244	Extended	1.58	2.17	15	
S-E08112D-051811-CCR-001	RSM-5	Riverside Marina	46.70591	-92.20403	Extended	0	0.5	9	
S-E08112D-051811-CCR-002	RSM-5	Riverside Marina	46.70591	-92.20403	Extended	0.5	1	9	
S-E08112D-051811-CCR-003	KB-1	Kingsbury Bay	46.7226	-92.182	Extended	0	0.5	1.7	
S-E08112D-051811-CCR-004	KB-1	Kingsbury Bay	46.7226	-92.182	Extended	0	0.5	1.7	X
S-E08112D-051811-CCR-005	KB-1	Kingsbury Bay	46.7226	-92.182	Extended	1.42	2.42	1.7	
S-E08112D-051811-CCR-006	KB-1	Kingsbury Bay	46.7226	-92.182	Extended	1.42	2.42	1.7	X
S-E08112D-051811-CCR-007	KB-3	Kingsbury Bay	46.72264	-92.17933	Short	0	0.5	2.7	
S-E08112D-051811-CCR-008	KB-3	Kingsbury Bay	46.72264	-92.17933	Short	1	1.67	2.7	
S-E08112D-051811-CCR-009	KB-2	Kingsbury Bay	46.723955	-92.18305	Extended	0	0.5	1.5	
S-E08112D-051811-CCR-010	KB-2	Kingsbury Bay	46.723955	-92.18305	Extended	1.5	2.33	1.5	
S-E08112D-051811-CCR-011	KB-5	Kingsbury Bay	46.72103	-92.17806	Extended	0	0.5	3.3	
S-E08112D-051811-CCR-012	KB-5	Kingsbury Bay	46.72103	-92.17806	Extended	2	2.58	3.3	
S-E08112D-051811-CCR-013	IPW-6	Indian Point Waterfront	46.72052	-92.18149	Extended	0	0.5	3	
S-E08112D-051811-CCR-014	IPW-6	Indian Point Waterfront	46.72052	-92.18149	Extended	2	2.83	3	
S-E08112D-051811-CCR-015	KB-4	Kingsbury Bay	46.71879	-92.17729	Short	0	0.5	3.4	
S-E08112D-051811-CCR-016	KB-4	Kingsbury Bay	46.71879	-92.17729	Short	1	1.67	3.4	
S-E08112D-051911-CCR-001	MC-2	Minnesota Channel	46.71735	-92.17965	Extended	0	0.5	25.6	
S-E08112D-051911-CCR-002	MC-2	Minnesota Channel	46.71735	-92.17965	Extended	1	1.67	25.6	
S-E08112D-051911-CCR-003	IPW-4	Indian Point Waterfront	46.71808	-92.18372	Short	0	0.5	2.3	
S-E08112D-051911-CCR-004	IPW-4	Indian Point Waterfront	46.71808	-92.18372	Short	0.75	1.25	2.3	

Sample ID	Location	Study Area	Latitude	Longitude	Analytical Parameters	Sample Interval (ft)		Water Depth (ft)	Field Duplicate
						Upper Depth (ft)	Lower Depth (ft)		
S-E08112D-052011-CCR-001	IPW-2	Indian Point Waterfront	46.71783	-92.185773	Short	0	0.5	13.4	
S-E08112D-052011-CCR-002	IPW-2	Indian Point Waterfront	46.71783	-92.185773	Short	0	0.5	13.4	X
S-E08112D-052011-CCR-003	IPW-2	Indian Point Waterfront	46.71783	-92.185773	Short	2.17	3	13.4	
S-E08112D-052011-CCR-004	IPW-2	Indian Point Waterfront	46.71783	-92.185773	Short	2.17	3	13.4	X
S-E08112D-052011-CCR-005	IPW-3	Indian Point Waterfront	46.72035	-92.18417	Extended	0	0.5	1.5	
S-E08112D-052011-CCR-006	IPW-3	Indian Point Waterfront	46.72035	-92.18417	Extended	1.67	2.17	1.5	
S-E08112D-052011-CCR-007	IPW-5	Indian Point Waterfront	46.71918	-92.19022	Extended	0	0.5	2	
S-E08112D-052011-CCR-008	IPW-5	Indian Point Waterfront	46.71918	-92.19022	Extended	0.83	1.33	2	
S-E08112D-052011-CCR-009	IPW-1	Indian Point Waterfront	46.71711	-92.19118	Short	0	0.5	7	
S-E08112D-052011-CCR-010	IPW-1	Indian Point Waterfront	46.71711	-92.19118	Short	2.25	2.75	7	
S-E08112D-052011-CCR-011	TIF-3	Tallas Island Flats	46.71416	-92.19272	Extended	0	0.67	3.8	
S-E08112D-052011-CCR-012	TIF-3	Tallas Island Flats	46.71416	-92.19272	Extended	0	0.67	3.8	X
S-E08112D-052011-CCR-013	TIF-3	Tallas Island Flats	46.71416	-92.19272	Extended	1.42	1.92	3.8	
S-E08112D-052011-CCR-014	TIF-3	Tallas Island Flats	46.71416	-92.19272	Extended	1.42	1.92	3.8	X
S-E08112D-052011-CCR-015	TIF-2	Tallas Island Flats	46.71226	-92.19628	Short	0	0.5	1.3	
S-E08112D-052011-CCR-016	TIF-2	Tallas Island Flats	46.71226	-92.19628	Short	0.5	1	1.3	
S-E08112D-052011-CCR-017	MC-3	Minnesota Channel	46.7116	-92.19383	Short	0	0.5	9.3	
S-E08112D-052011-CCR-018	MC-3	Minnesota Channel	46.7116	-92.19383	Short	1.67	2.67	9.3	
S-E08112D-052011-CCR-019	MC-1	Minnesota Channel	46.70843	-92.19771	Short	0	0.5	20.6	
S-E08112D-052011-CCR-020	MC-1	Minnesota Channel	46.70843	-92.19771	Short	3	4	20.6	
S-E08112D-052311-CCR-001	ML-1	Mud Lake	46.65984	-92.21004	Short	0	0.5	5.2	
S-E08112D-052311-CCR-002	ML-1	Mud Lake	46.65984	-92.21004	Short	1	2	5.2	
S-E08112D-052311-CCR-003	TIF-4	Tallas Island Flats	46.70786	-92.19917	Short	0	0.5	4.2	
S-E08112D-052311-CCR-004	TIF-4	Tallas Island Flats	46.70786	-92.19917	Short	1	2	4.2	
S-E08112D-052311-CCR-005	ML-6	Mud Lake	46.66047	-92.20779	Short	0	0.5	6.2	
S-E08112D-052311-CCR-006	ML-6	Mud Lake	46.66047	-92.20779	Short	0	0.5	6.2	X
S-E08112D-052311-CCR-007	ML-6	Mud Lake	46.66047	-92.20779	Short	1.42	2.42	6.2	
S-E08112D-052311-CCR-008	ML-6	Mud Lake	46.66047	-92.20779	Short	1.42	2.42	6.2	X

Sample ID	Location	Study Area	Latitude	Longitude	Analytical Parameters	Sample Interval (ft)		Water Depth (ft)	Field Duplicate
						Upper Depth (ft)	Lower Depth (ft)		
S-E08112D-052311-CCR-009	ML-3	Mud Lake	46.65974	-92.20489	Short	0	0.5	2.3	
S-E08112D-052311-CCR-010	ML-3	Mud Lake	46.65974	-92.20489	Short	0.5	1	2.3	
S-E08112D-052311-CCR-011	ML-2	Mud Lake	46.6603	-92.20671	Extended	0	0.5	5.2	
S-E08112D-052311-CCR-012	ML-2	Mud Lake	46.6603	-92.20671	Extended	1.75	2.75	5.2	
S-E08112D-052311-CCR-013	TIF-5	Tallas Island Flats	46.71006	-92.19766	Extended	0	0.5	1.2	
S-E08112D-052311-CCR-014	TIF-5	Tallas Island Flats	46.71006	-92.19766	Extended	0.5	1.17	1.2	
S-E08112D-052411-CCR-001	MLA-6	Munger Landing	46.70143	-92.20702	Extended	0	0.5	7	
S-E08112D-052411-CCR-002	MLA-6	Munger Landing	46.70143	-92.20702	Extended	0	0.5	7	**X**
S-E08112D-052411-CCR-003	MLA-6	Munger Landing	46.70143	-92.20702	Extended	3	4	7	
S-E08112D-052411-CCR-004	MLA-6	Munger Landing	46.70143	-92.20702	Extended	3	4	7	**X**
S-E08112D-052411-CCR-005	MLA-2	Munger Landing	46.70309	-92.20672	Short	0	0.5	2.5	
S-E08112D-052411-CCR-006	MLA-2	Munger Landing	46.70309	-92.20672	Short	1.83	1.5	2.5	
S-E08112D-052411-CCR-007	MLA-3	Munger Landing	46.69935	-92.20745	Extended	0	0.5	2.4	
S-E08112D-052411-CCR-008	MLA-3	Munger Landing	46.69935	-92.20745	Extended	1	1.83	2.4	
S-E08112D-052411-CCR-009	MLA-5	Munger Landing	46.69648	-92.204831	Extended	0	0.5	2.6	
S-E08112D-052411-CCR-010	MLA-5	Munger Landing	46.69648	-92.204831	Extended	1.83	2.83	2.6	
S-E08112D-052411-CCR-011	MLA-1	Munger Landing	46.69665	-92.20673	Short	0	0.5	2	
S-E08112D-052411-CCR-012	MLA-1	Munger Landing	46.69665	-92.20673	Short	0.5	1	2	
S-E08112D-052411-CCR-013	MLA-4	Munger Landing	46.69814	-92.20496	Short	0	0.5	6.4	
S-E08112D-052411-CCR-014	MLA-4	Munger Landing	46.69814	-92.20496	Short	1	2	6.4	
S-E08112D-052511-CCR-001	CGR-1	Chambers Grove Reach	46.65818	-92.27541	Extended	0	0.5	1.3	
S-E08112D-052511-CCR-002	CGR-1	Chambers Grove Reach	46.65818	-92.27541	Extended	1.17	2.17	1.30	
S-E08112D-052511-CCR-003	FDLS-2	Fond Du Lac Stretch	46.65082	-92.26901	Short	0	0.5	7.1	
S-E08112D-052511-CCR-004	FDLS-2	Fond Du Lac Stretch	46.65082	-92.26901	Short	0.5	1.08	7.1	
S-E08112D-052511-CCR-005	FDLS-4	Fond Du Lac Stretch	46.65241	-92.26428	Extended	0	0.5	8	
S-E08112D-052511-CCR-006	FDLS-4	Fond Du Lac Stretch	46.65241	-92.26428	Extended	1.58	2.58	8	
S-E08112D-052511-CCR-007	FDLS-1	Fond Du Lac Stretch	46.65875	-92.25521	Extended	0	0.5	10.3	
S-E08112D-052511-CCR-008	FDLS-1	Fond Du Lac Stretch	46.65875	-92.25521	Extended	0.5	1.25	10.3	

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S-E08112D-052511-CCR-009	FDLS-3	Fond Du Lac Stretch	46.65503	-92.26185	Short	0	0.5	3.9	
S-E08112D-052511-CCR-010	FDLS-3	Fond Du Lac Stretch	46.65503	-92.26185	Short	1	2	3.9	
S-E08112D-052511-CCR-011	RB-4	Rask Bay	46.65874	-92.25982	Extended	0	0.5	1.2	
S-E08112D-052511-CCR-012	RB-4	Rask Bay	46.65874	-92.25982	Extended	0.5	1.17	1.2	
S-E08112D-052611-CCR-001	SL-39	Spirit Lake	46.69318	-92.1931	Short	0	0.5	2.9	
S-E08112D-052611-CCR-002	SL-39	Spirit Lake	46.69318	-92.1931	Short	0	0.5	2.9	X
S-E08112D-052611-CCR-003	SL-39	Spirit Lake	46.69318	-92.1931	Short	1	2	2.9	
S-E08112D-052611-CCR-004	SL-39	Spirit Lake	46.69318	-92.1931	Short	1	2	2.9	X
S-E08112D-052611-CCR-005	SL-32	Spirit Lake	46.6889	-92.17642	Extended	0	0.67	5.5	
S-E08112D-052611-CCR-006	SL-32	Spirit Lake	46.6889	-92.17642	Extended	0	0.67	5.5	X
S-E08112D-052611-CCR-007	SL-32	Spirit Lake	46.6889	-92.17642	Extended	3	4	5.5	
S-E08112D-052611-CCR-008	SL-32	Spirit Lake	46.6889	-92.17642	Extended	3	4	5.5	X
S-E08112D-052611-CCR-009	SL-19	Spirit Lake	46.68499	-92.17711	Short	0	0.5	2.9	
S-E08112D-052611-CCR-010	SL-19	Spirit Lake	46.68499	-92.17711	Short	3	4	2.9	
S-E08112D-052611-CCR-011	SL-38	Spirit Lake	46.69092	-92.17855	Extended	0	0.5	2.7	
S-E08112D-052611-CCR-012	SL-38	Spirit Lake	46.69092	-92.17855	Extended	1.58	2.42	2.7	
S-E08112D-053111-CCR-001	SL-52	Spirit Lake	46.696408	-92.2011	Extended	0	0.5	7.7	
S-E08112D-053111-CCR-002	SL-52	Spirit Lake	46.696408	-92.2011	Extended	1.67	2.67	7.7	
S-E08112D-060111-CCR-001	PL-3	Perch Lake	46.65975	-92.2549	Extended	0	0.5	2.9	
S-E08112D-060111-CCR-002	PL-3	Perch Lake	46.65975	-92.2549	Extended	0.5	1	2.9	
S-E08112D-060111-CCR-003	PL-2	Perch Lake	46.66153	-92.25138	Short	0	0.5	3.6	
S-E08112D-060111-CCR-004	PL-2	Perch Lake	46.66153	-92.25138	Short	0	0.5	3.6	X
S-E08112D-060111-CCR-005	PL-2	Perch Lake	46.66153	-92.25138	Short	1	2	3.6	
S-E08112D-060111-CCR-006	PL-2	Perch Lake	46.66153	-92.25138	Short	1	2	3.6	X
S-E08112D-060111-CCR-007	PL-1	Perch Lake	46.66076	-92.25373	Short	0	0.5	3.5	
S-E08112D-060111-CCR-008	PL-1	Perch Lake	46.66076	-92.25373	Short	1	2	3.5	
S-E08112D-060111-CCR-009	CYB-1	Cedar Yard Bay	46.65458	-92.21214	Short	0.00	0.50	0.90	
S-E08112D-060111-CCR-010	CYB-1	Cedar Yard Bay	46.65458	-92.21214	Short	0.50	1.00	0.90	

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S-E08112D-060111-CCR-011	CYB-2	Cedar Yard Bay	46.65406	-92.215996	Extended	0.00	0.50	0.90	
S-E08112D-060111-CCR-012	CYB-2	Cedar Yard Bay	46.65458	-92.21214	Extended	0.75	1.33	1.50	
S-E08112D-060211-CCR-001	TIF-1	Tallas Island Flats	46.71443	-92.19442	Short	0	0.5	0.6	
S-E08112D-060211-CCR-002	TIF-1	Tallas Island Flats	46.71443	-92.19442	Short	0.5	1	0.6	
S-E08112D-060211-CCR-003	SL-48	Spirit Lake	46.69411	-92.18916	Extended	0	0.67	4.8	
S-E08112D-060211-CCR-004	SL-48	Spirit Lake	46.69411	-92.18916	Extended	0	0.67	4.8	X
S-E08112D-060211-CCR-005	SL-48	Spirit Lake	46.69411	-92.18916	Extended	1.5	2.5	4.8	
S-E08112D-060211-CCR-006	SL-48	Spirit Lake	46.69411	-92.18916	Extended	1.5	2.5	4.8	X
S-E08112D-060211-CCR-007	SL-49	Spirit Lake	46.69412	-92.18689	Short	0	0.5	5.3	
S-E08112D-060211-CCR-008	SL-49	Spirit Lake	46.69412	-92.18689	Short	0.5	1	5.3	
S-E08112D-060211-CCR-009	SL-50	Spirit Lake	46.6945	-92.18347	Extended	0	0.5	2.3	
S-E08112D-060211-CCR-010	SL-50	Spirit Lake	46.6945	-92.18347	Extended	0.75	1.33	2.3	
S-E08112D-060211-CCR-011	SL-51	Spirit Lake	46.69402	-92.18163	Short	0	0.5	4.7	
S-E08112D-060211-CCR-012	SL-51	Spirit Lake	46.69402	-92.18163	Short	3	4	4.7	
S-E08112D-060211-CCR-013	SL-44	Spirit Lake	46.69263	-92.18113	Extended	0	0.5	4.1	
S-E08112D-060211-CCR-014	SL-44	Spirit Lake	46.69263	-92.18113	Extended	0.92	1.67	4.1	
S-E08112D-060411-CCR-001	SL-46	Spirit Lake	46.69449	-92.19628	Extended	0	0.5	1.1	
S-E08112D-060411-CCR-002	SL-46	Spirit Lake	46.69449	-92.19628	Extended	0.67	1.5	1.1	
S-E08112D-060411-CCR-003	SL-53	Spirit Lake	46.69562	-92.19972	Short	0	0.5	3.7	
S-E08112D-060411-CCR-004	SL-53	Spirit Lake	46.69562	-92.19972	Short	0	0.5	3.7	X
S-E08112D-060411-CCR-005	SL-53	Spirit Lake	46.69562	-92.19972	Short	1	1.83	3.7	
S-E08112D-060411-CCR-006	SL-53	Spirit Lake	46.69562	-92.19972	Short	1	1.83	3.7	X
S-E08112D-060411-CCR-007	SL-54	Spirit Lake	46.69557	-92.19724	Extended	0	0.5	4.1	
S-E08112D-060411-CCR-008	SL-54	Spirit Lake	46.69557	-92.19724	Extended	1	2	4.1	
S-E08112D-060411-CCR-009	SL-40	Spirit Lake	46.69198	-92.19233	Extended	0	0.67	6	
S-E08112D-060411-CCR-010	SL-40	Spirit Lake	46.69198	-92.19233	Extended	0	0.67	6	X
S-E08112D-060411-CCR-011	SL-40	Spirit Lake	46.69198	-92.19233	Extended	3	4	6	
S-E08112D-060411-CCR-012	SL-40	Spirit Lake	46.69198	-92.19233	Extended	3	4	6	X

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S-E08112D-060411-CCR-013	SL-33	Spirit Lake	46.69079	-92.19153	Short	0	0.5	6.6	
S-E08112D-060411-CCR-014	SL-33	Spirit Lake	46.69079	-92.19153	Short	3	4	6.6	
S-E08112D-060411-CCR-015	SL-21	Spirit Lake	46.68648	-92.18769	Short	0	0.5	4.9	
S-E08112D-060411-CCR-016	SL-21	Spirit Lake	46.68648	-92.18769	Short	3	4	4.9	
S-E08112D-060411-CCR-017	SL-15	Spirit Lake	46.68616	-92.18561	Short	0	0.5	5.5	
S-E08112D-060411-CCR-018	SL-15	Spirit Lake	46.68616	-92.18561	Short	2.17	3.17	5.5	
S-E08112D-060511-CCR-001	SL-41	Spirit Lake	46.693137	-92.18805	Short	0	0.5	6.4	
S-E08112D-060511-CCR-002	SL-41	Spirit Lake	46.693137	-92.18805	Short	0	0.5	6.4	X
S-E08112D-060511-CCR-003	SL-41	Spirit Lake	46.693137	-92.18805	Short	3	4	6.4	
S-E08112D-060511-CCR-004	SL-41	Spirit Lake	46.693137	-92.18805	Short	3	4	6.4	X
S-E08112D-060511-CCR-005	SL-42	Spirit Lake	46.69214	-92.18698	Extended	0	0.5	7.5	
S-E08112D-060511-CCR-006	SL-42	Spirit Lake	46.69214	-92.18698	Extended	3	4	7.5	
S-E08112D-060511-CCR-007	SL-43	Spirit Lake	46.69302	-92.1831	Short	0	0.5	5.3	
S-E08112D-060511-CCR-008	SL-43	Spirit Lake	46.69302	-92.1831	Short	0.5	1	5.3	
S-E08112D-060511-CCR-009	SL-47	Spirit Lake	46.69357	-92.19253	Short	0	0.5	1.1	
S-E08112D-060511-CCR-010	SL-47	Spirit Lake	46.69357	-92.19253	Short	1	2	1.1	
S-E08112D-060511-CCR-011	SL-37	Spirit Lake	46.69037	-92.18192	Short	0	0.5	7.2	
S-E08112D-060511-CCR-012	SL-37	Spirit Lake	46.69037	-92.18192	Short	1	2	7.2	
S-E08112D-060611-CCR-001	SL-45	Spirit Lake	46.69203	-92.1796	Short	0	0.5	2.5	
S-E08112D-060611-CCR-002	SL-45	Spirit Lake	46.69203	-92.1796	Short	1	1.5	2.5	
S-E08112D-060611-CCR-003	SL-27	Spirit Lake	46.68927	-92.18866	Short	0	0.5	9.1	
S-E08112D-060611-CCR-004	SL-27	Spirit Lake	46.68927	-92.18866	Short	0	0.5	9.1	X
S-E08112D-060611-CCR-005	SL-27	Spirit Lake	46.68927	-92.18866	Short	3	4	9.1	
S-E08112D-060611-CCR-006	SL-27	Spirit Lake	46.68927	-92.18866	Short	3	4	9.1	X
S-E08112D-060611-CCR-007	SL-34	Spirit Lake	46.69004	-92.19084	Extended	0	0.5	7.8	
S-E08112D-060611-CCR-008	SL-34	Spirit Lake	46.69004	-92.19084	Extended	2	2.75	7.8	
S-E08112D-060611-CCR-009	SL-26	Spirit Lake	46.68901	-92.19162	Extended	0	0.5	8.5	
S-E08112D-060611-CCR-010	SL-26	Spirit Lake	46.68901	-92.19162	Extended	3	4	8.5	

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S-E08112D-060611-CCR-011	SL-20	Spirit Lake	46.68785	-92.19146	Extended	0	0.5	4.1	
S-E08112D-060611-CCR-012	SL-20	Spirit Lake	46.68785	-92.19146	Extended	1	1.67	4.1	
S-E08112D-060711-CCR-001	SL-35	Spirit Lake	46.69069	-92.18657	Short	0	0.5	6.9	
S-E08112D-060711-CCR-002	SL-35	Spirit Lake	46.69069	-92.18657	Short	3	4	6.9	
S-E08112D-060711-CCR-003	SL-36	Spirit Lake	46.69033	-92.18454	Extended	0	0.5	7.6	
S-E08112D-060711-CCR-004	SL-36	Spirit Lake	46.69033	-92.18454	Extended	2	3	7.6	
S-E08112D-060711-CCR-005	SL-29	Spirit Lake	46.68954	-92.183148	Short	0	0.5	7.1	
S-E08112D-060711-CCR-006	SL-29	Spirit Lake	46.68954	-92.183148	Short	0	0.5	7.1	X
S-E08112D-060711-CCR-007	SL-29	Spirit Lake	46.68954	-92.183148	Short	3	4	7.1	
S-E08112D-060711-CCR-008	SL-29	Spirit Lake	46.68954	-92.183148	Short	3	4	7.1	X
S-E08112D-060711-CCR-009	SL-28	Spirit Lake	46.68932	-92.18604	Extended	0	0.5	8.6	
S-E08112D-060711-CCR-010	SL-28	Spirit Lake	46.68932	-92.18604	Extended	3	4	8.6	
S-E08112D-060711-CCR-011	SL-14	Spirit Lake	46.68521	-92.18958	Extended	0	0.5	5.7	
S-E08112D-060711-CCR-012	SL-14	Spirit Lake	46.68521	-92.18958	Extended	3	4	5.7	
S-E08112D-060711-CCR-013	SL-22	Spirit Lake	46.68702	-92.18433	Extended	0	0.5	6.5	
S-E08112D-060711-CCR-014	SL-22	Spirit Lake	46.68702	-92.18433	Extended	3	4	6.5	
S-E08112D-060811-CCR-001	SL-9	Spirit Lake	46.68387	-92.189	Short	0	0.5	3.2	
S-E08112D-060811-CCR-002	SL-9	Spirit Lake	46.68387	-92.189	Short	3	4	3.2	
S-E08112D-060811-CCR-003	SL-5	Spirit Lake	46.68188	-92.1894	Short	0	0.5	2.3	
S-E08112D-060811-CCR-004	SL-5	Spirit Lake	46.68188	-92.1894	Short	0.67	1.17	2.3	
S-E08112D-060811-CCR-005	SL-2	Spirit Lake	46.66767	-92.20449	Extended	0	0.5	3	
S-E08112D-060811-CCR-006	SL-2	Spirit Lake	46.66767	-92.20449	Extended	0.83	1.58	3	
S-E08112D-060811-CCR-007	SL-1	Spirit Lake	46.67884	-92.18879	Short	0	0.5	6.5	
S-E08112D-060811-CCR-008	SL-1	Spirit Lake	46.67884	-92.18879	Short	1	2	6.5	
S-E08112D-060811-CCR-009	SL-3	Spirit Lake	46.67968	-92.18755	Short	0	0.5	1.8	
S-E08112D-060811-CCR-010	SL-3	Spirit Lake	46.67968	-92.18755	Short	0	0.5	1.8	X
S-E08112D-060811-CCR-011	SL-3	Spirit Lake	46.67968	-92.18755	Short	1	2	1.8	
S-E08112D-060811-CCR-012	SL-3	Spirit Lake	46.67968	-92.18755	Short	1	2	1.8	X

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S-E08112D-060811-CCR-013	SL-4	Spirit Lake	46.66909	-92.20238	Extended	0	0.5	9.7	
S-E08112D-060811-CCR-014	SL-4	Spirit Lake	46.66909	-92.20238	Extended	1	2	9.7	
S-E08112D-060811-CCR-015	SL-11	Spirit Lake	46.68287	-92.18538	Short	0	0.5	3	
S-E08112D-060811-CCR-016	SL-11	Spirit Lake	46.68287	-92.18538	Short	1	2	3	
S-E08112D-060811-CCR-017	SL-6	Spirit Lake	46.67204	-92.20047	Extended	0	0.5	2.2	
S-E08112D-060811-CCR-018	SL-6	Spirit Lake	46.67204	-92.20047	Extended	2.5	3.5	2.2	
S-E08112D-060911-CCR-001	SL-10	Spirit Lake	46.68346	-92.18706	Extended	0	0.67	3.4	
S-E08112D-060911-CCR-002	SL-10	Spirit Lake	46.68346	-92.18706	Extended	0	0.67	3.4	X
S-E08112D-060911-CCR-003	SL-10	Spirit Lake	46.68346	-92.18706	Extended	1.83	2.5	3.4	
S-E08112D-060911-CCR-004	SL-10	Spirit Lake	46.68346	-92.18706	Extended	1.83	2.5	3.4	X
S-E08112D-060911-CCR-005	SL-30	Spirit Lake	46.68945	-92.180726	Extended	0	0.5	5.9	
S-E08112D-060911-CCR-006	SL-30	Spirit Lake	46.68945	-92.180726	Extended	1.33	2.33	5.9	
S-E08112D-060911-CCR-007	SB-6	Steelton Bay	46.67204	-92.20047	Short	0	0.5	3.2	
S-E08112D-060911-CCR-008	SB-6	Steelton Bay	46.67204	-92.20047	Short	1	2	3.2	
S-E08112D-061011-CCR-001	ML-14	Mud Lake	46.66475	-92.21405	Short	0	0.5	3.3	
S-E08112D-061011-CCR-002	ML-15	Mud Lake	46.66255	-92.21272	Extended	0	0.5	5.5	
S-E08112D-061011-CCR-003	ML-15	Mud Lake	46.66255	-92.21272	Extended	1	2	5.5	
S-E08112D-061011-CCR-004	ML-16	Mud Lake	46.66392	-92.21113	Extended	0	0.5	6	
S-E08112D-061011-CCR-005	ML-16	Mud Lake	46.66392	-92.21113	Extended	1.5	2.5	6	
S-E08112D-061011-CCR-006	ML-10	Mud Lake	46.66704	-92.21011	Extended	0.00	0.50	2.50	
S-E08112D-061011-CCR-007	ML-10	Mud Lake	46.66704	-92.21011	Extended	0.50	1.50	2.50	
S-E08112D-061311-CCR-001	ML-12	Mud Lake	46.665315	-92.21279	Short	0	0.5	0.5	
S-E08112D-061311-CCR-002	ML-11	Mud Lake	46.66677	-92.21075	Short	0	0.5	1.8	
S-E08112D-061311-CCR-003	ML-13	Mud Lake	46.66555	-92.21104	Extended	0	0.5	3.1	
S-E08112D-061311-CCR-004	SB-7	Steelton Bay	46.67137	-92.199	Extended	0	0.5	6.2	
S-E08112D-061311-CCR-005	SB-7	Steelton Bay	46.67137	-92.199	Extended	0	0.5	6.2	X
S-E08112D-061311-CCR-006	SB-7	Steelton Bay	46.67137	-92.199	Extended	1.67	2.5	6.2	
S-E08112D-061311-CCR-007	SB-7	Steelton Bay	46.67137	-92.199	Extended	1.67	2.5	6.2	X

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S-E08112D-061311-CCR-008	SB-4	Steelton Bay	46.66909	-92.20237	Short	0	0.5	8.9	
S-E08112D-061311-CCR-009	SB-4	Steelton Bay	46.66909	-92.20237	Short	0.5	1	8.9	
S-E08112D-061411-CCR-001	SL-23	Spirit Lake	46.68743	-92.18116	Short	0	0.6	5	
S-E08112D-061411-CCR-002	SL-23	Spirit Lake	46.68743	-92.18116	Short	0	0.6	5	X
S-E08112D-061411-CCR-003	SL-31	Spirit Lake	46.68869	-92.18056	Short	0	0.5	6.2	
S-E08112D-061411-CCR-004	SL-31	Spirit Lake	46.68869	-92.18056	Short	0.83	1.5	6.2	
S-E08112D-061411-CCR-005	SL-24	Spirit Lake	46.68684	-92.17898	Extended	0	0.5	3.5	
S-E08112D-061411-CCR-006	SL-25	Spirit Lake	46.6865	-92.17742	Short	0	0.5	0.9	
S-E08112D-061411-CCR-007	SL-25	Spirit Lake	46.6865	-92.17742	Short	0.5	1	0.9	
S-E08112D-061411-CCR-008	SL-16	Spirit Lake	46.68619	-92.18401	Extended	0	0.5	5.5	
S-E08112D-061411-CCR-009	SL-16	Spirit Lake	46.68619	-92.18401	Extended	0.5	1	5.5	
S-E08112D-061411-CCR-010	SL-17	Spirit Lake	46.68458	-92.18283	Short	0	0.5	3.7	
S-E08112D-061411-CCR-011	SL-17	Spirit Lake	46.68458	-92.18283	Short	0.67	1.33	3.7	
S-E08112D-061511-CCR-001	SL-18	Spirit Lake	46.68489	-92.17842	Extended	0	0.5	1	
S-E08112D-061511-CCR-002	SL-18	Spirit Lake	46.68489	-92.17842	Extended	1	1.67	1	
S-E08112D-061511-CCR-003	SL-12	Spirit Lake	46.68325	-92.1825	Extended	0	0.5	2.6	
S-E08112D-061511-CCR-004	SL-7	Spirit Lake	46.68249	-92.18338	Short	0	0.5	2.8	
S-E08112D-061511-CCR-005	SL-13	Spirit Lake	46.68332	-92.17959	Short	0	0.5	0.8	
S-E08112D-061511-CCR-006	SL-13	Spirit Lake	46.68332	-92.17959	Short	0.5	1	0.8	
S-E08112D-061511-CCR-007	SL-8	Spirit Lake	46.68179	-92.18106	Extended	0	0.5	1.4	
S-E08112D-061511-CCR-008	SB-8	Steelton Bay	46.67295	-92.1975	Extended	0	0.5	6.9	
S-E08112D-061511-CCR-009	SB-8	Steelton Bay	46.67295	-92.1975	Extended	0.83	1.33	6.9	
S-E08112D-061611-CCR-001	SB-2	Steelton Bay	46.66767	-92.20448	Short	0	0.5	6.3	
S-E08112D-061611-CCR-002	SB-2	Steelton Bay	46.66767	-92.20448	Short	0.58	1.17	6.3	
S-E08112D-061611-CCR-003	SB-1	Steelton Bay	46.66668	-92.20595	Extended	0	0.5	1.8	
S-E08112D-061611-CCR-004	SB-5	Steelton Bay	46.67216	-92.20303	Extended	0	0.5	1.3	
S-E08112D-061611-CCR-005	SB-5	Steelton Bay	46.67216	-92.20303	Extended	0	0.5	1.3	X
S-E08112D-061611-CCR-006	NDS-3	New Duluth Stretch	46.66547	-92.20588	Short	0	0.5	12.6	

Sample ID	Location	Study Area	Latitude	Longitude	Analytical Parameters	Sample Interval (ft)		Water Depth (ft)	Field Duplicate
						Upper Depth (ft)	Lower Depth (ft)		
S-E08112D-061611-CCR-008	NDS-3	New Duluth Stretch	46.66547	-92.20588	Short	1.67	2.33	12.6	
S-E08112D-061611-CCR-010	SB-3	Steelton Bay	46.66855	-92.20375	Short	0	0.5	7.7	
S-E08112D-061611-CCR-011	SB-3	Steelton Bay	46.66855	-92.20375	Short	0.5	1	7.7	
S-E08112D-061711-CCR-001	NDS-15	New Duluth Stretch	46.66382	-92.20537	Short	0.00	0.50	16.90	
S-E08112D-061711-CCR-002	NDS-15	New Duluth Stretch	46.66382	-92.20537	Short	2.00	3.00	16.90	
S-E08112D-061711-CCR-003	ML-8	Mud Lake	46.663385	-92.20743	Short	0.00	0.50	4.20	
S-E08112D-061711-CCR-004	ML-8	Mud Lake	46.663385	-92.20743	Short	2.00	3.00	4.20	
S-E08112D-061711-CCR-005	ML-7	Mud Lake	46.66515	-92.20877	Extended	0.00	0.50	1.70	
S-E08112D-061711-CCR-006	ML-7	Mud Lake	46.66515	-92.20877	Extended	1.00	2.00	1.70	
S-E08112D-061711-CCR-007	ML-4	Mud Lake	46.66206	-92.2107	Extended	0.00	0.50	5.30	
S-E08112D-061711-CCR-008	ML-4	Mud Lake	46.66206	-92.2107	Extended	3.00	4.00	5.30	
S-E08112D-061711-CCR-009	ML-5	Mud Lake	46.66515	-92.20877	Short	0.00	0.50	5.50	
S-E08112D-061711-CCR-010	ML-5	Mud Lake	46.66515	-92.20877	Short	3.00	4.00	5.50	
S-E08112D-061711-CCR-011	ML-9	Mud Lake	46.66252	-92.20605	Extended	0.00	0.50	2.70	
S-E08112D-061711-CCR-012	ML-9	Mud Lake	46.66252	-92.20605	Extended	1.67	1.50	2.70	
S-E08112D-062011-CCR-001	RB-1	Rask Bay	46.65907	-92.26263	Extended	0	0.5	2.5	
S-E08112D-062011-CCR-002	RB-1	Rask Bay	46.65907	-92.26263	Extended	3	4	2.5	
S-E08112D-062011-CCR-003	RB-7	Rask Bay	46.65804	-92.264399	Extended	0	0.5	3.8	
S-E08112D-062011-CCR-004	RB-7	Rask Bay	46.65804	-92.264399	Extended	3	4	3.8	
S-E08112D-062011-CCR-005	RB-2	Rask Bay	46.65728	-92.26644	Short	0	0.5	3	
S-E08112D-062011-CCR-006	RB-2	Rask Bay	46.65728	-92.26644	Short	1	2	3	
S-E08112D-062011-CCR-007	RB-5	Rask Bay	46.655296	-92.26906	Short	0	0.5	2.8	
S-E08112D-062011-CCR-008	RB-5	Rask Bay	46.655296	-92.26906	Short	1.33	2	2.8	
S-E08112D-062011-CCR-009	RB-10	Rask Bay	46.65408	-92.26923	Short	0	0.5	2.6	
S-E08112D-062011-CCR-010	RB-10	Rask Bay	46.65408	-92.26923	Short	1.33	2	2.6	
S-E08112D-062011-CCR-011	RB-3	Rask Bay	46.65472	-92.267104	Extended	0	0.5	2.9	
S-E08112D-062011-CCR-012	RB-3	Rask Bay	46.65472	-92.267104	Extended	3	4	2.9	
S-E08112D-062111-CCR-001	RB-8	Rask Bay	46.65254	-92.26963	Extended	0	0.5	1.3	

Sample ID	Location	Study Area	Latitude	Longitude	Analytical Parameters	Sample Interval (ft)		Water Depth (ft)	Field Duplicate
						Upper Depth (ft)	Lower Depth (ft)		
S-E08112D-062111-CCR-002	RB-8	Rask Bay	46.65254	-92.26963	Extended	1	1.67	1.3	
S-E08112D-062111-CCR-003	RB-11	Rask Bay	46.658125	-92.26912	Extended	0	0.50	1.2	
S-E08112D-062111-CCR-004	RB-11	Rask Bay	46.658125	-92.26912	Extended	0.5	1.00	1.2	
S-E08112D-062111-CCR-005	NDS-9	New Duluth Stretch	46.65156	-92.20843	Extended	0	0.5	7.8	
S-E08112D-062111-CCR-006	NDS-9	New Duluth Stretch	46.65156	-92.20843	Extended	1	2	7.8	
S-E08112D-062111-CCR-007	NDS-8	New Duluth Stretch	46.65115	-92.2123603	Short	0	0.5	1.2	
S-E08112D-062111-CCR-008	NDS-8	New Duluth Stretch	46.65115	-92.2123603	Short	0.5	1	1.2	
S-E08112D-062111-CCR-009	NDS-11	New Duluth Stretch	46.65098	-92.20994	Short	0	0.5	8.9	
S-E08112D-062111-CCR-010	NDS-11	New Duluth Stretch	46.65098	-92.20994	Short	1	2	8.9	
S-E08112D-062311-CCR-001	NDS-7	New Duluth Stretch	46.65234	-92.21497	Short	0	0.5	1.3	
S-E08112D-062311-CCR-002	NDS-7	New Duluth Stretch	46.65234	-92.21497	Short	0.5	1	1.3	
S-E08112D-062311-CCR-003	NDS-5	New Duluth Stretch	46.65215	-92.21844	Extended	0	0.5	3.8	
S-E08112D-062311-CCR-004	NDS-5	New Duluth Stretch	46.65215	-92.21844	Extended	0.5	1	3.8	
S-E08112D-062311-CCR-005	NDS-4	New Duluth Stretch	46.65174	-92.22032	Short	0	0.5	11.3	
S-E08112D-062311-CCR-006	NDS-4	New Duluth Stretch	46.65174	-92.22032	Short	0.5	1	11.3	
S-E08112D-062311-CCR-007	NDS-14	New Duluth Stretch	46.65306	-92.220109	Extended	0	0.5	1.2	
S-E08112D-062311-CCR-008	NDS-14	New Duluth Stretch	46.65306	-92.220109	Extended	1.67	2.5	1.2	
S-E08112D-062311-CCR-009	NDS-13	New Duluth Stretch	46.65323	-92.2206	Extended	0	0.5	1.5	
S-E08112D-062311-CCR-010	NDS-13	New Duluth Stretch	46.65323	-92.2206	Extended	0.83	1.67	1.5	
S-E08112D-062311-CCR-011	NDS-1	New Duluth Stretch	46.652605	-92.22232	Extended	0	0.5	15.2	
S-E08112D-062311-CCR-012	NDS-1	New Duluth Stretch	46.652605	-92.22232	Extended	0.5	1	15.2	
S-E08112D-062311-CCR-013	NDS-6	New Duluth Stretch	46.65047	-92.23496	Extended	0	0.5	4.9	
S-E08112D-062311-CCR-014	NDS-6	New Duluth Stretch	46.65047	-92.23496	Extended	0.5	1.25	4.9	
S-E08112D-062411-CCR-001	RB-6	Rask Bay	46.65525	-92.26757	Short	3	4	3	
S-E08112D-062411-CCR-002	RB-6	Rask Bay	46.65525	-92.26757	Short	0	0.5	3	
S-E08112D-062411-CCR-003	RB-9	Rask Bay	46.65591	-92.26743	Short	0	0.5	3.2	
S-E08112D-062411-CCR-004	RB-9	Rask Bay	46.65591	-92.26743	Short	1	2	3.2	
S-E08112D-062411-CCR-005	NDS-10	New Duluth Stretch	46.65229	-92.24697	Short	0	0.5	1	

Sample ID	Location	Study Area	Latitude	Longitude	Analytical Parameters	Sample Interval (ft)		Water Depth (ft)	Field Duplicate
						Upper Depth (ft)	Lower Depth (ft)		
S-E08112D-062411-CCR-006	NDS-10	New Duluth Stretch	46.65229	-92.24697	Short	0.5	1	1	
S-E08112D-062411-CCR-007	NDS-12	New Duluth Stretch	46.65053	-92.24251	Short	0	0.5	2.1	
S-E08112D-062411-CCR-008	NDS-12	New Duluth Stretch	46.65053	-92.24251	Short	1	1.67	2.1	
S-E08112D-062411-CCR-009	NB-1	North Bay	46.65297	-92.23966	Short	0	0.5	3.2	
S-E08112D-062411-CCR-010	NB-1	North Bay	46.65297	-92.23966	Short	0.5	1	3.2	
S-E08112D-062411-CCR-011	NB-2	North Bay	46.65405	-92.23746	Extended	0	0.5	4	
S-E08112D-062411-CCR-012	NB-2	North Bay	46.65405	-92.23746	Extended	1	2	4	
S-E08112D-062411-CCR-013	NB-4	North Bay	46.65386	-92.2404	Short	0	0.5	3.5	
S-E08112D-062411-CCR-014	NB-4	North Bay	46.65386	-92.2404	Short	0.5	1	3.5	
S-E08112D-062511-CCR-001	NDS-2	New Duluth Stretch	46.653375	-92.226774	Extended	0	0.5	0.3	
S-E08112D-062511-CCR-002	NDS-2	New Duluth Stretch	46.653375	-92.226774	Extended	0.83	1.67	0.3	
S-E08112D-062511-CCR-003	NB-3	North Bay	46.652431	-92.236818	Extended	0	0.5	2.1	
S-E08112D-062511-CCR-004	NB-3	North Bay	46.652431	-92.236818	Extended	1.67	2.5	2.1	
S-E08112D-062511-CCR-005	NB-5	North Bay	46.653175	-92.235549	Short	0	0.5	3.2	
S-E08112D-062511-CCR-006	NB-5	North Bay	46.653175	-92.235549	Short	3	4	3.2	
S-E08112D-062511-CCR-007	NB-6	North Bay	46.652675	-92.23296	Extended	0	0.5	0.3	
S-E08112D-062511-CCR-008	NB-6	North Bay	46.652675	-92.23296	Extended	0.5	1	0.3	

Study Area	Number of Sediment Samples	Percent Samples within Ranges of Mean PEC-Qs		
		<0.1 (Low Risk)	0.1 to 0.6 (Moderate Risk)	> 0.6 (High Risk)
Top of Sediment (0-0.5 ft)				
Chambers Grove Reach	1	100	0	0
Cedar Yard Bay	2	0	100	0
Fond Du Lac Stretch	4	75	25	0
Indian Point Waterfront	7	0	86	14
Kingsbury Bay	6	0	100	0
Minnesota Channel	3	33	67	0
Mud Lake	17	0	100	0
Munger Landing	7	0	86	14
New Duluth Stretch	15	27	73	0
North Bay	6	67	33	0
Perch Lake	4	0	100	0
Rask Bay	11	9	91	0
Riverside Marina	5	20	60	20
Spirit Lake	65	34	66	0
Steelton Bay	10	70	30	0
Tallas Island Flats	6	50	50	0
Total	***169***	***28***	***70***	***2***
Sample at Depth (> 0.5 ft)				
Chambers Grove Reach	1	100	0	0
Cedar Yard Bay	2	0	100	0
Fond Du Lac Stretch	4	75	25	0
Indian Point Waterfront	7	0	86	14
Kingsbury Bay	6	17	83	0
Minnesota Channel	3	100	0	0
Mud Lake	13	23	77	0
Munger Landing	7	43	29	29
New Duluth Stretch	15	40	60	0
North Bay	6	67	33	0
Perch Lake	4	0	100	0
Rask Bay	11	36	64	0
Riverside Marina	5	0	80	20
Spirit Lake	59	31	63	7
Steelton Bay	7	71	29	0
Tallas Island Flats	6	100	0	0
Total	***156***	***37***	***58***	***5***

Tables 8.2 through 8.16: Mean PEC-Qs

These tables include the mean PEC-Qs calculated for each sample location

The following notes are useful in interpreting data presented in the Tables 8.2 through 8.16

Note 1. Only 13 priority PAHs are included in calculating total PAHs for the mean-PEC-Q calculation
Note 2. Sum of individual Aroclors are used in calculating total PCBs
Note 3. Only chemicals with reliable PECs are used in the calculation
Note 4. Calculation is based on dry weight concentrations of contaminants
Note 5. Non-detect data are handled using the following assumptions:
- PCBs/PAHs/Metals: Zero for the Aroclors/PAHs/metals that are all non-detects within a study area
- PCBs/PAHs/Metals: 1/2 of the reporting limit for the Aroclors/PAHs/Metals that are detected in more than one sample within a study area

Note 6.	xxx	Mean PEC-Q value is within the mean PEC-Q low risk range of < 0.1
Note 7.	xxx	Mean PEC-Q value is within the mean PEC-Q moderate risk range of 0.1 - 0.6
Note 8.	**xxx**	Mean PEC-Q value is in the mean PEC-Q high risk range of > 0.6

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
Chambers Grove Reach														
CGR-1	0-0.5	1.50	0.08	9.70	13.00	3.70	13.00	29.00	0.032	0.000	0.085	0.001	-	0.043
CGR-1	1.2-2.2	2.30	0.21	18.00	24.00	8.00	20.00	58.00	0.219	0.000	0.148	0.010	-	0.079
Cedar Yard Bay														
CYB-1	0-0.5	6.70	1.50	37.00	39.00	26.00	29.00	160.00	0.151	0.000	0.321	0.007	-	0.164
CYB-1	0.5-1.0	8.30	1.40	39.00	33.00	22.00	31.00	140.00	0.409	0.000	0.317	0.018	-	0.168
CYB-2	0-0.5	8.90	1.90	28.00	70.00	210.00	23.00	220.00	0.548	0.000	0.567	0.024	-	0.295
CYB-2	0.8-1.3	2.30	0.89	29.00	18.00	7.00	23.00	77.00	0.354	0.000	0.189	0.016	-	0.102

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
FDLS-2	0-0.5	2.0	0.12	12.0	15.0	3.8	15.0	35	0.242	0.000	0.101	0.011	-	0.056
FDLS-2	0.5-1.1	2.2	0.10	13.0	18.0	3.7	16.0	38	0.178	0.000	0.109	0.008	-	0.059
FDLS-4	0-0.5	1.8	0.15	14.0	15.0	4.8	15.0	41	0.077	0.000	0.107	0.003	-	0.055
FDLS-4	1.6-2.6	1.9	0.25	15.0	19.0	7.5	17.0	50	0.197	0.000	0.127	0.009	-	0.068
FDLS-1	0-0.5	3.3	0.23	32.0	28.0	6.9	30.0	67	0.382	0.000	0.206	0.017	-	0.111
FDLS-1	0.5-1.3	3.2	0.22	30.0	27.0	6.5	28.0	64	0.358	0.000	0.194	0.016	-	0.105
FDLS-3	0-0.5	2.0	0.20	17.0	15.0	5.8	17.0	50	0.123	0.000	0.123	0.005	-	0.064
FDLS-3	1.0-2.0	1.3	0.14	10.0	11.0	4.8	12.0	33	0.172	0.000	0.084	0.008	-	0.046

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
IPW-6	0-0.5	6.8	2.8	53.0	65.0	100.0	44.0	300	3.17	0.000	0.575	0.139	-	0.357
IPW-6	2-2.8	2.6	1.7	42.0	25.0	9.0	31.0	87	0.68	0.000	0.266	0.030	-	0.148
IPW-4	0-0.5	2.3	1.3	24.0	16.0	16.0	19.0	77	0.59	0.000	0.191	0.026	-	0.109
IPW-4	0.8-1.3	3.4	1.8	42.0	27.0	10.0	33.0	94	1.34	0.000	0.284	0.059	-	0.171
IPW-2	0-0.5	4.2	1.8	47.0	29.0	29.0	33.0	140	2.17	0.000	0.331	0.095	-	0.213
IPW-2- DUP	0-0.5	3.6	1.5	41.0	26.0	28.0	29.0	120	2.30	0.000	0.290	0.101	-	0.195
IPW-2	2.2-3.0	5.2	2.6	44.0	44.0	72.0	32.0	230	17.92	0.000	0.442	0.786	-	**0.614**
IPW-2- DUP	2.2-3.0	4.8	2.1	44.0	40.0	80.0	33.0	210	18.67	0.000	0.428	0.819	-	**0.623**
IPW-3	0-0.5	6.3	3.0	53.0	59.0	69.0	40.0	280	5.34	0.000	0.520	0.234	-	0.377
IPW-3	1.7-2.2	3.2	1.9	41.0	29.0	18.0	31.0	98	2.03	0.000	0.291	0.089	-	0.190
IPW-5	0-0.5	2.8	1.8	42.0	46.0	43.0	31.0	120	3.09	0.000	0.338	0.136	-	0.237
IPW-5	0.8-1.3	4.2	2.5	56.0	56.0	89.0	43.0	210	1.96	0.000	0.507	0.086	-	0.296
IPW-1	0-0.5	3.7	2.0	49.0	35.0	35.0	35.0	150	2.54	0.000	0.359	0.111	-	0.235
IPW-1	2.2-2.8	1.9	0.9	25.0	14.0	6.0	19.0	48	1.13	0.000	0.158	0.049	-	0.104

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
KB-1	0-0.5	4.4	2.6	33.0	70.0	73.0	39.0	200	1.81	0.000	0.462	0.079	-	0.270
KB-1- DUP	0-0.5	4.6	2.5	36.0	74.0	77.0	41.0	210	1.33	0.000	0.481	0.058	-	0.269
KB-1	1.4-2.4	3.1	1.5	23.0	43.0	52.0	28.0	130	1.63	0.000	0.308	0.071	-	0.190
KB-1- DUP	1.4-2.4	3.7	1.5	22.0	54.0	70.0	33.0	170	3.54	0.000	0.367	0.155	-	0.261
KB-3	0-0.5	3.9	2.2	37.0	62.0	65.0	39.0	190	1.74	0.000	0.433	0.076	-	0.255
KB-3	1.0-1.7	5.2	2.4	40.0	49.0	70.0	41.0	180	3.53	0.000	0.444	0.155	-	0.300
KB-2	0-0.5	3.0	1.9	29.0	61.0	52.0	33.0	160	2.14	0.000	0.368	0.094	-	0.231
KB-2	1.5-2.3	5.8	2.8	38.0	94.0	120.0	48.0	240	6.53	0.000	0.594	0.286	-	0.440
KB-5	0-0.5	5.9	2.5	48.0	67.0	66.0	52.0	220	4.23	0.000	0.518	0.186	-	0.352
KB-5	2.0-2.6	2.0	1.0	23.0	17.0	5.2	26.0	55	0.54	0.000	0.183	0.024	-	0.103
KB-4	0-0.5	2.7	1.1	23.0	17.0	17.0	19.0	74	9.95	0.000	0.187	0.436	-	0.312
KB-4	1.0-1.7	1.8	0.9	22.0	13.0	5.6	17.0	130	0.55	0.000	0.171	0.024	-	0.098

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
MC-2	0-0.5	1.5	0.9	23.0	14.0	4.9	18.0	49	0.67	0.000	0.149	0.029	-	0.089
MC-2	1.0-1.7	1.4	0.8	20.0	11.0	4.9	16.0	43	0.76	0.000	0.132	0.034	-	0.083
MC-3	0-0.5	3.2	0.4	27.0	19.0	19.0	22.0	95	2.58	0.000	0.193	0.113	-	0.153
MC-3	1.7-2.7	1.4	0.4	13.0	7.6	2.5	13.0	38	0.63	0.000	0.095	0.028	-	0.061
MC-1	0-0.5	3.2	0.5	22.0	18.0	31.0	20.0	110	3.73	0.000	0.200	0.164	-	0.182
MC-1	3.0-4.0	1.5	0.2	18.0	12.0	3.7	15.0	43	0.70	0.000	0.107	0.031	-	0.069

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
ML-1	0-0.5	5.7	0.9	35.0	35.0	28.0	27.0	140	0.78	0.000	0.283	0.034	-	0.159
ML-1	1.0-2.0	6.6	0.8	40.0	44.0	23.0	34.0	140	0.86	0.000	0.315	0.038	-	0.177
ML-6	0-0.5	4.9	1.0	48.0	38.0	32.0	36.0	210	0.87	0.000	0.354	0.038	-	0.196
ML-6- DUP	0-0.5	4.2	0.8	41.0	32.0	27.0	31.0	170	0.84	0.000	0.298	0.037	-	0.168
ML-6	1.4-2.4	3.4	0.5	42.0	27.0	16.0	34.0	120	0.59	0.000	0.264	0.026	-	0.145
ML-6- DUP	1.4-2.4	3.7	0.5	40.0	27.0	14.0	32.0	110	0.59	0.000	0.252	0.026	-	0.139
ML-3	0-0.5	3.3	0.5	25.0	20.0	12.0	20.0	84	0.65	0.000	0.177	0.028	-	0.103
ML-3	0.5-1.0	3.6	0.4	20.0	22.0	9.7	18.0	67	0.52	0.000	0.157	0.023	-	0.090
ML-2	0-0.5	4.2	0.6	43.0	30.0	21.0	33.0	130	0.78	0.000	0.280	0.034	-	0.157
ML-2	1.8-2.8	4.2	0.7	40.0	32.0	19.0	32.0	130	0.80	0.000	0.275	0.035	-	0.155
ML-14	0-0.5	13.0	3.3	51.0	61.0	100.0	31.0	340	1.41	0.000	0.584	0.062	-	0.323
ML-15	0-0.5	8.2	2.3	52.0	52.0	41.0	30.0	160	1.57	0.000	0.402	0.069	-	0.235
ML-15	1.0-2.0	7.5	1.8	41.0	47.0	24.0	35.0	130	1.30	0.000	0.352	0.057	-	0.205
ML-16	0-0.5	6.6	1.5	43.0	40.0	33.0	31.0	140	1.20	0.000	0.337	0.053	-	0.195
ML-16	1.5-2.5	4.5	1.5	48.0	31.0	11.0	40.0	120	1.22	0.000	0.321	0.053	-	0.187
ML-10	0-0.5	6.5	2.7	110.0	62.0	100.0	32.0	340	2.07	0.000	0.618	0.091	-	0.354
ML-10	0.5-1.5	7.0	3.2	100.0	69.0	97.0	38.0	330	2.77	0.000	0.640	0.121	-	0.381
ML-12	0-0.5	8.0	2.8	66.0	65.0	110.0	36.0	300	1.68	0.000	0.584	0.074	-	0.329
ML-11	0-0.5	6.7	2.3	78.0	55.0	84.0	28.0	250	2.70	0.000	0.502	0.119	-	0.310
ML-13	0-0.5	9.5	1.8	48.0	45.0	40.0	32.0	160	1.34	0.000	0.386	0.059	-	0.222
ML-8	0-0.5	3.3	1.4	36.0	26.0	18.0	28.0	100	0.69	0.000	0.259	0.030	-	0.145
ML-8	2.0-3.0	2.8	1.1	31.0	20.0	6.6	26.0	77	0.71	0.000	0.211	0.031	-	0.121
ML-7	0-0.5	4.5	1.3	39.0	29.0	22.0	28.0	120	0.66	0.000	0.279	0.029	-	0.154
ML-7	1.0-2.0	1.4	0.4	16.0	7.6	4.2	12.0	27	0.58	0.000	0.093	0.025	-	0.059
ML-4	0-0.5	5.8	2.2	44.0	41.0	44.0	33.0	200	0.85	0.000	0.393	0.037	-	0.215

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
ML-4	3.0-4.0	2.8	1.3	40.0	24.0	9.2	32.0	99	1.03	0.000	0.259	0.045	-	0.152
ML-5	0-0.5	4.5	1.5	41.0	33.0	29.0	32.0	140	0.62	0.000	0.317	0.027	-	0.172
ML-5	3.0-4.0	1.6	0.7	24.0	15.0	5.1	19.0	51	0.51	0.000	0.150	0.022	-	0.086
ML-9	0-0.5	3.4	1.0	21.0	18.0	15.0	17.0	80	0.53	0.000	0.179	0.023	-	0.101
ML-9	1.7-2.5	2.4	1.1	27.0	18.0	7.1	22.0	69	0.67	0.000	0.188	0.029	-	0.109

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
MLA-6	0-0.5	7.1	1.60	41.0	45.0	120.0	33.0	410	12.04	0.230	0.531	0.528	0.340	0.466
MLA-6- DUP	0-0.5	5.9	1.50	35.0	40.0	110.0	29.0	360	12.38	0.075	0.472	0.543	0.111	0.375
MLA-6	3.0-4.0	1.4	0.14	18.0	12.0	3.4	16.0	43	0.76	0.047	0.109	0.033	0.070	0.071
MLA-6- DUP	3.0-4.0	1.4	0.15	17.0	12.0	3.2	16.0	42	0.75	0.046	0.107	0.033	0.067	0.069
MLA-2	0-0.5	1.9	0.34	24.0	16.0	12.0	21.0	81	1.30	0.055	0.165	0.057	0.081	0.101
MLA-2	0.8-1.5	7.9	2.10	45.0	61.0	160.0	38.0	560	22.31	0.560	0.675	0.979	0.828	**0.827**
MLA-3	0-0.5	6.2	1.60	39.0	50.0	120.0	36.0	390	14.38	0.510	0.532	0.630	0.754	**0.639**
MLA-3	1.0-1.8	2.5	0.42	33.0	29.0	6.7	37.0	78	1.31	0.080	0.234	0.057	0.118	0.136
MLA-5	0-0.5	3.3	0.58	20.0	18.0	37.0	17.0	130	5.08	0.060	0.206	0.223	0.089	0.172
MLA-5	1.8-2.8	1.1	0.08	11.0	6.3	2.1	12.0	18	0.64	0.042	0.070	0.028	0.061	0.053
MLA-1	0-0.5	7.9	1.70	37.0	61.0	120.0	35.0	400	12.57	0.145	0.550	0.551	0.214	0.439
MLA-1	0.5-1.0	8.7	1.40	39.0	67.0	110.0	36.0	340	9.52	0.155	0.527	0.418	0.229	0.391
MLA-4	0-0.5	5.1	0.81	41.0	36.0	53.0	35.0	210	9.63	0.110	0.360	0.423	0.163	0.315
MLA-4	1.0-2.0	8.9	2.80	43.0	65.0	260.0	33.0	740	44.36	0.330	0.854	1.946	0.488	**1.096**

Table 8.9
Mean PEC-Qs: New Duluth Stretch
Sediment Investigation
Lower St. Louis River
USACE/MPCA
Duluth, Minnesota

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
NDS-3	0-0.5	2.2	0.8	17.0	14.0	7.7	15.0	49	0.15	0.000	0.137	0.006	-	0.072
NDS-3	1.7-2.3	2.7	1.0	25.0	22.0	12.0	21.0	76	0.28	0.000	0.192	0.012	-	0.102
NDS-15	0-0.5	1.9	0.7	16.0	13.0	6.5	15.0	44	0.17	0.000	0.126	0.008	-	0.067
NDS-15	2.0-3.0	1.8	0.7	17.0	12.0	4.0	16.0	45	0.40	0.000	0.128	0.018	-	0.073
NDS-9	0-0.5	1.6	0.8	14.0	11.0	5.0	13.0	35	0.28	0.000	0.113	0.012	-	0.063
NDS-9	1.0-2.0	1.8	0.7	13.0	11.0	6.3	12.0	41	0.28	0.000	0.110	0.012	-	0.061
NDS-8	0-0.5	3.3	1.3	33.0	26.0	14.0	27.0	110	0.37	0.000	0.248	0.016	-	0.132
NDS-8	0.5-1.0	2.6	1.3	40.0	21.0	6.7	29.0	84	0.48	0.000	0.239	0.021	-	0.130
NDS-11	0-0.5	1.9	0.7	16.0	12.0	5.2	15.0	38	0.34	0.000	0.121	0.015	-	0.068
NDS-11	1.0-2.0	2.0	0.7	14.0	12.0	6.3	13.0	44	0.13	0.000	0.118	0.006	-	0.062
NDS-7	0-0.5	3.2	1.0	24.0	19.0	24.0	18.0	91	0.17	0.000	0.200	0.008	-	0.104
NDS-7	0.5-1.0	2.4	0.9	19.0	16.0	14.0	16.0	81	0.19	0.000	0.165	0.009	-	0.087
NDS-5	0-0.5	1.9	0.5	14.0	8.4	4.1	13.0	35	0.38	0.000	0.103	0.017	-	0.060
NDS-5	0.5-1.0	1.6	0.8	21.0	11.0	3.7	16.0	44	0.43	0.000	0.131	0.019	-	0.075
NDS-4	0-0.5	1.7	0.5	14.0	9.9	3.2	17.0	42	0.34	0.000	0.116	0.015	-	0.066
NDS-4	0.5-1.0	1.7	0.6	14.0	15.0	2.5	16.0	36	0.35	0.000	0.119	0.015	-	0.067
NDS-14	0-0.5	3.6	1.3	28.0	23.0	43.0	23.0	120	0.54	0.000	0.264	0.024	-	0.144
NDS-14	1.7-2.5	2.3	1.0	31.0	20.0	6.4	24.0	67	0.49	0.000	0.196	0.021	-	0.109
NDS-13	0-0.5	5.4	1.3	38.0	35.0	80.0	27.0	200	0.57	0.000	0.374	0.025	-	0.200
NDS-13	0.8-1.7	2.2	1.0	25.0	14.0	5.2	19.0	62	0.36	0.000	0.164	0.016	-	0.090
NDS-1	0-0.5	1.3	0.5	11.0	10.0	2.9	12.0	33	0.33	0.000	0.091	0.015	-	0.053
NDS-1	0.5-1.0	1.7	0.6	15.0	15.0	3.6	17.0	42	0.30	0.000	0.126	0.013	-	0.070
NDS-6	0-0.5	2.0	0.7	15.0	11.0	5.0	13.0	42	0.16	0.000	0.115	0.007	-	0.061
NDS-6	0.5-1.2	1.6	0.4	11.0	8.2	2.7	10.0	30	0.30	0.000	0.083	0.013	-	0.048

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
NDS-10	0-0.5	1.5	0.4	13.0	7.2	3.7	10.0	34	0.03	0.000	0.087	0.002	-	0.044
NDS-10	0.5-1.0	1.4	0.4	12.0	7.1	2.6	10.0	36	0.03	0.000	0.083	0.001	-	0.042
NDS-12	0-0.5	2.1	0.5	15.0	11.0	7.4	12.0	44	0.42	0.000	0.110	0.019	-	0.064
NDS-12	1.0-1.7	1.8	0.5	13.0	11.0	3.2	12.0	36	0.37	0.000	0.099	0.016	-	0.057
NDS-2	0-0.5	1.4	0.3	27.0	8.2	3.0	16.0	25	0.18	0.000	0.115	0.008	-	0.061
NDS-2	0.8-1.7	1.3	0.4	10.0	10.0	3.4	10.0	24	0.15	0.000	0.080	0.006	-	0.043

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
NB-1	0-0.5	4.9	1.20	33.0	28.0	25.0	24.0	150	0.62	0.000	0.270	0.027	-	0.149
NB-1	0.5-1.0	5.5	1.10	33.0	29.0	11.0	27.0	94	0.90	0.000	0.247	0.039	-	0.143
NB-2	0-0.5	4.6	1.50	39.0	30.0	23.0	28.0	140	0.68	0.000	0.293	0.030	-	0.162
NB-2	1.0-2.0	4.4	1.40	37.0	33.0	20.0	29.0	130	0.67	0.000	0.286	0.029	-	0.158
NB-4	0-0.5	5.9	1.70	43.0	37.0	30.0	31.0	180	0.50	0.000	0.346	0.022	-	0.184
NB-4	0.5-1.0	6.4	1.60	37.0	38.0	34.0	28.0	190	0.51	0.000	0.337	0.022	-	0.180
NB-3	0-0.5	3.2	0.78	22.0	16.0	19.0	17.0	80	0.36	0.000	0.176	0.016	-	0.096
NB-3	1.7-2.5	2.8	0.73	22.0	25.0	11.0	17.0	85	0.24	0.000	0.174	0.010	-	0.092
NB-5	0-0.5	3.9	1.50	31.0	22.0	18.0	23.0	120	0.52	0.000	0.246	0.023	-	0.134
NB-5	3.0-4.0	3.1	1.40	37.0	20.0	7.0	27.0	92		0.000	0.236		-	0.236
NB-6	0-0.5	2.7	0.69	17.0	12.0	7.6	13.0	59	0.27	0.000	0.130	0.012	-	0.071
NB-6	0.5-1.0	2.0	0.82	23.0	15.0	5.6	18.0	60	0.41	0.000	0.154	0.018	-	0.086

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
PL-3	0-0.5	4.1	1.2	23.0	24.0	34.0	18.0	120	0.60	0.000	0.233	0.026	-	0.130
PL-3	0.5-1.0	6.4	1.5	25.0	28.0	63.0	20.0	180	0.66	0.000	0.315	0.029	-	0.172
PL-2	0-0.5	4.8	2.7	37.0	45.0	95.0	29.0	250	1.86	0.000	0.458	0.082	-	0.270
PL-2- DUP	0-0.5	4.3	2.1	34.0	40.0	87.0	27.0	230	0.81	0.000	0.409	0.036	-	0.222
PL-2	1.0-2.0	8.2	3.3	35.0	52.0	130.0	31.0	310	0.79	0.000	0.558	0.034	-	0.296
PL-2- DUP	1.0-2.0	8.1	3.1	33.0	47.0	160.0	29.0	330	0.77	0.000	0.578	0.034	-	0.306
PL-1	0-0.5	6.0	2.5	39.0	41.0	99.0	31.0	260	0.90	0.000	0.470	0.040	-	0.255
PL-1	1.0-2.0	5.1	1.4	31.0	41.0	7.7	29.0	66	1.41	0.000	0.256	0.062	-	0.159

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
RB-4	0-0.5	2.9	0.31	15.0	14.0	11.0	15.0	68	0.17	0.000	0.132	0.007	-	0.069
RB-4	0.5-1.2	1.8	0.23	18.0	15.0	7.0	16.0	54	0.18	0.000	0.124	0.008	-	0.066
RB-1	0-0.5	3.6	1.3	31.0	25.0	20.0	25.0	110	0.41	0.000	0.247	0.018	-	0.132
RB-1	3.0-4.0	5.4	1.3	33.0	27.0	7.5	27.0	77	0.70	0.000	0.241	0.031	-	0.136
RB-7	0-0.5	3.7	1.3	28.0	24.0	21.0	23.0	120	0.29	0.000	0.241	0.013	-	0.127
RB-7	3.0-4.0	2.5	1.1	29.0	21.0	6.8	25.0	65	0.83	0.000	0.201	0.036	-	0.119
RB-2	0-0.5	5.3	1.7	40.0	33.0	32.0	32.0	170	0.32	0.000	0.338	0.014	-	0.176
RB-2	1.0-2.0	3.9	1.3	29.0	28.0	7.8	28.0	74	0.68	0.000	0.232	0.030	-	0.131
RB-5	0-0.5	4.1	1.3	27.0	25.0	25.0	23.0	120	0.30	0.000	0.247	0.013	-	0.130
RB-5	1.3-2.0	4.5	1.4	34.0	26.0	7.1	27.0	78	0.76	0.000	0.240	0.033	-	0.137
RB-10	0-0.5	4.0	1.5	31.0	29.0	27.0	26.0	130	0.31	0.000	0.275	0.014	-	0.144
RB-10	1.3-2.0	2.3	0.8	25.0	21.0	6.3	22.0	62	0.49	0.000	0.176	0.021	-	0.099
RB-3	0-0.5	4.9	1.9	42.0	34.0	36.0	32.0	170	0.41	0.000	0.350	0.018	-	0.184
RB-3	3.0-4.0	3.5	1.6	41.0	28.0	7.1	35.0	87	0.68	0.000	0.279	0.030	-	0.154
RB-8	0-0.5	2.6	0.98	24.0	20.0	16.0	21.0	83	0.16	0.000	0.195	0.007	-	0.101
RB-8	1.0-1.7	2.7	0.82	21.0	17.0	7.0	18.0	54	0.38	0.000	0.156	0.016	-	0.086
RB-11	0-0.5	4.1	1.6	29.0	31.0	34.0	26.0	120	0.27	0.000	0.282	0.012	-	0.147
RB-11	0.5-1.0	4.8	2	31.0	34.0	27.0	28.0	110	0.30	0.000	0.297	0.013	-	0.155
RB-6	3.0-4.0	3.6	1.3	37.0	24.0	6.9	30.0	90	0.07	0.000	0.247	0.003	-	0.125
RB-6	0-0.5	4.7	1.8	39.0	33.0	32.0	30.0	180	0.04	0.000	0.334	0.002	-	0.168
RB-9	0-0.5	5.0	1.7	38.0	32.0	37.0	28.0	200	0.04	0.000	0.336	0.002	-	0.169
RB-9	1.0-2.0	1.9	0.76	21.0	15.0	5.3	18.0	57	0.05	0.000	0.148	0.002	-	0.075

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
RSM-1	0-0.5	9.8	6.4	75.0	470.0	330.0	27.0	390.0	3.58	0.000	1.342	0.157	-	**0.750**
RSM-1	1.2-1.8	2.0	1.5	18.0	51.0	99.0	16.0	160.0	0.79	0.000	0.331	0.034	-	0.183
RSM-2	0-0.5	4.4	2.5	46.0	46.0	39.0	37.0	160.0	2.22	0.000	0.396	0.097	-	0.247
RSM-2	1.7-2.5	6.5	3.5	49.0	58.0	120.0	43.0	420.0	18.70	0.000	0.638	0.820	-	**0.729**
RSM-3	0-0.5	4.0	2.5	48.0	37.0	80.0	29.0	270.0	5.96	0.000	0.445	0.262	-	0.353
RSM-3	0.5-1.0	3.8	1.3	97.0	30.0	27.0	16.0	91.0	0.66	0.000	0.313	0.029	-	0.171
RSM-4	0-0.5	5.5	2.7	49.0	41.0	38.0	45.0	180.0	2.46	0.000	0.434	0.108	-	0.271
RSM-4	1.6-2.2	3.2	1.2	14.0	23.0	49.0	16.0	110.0	0.90	0.000	0.224	0.040	-	0.132
RSM-5	0-0.5	1.6	0.6	11.0	12.0	8.6	14.0	38.0	0.44	0.000	0.112	0.019	-	0.066
RSM-5	0.5-1.0	2.2	1.5	13.0	14.0	23.0	17.0	66.0	0.78	0.000	0.179	0.034	-	0.107

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
SL-39	0-0.5	4.1	0.9	35.0	32.0	40.0	28.0	210.0	3.73	0.000	0.311	0.164	-	0.237
SL-39- DUP	0-0.5	3.8	0.8	32.0	28.0	37.0	25.0	200.0	1.56	0.000	0.285	0.068	-	0.177
SL-39	1.0-2.0	2.1	0.3	28.0	17.0	7.8	23.0	75.0	0.82	0.000	0.170	0.036	-	0.103
SL-39- DUP	1.0-2.0	2.6	0.4	31.0	20.0	14.0	25.0	96.0	0.87	0.000	0.200	0.038	-	0.119
SL-32	0-0.7	3.4	0.4	34.0	24.0	12.0	28.0	96.0	1.07	0.000	0.219	0.047	-	0.133
SL-32- DUP	0-0.7	3.3	0.4	37.0	26.0	13.0	29.0	100.0	0.80	0.000	0.230	0.035	-	0.133
SL-32	3.0-4.0	4.0	0.9	40.0	41.0	32.0	30.0	230.0	1.04	0.000	0.331	0.046	-	0.188
SL-32- DUP	3.0-4.0	3.9	0.9	40.0	40.0	31.0	30.0	230.0	0.96	0.000	0.327	0.042	-	0.184
SL-19	0-0.5	2.9	0.4	34.0	24.0	11.0	27.0	97.0	1.01	0.000	0.213	0.044	-	0.128
SL-19	3.0-4.0	3.3	0.7	32.0	34.0	22.0	25.0	150.0	4.08	0.000	0.253	0.179	-	0.216
SL-38	0-0.5	1.5	0.1	15.0	11.0	2.9	15.0	33.0	0.80	0.000	0.098	0.035	-	0.067
SL-38	1.6-2.4	2.0	0.8	22.0	14.0	4.7	18.0	61.0	0.77	0.000	0.151	0.034	-	0.093
SL-52	0-0.5	6.2	1.6	37.0	29.0	65.0	27.0	260.0	8.88	0.000	0.381	0.390	-	0.385
SL-52	1.7-2.7	4.7	1.8	35.0	27.0	52.0	27.0	180.0	5.07	0.000	0.336	0.223	-	0.279
SL-48	0-0.7	5.7	1.8	40.0	36.0	59.0	30.0	260.0	10.35	0.000	0.397	0.454	-	0.425
SL-48- DUP	0-0.7	6.2	1.9	43.0	38.0	61.0	31.0	290.0	9.75	0.000	0.423	0.428	-	0.425
SL-48	1.5-2.5	1.7	0.6	17.0	11.0	3.7	14.0	45.0	0.69	0.000	0.117	0.030	-	0.073
SL-48- DUP	1.5-2.5	1.9	0.7	17.0	10.0	3.6	14.0	45.0	0.68	0.000	0.119	0.030	-	0.074
SL-49	0-0.5	6.2	2.0	44.0	41.0	59.0	31.0	300.0	1.78	0.000	0.430	0.078	-	0.254
SL-49	0.5-1.0	4.9	1.7	36.0	35.0	52.0	28.0	210.0	8.86	0.000	0.356	0.389	-	0.372
SL-50	0-0.5	1.9	0.6	17.0	10.0	4.0	14.0	47.0	0.67	0.000	0.117	0.029	-	0.073
SL-50	0.8-1.3	1.4	0.6	15.0	9.4	3.1	13.0	38.0	0.70	0.000	0.104	0.031	-	0.067
SL-51	0-0.5	3.5	1.4	34.0	24.0	15.0	27.0	110.0	0.88	0.000	0.252	0.039	-	0.146
SL-51	3.0-4.0	3.9	1.7	33.0	28.0	25.0	26.0	160.0	1.24	0.000	0.289	0.054	-	0.172
SL-44	0-0.5	2.0	1.0	31.0	20.0	6.7	24.0	86.0	1.02	0.000	0.201	0.045	-	0.123

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
SL-44	0.9-1.7	2.1	0.8	25.0	18.0	5.3	21.0	73.0	0.75	0.000	0.172	0.033	-	0.102
SL-46	0-0.5	1.4	0.3	9.7	5.7	2.3	10.0	34.0	0.63	0.000	0.076	0.028	-	0.052
SL-46	0.7-1.5	1.6	0.4	9.1	5.5	1.8	10.0	32.0	0.65	0.000	0.076	0.029	-	0.052
SL-53	0-0.5	1.6	0.6	17.0	9.6	20.0	13.0	45.0	0.73	0.000	0.131	0.032	-	0.081
SL-53- DUP	0-0.5	1.5	0.6	16.0	8.8	3.6	12.0	41.0	0.70	0.000	0.103	0.031	-	0.067
SL-53	1.0-1.8	1.2	0.6	17.0	9.4	3.2	13.0	44.0	0.70	0.000	0.108	0.031	-	0.070
SL-53- DUP	1.0-1.8	1.2	0.6	17.0	9.2	3.2	13.0	43.0	0.64	0.000	0.107	0.028	-	0.068
SL-54	0-0.5	4.3	1.4	33.0	28.0	40.0	25.0	190.0	8.71	0.000	0.305	0.382	-	0.344
SL-54	1.0-2.0	6.8	2.2	39.0	43.0	80.0	29.0	390.0	7.51	0.000	0.480	0.329	-	0.405
SL-40	0-0.7	3.6	1.2	34.0	25.0	16.0	28.0	110.0	1.14	0.000	0.252	0.050	-	0.151
SL-40- DUP	0-0.7	3.8	1.2	35.0	25.0	17.0	28.0	110.0	1.03	0.000	0.255	0.045	-	0.150
SL-40	3.0-4.0	4.9	1.6	38.0	31.0	39.0	29.0	180.0	16.85	0.000	0.331	0.739	-	0.535
SL-40- DUP	3.0-4.0	4.9	1.5	48.0	38.0	40.0	38.0	180.0	15.47	0.000	0.375	0.678	-	0.527
SL-33	0-0.5	3.5	1.2	37.0	24.0	15.0	29.0	110.0	1.04	0.000	0.256	0.045	-	0.151
SL-33	3.0-4.0	2.6	1.1	45.0	25.0	7.2	36.0	100.0	1.37	0.000	0.270	0.060	-	0.165
SL-21	0-0.5	2.3	0.8	25.0	18.0	8.5	21.0	71.0	0.82	0.000	0.176	0.036	-	0.106
SL-21	3.0-4.0	3.5	1.4	32.0	40.0	38.0	27.0	240.0	4.49	0.000	0.331	0.197	-	0.264
SL-15	0-0.5	2.8	1.1	36.0	26.0	12.0	30.0	96.0	1.11	0.000	0.246	0.049	-	0.147
SL-15	2.2-3.2	4.5	1.5	40.0	42.0	38.0	33.0	200.0	0.92	0.000	0.356	0.040	-	0.198
SL-41	0-0.5	2.9	1.1	37.0	25.0	12.0	30.0	100.0	0.82	0.000	0.248	0.036	-	0.142
SL-41- DUP	0-0.5	2.8	0.9	33.0	21.0	11.0	26.0	91.0	0.98	0.000	0.218	0.043	-	0.130
SL-41	3.0-4.0	2.3	0.9	28.0	16.0	5.1	23.0	71.0	1.19	0.000	0.183	0.052	-	0.118
SL-41- DUP	3.0-4.0	2.1	0.8	28.0	16.0	5.1	22.0	71.0	1.24	0.000	0.176	0.054	-	0.115
SL-42	0-0.5	2.7	1.0	27.0	18.0	9.5	21.0	76.0	0.86	0.000	0.187	0.038	-	0.113
SL-42	3.0-4.0	3.5	1.4	42.0	25.0	10.0	34.0	110.0	1.01	0.000	0.279	0.044	-	0.161

Table 8.14
Mean PEC-Qs: Spirit Lake
Sediment Investigation
Lower St. Louis River
USACE/MPCA
Duluth, Minnesota

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
SL-43	0-0.5	5.6	1.9	41.0	39.0	54.0	31.0	280.0	5.49	0.000	0.407	0.241	-	0.324
SL-43	0.5-1.0	5.2	1.8	42.0	39.0	54.0	31.0	230.0	22.67	0.000	0.389	0.994	-	**0.691**
SL-47	0-0.5	1.3	0.4	9.9	5.4	2.3	10.0	31.0	0.62	0.000	0.076	0.027	-	0.052
SL-47	1.0-2.0	1.3	0.4	9.9	5.8	2.0	11.0	32.0	0.61	0.000	0.078	0.027	-	0.053
SL-37	0-0.5	4.4	1.7	40.0	30.0	28.0	30.0	170.0	1.49	0.000	0.320	0.066	-	0.193
SL-37	1.0-2.0	4.2	1.3	36.0	30.0	28.0	28.0	130.0	9.78	0.000	0.285	0.429	-	0.357
SL-45	0-0.5	1.6	0.7	24.0	12.0	4.9	19.0	53.0	0.75	0.000	0.148	0.033	-	0.090
SL-45	1.0-1.5	1.6	0.7	19.0	14.0	4.1	16.0	46.0	0.73	0.000	0.131	0.032	-	0.081
SL-27	0-0.5	3.7	1.1	40.0	26.0	16.0	32.0	120.0	1.02	0.000	0.273	0.045	-	0.159
SL-27- DUP	0-0.5	3.2	1.1	36.0	23.0	14.0	29.0	100.0	0.99	0.000	0.246	0.043	-	0.145
SL-27	3.0-4.0	2.8	1.1	42.0	24.0	7.5	34.0	100.0	1.61	0.000	0.260	0.070	-	0.165
SL-27- DUP	3.0-4.0	2.8	1.1	42.0	24.0	7.5	34.0	100.0	1.24	0.000	0.260	0.054	-	0.157
SL-34	0-0.5	3.5	1.1	38.0	24.0	15.0	31.0	110.0	1.02	0.000	0.261	0.045	-	0.153
SL-34	2.0-2.8	3.2	1.1	40.0	22.0	7.5	32.0	100.0	0.68	0.000	0.252	0.030	-	0.141
SL-26	0-0.5	3.1	0.9	32.0	21.0	13.0	26.0	96.0	1.06	0.000	0.221	0.046	-	0.134
SL-26	3.0-4.0	4.5	1.6	41.0	36.0	50.0	32.0	220.0	10.13	0.000	0.371	0.444	-	0.408
SL-20	0-0.5	3.7	1.2	25.0	23.0	41.0	19.0	170.0	2.76	0.000	0.259	0.121	-	0.190
SL-20	1.0-1.7	2.0	0.4	13.0	14.0	3.3	15.0	29.0	0.56	0.000	0.107	0.025	-	0.066
SL-35	0-0.5	2.6	0.9	24.0	18.0	9.2	20.0	69.0	0.82	0.000	0.174	0.036	-	0.105
SL-35	3.0-4.0	5.2	2.0	43.0	57.0	84.0	33.0	330.0	10.12	0.000	0.483	0.444	-	0.464
SL-36	0-0.5	2.9	1.0	31.0	21.0	12.0	24.0	91.0	0.73	0.000	0.213	0.032	-	0.122
SL-36	2.0-3.0	4.6	1.4	40.0	34.0	32.0	32.0	140.0	10.31	0.000	0.318	0.452	-	0.385
SL-29	0-0.5	2.8	0.9	34.0	22.0	13.0	27.0	100.0	0.85	0.000	0.228	0.037	-	0.132
SL-29- DUP	0-0.5	2.8	1.1	31.0	19.0	12.0	23.0	93.0	0.87	0.000	0.212	0.038	-	0.125
SL-29	3.0-4.0	4.6	1.4	34.0	30.0	35.0	26.0	130.0	35.10	0.000	0.289	1.539	-	**0.914**

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
SL-29- DUP	3.0-4.0	4.0	1.2	28.0	29.0	37.0	21.0	130.0	26.20	0.000	0.259	1.149	-	**0.704**
SL-28	0-0.5	2.7	0.9	24.0	17.0	10.0	20.0	79.0	0.74	0.000	0.179	0.032	-	0.106
SL-28	3.0-4.0	3.3	1.3	37.0	23.0	8.5	29.0	96.0	1.26	0.000	0.246	0.055	-	0.151
SL-14	0-0.5	2.0	0.7	19.0	13.0	7.2	16.0	57.0	0.67	0.000	0.139	0.029	-	0.084
SL-14	3.0-4.0	4.0	1.7	30.0	37.0	46.0	22.0	280.0	1.21	0.000	0.343	0.053	-	0.198
SL-22	0-0.5	3.1	1.1	29.0	19.0	12.0	23.0	90.0	0.84	0.000	0.210	0.037	-	0.123
SL-22	3.0-4.0	3.9	1.5	35.0	30.0	29.0	26.0	140.0	23.14	0.000	0.286	1.015	-	**0.651**
SL-9	0-0.5	2.0	0.6	14.0	11.0	5.4	12.0	40.0	0.55	0.000	0.109	0.024	-	0.066
SL-9	3.0-4.0	2.8	1.2	22.0	21.0	20.0	18.0	120.0	0.74	0.000	0.208	0.032	-	0.120
SL-5	0-0.5	1.4	0.5	9.9	6.6	4.1	9.6	32.0	0.50	0.000	0.082	0.022	-	0.052
SL-5	0.7-1.2	1.9	0.6	13.0	11.0	7.3	12.0	54.0	0.39	0.000	0.114	0.017	-	0.066
SL-2	0-0.5	1.8	0.8	14.0	9.8	5.4	13.0	43.0	0.72	0.000	0.116	0.031	-	0.074
SL-2	0.8-1.6	2.3	0.9	18.0	18.0	16.0	15.0	110.0	0.80	0.000	0.172	0.035	-	0.104
SL-1	0-0.5	1.3	0.4	9.8	6.6	3.4	9.5	31.0	0.61	0.000	0.077	0.027	-	0.052
SL-1	1.0-2.0	1.6	0.6	12.0	13.0	5.8	12.0	42.0	0.42	0.000	0.108	0.018	-	0.063
SL-3	0-0.5	2.6	0.6	12.0	9.1	5.1	11.0	37.0	0.50	0.000	0.102	0.022	-	0.062
SL-3- DUP	0-0.5	2.2	0.5	9.8	8.2	8.7	9.5	37.0	0.45	0.000	0.094	0.020	-	0.057
SL-3	1.0-2.0	1.9	1.0	18.0	17.0	4.0	14.0	52.0	0.73	0.000	0.137	0.032	-	0.084
SL-3- DUP	1.0-2.0	1.5	0.6	17.0	12.0	4.0	13.0	47.0	0.69	0.000	0.115	0.030	-	0.073
SL-4	0-0.5	1.9	0.7	15.0	11.0	6.6	13.0	45.0	0.78	0.000	0.118	0.034	-	0.076
SL-4	1.0-2.0	2.5	0.9	20.0	14.0	9.2	16.0	63.0	0.60	0.000	0.152	0.026	-	0.089
SL-11	0-0.5	1.6	0.7	16.0	12.0	6.2	14.0	46.0	0.50	0.000	0.123	0.022	-	0.072
SL-11	1.0-2.0	3.3	1.7	30.0	28.0	31.0	20.0	180.0	0.72	0.000	0.278	0.032	-	0.155
SL-6	0-0.5	2.2	0.8	15.0	12.0	5.4	14.0	41.0	0.50	0.170	0.122	0.022	0.251	0.132
SL-6	2.5-3.5	2.7	1.2	21.0	18.0	15.0	16.0	92.0	0.50	0.000	0.183	0.022	-	0.102

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
SL-10	0-0.7	2.6	0.8	19.0	13.0	6.4	15.0	50.0	0.63	0.000	0.138	0.028	-	0.083
SL-10- DUP	0-0.7	2.2	0.9	20.0	14.0	6.8	16.0	52.0	0.53	0.000	0.145	0.023	-	0.084
SL-10	1.8-2.5	2.9	1.3	24.0	20.0	18.0	19.0	110.0	0.88	0.000	0.210	0.038	-	0.124
SL-10- DUP	1.8-2.5	3.2	1.3	23.0	20.0	16.0	18.0	92.0	0.73	0.000	0.199	0.032	-	0.116
SL-30	0-0.5	3.3	1.5	34.0	23.0	16.0	25.0	110.0	1.15	0.000	0.249	0.051	-	0.150
SL-30	1.3-2.3	5.9	2.4	44.0	49.0	81.0	30.0	380.0	1.83	0.000	0.495	0.080	-	0.288
SL-23	0-0.6	4.6	1.2	29.0	26.0	21.0	23.0	100.0	1.20	0.000	0.239	0.053	-	0.146
SL-23- DUP	0-0.6	5.1	1.4	31.0	28.0	23.0	26.0	120.0	1.41	0.000	0.268	0.062	-	0.165
SL-31	0-0.5	3.5	1.2	36.0	27.0	19.0	29.0	110.0	1.19	0.000	0.262	0.052	-	0.157
SL-31	0.8-1.5	4.5	1.6	35.0	31.0	28.0	29.0	140.0	1.30	0.000	0.300	0.057	-	0.179
SL-24	0-0.5	6.8	1.7	34.0	39.0	61.0	28.0	230.0	1.50	0.000	0.381	0.066	-	0.223
SL-25	0-0.5	2.7	1.8	11.0	7.9	9.1	10.0	47.0	0.79	0.000	0.139	0.035	-	0.087
SL-25	0.5-1.0	2.1	0.2	15.0	13.0	4.5	15.0	42.0	0.68	0.000	0.108	0.030	-	0.069
SL-16	0-0.5	2.8	0.4	30.0	21.0	13.0	24.0	88.0	1.88	0.000	0.194	0.082	-	0.138
SL-16	0.5-1.0	4.6	0.9	34.0	36.0	44.0	26.0	240.0	1.87	0.000	0.325	0.082	-	0.204
SL-17	0-0.5	2.9	0.4	22.0	19.0	14.0	19.0	84.0	0.83	0.000	0.168	0.036	-	0.102
SL-17	0.7-1.3	3.7	0.7	24.0	27.0	30.0	20.0	150.0	4.19	0.000	0.230	0.184	-	0.207
SL-18	0-0.5	1.5	0.1	9.1	6.1	5.1	8.6	33.0	0.55	0.000	0.069	0.024	-	0.047
SL-18	1.0-1.7	1.6	0.1	12.0	11.0	3.1	12.0	33.0	0.74	0.000	0.086	0.033	-	0.059
SL-12	0-0.5	8.8	1.3	34.0	42.0	54.0	31.0	250.0	3.10	0.000	0.389	0.136	-	0.262
SL-7	0-0.5	4.0	0.4	19.0	19.0	22.0	17.0	90.0	1.66	0.000	0.175	0.073	-	0.124
SL-13	0-0.5	1.3	0.1	8.5	4.5	3.8	7.6	27.0	0.47	0.000	0.058	0.021	-	0.039
SL-13	0.5-1.0	1.2	0.1	7.8	5.3	5.9	7.5	33.0	0.81	0.000	0.062	0.036	-	0.049
SL-8	0-0.5	1.5	0.1	13.0	9.6	4.6	11.0	34.0	0.85	0.000	0.084	0.037	-	0.060

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
SB-6	0-0.5	4.7	2.20	41.0	34.0	47.0	26.0	250	0.28	0.000	0.376	0.012	-	0.194
SB-6	1.0-2.0	3.6	1.20	33.0	18.0	7.6	24.0	88	0.40	0.000	0.216	0.018	-	0.117
SB-7	0-0.5	1.5	0.48	13.0	10.0	5.2	12.0	34	0.32	0.000	0.098	0.014	-	0.056
SB-7- DUP	0-0.5	1.6	0.49	13.0	9.9	4.6	12.0	33	0.27	0.000	0.098	0.012	-	0.055
SB-7	1.7-2.5	2.1	0.85	21.0	20.0	13.0	17.0	90	0.22	0.000	0.172	0.010	-	0.091
SB-7- DUP	1.7-2.5	2.5	1.00	25.0	25.0	19.0	19.0	130	0.31	0.000	0.213	0.014	-	0.113
SB-4	0-0.5	1.8	0.69	22.0	15.0	4.7	18.0	50	0.49	0.000	0.144	0.021	-	0.083
SB-4	0.5-1.0	2.2	0.71	20.0	16.0	4.4	18.0	42	0.40	0.000	0.142	0.018	-	0.080
SB-8	0-0.5	2.3	0.26	18.0	15.0	9.9	15.0	62	0.25	0.000	0.129	0.011	-	0.070
SB-8	0.8-1.3	1.9	0.22	12.0	12.0	9.9	11.0	63	0.19	0.000	0.104	0.008	-	0.056
SB-2	0-0.5	1.3	0.08	10.0	10.0	3.3	10.0	22	0.39	0.000	0.070	0.017	-	0.044
SB-2	0.6-1.2	2.4	0.11	15.0	18.0	3.7	15.0	24	0.33	0.000	0.106	0.014	-	0.060
SB-1	0-0.5	1.9	0.13	12.0	8.8	4.2	11.0	34	0.25	0.000	0.083	0.011	-	0.047
SB-5	0-0.5	5.9	1.30	34.0	38.0	54.0	26.0	220	0.76	0.000	0.348	0.033	-	0.191
SB-5- DUP	0-0.5	7.9	1.70	39.0	46.0	77.0	31.0	290	0.52	0.000	0.445	0.023	-	0.234
SB-3	0-0.5	1.5	0.54	20.0	11.0	5.3	16.0	48	0.79	0.000	0.126	0.035	-	0.080
SB-3	0.5-1.0	1.5	0.80	24.0	16.0	6.3	19.0	63	0.83	0.000	0.158	0.036	-	0.097

Sample Location	Sample Depth (ft)	Concentrations (mg/kg in dry weight)									Mean PEC-Q_{metal}	PEC-$Q_{T.PAHs}$	PEC-$Q_{T.PCBs}$	**Mean PEC-Q**
		Metals							**Total PAHs**	**Total PCBs**				
		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc						
		PEC concentration (mg/kg dry weight) from EPA 905/R-00/007 June 2000												
		33	4.98	111	149	128	48.6	459	22.8	0.676				
TIF-3	0-0.7	2.7	1.3	31.0	20.0	17.0	23.0	88.0	0.40	0.000	0.222	0.017	-	0.120
TIF-3- DUP	0-0.7	2.1	1.1	26.0	16.0	15.0	19.0	74.0	0.46	0.000	0.185	0.020	-	0.103
TIF-3	1.4-1.9	1.7	0.2	19.0	13.0	4.2	16.0	51.0	0.61	0.000	0.118	0.027	-	0.072
TIF-3- DUP	1.4-1.9	1.6	0.2	19.0	12.0	4.0	16.0	50.0	0.65	0.000	0.116	0.029	-	0.072
TIF-2	0-0.5	1.1	0.0	7.4	4.2	2.5	8.8	28.0	0.41	0.000	0.056	0.018	-	0.037
TIF-2	0.5-1.0	1.6	0.1	7.8	4.3	1.9	9.2	29.0	0.50	0.000	0.061	0.022	-	0.042
TIF-4	0-0.5	2.6	0.3	19.0	13.0	14.0	19.0	87.0	1.19	0.000	0.155	0.052	-	0.104
TIF-4	1.0-2.0	1.8	0.2	22.0	14.0	8.2	18.0	61.0	0.35	0.000	0.137	0.015	-	0.076
TIF-5	0-0.5	1.2	0.1	10.0	5.5	4.6	11.0	40.0	0.30	0.000	0.076	0.013	-	0.045
TIF-5	0.5-1.2	1.4	0.1	11.0	7.0	9.2	12.0	59.0	0.52	0.000	0.095	0.023	-	0.059
TIF-1	0-0.5	1.3	0.4	11.0	5.5	2.6	9.9	31.0	0.45	0.000	0.077	0.020	-	0.049
TIF-1	0.5-1.0	1.6	0.5	11.0	6.1	2.4	12.0	34.0	0.50	0.000	0.088	0.022	-	0.055

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
Chambers Grove Reach									
CGR-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
CGR-1	1.2-2.2	ND	ND	ND	ND	ND	ND	ND	ND
Cedar Yard Bay									
CYB-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
CYB-1	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
CYB-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
CYB-2	0.8-1.3	ND	ND	ND	ND	ND	ND	ND	ND
Steelton Bay									
SB-6	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-6	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SB-7	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-7- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-7	1.7-2.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-7- DUP	1.7-2.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-4	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
SB-8	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-8	0.8-1.3	ND	ND	ND	ND	ND	ND	ND	ND
SB-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-2	0.6-1.2	ND	ND	ND	ND	ND	ND	ND	ND
SB-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-5- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SB-3	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
Fond Du Lac Stretch									
FDLS-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-2	0.5-1.1	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-4	1.6-2.6	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-1	0.5-1.3	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
FDLS-3	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
Indian Point Waterfront									
IPW-6	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
IPW-6	2-2.8	ND	ND	ND	ND	ND	ND	ND	ND
IPW-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
IPW-4	0.8-1.3	ND	ND	ND	ND	ND	ND	ND	ND
IPW-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
IPW-2- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
IPW-2	2.2-3.0	ND	ND	ND	ND	ND	ND	ND	ND
IPW-2- DUP	2.2-3.0	ND	ND	ND	ND	ND	ND	ND	ND
IPW-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
IPW-5	0.8-1.3	ND	ND	ND	ND	ND	ND	ND	ND
IPW-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
IPW-1	2.2-2.8	ND	ND	ND	ND	ND	ND	ND	ND
Kingsbury Bay									
KB-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
KB-1- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
KB-1	1.4-2.4	ND	ND	ND	ND	ND	ND	ND	ND
KB-1- DUP	1.4-2.4	ND	ND	ND	ND	ND	ND	ND	ND
KB-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
KB-3	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
KB-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
KB-2	1.5-2.3	ND	ND	ND	ND	ND	ND	ND	ND
KB-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
KB-5	2.0-2.6	ND	ND	ND	ND	ND	ND	ND	ND
KB-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
KB-4	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
Minnesota Channel									
MC-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
MC-2	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
MC-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
MC-3	1.7-2.7	ND	ND	ND	ND	ND	ND	ND	ND
MC-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
MC-1	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
Mud Lake									
ML-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-1	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-6	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-6- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-6	1.4-2.4	ND	ND	ND	ND	ND	ND	ND	ND
ML-6- DUP	1.4-2.4	ND	ND	ND	ND	ND	ND	ND	ND
ML-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-3	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-2	1.8-2.8	ND	ND	ND	ND	ND	ND	ND	ND
ML-14	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-15	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-15	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-16	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-16	1.5-2.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-10	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-10	0.5-1.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-12	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-11	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-13	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-8	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
ML-8	2.0-3.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-7	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-7	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-4	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-5	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
ML-9	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
ML-9	1.7-2.5	ND	ND	ND	ND	ND	ND	ND	ND
Munger Landing									
MLA-6	0-0.5	ND	ND	ND	ND	ND	ND	230.0	230.0
MLA-6- DU	0-0.5	ND	ND	ND	ND	ND	ND	75.0	75.0
MLA-6	3.0-4.0	ND	ND	ND	ND	ND	ND	47.0	47.0
MLA-6- DU	3.0-4.0	ND	ND	ND	ND	ND	ND	45.5	45.5
MLA-2	0-0.5	ND	ND	ND	ND	ND	ND	55.0	55.0
MLA-2	0.8-1.5	ND	ND	ND	ND	ND	ND	560.0	560.0
MLA-3	0-0.5	ND	ND	ND	ND	ND	ND	510.0	510.0
MLA-3	1.0-1.8	ND	ND	ND	ND	ND	ND	80.0	80.0
MLA-5	0-0.5	ND	ND	ND	ND	ND	ND	60.0	60.0
MLA-5	1.8-2.8	ND	ND	ND	ND	ND	ND	41.5	41.5
MLA-1	0-0.5	ND	ND	ND	ND	ND	ND	145.0	145.0
MLA-1	0.5-1.0	ND	ND	ND	ND	ND	ND	155.0	155.0
MLA-4	0-0.5	ND	ND	ND	ND	ND	ND	110.0	110.0
MLA-4	1.0-2.0	ND	ND	ND	ND	ND	ND	330.0	330.0
New Duluth Stretch									
NDS-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-3	1.7-2.3	ND	ND	ND	ND	ND	ND	ND	ND
NDS-15	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-15	2.0-3.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-9	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-9	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-8	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-8	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-11	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-11	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-7	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-7	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-5	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-4	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-14	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-14	1.7-2.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-13	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-13	0.8-1.7	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
NDS-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-1	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-6	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-6	0.5-1.2	ND	ND	ND	ND	ND	ND	ND	ND
NDS-10	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-10	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NDS-12	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-12	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
NDS-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NDS-2	0.8-1.7	ND	ND	ND	ND	ND	ND	ND	ND
North Bay									
NB-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-1	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
RP-I-127	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RP-I-127	1-2	ND	ND	ND	ND	ND	ND	ND	ND
NB-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-2	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
NB-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-4	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
NB-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-3	1.7-2.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-5	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
NB-6	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
NB-6	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
Perch Lake									
PL-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
PL-3	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
PL-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
PL-2- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
PL-2	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
PL-2- DUP	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
PL-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
PL-1	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
Rask Bay									
RB-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-4	0.5-1.2	ND	ND	ND	ND	ND	ND	ND	ND
RB-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-1	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-7	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-7	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-2	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-5	1.3-2.0	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
RB-10	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-10	1.3-2.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-3	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-8	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-8	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
RB-11	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-11	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-6	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
RB-6	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-9	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RB-9	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
Riverside Marina									
RSM-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RSM-1	1.2-1.8	ND	ND	ND	ND	ND	ND	ND	ND
RSM-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RSM-2	1.7-2.5	ND	ND	ND	ND	ND	ND	ND	ND
RSM-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RSM-3	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
RSM-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RSM-4	1.6-2.2	ND	ND	ND	ND	ND	ND	ND	ND
RSM-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
RSM-5	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
Spirit Lake									
SL-39	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-39- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-39	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-39- DUP	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-32	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-32- DUP	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-32	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-32- DUP	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-19	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-19	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-38	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-38	1.6-2.4	ND	ND	ND	ND	ND	ND	ND	ND
SL-52	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-52	1.7-2.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-48	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-48- DUP	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-48	1.5-2.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-48- DUP	1.5-2.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-49	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-49	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-50	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
SL-50	0.8-1.3	ND	ND	ND	ND	ND	ND	ND	ND
SL-51	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-51	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-44	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-44	0.9-1.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-46	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-46	0.7-1.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-53	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-53- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-53	1.0-1.8	ND	ND	ND	ND	ND	ND	ND	ND
SL-53- DUP	1.0-1.8	ND	ND	ND	ND	ND	ND	ND	ND
SL-54	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-54	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-40	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-40- DUP	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-40	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-40- DUP	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-33	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-33	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-21	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-21	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-15	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-15	2.2-3.2	ND	ND	ND	ND	ND	ND	ND	ND
SL-41	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-41- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-41	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-41- DUP	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-42	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-42	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-43	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-43	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-47	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-47	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-37	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-37	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-45	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-45	1.0-1.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-27	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-27- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-27	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-27- DUP	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-34	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-34	2.0-2.8	ND	ND	ND	ND	ND	ND	ND	ND
SL-26	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-26	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
SL-20	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-20	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-35	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-35	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-36	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-36	2.0-3.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-29	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-29- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-29	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-29- DUP	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-28	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-28	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-14	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-14	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-22	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-22	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-9	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-9	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-5	0.7-1.2	ND	ND	ND	ND	ND	ND	ND	ND
SL-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-2	0.8-1.6	ND	ND	ND	ND	ND	ND	ND	ND
SL-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-1	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-3	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-3- DUP	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-3	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-3- DUP	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-4	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-11	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-11	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-6	0-0.5	ND	ND	ND	ND	ND	170.0	ND	170.0
SL-6	2.5-3.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-10	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-10- DUP	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-10	1.8-2.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-10- DUP	1.8-2.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-30	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-30	1.3-2.3	ND	ND	ND	ND	ND	ND	ND	ND
SL-23	0-0.6	ND	ND	ND	ND	ND	ND	ND	ND
SL-23- DUP	0-0.6	ND	ND	ND	ND	ND	ND	ND	ND
SL-31	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-31	0.8-1.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-24	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	Sample Depth (ft)	Aroclors (µg/kg dry weight)							Total PBCs (µg/kg dry weight) (2)
		Aroclor 1016 (1)	Aroclor 1221 (1)	Aroclor 1232 (1)	Aroclor 1242 (1)	Aroclor 1248 (1)	Aroclor 1254 (1)	Aroclor 1260 (1)	
SL-25	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-25	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-16	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-16	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-17	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-17	0.7-1.3	ND	ND	ND	ND	ND	ND	ND	ND
SL-18	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-18	1.0-1.7	ND	ND	ND	ND	ND	ND	ND	ND
SL-12	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-7	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-13	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
SL-13	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
SL-8	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
Tallas Island Flats									
TIF-3	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
TIF-3- DUP	0-0.7	ND	ND	ND	ND	ND	ND	ND	ND
TIF-3	1.4-1.9	ND	ND	ND	ND	ND	ND	ND	ND
TIF-3- DUP	1.4-1.9	ND	ND	ND	ND	ND	ND	ND	ND
TIF-2	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
TIF-2	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND
TIF-4	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
TIF-4	1.0-2.0	ND	ND	ND	ND	ND	ND	ND	ND
TIF-5	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
TIF-5	0.5-1.2	ND	ND	ND	ND	ND	ND	ND	ND
TIF-1	0-0.5	ND	ND	ND	ND	ND	ND	ND	ND
TIF-1	0.5-1.0	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
1. Non-detect data are handled using the following assumptions:
   - Zero for the Aroclors that are all non-detects within a study area
   - 1/2 of the reporting limit for the Aroclors that are detected in more than one sample within a study area
2. Sum of individual Aroclors are used in calculating total PCBs

Table 8.18 Through Table 8.32: MPCA Level I and Level II SQT comparion

These tables compare the analyte concentrations (i.e., Dioxins, Metals, PAHs, and PCBs) with available SQTs

The following notes are useful in intepreting data presented in the Tables 8.18 through 8.32.

Note 1. Only 13 priority PAHs are included in calculating total PAHs for the SQT comparison
Note 2. Sum of individual Aroclors are used in calculating total PCBs
Note 3. Only chemicals with Level I and II SQTs are used in the comparison
Note 4. Table contains dry weight concentrations of substances
Note 5. Non-detect data are handled using the following assumptions:
- Zero for the Aroclors/PAHs/Metals that are all non-detects within a study area
- 1/2 of the reporting limit for the Aroclors/PAHs/Metals that are detected in more than one one sample.
- Kaplan-Meier Method is used for Dioxins

Note 6. "-" Sediment samples were not analyzed for this analyte

Note 7.	xxx	Concentration is less than MPCA SQT Level I
Note 8.	xxx	Concentration is between MPCA SQT Level I and Level II
Note 9.	**xxx**	Concentration is greater than MPCA SQT Level II
Note 10.	Pesticides were not detected	

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
Chambers Grove Reach									
CGR-1	0-0.5	1.5	0.08	9.7	13.0	3.7	0.01	13.0	29.0
CGR-1	1.2-2.2	2.3	0.21	18.0	24.0	8.0	0.06	20.0	58.0
Cedar Yard Bay									
CYB-1	0-0.5	6.7	1.50	37.0	39.0	26.0	0.18	29.0	160.0
CYB-1	0.5-1.0	8.3	1.40	39.0	33.0	22.0	0.08	31.0	140.0
CYB-2	0-0.5	8.9	1.90	28.0	70.0	210.0	0.18	23.0	220.0
CYB-2	0.8-1.3	2.3	0.89	29.0	18.0	7.0	0.03	23.0	77.0

Sample Location	**Sample Depth (ft)**	**Priority PAHs (µg/kg)**													**Total PAHs (µg/kg dry weight)**	**Total PCBs (µg/kg)**	**Dioxins (ng TEQ/kg dry weight)**
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
		Chambers Grove Reach															
CGR-1	0-0.5	0	0	0	0	0	0	6	10	0	0	0	16	0	32	ND	0.0
CGR-1	1.2-2.2	0	0	0	0	0	0	25	30	45	41	0	37	41	219	ND	0.0
		Cedar Yard Bay															
CYB-1	0-0.5	0	0	0	0	0	0	16	28	25	20	0	30	32	151	ND	0.39
CYB-1	0.5-1.0	0	0	0	0	0	0	11	120	16	120	0	22	120	409	ND	1.70
CYB-2	0-0.5	0	0	0	0	0	0	51	76	82	79	0	130	130	548	ND	0.14
CYB-2	0.8-1.3	0	0	0	0	0	0	65	65	29	65	0	65	65	354	ND	0.11

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
FDLS-2	0-0.5	2.0	0.12	12.0	15.0	3.8	0.01	15.0	35.0
FDLS-2	0.5-1.1	2.2	0.10	13.0	18.0	3.7	0.01	16.0	38.0
FDLS-4	0-0.5	1.8	0.15	14.0	15.0	4.8	0.03	15.0	41.0
FDLS-4	1.6-2.6	1.9	0.25	15.0	19.0	7.5	0.03	17.0	50.0
FDLS-1	0-0.5	3.3	0.23	32.0	28.0	6.9	0.02	30.0	67.0
FDLS-1	0.5-1.3	3.2	0.22	30.0	27.0	6.5	0.03	28.0	64.0
FDLS-3	0-0.5	2.0	0.20	17.0	15.0	5.8	0.03	17.0	50.0
FDLS-3	1.0-2.0	1.3	0.14	10.0	11.0	4.8	0.03	12.0	33.0

Sample Location	**Sample Depth (ft)**	**Priority PAHs (µg/kg)**													**Total PAHs (µg/kg dry weight)**	**Total PCBs (µg/kg)**	**Dioxins (ng TEQ/kg**
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
FDLS-2	0-0.5	0	0	0	0	0	0	55	9	55	55	0	13	55	242	ND	0.0
FDLS-2	0.5-1.1	0	0	0	0	0	0	11	11	55	55	0	26	20	178	ND	0.0
FDLS-4	0-0.5	0	0	0	0	0	0	12	13	8	9	0	18	17	77	ND	0.39
FDLS-4	1.6-2.6	0	0	0	0	0	0	55	55	7	16	0	9	55	197	ND	1.70
FDLS-1	0-0.5	0	0	0	0	0	0	60	60	82	60	0	60	60	382	ND	0.14
FDLS-1	0.5-1.3	0	0	0	0	0	0	60	60	58	60	0	60	60	358	ND	0.11
FDLS-3	0-0.5	0	0	11	0	0	0	12	17	16	16	0	25	26	123	ND	0.0
FDLS-3	1.0-2.0	0	0	0	0	0	0	50	9	6	50	0	6	50	172	ND	0.0

Sample Location		Metals (mg/kg dry weight)							
	Sample Depth (ft)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
IPW-6	0-0.5	6.8	2.80	53.0	65.0	100.0	0.31	44.0	300.0
IPW-6	2-2.8	2.6	1.70	42.0	25.0	9.0	0.05	31.0	87.0
IPW-4	0-0.5	2.3	1.30	24.0	16.0	16.0	0.06	19.0	77.0
IPW-4	0.8-1.3	3.4	1.80	42.0	27.0	10.0	0.05	33.0	94.0
IPW-2	0-0.5	4.2	1.80	47.0	29.0	29.0	0.12	33.0	140.0
IPW-2- DUP	0-0.5	3.6	1.50	41.0	26.0	28.0	0.10	29.0	120.0
IPW-2	2.2-3.0	5.2	2.60	44.0	44.0	72.0	0.33	32.0	230.0
IPW-2- DUP	2.2-3.0	4.8	2.10	44.0	40.0	80.0	0.30	33.0	210.0
IPW-3	0-0.5	6.3	3.00	53.0	59.0	69.0	0.26	40.0	280.0
IPW-3	1.7-2.2	3.2	1.90	41.0	29.0	18.0	0.06	31.0	98.0
IPW-5	0-0.5	2.8	1.80	42.0	46.0	43.0	0.06	31.0	120.0
IPW-5	0.8-1.3	4.2	2.50	56.0	56.0	89.0	0.16	43.0	210.0
IPW-1	0-0.5	3.7	2.00	49.0	35.0	35.0	0.13	35.0	150.0
IPW-1	2.2-2.8	1.9	0.92	25.0	14.0	6.0	0.02	19.0	48.0

Sample Location		**Priority PAHs (µg/kg dry weight)**													**Total PAHs (µg/kg dry weight)**	**Total PCBs (µg/kg dry weight)**	**Dioxins (ng TEQ/kg dry weight)**
	Sample Depth (ft)	Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
IPW-6	0-0.5	26	71	92	43	51	110	210	380	450	390	115	640	590	3168	ND	**34.99**
IPW-6	2-2.8	70	70	70	70	70	70	8	9	70	70	70	15	16	678	ND	0.11
IPW-4	0-0.5	55	11	19	11	10	33	35	55	65	58	55	99	88	594	ND	0.00
IPW-4	0.8-1.3	**100**	100	100	100	100	100	100	100	140	100	100	100	100	1340	ND	0.00
IPW-2	0-0.5	13	40	77	34	22	71	150	260	290	260	100	450	400	2167	ND	0.00
IPW-2- DUP	0-0.5	12	41	87	33	20	64	150	280	310	280	100	490	430	2297	ND	0.00
IPW-2	2.2-3.0	**120**	**290**	630	250	110	200	**1400**	**2200**	**2300**	**2200**	**320**	**4400**	**3500**	17920	ND	0.00
IPW-2- DUP	2.2-3.0	**120**	**280**	640	260	100	210	**1400**	**2400**	**2400**	**2200**	**360**	**4600**	**3700**	18670	ND	0.00
IPW-3	0-0.5	43	99	150	85	61	140	310	590	670	710	77	1200	1200	5335	ND	9.17
IPW-3	1.7-2.2	75	30	51	16	9	75	140	220	220	220	75	440	460	2031	ND	0.93
IPW-5	0-0.5	19	30	78	41	22	22	290	340	350	380	80	730	710	3092	ND	5.24
IPW-5	0.8-1.3	9	30	50	23	14	25	120	240	230	280	85	440	410	1956	ND	6.33
IPW-1	0-0.5	14	41	78	33	22	49	170	300	340	330	100	560	500	2537	ND	0.000
IPW-1	2.2-2.8	55	55	55	55	55	55	5	12	640	55	55	14	15	1126	ND	0.000

Sample Location	**Sample Depth (ft)**	**Metals (mg/kg dry weight)**							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
KB-1	0-0.5	4.4	2.60	33.0	70.0	73.0	0.12	39.0	200.0
KB-1- DUP	0-0.5	4.6	2.50	36.0	74.0	77.0	0.12	41.0	210.0
KB-1	1.4-2.4	3.1	1.50	23.0	43.0	52.0	0.23	28.0	130.0
KB-1- DUP	1.4-2.4	3.7	1.50	22.0	54.0	70.0	0.43	33.0	170.0
KB-3	0-0.5	3.9	2.20	37.0	62.0	65.0	0.10	39.0	190.0
KB-3	1.0-1.7	5.2	2.40	40.0	49.0	70.0	0.16	41.0	180.0
KB-2	0-0.5	3.0	1.90	29.0	61.0	52.0	0.08	33.0	160.0
KB-2	1.5-2.3	5.8	2.80	38.0	94.0	120.0	0.24	48.0	240.0
KB-5	0-0.5	5.9	2.50	48.0	67.0	66.0	0.14	**52.0**	220.0
KB-5	2.0-2.6	2.0	1.00	23.0	17.0	5.2	0.03	26.0	55.0
KB-4	0-0.5	2.7	1.10	23.0	17.0	17.0	0.06	19.0	74.0
KB-4	1.0-1.7	1.8	0.91	22.0	13.0	5.6	0.02	17.0	130.0

Sample Location		Priority PAHs (µg/kg dry weight)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
	Sample Depth (ft)	Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
KB-1	0-0.5	16	26	47	26	29	25	160	180	210	210	80	360	440	1809	ND	9.57
KB-1- DUP	0-0.5	17	19	36	22	19	0	120	130	150	160	85	270	300	1328	ND	8.41
KB-1	1.4-2.4	36	42	50	60	38	30	200	150	140	150	60	320	350	1626	ND	1.76
KB-1- DUP	1.4-2.4	**160**	130	83	270	78	0	620	230	180	310	**310**	550	620	3541	ND	2.06
KB-3	0-0.5	13	27	41	18	20	20	140	180	220	220	90	360	390	1739	ND	0.00
KB-3	1.0-1.7	13	97	120	40	31	40	190	410	550	450	63	710	820	3534	ND	0.00
KB-2	0-0.5	18	27	51	27	42	25	180	210	240	260	75	400	580	2135	ND	7.78
KB-2	1.5-2.3	**100**	**170**	190	180	190	180	550	550	590	670	**355**	1100	**1700**	6525	ND	**23.81**
KB-5	0-0.5	28	82	130	58	59	78	300	470	540	530	**145**	810	1000	4230	ND	13.25
KB-5	2.0-2.6	65	65	65	65	65	65	6	16	12	9	65	22	23	543	ND	0.35
KB-4	0-0.5	38	**280**	480	120	57	170	510	**1300**	**1700**	1300	**190**	2000	**1800**	9945	ND	0.00
KB-4	1.0-1.7	65	65	65	65	65	65	6	15	14	10	65	25	23	548	ND	0.00

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
MC-2	0-0.5	1.5	0.90	23.0	14.0	4.9	0.02	18.0	49.0
MC-2	1.0-1.7	1.4	0.84	20.0	11.0	4.9	0.01	16.0	43.0
MC-3	0-0.5	3.2	0.38	27.0	19.0	19.0	0.08	22.0	95.0
MC-3	1.7-2.7	1.4	0.42	13.0	7.6	2.5	0.01	13.0	38.0
MC-1	0-0.5	3.2	0.46	22.0	18.0	31.0	0.12	20.0	110.0
MC-1	3.0-4.0	1.5	0.16	18.0	12.0	3.7	0.02	15.0	43.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
MC-2	0-0.5	55	55	55	55	55	55	55	8	55	55	55	55	55	668	ND	0.11
MC-2	1.0-1.7	60	60	60	60	60	60	60	60	44	60	60	60	60	764	ND	0.03
MC-3	0-0.5	10	43	82	32	15	28	97	360	410	320	44	580	560	2581	ND	0.00
MC-3	1.7-2.7	49	49	49	49	49	49	49	49	49	49	49	49	49	631	ND	0.00
MC-1	0-0.5	9	35	100	39	17	37	120	520	600	560	76	840	780	3733	ND	0.00
MC-1	3.0-4.0	55	55	55	55	55	55	55	55	43	55	55	55	55	703	ND	0.00

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
ML-1	0-0.5	5.7	0.89	35.0	35.0	28.0	0.46	27.0	140.0
ML-1	1.0-2.0	6.6	0.83	40.0	44.0	23.0	0.18	34.0	140.0
ML-6	0-0.5	4.9	0.97	48.0	38.0	32.0	0.39	36.0	210.0
ML-6- DUP	0-0.5	4.2	0.78	41.0	32.0	27.0	0.24	31.0	170.0
ML-6	1.4-2.4	3.4	0.49	42.0	27.0	16.0	0.10	34.0	120.0
ML-6- DUP	1.4-2.4	3.7	0.51	40.0	27.0	14.0	0.12	32.0	110.0
ML-3	0-0.5	3.3	0.45	25.0	20.0	12.0	0.11	20.0	84.0
ML-3	0.5-1.0	3.6	0.35	20.0	22.0	9.7	0.11	18.0	67.0
ML-2	0-0.5	4.2	0.58	43.0	30.0	21.0	0.15	33.0	130.0
ML-2	1.8-2.8	4.2	0.67	40.0	32.0	19.0	0.15	32.0	130.0
ML-14	0-0.5	13.0	3.30	51.0	61.0	100.0	0.60	31.0	340.0
ML-15	0-0.5	8.2	2.30	52.0	52.0	41.0	0.40	30.0	160.0
ML-15	1.0-2.0	7.5	1.80	41.0	47.0	24.0	0.24	35.0	130.0
ML-16	0-0.5	6.6	1.50	43.0	40.0	33.0	0.29	31.0	140.0
ML-16	1.5-2.5	4.5	1.50	48.0	31.0	11.0	0.08	40.0	120.0
ML-10	0-0.5	6.5	2.70	110.0	62.0	100.0	0.50	32.0	340.0
ML-10	0.5-1.5	7.0	3.20	100.0	69.0	97.0	0.55	38.0	330.0
ML-12	0-0.5	8.0	2.80	66.0	65.0	110.0	0.20	36.0	300.0
ML-11	0-0.5	6.7	2.30	78.0	55.0	84.0	0.42	28.0	250.0
ML-13	0-0.5	9.5	1.80	48.0	45.0	40.0	0.30	32.0	160.0
ML-8	0-0.5	3.3	1.40	36.0	26.0	18.0	0.04	28.0	100.0
ML-8	2.0-3.0	2.8	1.10	31.0	20.0	6.6	0.04	26.0	77.0
ML-7	0-0.5	4.5	1.30	39.0	29.0	22.0	0.17	28.0	120.0
ML-7	1.0-2.0	1.4	0.36	16.0	7.6	4.2	0.01	12.0	27.0
ML-4	0-0.5	5.8	2.20	44.0	41.0	44.0	0.31	33.0	200.0
ML-4	3.0-4.0	2.8	1.30	40.0	24.0	9.2	0.15	32.0	99.0
ML-5	0-0.5	4.5	1.50	41.0	33.0	29.0	0.18	32.0	140.0
ML-5	3.0-4.0	1.6	0.72	24.0	15.0	5.1	0.01	19.0	51.0
ML-9	0-0.5	3.4	1.00	21.0	18.0	15.0	0.06	17.0	80.0
ML-9	1.7-2.5	2.4	1.10	27.0	18.0	7.1	0.11	22.0	69.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
ML-1	0-0.5	**150**	0	150	150	0	0	28	51	75	42	0	57	76	779	ND	0.000
ML-1	1.0-2.0	**165**	0	165	165	0	0	31	54	88	48	0	68	79	863	ND	0.000
ML-6	0-0.5	**115**	0	115	115	0	0	48	66	92	85	0	100	130	866	ND	0.000
ML-6- DUP	0-0.5	**115**	0	115	115	0	0	47	64	84	84	0	90	130	844	ND	0.000
ML-6	1.4-2.4	**90**	0	90	90	0	0	29	45	64	45	0	61	76	590	ND	0.000
ML-6- DUP	1.4-2.4	85	0	85	85	0	0	32	49	63	44	0	69	80	592	ND	0.000
ML-3	0-0.5	**110**	0	110	110	0	0	35	46	54	44	0	66	71	646	ND	0.000
ML-3	0.5-1.0	**95**	0	95	95	0	0	30	31	32	29	0	54	55	516	ND	0.000
ML-2	0-0.5	**140**	0	140	140	0	0	33	45	61	54	0	76	89	778	ND	12.29
ML-2	1.8-2.8	**95**	0	18	11	12	0	61	83	120	88	0	140	170	798	ND	9.04
ML-14	0-0.5	**210**	0	210	210	0	0	87	94	160	96	0	190	150	1407	ND	0.00
ML-15	0-0.5	**285**	0	285	285	0	0	57	110	170	95	0	150	130	1567	ND	**30.33**
ML-15	1.0-2.0	**230**	0	230	230	0	0	21	44	37	230	0	50	230	1302	ND	**37.39**
ML-16	0-0.5	**205**	0	205	205	0	0	57	79	110	82	0	140	120	1203	ND	**26.30**
ML-16	1.5-2.5	**135**	0	135	135	0	0	135	135	135	135	0	135	135	1215	ND	0.47
ML-10	0-0.5	**245**	0	37	245	0	0	130	210	430	200	0	310	260	2067	ND	**56.18**
ML-10	0.5-1.5	38	0	66	36	0	0	230	350	700	350	0	530	470	2770	ND	**57.35**
ML-12	0-0.5	**190**	0	190	190	0	0	110	140	240	160	0	250	210	1680	ND	0.00
ML-11	0-0.5	46	0	58	39	0	0	220	330	730	320	0	520	440	2703	ND	0.00
ML-13	0-0.5	**250**	0	250	250	0	0	46	98	170	71	0	100	100	1335	ND	**34.20**
ML-8	0-0.5	**120**	0	120	120	0	0	14	22	22	120	0	31	120	689	ND	0.00
ML-8	2.0-3.0	80	0	80	80	0	0	80	80	71	80	0	80	80	711	ND	0.00
ML-7	0-0.5	**100**	0	100	100	0	0	34	49	84	54	0	73	64	658	ND	**21.93**
ML-7	1.0-2.0	50	0	50	50	0	0	50	50	180	50	0	50	50	580	ND	0.07
ML-4	0-0.5	**115**	0	115	115	0	0	38	56	79	81	0	130	120	849	ND	20.98
ML-4	3.0-4.0	85	0	85	85	0	0	85	85	350	85	0	85	85	1030	ND	0.19
ML-5	0-0.5	**145**	0	145	145	0	0	21	29	25	26	0	51	36	623	ND	0.00
ML-5	3.0-4.0	55	0	55	55	0	0	55	55	120	0	0	55	55	505	ND	0.00
ML-9	0-0.5	75	0	75	75	0	0	24	41	67	47	0	65	56	525	ND	6.79
ML-9	1.7-2.5	70	0	70	70	0	0	70	70	110	70	0	70	70	670	ND	0.43

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
MLA-6	0-0.5	7.1	1.60	41.0	45.0	120.0	0.42	33.0	410.0
MLA-6- DUP	0-0.5	5.9	1.50	35.0	40.0	110.0	0.44	29.0	360.0
MLA-6	3.0-4.0	1.4	0.14	18.0	12.0	3.4	0.01	16.0	43.0
MLA-6- DUP	3.0-4.0	1.4	0.15	17.0	12.0	3.2	0.01	16.0	42.0
MLA-2	0-0.5	1.9	0.34	24.0	16.0	12.0	0.08	21.0	81.0
MLA-2	0.8-1.5	7.9	2.10	45.0	61.0	**160.0**	0.49	38.0	**560.0**
MLA-3	0-0.5	6.2	1.60	39.0	50.0	120.0	0.46	36.0	390.0
MLA-3	1.0-1.8	2.5	0.42	33.0	29.0	6.7	0.06	37.0	78.0
MLA-5	0-0.5	3.3	0.58	20.0	18.0	37.0	0.10	17.0	130.0
MLA-5	1.8-2.8	1.1	0.08	11.0	6.3	2.1	0.01	12.0	18.0
MLA-1	0-0.5	7.9	1.70	37.0	61.0	120.0	0.38	35.0	400.0
MLA-1	0.5-1.0	8.7	1.40	39.0	67.0	110.0	0.18	36.0	340.0
MLA-4	0-0.5	5.1	0.81	41.0	36.0	53.0	0.22	35.0	210.0
MLA-4	1.0-2.0	8.9	2.80	43.0	65.0	**260.0**	0.59	33.0	**740.0**

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
MLA-6	0-0.5	35	**160**	310	140	66	390	460	**1600**	**1900**	**1600**	**280**	**2400**	**2700**	12041	230	**44.15**
MLA-6- DUP	0-0.5	33	**170**	320	140	68	390	480	**1600**	**2000**	**1600**	**280**	**2500**	**2800**	12381	75	**36.43**
MLA-6	3.0-4.0	55	55	55	55	55	55	55	55	100	55	55	55	55	760	47	0.11
MLA-6- DUP	3.0-4.0	55	55	55	55	55	55	55	55	88	55	55	55	55	748	46	0.11
MLA-2	0-0.5	65	11	33	16	65	65	43	150	180	130	65	230	250	1303	55	0.00
MLA-2	0.8-1.5	54	**290**	510	220	96	410	650	**3200**	**3500**	**3100**	**580**	**4200**	**5500**	22310	560	0.00
MLA-3	0-0.5	56	**190**	390	210	99	440	630	**2000**	**2300**	**1800**	**360**	**2600**	**3300**	14375	510	**57.56**
MLA-3	1.0-1.8	**90**	90	90	90	90	90	13	25	540	20	90	32	48	1308	80	0.18
MLA-5	0-0.5	15	65	160	64	24	78	290	640	810	660	120	950	1200	5076	60	7.54
MLA-5	1.8-2.8	49	49	49	49	49	49	49	49	49	49	49	49	49	637	42	0.33
MLA-1	0-0.5	67	**160**	350	220	99	340	660	**1500**	**1700**	**1700**	**270**	**2500**	**3000**	12566	145	0.00
MLA-1	0.5-1.0	47	120	250	140	56	220	470	1100	1300	1300	**220**	1800	**2500**	9523	155	0.00
MLA-4	0-0.5	28	**160**	340	120	45	200	680	**1200**	1400	1200	**260**	1800	**2200**	9633	110	0.00
MLA-4	1.0-2.0	**190**	**520**	**1400**	**610**	200	**1400**	**1600**	**6200**	**5700**	**5500**	**940**	**9100**	**11000**	**44360**	330	0.00

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
NDS-3	0-0.5	2.2	0.83	17.0	14.0	7.7	0.03	15.0	49.0
NDS-3	1.7-2.3	2.7	1.00	25.0	22.0	12.0	0.10	21.0	76.0
NDS-15	0-0.5	1.9	0.69	16.0	13.0	6.5	0.03	15.0	44.0
NDS-15	2.0-3.0	1.8	0.74	17.0	12.0	4.0	0.04	16.0	45.0
NDS-9	0-0.5	1.6	0.79	14.0	11.0	5.0	0.02	13.0	35.0
NDS-9	1.0-2.0	1.8	0.70	13.0	11.0	6.3	0.05	12.0	41.0
NDS-8	0-0.5	3.3	1.30	33.0	26.0	14.0	0.14	27.0	110.0
NDS-8	0.5-1.0	2.6	1.30	40.0	21.0	6.7	0.03	29.0	84.0
NDS-11	0-0.5	1.9	0.66	16.0	12.0	5.2	0.01	15.0	38.0
NDS-11	1.0-2.0	2.0	0.72	14.0	12.0	6.3	0.02	13.0	44.0
NDS-7	0-0.5	3.2	1.00	24.0	19.0	24.0	0.10	18.0	91.0
NDS-7	0.5-1.0	2.4	0.93	19.0	16.0	14.0	0.10	16.0	81.0
NDS-5	0-0.5	1.9	0.51	14.0	8.4	4.1	0.01	13.0	35.0
NDS-5	0.5-1.0	1.6	0.76	21.0	11.0	3.7	0.01	16.0	44.0
NDS-4	0-0.5	1.7	0.52	14.0	9.9	3.2	0.02	17.0	42.0
NDS-4	0.5-1.0	1.7	0.62	14.0	15.0	2.5	0.01	16.0	36.0
NDS-14	0-0.5	3.6	1.30	28.0	23.0	43.0	0.10	23.0	120.0
NDS-14	1.7-2.5	2.3	1.00	31.0	20.0	6.4	0.03	24.0	67.0
NDS-13	0-0.5	5.4	1.30	38.0	35.0	80.0	0.31	27.0	200.0
NDS-13	0.8-1.7	2.2	0.96	25.0	14.0	5.2	0.03	19.0	62.0
NDS-1	0-0.5	1.3	0.45	11.0	10.0	2.9	0.01	12.0	33.0
NDS-1	0.5-1.0	1.7	0.63	15.0	15.0	3.6	0.01	17.0	42.0
NDS-6	0-0.5	2.0	0.70	15.0	11.0	5.0	0.03	13.0	42.0
NDS-6	0.5-1.2	1.6	0.42	11.0	8.2	2.7	0.01	10.0	30.0
NDS-10	0-0.5	1.5	0.43	13.0	7.2	3.7	0.02	10.0	34.0
NDS-10	0.5-1.0	1.4	0.40	12.0	7.1	2.6	0.02	10.0	36.0
NDS-12	0-0.5	2.1	0.48	15.0	11.0	7.4	0.03	12.0	44.0
NDS-12	1.0-1.7	1.8	0.47	13.0	11.0	3.2	0.02	12.0	36.0
NDS-2	0-0.5	1.4	0.28	27.0	8.2	3.0	0.00	16.0	25.0
NDS-2	0.8-1.7	1.3	0.38	10.0	10.0	3.4	0.00	10.0	24.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
NDS-3	0-0.5	0	0	0	0	0	0	10	14	14	11	0	21	18	88	ND	0
NDS-3	1.7-2.3	0	0	0	0	0	0	22	29	29	26	0	59	53	218	ND	0
NDS-15	0-0.5	0	0	0	0	0	0	14	15	11	13	0	35	26	114	ND	0
NDS-15	2.0-3.0	0	0	0	0	0	0	55	55	72	55	0	55	55	347	ND	0
NDS-9	0-0.5	0	0	0	0	0	0	5	9	83	55	0	17	55	225	ND	0.48
NDS-9	1.0-2.0	0	0	0	0	0	0	50	15	11	50	0	50	50	226	ND	2.59
NDS-8	0-0.5	0	0	0	0	0	0	10	21	17	100	0	27	100	275	ND	0.00
NDS-8	0.5-1.0	0	0	0	0	0	0	70	70	58	70	0	70	70	408	ND	0.00
NDS-11	0-0.5	0	0	55	0	0	0	55	55	55	55	0	8	55	338	ND	0.00
NDS-11	1.0-2.0	0	0	55	0	0	0	7	15	15	8	0	14	13	126	ND	0.00
NDS-7	0-0.5	0	0	55	0	0	0	18	18	16	11	0	32	22	172	ND	0.00
NDS-7	0.5-1.0	0	0	55	0	0	0	16	23	19	12	0	43	26	194	ND	0.00
NDS-5	0-0.5	0	0	55	0	0	0	55	55	50	55	0	55	55	380	ND	0.18
NDS-5	0.5-1.0	0	0	55	0	0	0	55	55	100	55	0	55	55	430	ND	0.01
NDS-4	0-0.5	0	0	48	0	0	0	48	48	48	48	0	48	48	336	ND	0.00
NDS-4	0.5-1.0	0	0	55	0	0	0	55	55	18	55	0	55	55	348	ND	0.00
NDS-14	0-0.5	0	0	70	0	0	0	33	77	110	79	0	100	72	541	ND	6.08
NDS-14	1.7-2.5	0	0	60	0	0	0	60	60	130	60	0	60	60	490	ND	0.09
NDS-13	0-0.5	0	0	75	0	0	0	61	62	67	67	0	140	100	572	ND	7.70
NDS-13	0.8-1.7	0	0	60	0	0	0	60	60	83	60	0	20	17	360	ND	**44.78**
NDS-1	0-0.5	0	0	0	0	0	0	48	48	48	48	0	48	48	285	ND	0.13
NDS-1	0.5-1.0	0	0	0	0	0	0	49	49	49	49	0	7	49	252	ND	0.06
NDS-6	0-0.5	0	0	0	0	0	0	9	19	12	8	0	27	23	99	ND	0.71
NDS-6	0.5-1.2	0	0	0	0	0	0	50	50	50	50	0	7	50	255	ND	0.07
NDS-10	0-0.5	0	0	0	0	0	0	6	6	1	6	0	6	6	29	ND	0.00
NDS-10	0.5-1.0	0	0	0	0	0	0	5	5	3	5	0	5	5	28	ND	0.00
NDS-12	0-0.5	0	9	20	0	0	0	50	53	53	40	0	120	77	422	ND	0.00
NDS-12	1.0-1.7	0	0	0	0	0	0	55	55	43	55	0	55	55	318	ND	0.00
NDS-2	0-0.5	0	0	6	0	0	0	6	8	48	48	0	14	48	178	ND	0.04
NDS-2	0.8-1.7	0	0	0	0	0	0	5	7	7	50	0	15	12	96	ND	0.11

Sample Location	**Sample Depth (ft)**	**Metals (mg/kg dry weight)**							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
NB-1	0-0.5	4.9	1.20	33.0	28.0	25.0	0.32	24.0	150.0
NB-1	0.5-1.0	5.5	1.10	33.0	29.0	11.0	0.05	27.0	94.0
NB-2	0-0.5	4.6	1.50	39.0	30.0	23.0	0.19	28.0	140.0
NB-2	1.0-2.0	4.4	1.40	37.0	33.0	20.0	0.16	29.0	130.0
NB-4	0-0.5	5.9	1.70	43.0	37.0	30.0	0.17	31.0	180.0
NB-4	0.5-1.0	6.4	1.60	37.0	38.0	34.0	0.41	28.0	190.0
NB-3	0-0.5	3.2	0.78	22.0	16.0	19.0	0.11	17.0	80.0
NB-3	1.7-2.5	2.8	0.73	22.0	25.0	11.0	0.12	17.0	85.0
NB-5	0-0.5	3.9	1.50	31.0	22.0	18.0	0.23	23.0	120.0
NB-5	3.0-4.0	3.1	1.40	37.0	20.0	7.0	0.04	27.0	92.0
NB-6	0-0.5	2.7	0.69	17.0	12.0	7.6	0.05	13.0	59.0
NB-6	0.5-1.0	2.0	0.82	23.0	15.0	5.6	0.04	18.0	60.0

Table 8.26b: SQT Comparison:
North Bay - PAHs, PCBs, and Dioxins
Sediment Investigation
Lower St. Louis River / Fond Du Lac Dam - Kingsbury Bay
USACE/MPCA
Duluth, Minnesota

Sample Location	**Sample Depth (ft)**	**Priority PAHs (µg/kg)**													**Total PAHs (µg/kg dry weight)**	**Total PCBs (µg/kg dry weight)**	**Dioxins (ng TEQ/kg dry weight)**
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
NB-1	0-0.5	0	0	125	0	0	0	53	51	95	96	0	110	87	617	ND	0
NB-1	0.5-1.0	0	0	130	0	0	0	130	130	120	130	0	130	130	900	ND	0
NB-2	0-0.5	0	0	150	0	0	0	14	34	150	150	0	33	150	681	ND	20.72
NB-2	1.0-2.0	0	0	16	0	0	0	67	81	86	72	0	200	150	672	ND	**25.34**
NB-4	0-0.5	0	0	180	0	0	0	27	48	41	59	0	90	56	501	ND	0.00
NB-4	0.5-1.0	0	0	155	0	0	0	43	56	34	37	0	100	82	507	ND	0.00
NB-3	0-0.5	0	8	12	0	0	0	32	59	64	48	0	83	57	363	ND	10.61
NB-3	1.7-2.5	0	0	65	0	0	0	17	26	27	20	0	42	40	237	ND	**79.09**
NB-5	0-0.5	0	0	90	0	0	0	35	66	90	93	0	63	83	520	ND	0.00
NB-5	3.0-4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ND	0.00
NB-6	0-0.5	0	0	60	0	0	0	6	10	60	60	0	13	60	269	ND	5.89
NB-6	0.5-1.0	0	0	60	0	0	0	60	60	52	60	0	60	60	412	ND	0.46

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
PL-3	0-0.5	4.1	1.20	23.0	24.0	34.0	0.10	18.0	120.0
PL-3	0.5-1.0	6.4	1.50	25.0	28.0	63.0	0.12	20.0	180.0
PL-2	0-0.5	4.8	2.70	37.0	45.0	95.0	0.13	29.0	250.0
PL-2- DUP	0-0.5	4.3	2.10	34.0	40.0	87.0	0.12	27.0	230.0
PL-2	1.0-2.0	8.2	3.30	35.0	52.0	**130.0**	0.20	31.0	310.0
PL-2- DUP	1.0-2.0	8.1	3.10	33.0	47.0	**160.0**	0.15	29.0	330.0
PL-1	0-0.5	6.0	2.50	39.0	41.0	99.0	0.17	31.0	260.0
PL-1	1.0-2.0	5.1	1.40	31.0	41.0	7.7	0.08	29.0	66.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
PL-3	0-0.5	0	0	0	0	0	0	76	85	74	77	0	140	150	602	ND	0.29
PL-3	0.5-1.0	0	0	0	0	0	0	91	88	77	93	0	160	150	659	ND	20.29
PL-2	0-0.5	0	0	0	0	0	0	310	310	310	310	0	310	310	1860	ND	0.00
PL-2- DUP	0-0.5	0	0	0	0	0	0	37	52	42	315	0	50	315	811	ND	0.00
PL-2	1.0-2.0	0	0	0	0	0	0	23	29	235	235	0	29	235	786	ND	0.00
PL-2- DUP	1.0-2.0	0	0	0	0	0	0	26	30	225	225	0	38	225	769	ND	0.00
PL-1	0-0.5	0	0	0	0	0	0	26	40	265	265	0	42	265	903	ND	0.00
PL-1	1.0-2.0	0	0	0	0	0	0	255	255	130	255	0	255	255	1405	ND	0.00

Sample Location	**Sample Depth (ft)**	**Metals (mg/kg dry weight)**							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
RB-4	0-0.5	2.9	0.31	15.0	14.0	11.0	0.18	15.0	68.0
RB-4	0.5-1.2	1.8	0.23	18.0	15.0	7.0	0.06	16.0	54.0
RB-1	0-0.5	3.6	1.30	31.0	25.0	20.0	0.04	25.0	110.0
RB-1	3.0-4.0	5.4	1.30	33.0	27.0	7.5	0.04	27.0	77.0
RB-7	0-0.5	3.7	1.30	28.0	24.0	21.0	0.36	23.0	120.0
RB-7	3.0-4.0	2.5	1.10	29.0	21.0	6.8	0.03	25.0	65.0
RB-2	0-0.5	5.3	1.70	40.0	33.0	32.0	0.25	32.0	170.0
RB-2	1.0-2.0	3.9	1.30	29.0	28.0	7.8	0.03	28.0	74.0
RB-5	0-0.5	4.1	1.30	27.0	25.0	25.0	0.18	23.0	120.0
RB-5	1.3-2.0	4.5	1.40	34.0	26.0	7.1	0.04	27.0	78.0
RB-10	0-0.5	4.0	1.50	31.0	29.0	27.0	0.11	26.0	130.0
RB-10	1.3-2.0	2.3	0.80	25.0	21.0	6.3	0.03	22.0	62.0
RB-3	0-0.5	4.9	1.90	42.0	34.0	36.0	0.16	32.0	170.0
RB-3	3.0-4.0	3.5	1.60	41.0	28.0	7.1	0.02	35.0	87.0
RB-8	0-0.5	2.6	0.98	24.0	20.0	16.0	0.04	21.0	83.0
RB-8	1.0-1.7	2.7	0.82	21.0	17.0	7.0	0.04	18.0	54.0
RB-11	0-0.5	4.1	1.60	29.0	31.0	34.0	0.12	26.0	120.0
RB-11	0.5-1.0	4.8	2.00	31.0	34.0	27.0	0.06	28.0	110.0
RB-6	3.0-4.0	3.6	1.30	37.0	24.0	6.9	0.03	30.0	90.0
RB-6	0-0.5	4.7	1.80	39.0	33.0	32.0	0.28	30.0	180.0
RB-9	0-0.5	5.0	1.70	38.0	32.0	37.0	0.37	28.0	200.0
RB-9	1.0-2.0	1.9	0.76	21.0	15.0	5.3	0.03	18.0	57.0

Sample Location	**Sample Depth (ft)**	**Priority PAHs (µg/kg)**													**Total PAHs (µg/kg dry weight)**	**Total PCBs (µg/kg dry weight)**	**Dioxins (ng TEQ/kg dry weight)**
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
RB-4	0-0.5	0	0	0	0	55	0	13	15	19	17	0	21	26	166	ND	8.75
RB-4	0.5-1.2	0	0	0	0	55	0	9	22	25	19	0	24	25	179	ND	13.76
RB-1	0-0.5	0	0	0	0	90	0	25	31	62	54	0	77	66	405	ND	4.21
RB-1	3.0-4.0	0	0	0	0	95	0	95	95	130	95	0	95	95	700	ND	0.08
RB-7	0-0.5	0	0	0	0	10	0	25	31	49	36	0	76	67	294	ND	7.81
RB-7	3.0-4.0	0	0	0	0	75	0	75	75	380	75	0	75	75	830	ND	0.10
RB-2	0-0.5	0	0	0	0	130	0	18	25	37	33	0	36	39	318	ND	0.00
RB-2	1.0-2.0	0	0	0	0	85	0	85	85	170	85	0	85	85	680	ND	0.00
RB-5	0-0.5	0	0	0	0	80	0	27	33	29	23	0	60	46	298	ND	0.00
RB-5	1.3-2.0	0	0	0	0	100	0	100	100	160	100	0	100	100	760	ND	0.00
RB-10	0-0.5	0	0	0	0	105	0	25	27	26	26	0	64	38	311	ND	0.00
RB-10	1.3-2.0	0	0	0	0	65	0	65	65	100	65	0	65	65	490	ND	0.00
RB-3	0-0.5	0	0	0	0	135	0	27	38	41	40	0	81	49	411	ND	19.92
RB-3	3.0-4.0	0	0	0	0	95	0	95	95	110	95	0	95	95	680	ND	0.11
RB-8	0-0.5	0	0	0	0	75	0	11	9	9	16	0	25	18	164	ND	7.56
RB-8	1.0-1.7	0	0	0	0	60	0	60	60	15	60	0	60	60	375	ND	5.16
RB-11	0-0.5	0	0	0	0	12	0	32	34	28	35	0	73	56	270	ND	**21.69**
RB-11	0.5-1.0	0	0	0	0	80	0	9	12	10	80	0	25	80	296	ND	5.46
RB-6	3.0-4.0	0	0	0	0	9	0	9	9	19	9	0	9	9	70	ND	0.00
RB-6	0-0.5	0	0	0	0	13	0	1	2	2	2	0	3	13	36	ND	0.00
RB-9	0-0.5	0	0	0	0	11	0	3	3	4	4	0	6	5	37	ND	0.00
RB-9	1.0-2.0	0	0	0	0	7	0	7	7	8	7	0	7	7	47	ND	0.00

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
RSM-1	0-0.5	9.8	**6.4**	75.0	**470.0**	**330.0**	0.4	27.0	390.0
RSM-1	1.2-1.8	2.0	1.5	18.0	51.0	99.0	0.2	16.0	160.0
RSM-2	0-0.5	4.4	2.5	46.0	46.0	39.0	0.1	37.0	160.0
RSM-2	1.7-2.5	6.5	3.5	49.0	58.0	120.0	0.4	43.0	420.0
RSM-3	0-0.5	4.0	2.5	48.0	37.0	80.0	0.4	29.0	270.0
RSM-3	0.5-1.0	3.8	1.3	97.0	30.0	27.0	0.2	16.0	91.0
RSM-4	0-0.5	5.5	2.7	49.0	41.0	38.0	0.2	45.0	180.0
RSM-4	1.6-2.2	3.2	1.2	14.0	23.0	49.0	0.8	16.0	110.0
RSM-5	0-0.5	1.6	0.6	11.0	12.0	8.6	0.0	14.0	38.0
RSM-5	0.5-1.0	2.2	1.5	13.0	14.0	23.0	0.1	17.0	66.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
RSM-1	0-0.5	35	24	140	56	15	20	410	370	320	430	42	930	790	3582	ND	8.35
RSM-1	1.2-1.8	26	10	14	33	18	16	120	110	39	120	50	120	110	786	ND	8.07
RSM-2	0-0.5	**110**	39	72	26	110	43	140	250	270	240	110	440	370	2220	ND	0.00
RSM-2	1.7-2.5	74	**260**	580	240	54	150	**1400**	**2400**	**2400**	**2500**	**340**	**4600**	**3700**	18698	ND	0.00
RSM-3	0-0.5	83	50	270	140	60	270	850	520	390	570	60	1100	**1600**	5963	ND	0.00
RSM-3	0.5-1.0	65	8	15	8	65	20	40	60	51	63	65	110	88	659	ND	0.00
RSM-4	0-0.5	**115**	41	67	29	17	50	150	290	330	320	115	520	420	2464	ND	8.23
RSM-4	1.6-2.2	11	14	25	17	15	26	96	90	84	98	55	200	170	901	ND	15.36
RSM-5	0-0.5	48	48	48	48	48	48	14	14	17	10	48	23	28	442	ND	0.62
RSM-5	0.5-1.0	50	6	14	50	50	50	38	77	81	88	50	120	110	784	ND	3.21

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
SL-39	0-0.5	4.1	0.9	35.0	32.0	40.0	0.3	28.0	210.0
SL-39- DUP	0-0.5	3.8	0.8	32.0	28.0	37.0	0.3	25.0	200.0
SL-39	1.0-2.0	2.1	0.3	28.0	17.0	7.8	0.0	23.0	75.0
SL-39- DUP	1.0-2.0	2.6	0.4	31.0	20.0	14.0	0.0	25.0	96.0
SL-32	0-0.7	3.4	0.4	34.0	24.0	12.0	0.1	28.0	96.0
SL-32- DUP	0-0.7	3.3	0.4	37.0	26.0	13.0	0.1	29.0	100.0
SL-32	3.0-4.0	4.0	0.9	40.0	41.0	32.0	0.6	30.0	230.0
SL-32- DUP	3.0-4.0	3.9	0.9	40.0	40.0	31.0	0.6	30.0	230.0
SL-19	0-0.5	2.9	0.4	34.0	24.0	11.0	0.1	27.0	97.0
SL-19	3.0-4.0	3.3	0.7	32.0	34.0	22.0	0.1	25.0	150.0
SL-38	0-0.5	1.5	0.1	15.0	11.0	2.9	0.0	15.0	33.0
SL-38	1.6-2.4	2.0	0.8	22.0	14.0	4.7	0.0	18.0	61.0
SL-52	0-0.5	6.2	1.6	37.0	29.0	65.0	0.2	27.0	260.0
SL-52	1.7-2.7	4.7	1.8	35.0	27.0	52.0	0.1	27.0	180.0
SL-48	0-0.7	5.7	1.8	40.0	36.0	59.0	0.3	30.0	260.0
SL-48- DUP	0-0.7	6.2	1.9	43.0	38.0	61.0	0.3	31.0	290.0
SL-48	1.5-2.5	1.7	0.6	17.0	11.0	3.7	0.0	14.0	45.0
SL-48- DUP	1.5-2.5	1.9	0.7	17.0	10.0	3.6	0.0	14.0	45.0
SL-49	0-0.5	6.2	2.0	44.0	41.0	59.0	0.5	31.0	300.0
SL-49	0.5-1.0	4.9	1.7	36.0	35.0	52.0	0.2	28.0	210.0
SL-50	0-0.5	1.9	0.6	17.0	10.0	4.0	0.0	14.0	47.0
SL-50	0.8-1.3	1.4	0.6	15.0	9.4	3.1	0.0	13.0	38.0
SL-51	0-0.5	3.5	1.4	34.0	24.0	15.0	0.1	27.0	110.0
SL-51	3.0-4.0	3.9	1.7	33.0	28.0	25.0	0.2	26.0	160.0
SL-44	0-0.5	2.0	1.0	31.0	20.0	6.7	0.0	24.0	86.0
SL-44	0.9-1.7	2.1	0.8	25.0	18.0	5.3	0.0	21.0	73.0
SL-46	0-0.5	1.4	0.3	9.7	5.7	2.3	0.0	10.0	34.0
SL-46	0.7-1.5	1.6	0.4	9.1	5.5	1.8	0.0	10.0	32.0
SL-53	0-0.5	1.6	0.6	17.0	9.6	20.0	0.0	13.0	45.0
SL-53- DUP	0-0.5	1.5	0.6	16.0	8.8	3.6	0.0	12.0	41.0
SL-53	1.0-1.8	1.2	0.6	17.0	9.4	3.2	0.0	13.0	44.0
SL-53- DUP	1.0-1.8	1.2	0.6	17.0	9.2	3.2	0.0	13.0	43.0
SL-54	0-0.5	4.3	1.4	33.0	28.0	40.0	0.2	25.0	190.0
SL-54	1.0-2.0	6.8	2.2	39.0	43.0	80.0	0.6	29.0	390.0
SL-40	0-0.7	3.6	1.2	34.0	25.0	16.0	0.1	28.0	110.0
SL-40- DUP	0-0.7	3.8	1.2	35.0	25.0	17.0	0.1	28.0	110.0
SL-40	3.0-4.0	4.9	1.6	38.0	31.0	39.0	0.2	29.0	180.0
SL-40- DUP	3.0-4.0	4.9	1.5	48.0	38.0	40.0	0.1	38.0	180.0

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
SL-33	0-0.5	3.5	1.2	37.0	24.0	15.0	0.1	29.0	110.0
SL-33	3.0-4.0	2.6	1.1	45.0	25.0	7.2	0.1	36.0	100.0
SL-21	0-0.5	2.3	0.8	25.0	18.0	8.5	0.0	21.0	71.0
SL-21	3.0-4.0	3.5	1.4	32.0	40.0	38.0	0.3	27.0	240.0
SL-15	0-0.5	2.8	1.1	36.0	26.0	12.0	0.1	30.0	96.0
SL-15	2.2-3.2	4.5	1.5	40.0	42.0	38.0	0.1	33.0	200.0
SL-41	0-0.5	2.9	1.1	37.0	25.0	12.0	0.1	30.0	100.0
SL-41- DUP	0-0.5	2.8	0.9	33.0	21.0	11.0	0.1	26.0	91.0
SL-41	3.0-4.0	2.3	0.9	28.0	16.0	5.1	0.0	23.0	71.0
SL-41- DUP	3.0-4.0	2.1	0.8	28.0	16.0	5.1	0.0	22.0	71.0
SL-42	0-0.5	2.7	1.0	27.0	18.0	9.5	0.1	21.0	76.0
SL-42	3.0-4.0	3.5	1.4	42.0	25.0	10.0	0.1	34.0	110.0
SL-43	0-0.5	5.6	1.9	41.0	39.0	54.0	0.3	31.0	280.0
SL-43	0.5-1.0	5.2	1.8	42.0	39.0	54.0	0.3	31.0	230.0
SL-47	0-0.5	1.3	0.4	9.9	5.4	2.3	0.0	10.0	31.0
SL-47	1.0-2.0	1.3	0.4	9.9	5.8	2.0	0.0	11.0	32.0
SL-37	0-0.5	4.4	1.7	40.0	30.0	28.0	0.1	30.0	170.0
SL-37	1.0-2.0	4.2	1.3	36.0	30.0	28.0	0.1	28.0	130.0
SL-45	0-0.5	1.6	0.7	24.0	12.0	4.9	0.0	19.0	53.0
SL-45	1.0-1.5	1.6	0.7	19.0	14.0	4.1	0.0	16.0	46.0
SL-27	0-0.5	3.7	1.1	40.0	26.0	16.0	0.1	32.0	120.0
SL-27- DUP	0-0.5	3.2	1.1	36.0	23.0	14.0	0.1	29.0	100.0
SL-27	3.0-4.0	2.8	1.1	42.0	24.0	7.5	0.1	34.0	100.0
SL-27- DUP	3.0-4.0	2.8	1.1	42.0	24.0	7.5	0.1	34.0	100.0
SL-34	0-0.5	3.5	1.1	38.0	24.0	15.0	0.1	31.0	110.0
SL-34	2.0-2.8	3.2	1.1	40.0	22.0	7.5	0.0	32.0	100.0
SL-26	0-0.5	3.1	0.9	32.0	21.0	13.0	0.1	26.0	96.0
SL-26	3.0-4.0	4.5	1.6	41.0	36.0	50.0	0.1	32.0	220.0
SL-20	0-0.5	3.7	1.2	25.0	23.0	41.0	0.2	19.0	170.0
SL-20	1.0-1.7	2.0	0.4	13.0	14.0	3.3	0.0	15.0	29.0
SL-35	0-0.5	2.6	0.9	24.0	18.0	9.2	0.0	20.0	69.0
SL-35	3.0-4.0	5.2	2.0	43.0	57.0	84.0	0.3	33.0	330.0
SL-36	0-0.5	2.9	1.0	31.0	21.0	12.0	0.1	24.0	91.0
SL-36	2.0-3.0	4.6	1.4	40.0	34.0	32.0	0.1	32.0	140.0
SL-29	0-0.5	2.8	0.9	34.0	22.0	13.0	0.1	27.0	100.0
SL-29- DUP	0-0.5	2.8	1.1	31.0	19.0	12.0	0.1	23.0	93.0
SL-29	3.0-4.0	4.6	1.4	34.0	30.0	35.0	0.1	26.0	130.0
SL-29- DUP	3.0-4.0	4.0	1.2	28.0	29.0	37.0	0.1	21.0	130.0

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
SL-28	0-0.5	2.7	0.9	24.0	17.0	10.0	0.1	20.0	79.0
SL-28	3.0-4.0	3.3	1.3	37.0	23.0	8.5	0.1	29.0	96.0
SL-14	0-0.5	2.0	0.7	19.0	13.0	7.2	0.0	16.0	57.0
SL-14	3.0-4.0	4.0	1.7	30.0	37.0	46.0	0.3	22.0	280.0
SL-22	0-0.5	3.1	1.1	29.0	19.0	12.0	0.1	23.0	90.0
SL-22	3.0-4.0	3.9	1.5	35.0	30.0	29.0	0.1	26.0	140.0
SL-9	0-0.5	2.0	0.6	14.0	11.0	5.4	0.0	12.0	40.0
SL-9	3.0-4.0	2.8	1.2	22.0	21.0	20.0	0.2	18.0	120.0
SL-5	0-0.5	1.4	0.5	9.9	6.6	4.1	0.0	9.6	32.0
SL-5	0.7-1.2	1.9	0.6	13.0	11.0	7.3	0.1	12.0	54.0
SL-2	0-0.5	1.8	0.8	14.0	9.8	5.4	0.0	13.0	43.0
SL-2	0.8-1.6	2.3	0.9	18.0	18.0	16.0	0.2	15.0	110.0
SL-1	0-0.5	1.3	0.4	9.8	6.6	3.4	0.0	9.5	31.0
SL-1	1.0-2.0	1.6	0.6	12.0	13.0	5.8	0.0	12.0	42.0
SL-3	0-0.5	2.6	0.6	12.0	9.1	5.1	0.0	11.0	37.0
SL-3- DUP	0-0.5	2.2	0.5	9.8	8.2	8.7	0.0	9.5	37.0
SL-3	1.0-2.0	1.9	1.0	18.0	17.0	4.0	0.0	14.0	52.0
SL-3- DUP	1.0-2.0	1.5	0.6	17.0	12.0	4.0	0.0	13.0	47.0
SL-4	0-0.5	1.9	0.7	15.0	11.0	6.6	0.0	13.0	45.0
SL-4	1.0-2.0	2.5	0.9	20.0	14.0	9.2	0.1	16.0	63.0
SL-11	0-0.5	1.6	0.7	16.0	12.0	6.2	0.0	14.0	46.0
SL-11	1.0-2.0	3.3	1.7	30.0	28.0	31.0	0.4	20.0	180.0
SL-6	0-0.5	2.2	0.8	15.0	12.0	5.4	0.0	14.0	41.0
SL-6	2.5-3.5	2.7	1.2	21.0	18.0	15.0	0.1	16.0	92.0
SL-10	0-0.7	2.6	0.8	19.0	13.0	6.4	0.0	15.0	50.0
SL-10- DUP	0-0.7	2.2	0.9	20.0	14.0	6.8	0.0	16.0	52.0
SL-10	1.8-2.5	2.9	1.3	24.0	20.0	18.0	0.2	19.0	110.0
SL-10- DUP	1.8-2.5	3.2	1.3	23.0	20.0	16.0	0.1	18.0	92.0
SL-30	0-0.5	3.3	1.5	34.0	23.0	16.0	0.1	25.0	110.0
SL-30	1.3-2.3	5.9	2.4	44.0	49.0	81.0	0.6	30.0	380.0
SL-23	0-0.6	4.6	1.2	29.0	26.0	21.0	0.1	23.0	100.0
SL-23- DUP	0-0.6	5.1	1.4	31.0	28.0	23.0	0.2	26.0	120.0
SL-31	0-0.5	3.5	1.2	36.0	27.0	19.0	0.1	29.0	110.0
SL-31	0.8-1.5	4.5	1.6	35.0	31.0	28.0	0.2	29.0	140.0
SL-24	0-0.5	6.8	1.7	34.0	39.0	61.0	0.2	28.0	230.0
SL-25	0-0.5	2.7	1.8	11.0	7.9	9.1	0.0	10.0	47.0
SL-25	0.5-1.0	2.1	0.2	15.0	13.0	4.5	0.0	15.0	42.0
SL-16	0-0.5	2.8	0.4	30.0	21.0	13.0	0.1	24.0	88.0

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
SL-16	0.5-1.0	4.6	0.9	34.0	36.0	44.0	0.3	26.0	240.0
SL-17	0-0.5	2.9	0.4	22.0	19.0	14.0	0.1	19.0	84.0
SL-17	0.7-1.3	3.7	0.7	24.0	27.0	30.0	0.3	20.0	150.0
SL-18	0-0.5	1.5	0.1	9.1	6.1	5.1	0.0	8.6	33.0
SL-18	1.0-1.7	1.6	0.1	12.0	11.0	3.1	0.0	12.0	33.0
SL-12	0-0.5	8.8	1.3	34.0	42.0	54.0	0.2	31.0	250.0
SL-7	0-0.5	4.0	0.4	19.0	19.0	22.0	0.0	17.0	90.0
SL-13	0-0.5	1.3	0.1	8.5	4.5	3.8	0.0	7.6	27.0
SL-13	0.5-1.0	1.2	0.1	7.8	5.3	5.9	0.0	7.5	33.0
SL-8	0-0.5	1.5	0.1	13.0	9.6	4.6	0.0	11.0	34.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
SL-39	0-0.5	44	26	230	72	80	25	480	380	370	390	52	850	730	3729	ND	0.00
SL-39- DUP	0-0.5	19	24	39	21	80	80	96	170	190	180	80	290	290	1559	ND	0.00
SL-39	1.0-2.0	65	65	10	65	65	65	12	64	64	46	65	120	110	816	ND	0.00
SL-39- DUP	1.0-2.0	65	65	10	65	65	65	13	78	78	61	65	130	110	870	ND	0.00
SL-32	0-0.7	**95**	95	95	95	95	95	95	15	95	95	95	12	95	1072	ND	2.90
SL-32- DUP	0-0.7	**95**	95	95	95	95	95	11	23	23	18	95	29	29	798	ND	2.29
SL-32	3.0-4.0	75	12	14	10	75	75	68	91	150	130	75	110	160	1045	ND	**22.21**
SL-32- DUP	3.0-4.0	75	8	75	75	75	75	39	69	120	90	75	75	110	961	ND	**28.39**
SL-19	0-0.5	**95**	95	95	95	95	95	95	20	16	95	95	19	95	1005	ND	0.00
SL-19	3.0-4.0	10	24	130	33	75	75	240	540	560	460	69	950	910	4076	ND	0.00
SL-38	0-0.5	50	50	50	50	50	50	50	50	200	50	50	50	50	800	ND	0.04
SL-38	1.6-2.4	55	55	55	55	55	55	55	55	110	55	55	55	55	770	ND	0.00
SL-52	0-0.5	24	110	300	80	15	75	480	**1200**	1300	1300	**200**	2000	**1800**	8884	ND	7.25
SL-52	1.7-2.7	18	41	160	60	12	38	280	660	730	580	95	1200	1200	5074	ND	2.30
SL-48	0-0.7	13	59	220	62	24	77	240	**1500**	**2000**	1300	**250**	2000	**2600**	10345	ND	14.21
SL-48- DUP	0-0.7	13	46	220	68	20	61	220	**1400**	**1700**	1200	**200**	2100	**2500**	9748	ND	**60.42**
SL-48	1.5-2.5	55	55	55	55	55	55	55	55	32	55	55	55	55	692	ND	0.12
SL-48- DUP	1.5-2.5	55	55	55	55	55	55	55	55	19	55	55	55	55	679	ND	0.10
SL-49	0-0.5	85	26	42	22	13	56	77	200	240	240	85	320	370	1776	ND	0.00
SL-49	0.5-1.0	**90**	34	190	51	12	32	180	**1400**	1500	1100	**170**	2000	**2100**	8859	ND	0.00
SL-50	0-0.5	55	55	55	55	55	55	55	7	55	55	55	55	55	667	ND	0.07
SL-50	0.8-1.3	55	55	55	55	55	55	55	55	39	55	55	55	55	699	ND	0.40
SL-51	0-0.5	**100**	100	100	100	100	100	14	33	31	22	100	42	41	883	ND	0.00
SL-51	3.0-4.0	8	11	23	12	80	80	56	130	160	160	80	190	250	1240	ND	0.00
SL-44	0-0.5	80	80	80	80	80	80	80	80	55	80	80	80	80	1015	ND	0.03
SL-44	0.9-1.7	60	60	60	60	60	60	60	60	27	60	60	60	60	747	ND	0.21
SL-46	0-0.5	49	49	49	49	49	49	49	49	49	49	49	49	49	631	ND	0.12
SL-46	0.7-1.5	50	50	50	50	50	50	50	50	50	50	50	50	50	650	ND	0.02
SL-53	0-0.5	60	60	60	60	60	60	60	60	61	60	60	12	60	733	ND	0.00
SL-53- DUP	0-0.5	60	60	60	60	60	60	60	9	27	60	60	60	60	696	ND	0.00
SL-53	1.0-1.8	55	55	55	55	55	55	55	55	37	55	55	55	55	697	ND	0.00
SL-53- DUP	1.0-1.8	50	50	50	50	50	50	50	50	39	50	50	50	50	639	ND	0.00
SL-54	0-0.5	36	120	450	150	27	140	1000	1000	890	980	120	1900	**1900**	8713	ND	**107.37**
SL-54	1.0-2.0	**91**	83	200	260	41	84	370	**1300**	800	460	120	1800	**1900**	7509	ND	19.31
SL-40	0-0.7	80	10	20	80	80	80	50	100	120	110	80	150	180	1140	ND	3.53
SL-40- DUP	0-0.7	85	8	24	10	85	85	50	84	100	100	85	150	160	1026	ND	6.05
SL-40	3.0-4.0	**93**	53	690	260	23	67	**1400**	**2200**	**2100**	**1700**	**260**	**3800**	**4200**	16846	ND	**109.48**
SL-40- DUP	3.0-4.0	68	56	600	200	23	68	1100	**2100**	**2000**	**1600**	**250**	**3500**	**3900**	15465	ND	**32.06**
SL-33	0-0.5	**90**	90	15	90	90	90	35	67	83	67	90	100	130	1037	ND	0.00
SL-33	3.0-4.0	85	85	85	85	85	85	85	15	550	85	85	16	20	1366	ND	0.00
SL-21	0-0.5	75	75	75	75	75	75	24	41	43	42	75	66	80	821	ND	0.00
SL-21	3.0-4.0	28	53	170	69	19	58	470	550	490	600	65	820	1100	4492	ND	0.00
SL-15	0-0.5	85	85	85	85	85	85	25	42	280	32	85	53	79	1106	ND	0.00
SL-15	2.2-3.2	75	75	75	75	75	75	19	33	200	32	75	46	64	919	ND	0.00
SL-41	0-0.5	85	85	11	85	85	85	25	42	51	41	85	70	74	824	ND	0.00

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
SL-41- DUP	0-0.5	**90**	90	90	90	90	90	18	31	180	28	90	49	47	983	ND	0.00
SL-41	3.0-4.0	65	65	65	65	65	65	65	8	470	65	65	65	65	1193	ND	0.00
SL-41- DUP	3.0-4.0	65	65	65	65	65	65	65	65	460	65	65	65	65	1240	ND	0.00
SL-42	0-0.5	75	75	75	75	75	75	18	32	160	31	75	43	53	862	ND	3.00
SL-42	3.0-4.0	85	85	85	85	85	85	12	17	190	85	85	85	23	1007	ND	0.48
SL-43	0-0.5	**90**	30	130	37	12	29	150	780	980	650	100	1100	1400	5488	ND	0.00
SL-43	0.5-1.0	30	84	670	150	36	83	660	**3300**	**3700**	**2300**	**360**	**4800**	**6500**	22673	ND	0.00
SL-47	0-0.5	50	50	50	50	50	50	50	50	21	50	50	50	50	615	ND	0.00
SL-47	1.0-2.0	50	50	50	50	50	50	50	50	17	50	50	50	50	611	ND	0.00
SL-37	0-0.5	**95**	11	21	95	95	95	47	130	210	150	95	190	260	1494	ND	0.00
SL-37	1.0-2.0	54	34	550	160	90	90	850	**1700**	**1700**	1300	78	370	**2800**	9776	ND	0.00
SL-45	0-0.5	55	55	55	55	55	55	55	55	91	55	55	55	55	751	ND	0.00
SL-45	1.0-1.5	55	55	55	55	55	55	55	55	68	55	55	55	55	728	ND	0.00
SL-27	0-0.5	**100**	100	100	100	100	100	25	45	50	47	100	75	73	1015	ND	0.00
SL-27- DUP	0-0.5	**95**	95	95	95	95	95	24	53	54	42	95	76	72	986	ND	0.00
SL-27	3.0-4.0	**95**	95	95	95	95	95	95	12	550	95	95	95	95	1607	ND	0.00
SL-27- DUP	3.0-4.0	**95**	95	95	95	95	95	95	95	95	95	95	95	95	1235	ND	0.00
SL-34	0-0.5	**95**	95	95	95	95	95	29	48	53	49	95	97	76	1017	ND	4.44
SL-34	2.0-2.8	13	80	16	15	80	80	70	25	80	14	80	67	62	682	ND	0.09
SL-26	0-0.5	**90**	10	21	90	90	90	48	76	88	77	90	140	150	1060	ND	3.45
SL-26	3.0-4.0	72	58	360	140	23	62	760	**1200**	1300	1000	**150**	**2600**	**2400**	10125	ND	5.70
SL-20	0-0.5	8	48	84	33	19	100	130	310	360	350	63	580	670	2755	ND	**71.16**
SL-20	1.0-1.7	47	47	47	47	47	47	47	47	47	47	47	6	47	564	ND	0.46
SL-35	0-0.5	80	80	80	80	80	80	25	33	40	32	80	62	65	817	ND	0.00
SL-35	3.0-4.0	80	86	370	140	50	170	680	**1300**	880	1100	**160**	**2300**	**2800**	10116	ND	0.00
SL-36	0-0.5	85	85	85	85	85	85	11	21	24	20	85	30	29	730	ND	3.78
SL-36	2.0-3.0	70	39	480	150	80	18	730	**1300**	1300	1000	140	**2600**	**2400**	10307	ND	8.93
SL-29	0-0.5	**95**	95	95	95	95	95	16	30	28	19	95	44	47	849	ND	0.00
SL-29- DUP	0-0.5	**90**	90	90	90	90	90	21	36	38	34	90	64	51	874	ND	0.00
SL-29	3.0-4.0	**270**	130	**1900**	**600**	29	57	**3100**	**5000**	**2100**	**3400**	**510**	**9500**	**8500**	**35096**	ND	0.00
SL-29- DUP	3.0-4.0	**180**	110	**1300**	410	23	44	**2100**	**3400**	**3200**	**2500**	**330**	**6900**	**5700**	**26197**	ND	0.00
SL-28	0-0.5	80	80	80	80	80	80	16	26	29	21	80	45	39	736	ND	2.62
SL-28	3.0-4.0	**100**	100	100	100	100	100	100	100	140	100	100	22	100	1262	ND	0.20
SL-14	0-0.5	65	65	65	65	65	65	32	27	26	25	65	55	46	666	ND	1.38
SL-14	3.0-4.0	9	21	26	15	60	60	88	130	160	150	60	220	210	1209	ND	10.08
SL-22	0-0.5	**90**	90	90	90	90	90	18	31	36	26	90	53	50	844	ND	3.30
SL-22	3.0-4.0	**140**	83	**1100**	320	18	33	**1700**	**3000**	**3000**	**2300**	**350**	**5700**	**5400**	**23144**	ND	3.23
SL-9	0-0.5	65	65	65	65	65	65	10	14	16	11	65	20	22	548	ND	0.00
SL-9	3.0-4.0	60	60	60	60	60	60	25	39	68	60	60	59	65	736	ND	0.00
SL-5	0-0.5	55	55	55	55	55	55	10	11	8	55	55	18	16	502	ND	0.00
SL-5	0.7-1.2	50	6	50	50	50	50	6	13	16	12	50	16	18	387	ND	0.00
SL-2	0-0.5	55	55	55	55	55	55	55	55	55	55	55	55	55	715	ND	0.41
SL-2	0.8-1.6	60	13	11	60	60	60	60	52	72	63	60	110	120	801	ND	7.71
SL-1	0-0.5	50	50	50	50	50	50	50	50	50	50	50	6	50	606	ND	0.00
SL-1	1.0-2.0	50	50	50	50	50	50	9	10	9	8	50	16	15	418	ND	0.00

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
SL-3	0-0.5	55	55	55	55	55	55	7	14	58	8	55	14	18	503	ND	0.00
SL-3- DUP	0-0.5	55	55	55	55	55	55	6	12	12	8	55	11	15	449	ND	0.00
SL-3	1.0-2.0	50	50	50	50	50	50	50	50	130	50	50	50	50	730	ND	0.00
SL-3- DUP	1.0-2.0	50	50	50	50	50	50	50	50	89	50	50	50	50	689	ND	0.00
SL-4	0-0.5	60	60	60	60	60	60	60	60	60	60	60	60	60	780	ND	2.62
SL-4	1.0-2.0	60	60	60	60	60	60	18	24	24	23	60	49	37	595	ND	2.29
SL-11	0-0.5	60	60	60	60	60	60	8	12	11	8	60	21	18	498	ND	0.00
SL-11	1.0-2.0	70	9	9	70	70	70	26	48	68	56	70	82	74	721	ND	0.00
SL-6	0-0.5	60	60	60	60	60	60	13	12	9	10	60	20	16	499	170	0.64
SL-6	2.5-3.5	60	60	60	60	60	60	9	13	11	9	60	21	17	500	ND	**33.55**
SL-10	0-0.7	65	65	65	65	65	65	6	11	9	65	65	16	65	627	ND	0.98
SL-10- DUP	0-0.7	65	65	65	65	65	65	7	13	13	10	65	17	15	530	ND	0.87
SL-10	1.8-2.5	65	10	12	9	65	65	37	65	90	93	65	130	170	875	ND	7.74
SL-10- DUP	1.8-2.5	65	7	65	65	65	65	21	44	63	60	65	75	74	734	ND	5.13
SL-30	0-0.5	**105**	105	18	105	105	105	37	75	82	60	105	130	120	1152	ND	4.91
SL-30	1.3-2.3	12	38	38	14	13	36	97	210	240	220	110	360	440	1828	ND	**88.59**
SL-23	0-0.6	**115**	115	15	115	115	115	33	75	83	67	115	130	110	1203	ND	0.00
SL-23- DUP	0-0.6	**115**	19	27	115	115	115	57	120	120	100	115	210	180	1408	ND	0.00
SL-31	0-0.5	**120**	120	120	120	120	120	26	54	55	42	120	98	79	1194	ND	0.00
SL-31	0.8-1.5	**100**	13	20	100	100	100	54	110	130	110	100	180	180	1297	ND	0.00
SL-24	0-0.5	**135**	**135**	135	135	135	135	135	53	58	135	135	83	86	1495	ND	**87.77**
SL-25	0-0.5	50	11	21	50	50	50	32	78	72	73	50	140	110	787	ND	0.00
SL-25	0.5-1.0	55	55	55	55	55	55	55	55	63	55	55	8	55	676	ND	0.00
SL-16	0-0.5	80	12	36	13	80	80	64	230	260	190	80	370	380	1875	ND	2.41
SL-16	0.5-1.0	80	27	49	21	13	29	100	290	370	270	80	460	80	1869	ND	**74.28**
SL-17	0-0.5	80	80	80	80	80	80	19	45	49	37	80	58	64	832	ND	0.00
SL-17	0.7-1.3	16	65	130	56	16	34	290	500	540	450	100	890	1100	4187	ND	0.00
SL-18	0-0.5	55	55	55	55	55	55	5	29	25	25	55	39	39	547	ND	0.60
SL-18	1.0-1.7	55	55	55	55	55	55	55	55	84	55	55	55	55	744	ND	0.14
SL-12	0-0.5	**135**	26	62	31	21	45	130	350	410	330	135	730	690	3095	ND	**70.71**
SL-7	0-0.5	85	11	32	17	85	85	69	180	200	160	85	310	340	1659	ND	0.00
SL-13	0-0.5	50	50	50	50	50	50	14	19	16	14	50	30	27	470	ND	0.00
SL-13	0.5-1.0	50	13	30	7	50	50	86	66	62	58	50	150	140	812	ND	0.00
SL-8	0-0.5	65	65	65	65	65	65	65	65	65	65	65	65	65	845	ND	2.08

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
SB-6	0-0.5	4.7	2.20	41.0	34.0	47.0	0.82	26.0	250.0
SB-6	1.0-2.0	3.6	1.20	33.0	18.0	7.6	0.08	24.0	88.0
SB-7	0-0.5	1.5	0.48	13.0	10.0	5.2	0.02	12.0	34.0
SB-7- DUP	0-0.5	1.6	0.49	13.0	9.9	4.6	0.02	12.0	33.0
SB-7	1.7-2.5	2.1	0.85	21.0	20.0	13.0	0.33	17.0	90.0
SB-7- DUP	1.7-2.5	2.5	1.00	25.0	25.0	19.0	0.37	19.0	130.0
SB-4	0-0.5	1.8	0.69	22.0	15.0	4.7	0.02	18.0	50.0
SB-4	0.5-1.0	2.2	0.71	20.0	16.0	4.4	0.02	18.0	42.0
SB-8	0-0.5	2.3	0.26	18.0	15.0	9.9	0.04	15.0	62.0
SB-8	0.8-1.3	1.9	0.22	12.0	12.0	9.9	0.10	11.0	63.0
SB-2	0-0.5	1.3	0.08	10.0	10.0	3.3	0.01	10.0	22.0
SB-2	0.6-1.2	2.4	0.11	15.0	18.0	3.7	0.02	15.0	24.0
SB-1	0-0.5	1.9	0.13	12.0	8.8	4.2	0.03	11.0	34.0
SB-5	0-0.5	5.9	1.30	34.0	38.0	54.0	0.35	26.0	220.0
SB-5- DUP	0-0.5	7.9	1.70	39.0	46.0	77.0	0.28	31.0	290.0
SB-3	0-0.5	1.5	0.54	20.0	11.0	5.3	0.02	16.0	48.0
SB-3	0.5-1.0	1.5	0.80	24.0	16.0	6.3	0.02	19.0	63.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
SB-6	0-0.5	0	85	0	0	0	0	22	28	35	28	0	45	39	282	ND	0.00
SB-6	1.0-2.0	0	75	0	0	0	0	75	11	75	75	0	16	75	402	ND	0.00
SB-7	0-0.5	0	60	0	0	0	0	60	9	60	60	0	9	60	318	ND	1.30
SB-7- DUP	0-0.5	0	60	0	0	0	0	5	9	60	60	0	13	60	268	ND	1.12
SB-7	1.7-2.5	0	6	0	0	0	0	21	29	45	35	0	38	45	219	ND	5.45
SB-7- DUP	1.7-2.5	0	9	0	0	0	0	29	38	66	49	0	53	64	308	ND	10.84
SB-4	0-0.5	0	70	0	0	0	0	70	70	70	70	0	70	70	490	ND	0.00
SB-4	0.5-1.0	0	60	0	0	0	0	60	60	43	60	0	60	60	403	ND	0.00
SB-8	0-0.5	0	70	0	0	0	0	18	28	29	22	0	41	39	247	ND	2.97
SB-8	0.8-1.3	0	55	0	0	0	0	11	20	29	24	0	25	29	193	ND	5.52
SB-2	0-0.5	0	55	0	0	0	0	55	55	55	55	0	55	55	385	ND	0.00
SB-2	0.6-1.2	0	50	0	0	0	0	50	50	30	50	0	50	50	330	ND	0.00
SB-1	0-0.5	0	55	0	0	0	0	55	15	15	26	0	42	41	249	ND	1.27
SB-5	0-0.5	0	**170**	0	0	0	0	60	73	110	83	0	140	120	756	ND	**41.99**
SB-5- DUP	0-0.5	0	**165**	0	0	0	0	34	49	68	50	0	83	72	521	ND	**36.37**
SB-3	0-0.5	0	55	0	0	0	0	55	55	460	55	0	55	55	790	ND	0.00
SB-3	0.5-1.0	0	60	0	0	0	0	60	60	470	60	0	60	60	830	ND	0.00

Sample Location	Sample Depth (ft)	Metals (mg/kg dry weight)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Level I SQT		9.8	0.99	43	32	36	0.18	23	120
Level II SQT		33	4.98	111	149	128	1.1	48.6	459
TIF-3	0-0.7	2.7	1.30	31.0	20.0	17.0	0.15	23.0	88.0
TIF-3- DUP	0-0.7	2.1	1.10	26.0	16.0	15.0	0.08	19.0	74.0
TIF-3	1.4-1.9	1.7	0.21	19.0	13.0	4.2	0.02	16.0	51.0
TIF-3- DUP	1.4-1.9	1.6	0.20	19.0	12.0	4.0	0.03	16.0	50.0
TIF-2	0-0.5	1.1	0.00	7.4	4.2	2.5	0.01	8.8	28.0
TIF-2	0.5-1.0	1.6	0.07	7.8	4.3	1.9	0.01	9.2	29.0
TIF-4	0-0.5	2.6	0.29	19.0	13.0	14.0	0.06	19.0	87.0
TIF-4	1.0-2.0	1.8	0.22	22.0	14.0	8.2	0.06	18.0	61.0
TIF-5	0-0.5	1.2	0.09	10.0	5.5	4.6	0.01	11.0	40.0
TIF-5	0.5-1.2	1.4	0.14	11.0	7.0	9.2	0.03	12.0	59.0
TIF-1	0-0.5	1.3	0.37	11.0	5.5	2.6	0.01	9.9	31.0
TIF-1	0.5-1.0	1.6	0.45	11.0	6.1	2.4	0.02	12.0	34.0

Sample Location	Sample Depth (ft)	Priority PAHs (µg/kg)													Total PAHs (µg/kg dry weight)	Total PCBs (µg/kg dry weight)	Dioxins (ng TEQ/kg dry weight)
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Pyrene			
Level I SQT		6.7	5.9	57	77	20	180	200	110	150	170	33	420	200	1600	60	0.85
Level II SQT		89	130	850	540	200	560	1200	1100	1500	1300	140	2200	1500	23000	680	21.5
TIF-3	0-0.7	0	8	13	7	0	28	27	49	58	48	0	81	79	399	ND	10.24
TIF-3- DUP	0-0.7	0	10	16	8	0	21	30	63	70	54	0	97	91	460	ND	2.71
TIF-3	1.4-1.9	0	65	65	65	0	65	65	65	27	65	0	65	65	612	ND	0.98
TIF-3- DUP	1.4-1.9	0	65	65	65	0	65	65	65	65	65	0	65	65	650	ND	0.23
TIF-2	0-0.5	0	50	50	50	0	50	50	7	50	50	0	7	50	414	ND	0.00
TIF-2	0.5-1.0	0	50	50	50	0	50	50	50	50	50	0	50	50	500	ND	0.00
TIF-4	0-0.5	0	18	38	12	0	65	120	150	140	140	0	280	230	1193	ND	0.00
TIF-4	1.0-2.0	0	60	60	60	0	20	14	21	19	20	0	33	39	346	ND	0.00
TIF-5	0-0.5	0	49	49	49	0	49	7	12	14	14	0	10	49	302	ND	0.57
TIF-5	0.5-1.2	16	55	24	18	0	15	73	47	45	46	0	90	87	516	ND	3.02
TIF-1	0-0.5	0	50	50	0	0	50	50	50	50	50	0	50	50	450	ND	0.00
TIF-1	0.5-1.0	0	50	50	50	0	50	50	50	50	50	0	50	50	500	ND	0.00

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
Chambers Grove Reach									
CGR-1	0-0.5	0.03	0.04	0.18	0.04		0.15	0.15	0.15
CGR-1	1.2-2.2	0.22	0.32	0.79	0.07		0.75	0.75	0.75
Cedar Yard Bay									
CYB-1	0-0.5	0.15	0.20	0.28	0.00		-	-	
CYB-1	0.5-1.0	0.41	0.55	0.80	0.01		-	-	
CYB-2	0-0.5	0.55	0.74	1.06	0.01		81.29	81.29	81.29
CYB-2	0.8-1.3	0.35	0.48	0.55	0.03		33.29	33.29	33.29
Steelton Bay									
SB-6	0-0.5	0.28	0.44	1.12	0.04		-	-	
SB-6	1.0-2.0	0.40	0.56	1.31	0.07		-	-	
SB-7	0-0.5	0.32	0.45	1.05	0.10		1.22	4.82	1.52
SB-7- DUP	0-0.5	0.27	0.40	1.00	0.10		0.92	4.77	1.38
SB-7	1.7-2.5	0.22	0.35	1.10	0.06		5.45	5.45	5.45
SB-7- DUP	1.7-2.5	0.31	0.43	1.44	0.05		10.84	10.84	10.84
SB-4	0-0.5	0.49	0.70	1.40	0.04		-	-	
SB-4	0.5-1.0	0.40	0.58	1.18	0.05		-	-	
SB-8	0-0.5	0.25	0.31	1.01	0.06		2.32	6.43	3.42
SB-8	0.8-1.3	0.19	0.29	0.84	0.14		4.85	7.13	8.76
SB-2	0-0.5	0.39	0.55	1.10	0.32		-	-	
SB-2	0.6-1.2	0.33	0.48	1.11	1.14	Toxic	-	-	
SB-1	0-0.5	0.25	0.39	0.94	0.13		0.73	8.95	1.51
SB-5	0-0.5	0.76	1.01	2.71	0.18		41.63	42.11	49.95
SB-5- DUP	0-0.5	0.52	0.80	2.45	0.17		36.37	36.37	36.37
SB-3	0-0.5	0.79	0.96	1.64	0.28		-	-	
SB-3	0.5-1.0	0.83	1.01	1.76	0.17		-	-	
Fond Du Lac Stretch									
FDLS-2	0-0.5	0.24	0.35	0.35	0.04		-	-	
FDLS-2	0.5-1.1	0.18	0.25	0.25	0.04		-	-	
FDLS-4	0-0.5	0.08	0.15	0.15	0.01		0.39	0.39	0.39
FDLS-4	1.6-2.6	0.20	0.26	0.26	0.03		1.54	1.90	1.70
FDLS-1	0-0.5	0.38	0.50	0.50	0.03		0.13	0.17	0.14
FDLS-1	0.5-1.3	0.36	0.48	0.48	0.04		0.08	0.15	0.11
FDLS-3	0-0.5	0.12	0.24	0.24	0.02		-	-	
FDLS-3	1.0-2.0	0.17	0.27	0.27	0.09		-	-	
Indian Point Waterfront									
IPW-6	0-0.5	3.17	4.40	7.72	0.07		34.99	34.99	34.99
IPW-6	2-2.8	0.68	0.83	2.02	0.12		0.04	10.77	0.11
IPW-4	0-0.5	0.59	0.81	1.80	0.15		-	-	
IPW-4	0.8-1.3	1.34	1.64	3.34	0.09		-	-	
IPW-2	0-0.5	2.17	3.02	5.06	0.11		-	-	
IPW-2- DUP	0-0.5	2.30	3.20	5.29	0.12		-	-	

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
IPW-2	2.2-3.0	17.92	24.81	44.76	0.68		-	-	
IPW-2- DUP	2.2-3.0	18.67	25.67	46.72	0.85		-	-	
IPW-3	0-0.5	5.34	7.29	11.55	0.10		9.04	9.40	9.17
IPW-3	1.7-2.2	2.03	2.63	4.28	0.10		0.56	12.32	0.93
IPW-5	0-0.5	3.09	4.23	6.45	0.15		4.93	5.68	5.24
IPW-5	0.8-1.3	1.96	2.86	4.80	0.12		6.33	6.33	6.33
IPW-1	0-0.5	2.54	3.52	5.72	0.13		-	-	
IPW-1	2.2-2.8	1.13	1.22	2.16	0.20		-	-	
Kingsbury Bay									
KB-1	0-0.5	1.81	2.47	4.20	0.06		9.57	9.57	9.57
KB-1- DUP	0-0.5	1.33	1.79	3.23	0.04		8.41	8.41	8.41
KB-1	1.4-2.4	1.63	2.05	11.11	0.20		1.66	2.02	1.76
KB-1- DUP	1.4-2.4	3.54	4.31	50.62	1.26	Toxic	1.94	6.24	2.06
KB-3	0-0.5	1.74	2.39	3.93	0.06		-	-	
KB-3	1.0-1.7	3.53	5.06	8.47	0.16		-	-	
KB-2	0-0.5	2.14	2.90	4.54	0.08		7.78	7.78	7.78
KB-2	1.5-2.3	6.53	8.39	30.52	0.41		23.81	23.81	23.81
KB-5	0-0.5	4.23	5.95	9.27	0.06		13.25	13.25	13.25
KB-5	2.0-2.6	0.54	0.69	1.79	0.09		0.19	9.48	0.35
KB-4	0-0.5	9.95	13.71	21.50	2.74	Toxic	-	-	
KB-4	1.0-1.7	0.55	0.70	1.80	0.05		-	-	
Minnesota Channel									
MC-2	0-0.5	0.67	0.83	0.89	0.09		0.11	0.11	0.11
MC-2	1.0-1.7	0.76	0.94	1.00	0.12		0.03	0.03	0.03
MC-3	0-0.5	2.58	3.78	6.64	0.23		-	-	
MC-3	1.7-2.7	0.63	0.78	0.82	0.33		-	-	
MC-1	0-0.5	3.73	6.89	6.90	0.22		-	-	
MC-1	3.0-4.0	0.70	0.87	0.92	0.10		-	-	
Mud Lake									
ML-1	0-0.5	0.78	1.22	2.42	0.01		-	-	
ML-1	1.0-2.0	0.86	1.36	2.68	0.01		-	-	
ML-6	0-0.5	0.87	1.21	2.13	0.02		-	-	
ML-6- DUP	0-0.5	0.84	1.17	2.09	0.02		-	-	
ML-6	1.4-2.4	0.59	0.83	1.55	0.02		-	-	
ML-6- DUP	1.4-2.4	0.59	0.83	1.51	0.02		-	-	
ML-3	0-0.5	0.65	0.96	1.84	0.02		-	-	
ML-3	0.5-1.0	0.52	0.76	1.52	0.02		-	-	
ML-2	0-0.5	0.78	1.07	2.19	0.02		11.57	15.97	15.01
ML-2	1.8-2.8	0.80	1.18	1.95	0.02		8.33	11.33	9.88
ML-14	0-0.5	1.41	1.98	3.55	0.02		-	-	
ML-15	0-0.5	1.57	2.25	4.53	0.03		30.01	30.86	36.50
ML-15	1.0-2.0	1.30	2.03	3.87	0.03		37.07	37.82	40.83

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
ML-16	0-0.5	1.20	1.68	3.20	0.04		26.30	26.30	26.30
ML-16	1.5-2.5	1.22	1.76	2.84	0.02		0.24	10.23	0.63
ML-10	0-0.5	2.07	3.27	5.09	0.03		56.18	56.18	56.18
ML-10	0.5-1.5	2.77	4.67	6.34	0.04		57.35	57.35	57.35
ML-12	0-0.5	1.68	2.44	3.69	0.02		-	-	
ML-11	0-0.5	2.70	4.70	6.41	0.03		-	-	
ML-13	0-0.5	1.34	1.95	3.95	0.03		34.20	34.20	34.20
ML-8	0-0.5	0.69	1.07	2.32	0.08		-	-	
ML-8	2.0-3.0	0.71	1.03	1.87	0.08		-	-	
ML-7	0-0.5	0.66	0.94	1.74	0.04		21.93	21.93	21.93
ML-7	1.0-2.0	0.58	0.78	1.18	0.37		0.02	7.96	0.10
ML-4	0-0.5	0.85	1.13	2.01	0.05		20.98	20.98	20.98
ML-4	3.0-4.0	1.03	1.37	2.17	0.07		0.06	6.77	0.21
ML-5	0-0.5	0.62	1.09	2.43	0.07		-	-	
ML-5	3.0-4.0	0.51	0.73	1.32	0.18		-	-	
ML-9	0-0.5	0.53	0.69	1.61	2.26	Toxic	6.79	6.79	6.79
ML-9	1.7-2.5	0.67	0.95	1.52	0.07		0.27	9.03	0.51
Munger Landing									
MLA-6	0-0.5	12.04	18.04	18.04	0.24		44.15	44.15	44.15
MLA-6- DUP	0-0.5	12.38	18.58	18.58	0.24		36.43	36.43	36.43
MLA-6	3.0-4.0	0.76	0.98	0.98	0.07		0.03	7.92	0.12
MLA-6- DUP	3.0-4.0	0.75	0.97	0.97	0.13		0.04	8.54	0.12
MLA-2	0-0.5	1.30	1.94	1.94	0.11		-	-	
MLA-2	0.8-1.5	22.31	33.01	33.01	0.79		-	-	
MLA-3	0-0.5	14.38	21.68	21.68	0.47		57.56	57.56	57.56
MLA-3	1.0-1.8	1.31	1.67	1.67	0.03		0.06	6.92	0.23
MLA-5	0-0.5	5.08	7.63	7.63	0.37		6.95	8.23	8.93
MLA-5	1.8-2.8	0.64	0.83	0.83	0.63		0.17	7.50	0.41
MLA-1	0-0.5	12.57	18.13	18.13	0.16		-	-	
MLA-1	0.5-1.0	9.52	13.51	13.51	0.10		-	-	
MLA-4	0-0.5	9.63	14.19	14.19	0.37		-	-	
MLA-4	1.0-2.0	44.36	72.96	72.96	1.48	Toxic	-	-	
New Duluth Stretch									
NDS-3	0-0.5	0.15	0.28	0.90	0.09		-	-	
NDS-3	1.7-2.3	0.28	0.37	0.98	0.07		-	-	
NDS-15	0-0.5	0.17	0.31	0.94	0.13		-	-	
NDS-15	2.0-3.0	0.40	0.51	1.08	0.17		-	-	
NDS-9	0-0.5	0.28	0.40	0.92	0.17		0.31	8.32	0.86
NDS-9	1.0-2.0	0.28	0.43	0.91	0.15		2.59	2.59	2.59
NDS-8	0-0.5	0.37	0.60	1.45	0.04		-	-	
NDS-8	0.5-1.0	0.48	0.69	1.39	0.07		-	-	
NDS-11	0-0.5	0.34	0.50	1.03	0.15		-	-	

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
NDS-11	1.0-2.0	0.13	0.24	0.75	0.13		-	-	
NDS-7	0-0.5	0.17	0.29	0.80	0.07		-	-	
NDS-7	0.5-1.0	0.19	0.32	0.79	0.07		-	-	
NDS-5	0-0.5	0.38	0.55	1.02	0.16		0.10	7.56	0.31
NDS-5	0.5-1.0	0.43	0.60	1.09	0.11		0.00	8.87	0.01
NDS-4	0-0.5	0.34	0.48	0.92	0.92		-	-	
NDS-4	0.5-1.0	0.35	0.51	1.02	0.40		-	-	
NDS-14	0-0.5	0.54	0.73	1.52	0.07		6.08	6.08	6.08
NDS-14	1.7-2.5	0.49	0.67	1.20	0.09		0.03	8.98	0.14
NDS-13	0-0.5	0.57	0.71	1.36	0.05		7.70	7.70	7.70
NDS-13	0.8-1.7	0.36	0.54	1.11	0.07		44.21	46.19	49.15
NDS-1	0-0.5	0.33	0.48	0.91	1.20	Toxic	0.03	8.23	0.18
NDS-1	0.5-1.0	0.30	0.45	0.91	1.21	Toxic	0.01	7.96	0.08
NDS-6	0-0.5	0.16	0.29	0.86	1.61	Toxic	0.33	9.78	1.15
NDS-6	0.5-1.2	0.30	0.45	0.92	0.10		0.01	8.21	0.11
NDS-10	0-0.5	0.03	0.05	0.10	0.01		-	-	
NDS-10	0.5-1.0	0.03	0.05	0.10	0.01		-	-	
NDS-12	0-0.5	0.42	0.50	0.97	0.10		-	-	
NDS-12	1.0-1.7	0.37	0.54	1.04	0.14		-	-	
NDS-2	0-0.5	0.18	0.28	0.72	0.41		0.01	7.83	0.06
NDS-2	0.8-1.7	0.15	0.26	0.73	0.32		0.03	8.35	0.22
North Bay									
NB-1	0-0.5	0.62	2.03	2.03	0.05		-	-	
NB-1	0.5-1.0	0.90	2.62	2.62	0.04		-	-	
NB-2	0-0.5	0.68	2.70	2.70	0.06		20.72	20.72	20.72
NB-2	1.0-2.0	0.67	2.31	2.31	0.05		25.34	25.34	25.34
NB-4	0-0.5	0.50	2.80	2.80	0.04		-	-	
NB-4	0.5-1.0	0.51	2.37	2.37	0.01		-	-	
NB-3	0-0.5	0.36	1.26	1.26	0.08		10.42	10.82	14.74
NB-3	1.7-2.5	0.24	1.11	1.11	0.05		79.09	79.09	79.09
NB-5	0-0.5	0.52	1.74	1.74	0.07		-	-	
NB-5	3.0-4.0	0.00	0.00	0.00	0.00		-	-	
NB-6	0-0.5	0.27	1.05	1.05	0.08		5.89	5.89	5.89
NB-6	0.5-1.0	0.41	1.22	1.22	0.08		0.17	9.47	0.76
Perch Lake									
PL-3	0-0.5	0.60	0.79	0.79	0.01		0.26	0.26	0.258
PL-3	0.5-1.0	0.66	0.79	0.79	0.01		20.29	20.29	20.29
PL-2	0-0.5	1.86	2.48	2.48	0.02		-	-	
PL-2- DUP	0-0.5	0.81	1.17	1.17	0.01		-	-	
PL-2	1.0-2.0	0.79	1.26	1.26	0.01		-	-	
PL-2- DUP	1.0-2.0	0.77	1.22	1.22	0.01		-	-	
PL-1	0-0.5	0.90	1.43	1.43	0.01		-	-	

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
PL-1	1.0-2.0	1.41	1.92	1.92	0.01		-	-	
Rask Bay									
RB-4	0-0.5	0.17	0.14	0.66	0.06		8.75	8.75	8.75
RB-4	0.5-1.2	0.18	0.16	0.68	0.05		13.22	13.58	15.56
RB-1	0-0.5	0.41	0.43	1.28	0.06		4.21	4.21	4.21
RB-1	3.0-4.0	0.70	0.80	2.04	0.06		0.04	7.03	0.15
RB-7	0-0.5	0.29	0.35	1.16	0.06		7.81	7.81	7.81
RB-7	3.0-4.0	0.83	0.91	1.88	0.08		0.04	11.47	0.12
RB-2	0-0.5	0.32	0.36	1.86	0.06		-	-	
RB-2	1.0-2.0	0.68	0.77	1.69	0.05		-	-	
RB-5	0-0.5	0.30	0.27	1.17	0.06		-	-	
RB-5	1.3-2.0	0.76	0.86	1.96	0.04		-	-	
RB-10	0-0.5	0.31	0.35	1.50	0.05		-	-	
RB-10	1.3-2.0	0.49	0.56	1.26	0.11		-	-	
RB-3	0-0.5	0.41	0.45	1.99	0.06		19.92	19.92	19.92
RB-3	3.0-4.0	0.68	0.78	1.86	0.06		0.05	7.19	0.06
RB-8	0-0.5	0.16	0.18	0.97	0.03		7.56	7.56	7.56
RB-8	1.0-1.7	0.38	0.44	1.12	0.08		5.16	5.16	5.16
RB-11	0-0.5	0.27	0.31	1.22	0.03		21.69	21.69	21.69
RB-11	0.5-1.0	0.30	0.38	1.29	0.03		5.46	5.46	5.46
RB-6	3.0-4.0	0.07	0.08	0.17	0.05		-	-	
RB-6	0-0.5	0.04	0.04	0.19	0.01		-	-	
RB-9	0-0.5	0.04	0.03	0.16	0.00		-	-	
RB-9	1.0-2.0	0.05	0.05	0.13	0.00		-	-	
Riverside Marina									
RSM-1	0-0.5	3.58	4.55	6.36	0.16		8.13	8.54	10.87
RSM-1	1.2-1.8	0.79	0.93	4.35	0.34		8.07	8.07	8.07
RSM-2	0-0.5	2.22	2.90	4.81	0.06		-	-	
RSM-2	1.7-2.5	18.70	25.54	40.33	0.46		-	-	
RSM-3	0-0.5	5.96	7.40	13.09	0.36		-	-	
RSM-3	0.5-1.0	0.66	0.80	1.86	0.07		-	-	
RSM-4	0-0.5	2.46	3.45	5.74	0.05		8.10	8.43	10.55
RSM-4	1.6-2.2	0.90	1.17	2.92	0.19		15.36	15.36	15.36
RSM-5	0-0.5	0.44	0.49	1.26	0.96		0.47	5.79	0.87
RSM-5	0.5-1.0	0.78	0.98	1.75	0.21		3.21	3.21	3.21
Spirit Lake									
SL-39	0-0.5	3.73	4.71	6.90	0.33		-	-	
SL-39- DUP	0-0.5	1.56	2.05	3.64	0.16		-	-	
SL-39	1.0-2.0	0.82	0.97	1.95	0.15		-	-	
SL-39- DUP	1.0-2.0	0.87	1.07	2.07	0.14		-	-	
SL-32	0-0.7	1.07	1.27	2.79	0.12		3.57	3.86	4.48
SL-32- DUP	0-0.7	0.80	0.93	2.45	0.10		1.61	7.32	3.01

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
SL-32	3.0-4.0	1.04	1.39	3.88	0.14		21.80	22.27	31.11
SL-32- DUP	3.0-4.0	0.96	1.20	3.43	0.13		28.39	28.39	28.39
SL-19	0-0.5	1.01	1.21	2.73	0.13		-	-	
SL-19	3.0-4.0	4.08	5.78	8.55	0.28		-	-	
SL-38	0-0.5	0.80	0.95	1.75	0.49		0.01	9.18	0.06
SL-38	1.6-2.4	0.77	0.94	1.82	0.55		0.000	8.10	0.01
SL-52	0-0.5	8.88	12.60	16.14	0.52		7.10	7.41	9.25
SL-52	1.7-2.7	5.07	7.33	10.77	0.39		1.66	10.15	2.95
SL-48	0-0.7	10.35	16.52	17.90	0.64		14.21	14.21	14.21
SL-48- DUP	0-0.7	9.75	15.32	16.69	0.63		60.42	60.42	60.42
SL-48	1.5-2.5	0.69	0.86	1.74	0.18		0.03	9.02	0.18
SL-48- DUP	1.5-2.5	0.68	0.84	1.72	0.19		0.02	9.44	0.15
SL-49	0-0.5	1.78	2.52	4.58	0.18		-	-	
SL-49	0.5-1.0	8.86	13.72	15.08	0.42		-	-	
SL-50	0-0.5	0.67	0.83	1.71	0.19		0.02	10.19	0.14
SL-50	0.8-1.3	0.70	0.86	1.74	0.18		0.25	8.95	0.45
SL-51	0-0.5	0.88	1.04	2.64	0.10		-	-	
SL-51	3.0-4.0	1.24	1.61	2.89	0.10		-	-	
SL-44	0-0.5	1.02	1.26	2.54	0.09		0.01	12.11	0.05
SL-44	0.9-1.7	0.75	0.93	1.89	0.17		0.06	10.18	0.27
SL-46	0-0.5	0.63	0.78	1.55	2.08	Toxic	0.04	7.69	0.18
SL-46	0.7-1.5	0.65	0.80	1.60	1.53	Toxic	0.01	8.20	0.03
SL-53	0-0.5	0.73	0.91	1.87	0.18		-	-	
SL-53- DUP	0-0.5	0.70	0.88	1.84	0.21		-	-	
SL-53	1.0-1.8	0.70	0.86	1.74	0.25		-	-	
SL-53- DUP	1.0-1.8	0.64	0.79	1.59	0.21		-	-	
SL-54	0-0.5	8.71	11.54	15.80	0.44		107.37	107.37	107.37
SL-54	1.0-2.0	7.51	10.02	15.52	0.38		19.31	19.31	19.31
SL-40	0-0.7	1.14	1.44	2.79	0.15		3.43	3.69	4.78
SL-40- DUP	0-0.7	1.03	1.30	2.72	0.14		6.05	6.05	6.05
SL-40	3.0-4.0	16.85	23.72	33.85	1.15	Toxic	109.48	109.48	109.48
SL-40- DUP	3.0-4.0	15.47	22.14	31.95	1.24	Toxic	32.06	32.06	32.06
SL-33	0-0.5	1.04	1.25	2.62	0.14		-	-	
SL-33	3.0-4.0	1.37	1.55	2.91	0.13		-	-	
SL-21	0-0.5	0.82	0.93	2.10	0.14		-	-	
SL-21	3.0-4.0	4.49	5.95	10.79	0.64		-	-	
SL-15	0-0.5	1.11	1.22	2.50	0.15		-	-	
SL-15	2.2-3.2	0.92	1.07	2.24	0.09		-	-	
SL-41	0-0.5	0.82	0.96	2.20	0.14		-	-	
SL-41- DUP	0-0.5	0.98	1.14	2.55	0.16		-	-	
SL-41	3.0-4.0	1.19	1.39	2.43	0.14		-	-	
SL-41- DUP	3.0-4.0	1.24	1.44	2.48	0.15		-	-	

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
SL-42	0-0.5	0.86	1.01	2.14	0.14		2.44	6.26	3.85
SL-42	3.0-4.0	1.01	1.26	2.62	0.08		0.29	5.18	0.48
SL-43	0-0.5	5.49	8.54	13.69	0.48		-	-	
SL-43	0.5-1.0	22.67	33.94	48.65	1.35	Toxic	-	-	
SL-47	0-0.5	0.62	0.76	1.56	1.90	Toxic	-	-	
SL-47	1.0-2.0	0.61	0.76	1.55	2.15	Toxic	-	-	
SL-37	0-0.5	1.49	1.90	3.76	0.14		-	-	
SL-37	1.0-2.0	9.78	14.96	22.54	0.55		-	-	
SL-45	0-0.5	0.75	0.92	1.80	0.37		-	-	
SL-45	1.0-1.5	0.73	0.89	1.77	0.42		-	-	
SL-27	0-0.5	1.02	1.15	2.75	0.13		-	-	
SL-27- DUP	0-0.5	0.99	1.12	2.59	0.13		-	-	
SL-27	3.0-4.0	1.61	1.81	3.33	0.09		-	-	
SL-27- DUP	3.0-4.0	1.24	1.52	3.04	0.09		-	-	
SL-34	0-0.5	1.02	1.16	2.68	0.13		3.57	8.78	5.40
SL-34	2.0-2.8	0.68	0.92	2.20	0.10		0.03	12.57	0.11
SL-26	0-0.5	1.06	1.31	2.75	0.14		3.14	3.98	4.18
SL-26	3.0-4.0	10.13	14.39	15.54	0.56		5.49	5.96	5.92
SL-20	0-0.5	2.76	3.90	5.04	0.26		71.16	71.16	71.16
SL-20	1.0-1.7	0.56	0.70	1.45	0.59		0.26	7.41	0.64
SL-35	0-0.5	0.82	1.00	2.28	0.13		-	-	
SL-35	3.0-4.0	10.12	14.69	15.94	0.47		-	-	
SL-36	0-0.5	0.73	0.85	2.17	0.12		3.45	5.07	4.26
SL-36	2.0-3.0	10.31	14.37	15.65	0.46		8.93	8.93	8.93
SL-29	0-0.5	0.85	1.06	2.58	0.13		-	-	
SL-29- DUP	0-0.5	0.87	1.04	2.39	0.12		-	-	
SL-29	3.0-4.0	35.10	49.17	70.59	1.80	Toxic	-	-	
SL-29- DUP	3.0-4.0	26.20	36.17	51.18	1.38	Toxic	-	-	
SL-28	0-0.5	0.74	0.88	2.22	0.13		2.46	4.91	3.16
SL-28	3.0-4.0	1.26	1.48	3.08	0.07		0.07	7.93	0.26
SL-14	0-0.5	0.67	0.78	1.81	0.18		0.87	10.59	1.91
SL-14	3.0-4.0	1.21	1.54	3.30	0.16		10.08	10.08	10.08
SL-22	0-0.5	0.84	1.01	2.45	0.13		2.88	6.67	4.20
SL-22	3.0-4.0	23.14	32.43	46.03	1.23	Toxic	2.34	13.51	4.65
SL-9	0-0.5	0.55	0.64	1.65	0.12		-	-	
SL-9	3.0-4.0	0.74	0.86	2.10	0.11		-	-	
SL-5	0-0.5	0.50	0.62	1.50	0.43		-	-	
SL-5	0.7-1.2	0.39	0.46	1.23	0.28		-	-	
SL-2	0-0.5	0.72	0.88	1.76	0.25		0.18	9.64	1.22
SL-2	0.8-1.6	0.80	0.96	2.25	0.22		6.70	9.29	11.28
SL-1	0-0.5	0.61	0.76	1.56	0.77		-	-	
SL-1	1.0-2.0	0.42	0.53	1.33	0.18		-	-	

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
SL-3	0-0.5	0.50	0.63	1.46	0.25		-	-	
SL-3- DUP	0-0.5	0.45	0.57	1.45	0.26		-	-	
SL-3	1.0-2.0	0.73	0.88	1.68	0.31		-	-	
SL-3- DUP	1.0-2.0	0.69	0.84	1.64	0.37		-	-	
SL-4	0-0.5	0.78	0.96	1.92	0.26		1.57	10.18	5.15
SL-4	1.0-2.0	0.60	0.66	1.58	0.13		1.52	9.77	3.72
SL-11	0-0.5	0.50	0.63	1.56	0.16		-	-	
SL-11	1.0-2.0	0.72	0.86	2.16	0.09		-	-	
SL-6	0-0.5	0.50	0.63	1.59	0.22		0.31	9.58	1.33
SL-6	2.5-3.5	0.50	0.63	1.60	0.10		33.29	33.65	41.38
SL-10	0-0.7	0.63	0.77	1.81	0.15		0.54	10.34	1.59
SL-10- DUP	0-0.7	0.53	0.67	1.71	0.14		0.49	10.72	1.51
SL-10	1.8-2.5	0.88	1.06	3.52	0.18		6.76	9.56	12.72
SL-10- DUP	1.8-2.5	0.73	0.85	2.45	0.13		3.98	11.24	7.45
SL-30	0-0.5	1.15	1.38	3.03	0.11		4.19	6.58	6.25
SL-30	1.3-2.3	1.83	2.57	6.19	0.11		88.59	88.59	88.59
SL-23	0-0.6	1.20	1.43	3.16	0.03		-	-	
SL-23- DUP	0-0.6	1.41	1.76	3.62	0.03		-	-	
SL-31	0-0.5	1.19	1.35	3.23	0.03		-	-	
SL-31	0.8-1.5	1.30	1.59	3.24	0.03		-	-	
SL-24	0-0.5	1.50	1.73	3.89	0.02		87.77	87.77	87.77
SL-25	0-0.5	0.79	0.96	1.74	0.17		-	-	
SL-25	0.5-1.0	0.68	0.84	1.72	0.10		-	-	
SL-16	0-0.5	1.88	2.70	3.98	0.11		2.41	2.41	2.41
SL-16	0.5-1.0	1.87	2.97	4.18	0.07		74.28	74.28	74.28
SL-17	0-0.5	0.83	0.95	2.18	1.56	Toxic	-	-	
SL-17	0.7-1.3	4.19	5.77	9.74	0.09		-	-	
SL-18	0-0.5	0.55	0.61	1.49	0.21		0.49	5.77	0.74
SL-18	1.0-1.7	0.74	0.91	1.79	0.11		0.05	8.77	0.17
SL-12	0-0.5	3.10	4.56	6.61	0.03		70.71	70.71	70.71
SL-7	0-0.5	1.66	2.26	3.93	0.06		-	-	
SL-13	0-0.5	0.47	0.60	1.40	0.51		-	-	
SL-13	0.5-1.0	0.81	0.96	1.74	0.21		-	-	
SL-8	0-0.5	0.85	1.04	2.08	0.10		1.95	2.38	2.40
Tallas Island Flats									
TIF-3	0-0.7	0.40	0.56	1.07	0.07		10.24	10.24	10.24
TIF-3- DUP	0-0.7	0.46	0.64	1.05	0.07		2.05	8.94	3.47
TIF-3	1.4-1.9	0.61	0.81	1.31	0.07		0.84	5.58	0.90
TIF-3- DUP	1.4-1.9	0.65	0.85	1.38	0.07		0.07	10.19	0.28
TIF-2	0-0.5	0.41	0.56	0.96	0.70		-	-	
TIF-2	0.5-1.0	0.50	0.65	1.05	1.10	Toxic	-	-	
TIF-4	0-0.5	1.19	1.58	2.10	0.09		-	-	

Sample Location	Sample Interval (ft)	PAHs Group Totals			ESB Toxic Units, PAHs[1,5]		Total TCDD TEQ Concentration (pg/g)		
		PAHs -13 (mg/kg)[1,2]	PAHs -16 (mg/kg)[1,3]	PAHs- 34 (mg/kg)[1,4]	Sum of ESB Toxic Units[6]	Toxicity to Benthic Organisms[7]	Calculated (ND=0)[8]	Calculated (ND=RL/2)[1,9]	Kaplan-Meier Method[10]
TIF-4	1.0-2.0	0.35	0.44	0.92	0.06		-	-	
TIF-5	0-0.5	0.30	0.38	0.77	0.54		0.27	8.25	1.09
TIF-5	0.5-1.2	0.52	0.62	0.94	0.41		2.37	7.93	4.40
TIF-1	0-0.5	0.45	0.60	1.00	1.44	Toxic	-	-	
TIF-1	0.5-1.0	0.50	0.65	1.05	0.48		-	-	

Notes:

1. Concentration is based on dry weight concentrations of contaminants and the nondetect data are handled using the following assumptions:
   - Zero for the PAHs that are all non-detects within a study area
   - 1/2 of the reporting limit for the PAHs that are detected in more than one sample within a study area
2. PAHs-13 is the Priority PAHs per MCPA (2007)
3. PAHs-16 is the EPA Priority Pollutant PAHs
4. PAHs -34 is the Total PAHs per USEPA (2003)

5. Equilibrium Partitioning Sediment Benchmarks (ESBs) Toxic Units are are calculated using the procedure described in (USEPA 2003)
6. Uncertainity factor of 1 is used because most of the 34 PAHs are analyzed.
7. Toxicity to aquatic life is assessed as below (USEPA 2003)
   - ΣESB Toxic Units < 1 $\Rightarrow$ sediment will not be toxic to benthic organisms
   - ΣESB Toxic Units ≥ 1 $\Rightarrow$ sediment may be toxic to benthic organisms and further testing or more information is necessary to determine appropriate sediment management options.
8. Laboratory calculated TEC concentration treating nondetects as zero
9. Calculated TEC concentration treating nondetects as described in "Note 1"
10. Calculated TEQ concentration using kaplan-Meier Method to handle nondetects Helsel (2009).

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																			
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)*[2]	*EPA PAH 16*[3]	*Total PAH 34*[4]
Chambers Grove Reach																																					
CGR-1	0-0.5	ND	ND	ND	ND	ND	ND	6	10	ND	ND	ND	16	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	ND	ND	ND	ND	ND	*32*	*39*	*179*
CGR-1	1.2-2.2	ND	ND	ND	ND	ND	ND	25	30	45	41	ND	37	41	29	17	58	ND	ND	ND	ND	ND	ND	ND	ND	81	38	ND	65	41	120	88	29	ND	*219*	*323*	*785*
Cedar Yard Bay																																					
CYB-1	0-0.5	ND	ND	ND	ND	ND	ND	16	28	25	20	ND	30	32	30	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	80	ND	ND	ND	ND	ND	*151*	*199*	*279*
CYB-1	0.5-1.0	ND	ND	ND	ND	ND	ND	11	120	16	120	ND	22	120	20	ND	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	250	ND	ND	ND	ND	ND	*409*	*549*	*799*
CYB-2	0-0.5	ND	ND	ND	ND	ND	ND	51	76	82	79	ND	130	130	94	54	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	250	71	ND	ND	ND	ND	*548*	*743*	*1064*
CYB-2	0.8-1.3	ND	ND	ND	ND	ND	ND	65	65	29	65	ND	65	65	65	ND	65	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	65	ND	ND	ND	ND	ND	*354*	*484*	*549*
Steelton Bay																																					
SB-6	0-0.5	ND	85	ND	ND	ND	ND	22	28	35	28	ND	45	39	38	85	31	ND	ND	85	ND	85	ND	ND	ND	85	39	46	78	56	37	85	85	ND	*282*	*436*	*1117*
SB-6	1.0-2.0	ND	75	ND	ND	ND	ND	75	11	75	75	ND	16	75	10	75	75	ND	ND	75	ND	75	ND	ND	ND	75	75	75	75	75	75	75	75	ND	*402*	*562*	*1312*
SB-7	0-0.5	ND	60	ND	ND	ND	ND	60	9	60	60	ND	9	60	8	60	60	ND	ND	60	ND	60	ND	ND	ND	60	60	60	60	60	60	60	60	ND	*318*	*447*	*1047*
SB-7- DUP	0-0.5	ND	60	ND	ND	ND	ND	5	9	60	60	ND	13	60	8	60	60	ND	ND	60	ND	60	ND	ND	ND	60	60	60	60	60	60	60	60	ND	*268*	*396*	*996*
SB-7	1.7-2.5	ND	6	ND	ND	ND	ND	21	29	45	35	ND	38	45	38	60	36	ND	ND	60	ND	60	ND	ND	ND	30	67	110	93	71	94	100	58	ND	*219*	*353*	*1096*
SB-7- DUP	1.7-2.5	ND	9	ND	ND	ND	ND	29	38	66	49	ND	53	64	49	19	51	ND	ND	60	ND	60	ND	ND	ND	39	110	160	120	100	130	130	100	ND	*308*	*427*	*1436*
SB-4	0-0.5	ND	70	ND	ND	ND	ND	70	70	70	70	ND	70	70	70	70	70	ND	ND	70	ND	70	ND	ND	ND	70	70	70	70	70	70	70	70	ND	*490*	*700*	*1400*
SB-4	0.5-1.0	ND	60	ND	ND	ND	ND	60	60	43	60	ND	60	60	60	60	60	ND	ND	60	ND	60	ND	ND	ND	60	60	60	60	60	60	60	60	ND	*403*	*583*	*1183*
SB-8	0-0.5	ND	70	ND	ND	ND	ND	18	28	29	22	ND	41	39	33	20	13	ND	ND	70	ND	70	ND	ND	ND	70	70	70	70	70	70	70	70	ND	*247*	*313*	*1013*
SB-8	0.8-1.3	ND	55	ND	ND	ND	ND	11	20	29	24	ND	25	29	23	55	20	ND	ND	55	ND	55	ND	ND	ND	55	55	55	55	55	55	55	55	ND	*193*	*291*	*841*
SB-2	0-0.5	ND	55	ND	ND	ND	ND	55	55	55	55	ND	55	55	55	55	55	ND	ND	55	ND	55	ND	ND	ND	55	55	55	55	55	55	55	55	ND	*385*	*550*	*1100*
SB-2	0.6-1.2	ND	50	ND	ND	ND	ND	50	50	30	50	ND	50	50	50	50	50	ND	ND	44	ND	190	ND	ND	ND	50	50	50	50	50	50	50	50	ND	*330*	*480*	*1114*
SB-1	0-0.5	ND	55	ND	ND	ND	ND	55	15	15	26	ND	42	41	33	55	55	ND	ND	55	ND	55	ND	ND	ND	55	55	55	55	55	55	55	55	ND	*249*	*392*	*942*
SB-5	0-0.5	ND	170	ND	ND	ND	ND	60	73	110	83	ND	140	120	130	57	65	ND	ND	170	ND	170	ND	ND	ND	170	170	170	170	170	170	170	170	ND	*756*	*1008*	*2708*
SB-5- DUP	0-0.5	ND	165	ND	ND	ND	ND	34	49	68	50	ND	83	72	79	165	37	ND	ND	165	ND	165	ND	ND	ND	165	165	165	165	165	165	165	165	ND	*521*	*802*	*2452*
SB-3	0-0.5	ND	55	ND	ND	ND	ND	55	55	460	55	ND	55	55	55	55	55	ND	ND	48	ND	200	ND	ND	ND	55	55	55	55	55	55	55	55	ND	*790*	*955*	*1643*
SB-3	0.5-1.0	ND	60	ND	ND	ND	ND	60	60	470	60	ND	60	60	60	60	60	ND	ND	51	ND	220	ND	ND	ND	60	60	60	60	60	60	60	60	ND	*830*	*1010*	*1761*
Fond Du Lac Stretch																																					
FDLS-2	0-0.5	ND	ND	ND	ND	ND	ND	55	9	55	55	ND	13	55	55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	48	ND	ND	ND	ND	ND	*242*	*297*	*345*
FDLS-2	0.5-1.1	ND	ND	ND	ND	ND	ND	11	11	55	55	ND	26	20	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	68	ND	ND	ND	ND	ND	*178*	*186*	*254*
FDLS-4	0-0.5	ND	ND	ND	ND	ND	ND	12	13	8	9	ND	18	17	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60	ND	ND	ND	ND	ND	*77*	*89*	*149*
FDLS-4	1.6-2.6	ND	ND	ND	ND	ND	ND	55	55	7	16	ND	9	55	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	55	ND	ND	ND	ND	ND	*197*	*206*	*261*
FDLS-1	0-0.5	ND	ND	ND	ND	ND	ND	60	60	82	60	ND	60	60	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60	ND	ND	ND	ND	ND	*382*	*442*	*502*
FDLS-1	0.5-1.3	ND	ND	ND	ND	ND	ND	60	60	58	60	ND	60	60	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60	ND	ND	ND	ND	ND	*358*	*418*	*478*
FDLS-3	0-0.5	ND	ND	11	ND	ND	ND	12	17	16	16	ND	25	26	18	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	65	ND	27	ND	ND	ND	*123*	*151*	*243*
FDLS-3	1.0-2.0	ND	ND	ND	ND	ND	ND	50	9	6	50	ND	6	50	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	ND	ND	ND	ND	ND	*172*	*222*	*272*
Indian Point Waterfront																																					
IPW-6	0-0.5	26	71	92	43	51	110	210	380	450	390	115	640	590	630	230	220	200	53	90	69	115	100	115	200	280	260	210	240	460	370	320	230	160	*3168*	*4397*	*7720*
IPW-6	2-2.8	70	70	70	70	70	70	8	9	70	70	70	15	16	11	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	*678*	*829*	*2019*
IPW-4	0-0.5	55	11	19	11	10	33	35	55	65	58	55	99	88	97	34	36	55	55	55	55	55	55	55	33	48	61	65	89	92	72	86	55	55	*594*	*806*	*1802*
IPW-4	0.8-1.3	100	100	100	100	100	100	100	100	140	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	*1340*	*1640*	*3340*
IPW-2	0-0.5	13	40	77	34	22	71	150	260	290	260	100	450	400	460	160	130	120	100	100	100	100	100	100	67	100	120	96	160	290	220	190	120	55	*2167*	*3015*	*5055*
IPW-2- DUP	0-0.5	12	41	87	33	20	64	150	280	310	280	100	490	430	500	160	130	130	100	100	100	100	100	100	100	100	130	96	150	300	230	200	120	45	*2297*	*3197*	*5288*
IPW-2	2.2-3.0	120	290	630	250	110	200	1400	2200	2300	2200	320	4400	3500	2900	1400	1300	1400	415	280	530	620	550	350	930	1500	2200	1700	1400	3800	2200	1800	1100	460	*17920*	*24810*	*44755*
IPW-2- DUP	2.2-3.0	120	280	640	260	100	210	1400	2400	2400	2200	360	4600	3700	3000	1500	1300	1300	405	290	420	290	580	340	900	1700	2400	1900	1700	4000	2400	1900	1200	520	*18670*	*25670*	*46715*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																		
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
IPW-5	0-0.5	19	30	78	41	22	22	290	340	350	380	80	730	710	600	230	170	160	80	90	80	80	55	80	53	80	160	130	230	340	270	220	150	97	*3092*	*4230*	*6447*
IPW-5	0.8-1.3	9	30	50	23	14	25	120	240	230	280	85	440	410	450	190	140	140	85	40	85	85	39	85	46	85	120	110	190	270	230	200	170	81	*1956*	*2862*	*4797*
IPW-1	0-0.5	14	41	78	33	22	49	170	300	340	330	100	560	500	480	220	160	140	100	47	100	100	100	100	50	100	150	120	160	330	270	230	140	89	*2537*	*3515*	*5723*
IPW-1	2.2-2.8	55	55	55	55	55	55	5	12	640	55	55	14	15	19	21	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*1126*	*1221*	*2156*
Kingsbury Bay																																					
KB-1	0-0.5	16	26	47	26	29	25	160	180	210	210	80	360	440	340	160	100	93	80	73	63	35	64	80	73	140	160	120	120	210	150	170	80	80	*1809*	*2473*	*4200*
KB-1- DUP	0-0.5	17	19	36	22	19	ND	120	130	150	160	85	270	300	260	86	72	61	85	43	69	62	85	85	62	110	110	86	79	160	130	85	85	85	*1328*	*1788*	*3228*
KB-1	1.4-2.4	36	42	50	60	38	30	200	150	140	150	60	320	350	210	120	67	61	57	420	1800	2000	440	650	510	390	700	570	430	410	270	260	60	60	*1626*	*2046*	*11111*
KB-1- DUP	1.4-2.4	160	130	83	270	78	ND	620	230	180	310	310	550	620	280	96	160	310	170	2100	11000	11000	3600	3800	2800	1700	3000	2100	1600	1000	570	890	590	310	*3541*	*4309*	*50617*
KB-3	0-0.5	13	27	41	18	20	20	140	180	220	220	90	360	390	340	140	99	88	90	42	90	90	90	86	50	89	110	77	66	200	160	130	68	90	*1739*	*2386*	*3934*
KB-3	1.0-1.7	13	97	120	40	31	40	190	410	550	450	63	710	820	800	330	220	210	33	65	100	120	120	130	180	370	320	280	290	540	410	310	70	34	*3534*	*5063*	*8466*
KB-2	0-0.5	18	27	51	27	42	25	180	210	240	260	75	400	580	390	180	130	110	43	81	49	68	67	75	70	130	150	110	130	200	200	75	75	75	*2135*	*2903*	*4543*
KB-2	1.5-2.3	100	170	190	180	190	180	550	550	590	670	355	1100	1700	1000	420	280	355	190	740	1900	2800	1300	1700	2300	1300	1900	2000	1900	1300	900	1000	355	355	*6525*	*8390*	*30520*
KB-5	0-0.5	28	82	130	58	59	78	300	470	540	530	145	810	1000	920	360	260	240	72	160	82	145	110	145	110	150	280	230	260	470	410	350	145	145	*4230*	*5951*	*9274*
KB-5	2.0-2.6	65	65	65	65	65	65	6	16	12	9	65	22	23	16	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*543*	*689*	*1794*
KB-4	0-0.5	38	280	480	120	57	170	510	1300	1700	1300	190	2000	1800	1900	700	590	630	71	90	89	66	220	240	290	510	850	800	560	1700	1100	650	370	130	*9945*	*13708*	*21501*
KB-4	1.0-1.7	65	65	65	65	65	65	6	15	14	10	65	25	23	18	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*548*	*696*	*1801*
Minnesota Channel																																					
MC-2	0-0.5	55	55	55	55	55	55	55	8	55	55	55	55	55	55	55	55	55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*668*	*833*	*888*
MC-2	1.0-1.7	60	60	60	60	60	60	60	60	44	60	60	60	60	60	60	60	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*764*	*944*	*1004*
MC-3	0-0.5	10	43	82	32	15	28	97	360	410	320	44	580	560	610	280	150	170	ND	33	ND	ND	56	480	140	220	220	190	230	480	340	280	180	ND	*2581*	*3776*	*6640*
MC-3	1.7-2.7	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*631*	*776*	*825*
MC-1	0-0.5	9	35	100	39	17	37	120	520	600	560	76	840	780	1200	1300	320	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*3733*	*6886*	*6903*
MC-1	3.0-4.0	55	55	55	55	55	55	55	55	43	55	55	55	55	55	55	55	55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*703*	*868*	*923*
Mud Lake																																					
ML-1	0-0.5	150	ND	150	150	ND	ND	28	51	75	42	ND	57	76	85	150	53	150	ND	150	ND	150	ND	ND	ND	150	ND	150	150	150	150	150	ND	ND	*779*	*1217*	*2417*
ML-1	1.0-2.0	165	ND	165	165	ND	ND	31	54	88	48	ND	68	79	110	165	57	165	ND	165	ND	165	ND	ND	ND	165	ND	165	165	165	165	165	ND	ND	*863*	*1360*	*2680*
ML-6	0-0.5	115	ND	115	115	ND	ND	48	66	92	85	ND	100	130	98	44	83	115	ND	115	ND	115	ND	ND	ND	115	ND	115	115	115	115	115	ND	ND	*866*	*1206*	*2126*
ML-6- DUP	0-0.5	115	ND	115	115	ND	ND	47	64	84	84	ND	90	130	90	46	79	115	ND	115	ND	115	ND	ND	ND	115	ND	115	115	115	115	115	ND	ND	*844*	*1174*	*2094*
ML-6	1.4-2.4	90	ND	90	90	ND	ND	29	45	64	45	ND	61	76	72	41	39	90	ND	90	ND	90	ND	ND	ND	90	ND	90	90	90	90	90	ND	ND	*590*	*832*	*1552*
ML-6- DUP	1.4-2.4	85	ND	85	85	ND	ND	32	49	63	44	ND	69	80	77	35	39	85	ND	85	ND	85	ND	ND	ND	85	ND	85	85	85	85	85	ND	ND	*592*	*828*	*1508*
ML-3	0-0.5	110	ND	110	110	ND	ND	35	46	54	44	ND	66	71	61	28	110	110	ND	110	ND	110	ND	ND	ND	110	ND	110	110	110	110	110	ND	ND	*646*	*955*	*1835*
ML-3	0.5-1.0	95	ND	95	95	ND	ND	30	31	32	29	ND	54	55	34	95	16	95	ND	95	ND	95	ND	ND	ND	95	ND	95	95	95	95	95	ND	ND	*516*	*756*	*1516*
ML-2	0-0.5	140	ND	140	140	ND	ND	33	45	61	54	ND	76	89	78	38	39	140	ND	140	ND	140	ND	ND	ND	140	ND	140	140	140	140	140	ND	ND	*778*	*1073*	*2193*
ML-2	1.8-2.8	95	ND	18	11	12	ND	61	83	120	88	ND	140	170	170	65	81	75	ND	95	ND	95	ND	ND	ND	95	ND	95	95	95	95	95	ND	ND	*798*	*1177*	*1949*
ML-14	0-0.5	210	ND	210	210	ND	ND	87	94	160	96	ND	190	150	200	61	100	210	ND	210	ND	210	ND	ND	ND	210	ND	210	210	98	210	210	ND	ND	*1407*	*1978*	*3546*
ML-15	0-0.5	285	ND	285	285	ND	ND	57	110	170	95	ND	150	130	210	74	110	285	ND	285	ND	285	ND	ND	ND	285	ND	285	285	285	285	285	ND	ND	*1567*	*2246*	*4526*
ML-15	1.0-2.0	230	ND	230	230	ND	ND	21	44	37	230	ND	50	230	42	230	230	230	ND	230	ND	230	ND	ND	ND	230	ND	230	230	230	230	230	ND	ND	*1302*	*2034*	*3874*
ML-16	0-0.5	205	ND	205	205	ND	ND	57	79	110	82	ND	140	120	150	53	70	205	ND	205	ND	205	ND	ND	ND	205	ND	205	205	88	205	205	ND	ND	*1203*	*1681*	*3204*
ML-16	1.5-2.5	135	ND	135	135	ND	ND	135	135	135	135	ND	135	135	135	135	135	135	ND	135	ND	135	ND	ND	ND	135	ND	135	135	135	135	135	ND	ND	*1215*	*1755*	*2835*
ML-10	0-0.5	245	ND	37	245	ND	ND	130	210	430	200	ND	310	260	520	200	260	220	ND	245	ND	245	ND	ND	ND	245	ND	245	245	110	245	245	ND	ND	*2067*	*3267*	*5092*
ML-10	0.5-1.5	38	ND	66	36	ND	ND	230	350	700	350	ND	530	470	880	270	400	350	ND	225	ND	225	ND	ND	ND	225	ND	225	225	190	130	225	ND	ND	*2770*	*4670*	*6340*
ML-12	0-0.5	190	ND	190	190	ND	ND	110	140	240	160	ND	250	210	330	95	140	190	ND	190	ND	190	ND	ND	ND	84	ND	190	100	120	190	190	ND	ND	*1680*	*2435*	*3689*
ML-11	0-0.5	46	ND	58	39	ND	ND	220	330	730	320	ND	520	440	850	340	440	370	ND	230	ND	230	ND	ND	ND	230	ND	230	230	190	140	230	ND	ND	*2703*	*4703*	*6413*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																		
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
ML-13	0-0.5	250	ND	250	250	ND	ND	46	98	170	71	ND	100	100	210	63	92	250	ND	250	ND	250	ND	ND	ND	250	ND	250	250	250	250	250	ND	ND	*1335*	*1950*	*3950*
ML-8	0-0.5	120	ND	120	120	ND	ND	14	22	22	120	ND	31	120	25	120	120	120	ND	100	ND	430	ND	ND	ND	120	ND	120	120	120	120	120	ND	ND	*689*	*1074*	*2324*
ML-8	2.0-3.0	80	ND	80	80	ND	ND	80	80	71	80	ND	80	80	80	80	80	80	ND	70	ND	290	ND	ND	ND	80	ND	80	80	80	80	80	ND	ND	*711*	*1031*	*1871*
ML-7	0-0.5	100	ND	100	100	ND	ND	34	49	84	54	ND	73	64	90	36	56	100	ND	100	ND	100	ND	ND	ND	100	ND	100	100	100	100	100	ND	ND	*658*	*940*	*1740*
ML-7	1.0-2.0	50	ND	50	50	ND	ND	50	50	180	50	ND	50	50	50	50	50	50	ND	50	ND	50	ND	ND	ND	50	ND	50	50	50	50	50	ND	ND	*580*	*780*	*1180*
ML-4	0-0.5	115	ND	115	115	ND	ND	38	56	79	81	ND	130	120	93	34	42	115	ND	78	ND	320	ND	ND	ND	115	ND	50	50	80	93	94	ND	ND	*849*	*1133*	*2013*
ML-4	3.0-4.0	85	ND	85	85	ND	ND	85	85	350	85	ND	85	85	85	85	85	85	ND	54	ND	240	ND	ND	ND	85	ND	85	85	85	85	85	ND	ND	*1030*	*1370*	*2174*
ML-5	0-0.5	145	ND	145	145	ND	ND	21	29	25	26	ND	51	36	27	145	145	145	ND	86	ND	390	ND	ND	ND	145	ND	145	145	145	145	145	ND	ND	*623*	*1085*	*2431*
ML-5	3.0-4.0	55	ND	55	55	ND	ND	55	55	120	ND	ND	55	55	55	55	55	55	ND	52	ND	220	ND	ND	ND	72	ND	55	26	55	55	55	ND	ND	*505*	*725*	*1315*
ML-9	0-0.5	75	ND	75	75	ND	ND	24	41	67	47	ND	65	56	34	27	30	75	ND	44	ND	200	ND	ND	ND	75	57	92	120	80	110	99	44	ND	*525*	*691*	*1612*
ML-9	1.7-2.5	70	ND	70	70	ND	ND	70	70	110	70	ND	70	70	70	70	70	70	ND	69	ND	290	ND	ND	ND	ND	ND	ND	ND	70	70	70	ND	ND	*670*	*950*	*1519*
Munger Landing																																				
MLA-6	0-0.5	35	160	310	140	66	390	460	1600	1900	1600	280	2400	2700	2900	1000	1100	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*12041*	*17975*	*18041*
MLA-6- DUP	0-0.5	33	170	320	140	68	390	480	1600	2000	1600	280	2500	2800	2800	1200	1100	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*12381*	*18513*	*18581*
MLA-6	3.0-4.0	55	55	55	55	55	55	55	55	100	55	55	55	55	55	55	55	55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*760*	*925*	*980*
MLA-6- DUP	3.0-4.0	55	55	55	55	55	55	55	55	88	55	55	55	55	55	55	55	55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*748*	*913*	*968*
MLA-2	0-0.5	65	11	33	16	65	65	43	150	180	130	65	230	250	270	150	110	110	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*1303*	*1878*	*1943*
MLA-2	0.8-1.5	54	290	510	220	96	410	650	3200	3500	3100	580	4200	5500	5000	2100	1900	1700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*22310*	*32914*	*33010*
MLA-3	0-0.5	56	190	390	210	99	440	630	2000	2300	1800	360	2600	3300	3400	1400	1300	1200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*14375*	*21576*	*21675*
MLA-3	1.0-1.8	90	90	90	90	90	90	13	25	540	20	90	32	48	90	90	90	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*1308*	*1578*	*1668*
MLA-5	0-0.5	15	65	160	64	24	78	290	640	810	660	120	950	1200	1200	460	470	420	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*5076*	*7602*	*7626*
MLA-5	1.8-2.8	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*637*	*784*	*833*
MLA-1	0-0.5	67	160	350	220	99	340	660	1500	1700	1700	270	2500	3000	2600	1000	1000	960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*12566*	*18027*	*18126*
MLA-1	0.5-1.0	47	120	250	140	56	220	470	1100	1300	1300	220	1800	2500	1900	670	730	690	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*9523*	*13457*	*13513*
MLA-4	0-0.5	28	160	340	120	45	200	680	1200	1400	1200	260	1800	2200	2000	920	850	790	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*9633*	*14148*	*14193*
MLA-4	1.0-2.0	190	520	1400	610	200	1400	1600	6200	5700	5500	940	9100	11000	7900	3000	3400	3100	190	280	330	ND	380	360	130	900	ND	680	510	3900	2600	940	ND	ND	*44360*	*61560*	*72960*
New Duluth Stretch																																				
NDS-3	0-0.5	ND	ND	60	ND	ND	ND	10	14	14	11	ND	21	18	16	60	60	ND	ND	51	ND	210	ND	ND	ND	60	ND	60	60	60	60	60	ND	ND	*148*	*284*	*905*
NDS-3	1.7-2.3	ND	ND	65	ND	ND	ND	22	29	29	26	ND	59	53	39	22	21	ND	ND	58	ND	230	ND	ND	ND	52	ND	49	46	49	65	65	ND	ND	*283*	*365*	*979*
NDS-15	0-0.5	ND	ND	60	ND	ND	ND	14	15	11	13	ND	35	26	15	60	60	ND	ND	52	ND	220	ND	ND	ND	60	ND	60	60	60	60	60	ND	ND	*174*	*309*	*941*
NDS-15	2.0-3.0	ND	ND	55	ND	ND	ND	55	55	72	55	ND	55	55	ND	55	55	ND	ND	46	ND	190	ND	ND	ND	55	ND	55	55	55	55	55	ND	ND	*402*	*512*	*1078*
NDS-9	0-0.5	ND	ND	55	ND	ND	ND	5	9	83	55	ND	17	55	8	55	55	ND	ND	33	ND	160	ND	ND	ND	55	ND	55	55	55	55	55	ND	ND	*280*	*397*	*920*
NDS-9	1.0-2.0	ND	ND	50	ND	ND	ND	50	15	11	50	ND	50	50	50	50	50	ND	ND	30	ND	150	ND	ND	ND	50	ND	50	50	50	50	50	ND	ND	*276*	*426*	*906*
NDS-8	0-0.5	ND	ND	100	ND	ND	ND	10	21	17	100	ND	27	100	21	100	100	ND	ND	64	ND	280	ND	ND	ND	50	ND	100	65	100	100	100	ND	ND	*375*	*596*	*1455*
NDS-8	0.5-1.0	ND	ND	70	ND	ND	ND	70	70	58	70	ND	70	70	70	70	70	ND	ND	49	ND	200	ND	ND	ND	130	ND	70	40	70	70	70	ND	ND	*478*	*688*	*1387*
NDS-11	0-0.5	ND	ND	55	ND	ND	ND	55	55	55	55	ND	8	55	55	55	55	ND	ND	37	ND	160	ND	ND	ND	55	ND	55	55	55	55	55	ND	ND	*338*	*503*	*1030*
NDS-11	1.0-2.0	ND	ND	55	ND	ND	ND	7	15	15	8	ND	14	13	8	55	55	ND	ND	35	ND	150	ND	ND	ND	55	ND	55	48	55	55	55	ND	ND	*126*	*244*	*752*
NDS-7	0-0.5	ND	ND	55	ND	ND	ND	18	18	16	11	ND	32	22	11	55	55	ND	ND	33	ND	150	ND	ND	ND	55	ND	55	55	55	55	46	ND	ND	*172*	*293*	*797*
NDS-7	0.5-1.0	ND	ND	55	ND	ND	ND	16	23	19	12	ND	43	26	20	55	55	ND	ND	33	ND	160	ND	ND	ND	55	ND	29	56	26	55	55	ND	ND	*194*	*324*	*793*
NDS-5	0-0.5	ND	ND	55	ND	ND	ND	55	55	50	55	ND	55	55	55	55	55	ND	ND	36	ND	130	ND	ND	ND	42	ND	55	55	55	55	51	ND	ND	*380*	*545*	*1024*
NDS-5	0.5-1.0	ND	ND	55	ND	ND	ND	55	55	100	55	ND	55	55	55	55	55	ND	ND	34	ND	130	ND	ND	ND	55	ND	55	55	55	55	55	ND	ND	*430*	*595*	*1089*
NDS-4	0-0.5	ND	ND	48	ND	ND	ND	48	48	48	48	ND	48	48	48	48	48	ND	ND	32	ND	120	ND	ND	ND	48	ND	48	48	48	48	48	ND	ND	*336*	*480*	*920*
NDS-4	0.5-1.0	ND	ND	55	ND	ND	ND	55	55	18	55	ND	55	55	55	55	55	ND	ND	31	ND	150	ND	ND	ND	55	ND	55	55	55	55	55	ND	ND	*348*	*513*	*1024*
NDS-14	0-0.5	ND	ND	70	ND	ND	ND	33	77	110	79	ND	100	72	110	38	38	ND	ND	54	ND	190	ND	ND	ND	70	31	51	73	84	110	130	ND	ND	*541*	*727*	*1520*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																			
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
NDS-14	1.7-2.5	ND	ND	60	ND	ND	ND	60	60	130	60	ND	60	60	60	60	60	ND	ND	35	ND	160	ND	ND	ND	60	ND	60	39	60	60	60	ND	ND	*490*	*670*	*1204*
NDS-13	0-0.5	ND	ND	75	ND	ND	ND	61	62	67	67	ND	140	100	72	33	32	ND	ND	61	ND	210	ND	ND	ND	75	ND	75	48	66	72	43	ND	ND	*572*	*709*	*1359*
NDS-13	0.8-1.7	ND	ND	60	ND	ND	ND	60	60	83	60	ND	20	17	60	60	60	ND	ND	43	ND	170	ND	ND	ND	60	ND	60	60	60	60	60	ND	ND	*360*	*540*	*1113*
NDS-1	0-0.5	ND	ND	48	ND	ND	ND	48	48	48	48	ND	48	48	48	48	48	ND	ND	30	ND	120	ND	ND	ND	48	ND	48	48	48	48	48	ND	ND	*333*	*475*	*910*
NDS-1	0.5-1.0	ND	ND	49	ND	ND	ND	49	49	49	49	ND	7	49	49	49	49	ND	ND	32	ND	140	ND	ND	ND	49	ND	49	49	49	49	49	ND	ND	*301*	*448*	*914*
NDS-6	0-0.5	ND	ND	60	ND	ND	ND	9	19	12	8	ND	27	23	16	60	60	ND	ND	45	ND	160	ND	ND	ND	60	ND	60	60	60	60	60	ND	ND	*159*	*295*	*860*
NDS-6	0.5-1.2	ND	ND	50	ND	ND	ND	50	50	50	50	ND	7	50	50	50	50	ND	ND	34	ND	140	ND	ND	ND	50	ND	50	50	50	50	50	ND	ND	*304*	*453*	*924*
NDS-10	0-0.5	ND	ND	6	ND	ND	ND	6	6	1	6	ND	6	6	6	6	6	ND	ND	4	ND	14	ND	ND	ND	6	ND	6	6	6	6	6	ND	ND	*34*	*51*	*102*
NDS-10	0.5-1.0	ND	ND	5	ND	ND	ND	5	5	3	5	ND	5	5	5	5	5	ND	ND	3	ND	13	ND	ND	ND	8	ND	5	5	5	5	5	ND	ND	*33*	*48*	*97*
NDS-12	0-0.5	ND	9	20	ND	ND	ND	50	53	53	40	ND	120	77	49	17	10	ND	ND	37	ND	150	ND	ND	ND	55	ND	55	29	35	55	55	ND	ND	*422*	*498*	*969*
NDS-12	1.0-1.7	ND	ND	55	ND	ND	ND	55	55	43	55	ND	55	55	55	55	55	ND	ND	34	ND	140	ND	ND	ND	55	ND	55	55	55	55	54	ND	ND	*373*	*538*	*1041*
NDS-2	0-0.5	ND	ND	6	ND	ND	ND	6	8	48	48	ND	14	48	6	48	48	ND	ND	30	ND	120	ND	ND	ND	48	ND	48	48	48	48	48	ND	ND	*178*	*280*	*718*
NDS-2	0.8-1.7	ND	ND	50	ND	ND	ND	5	7	7	50	ND	15	12	14	50	50	ND	ND	33	ND	140	ND	ND	ND	50	ND	50	50	50	50	50	ND	ND	*145*	*258*	*728*
North Bay																																					
NB-1	0-0.5	ND	ND	125	ND	ND	ND	53	51	95	96	ND	110	87	61	51	55	ND	ND	86	ND	370	ND	ND	ND	125	125	125	100	94	130	88	ND	ND	*617*	*784*	*2027*
NB-1	0.5-1.0	ND	ND	130	ND	ND	ND	130	130	120	130	ND	130	130	130	130	130	ND	ND	73	ND	350	ND	ND	ND	130	130	130	130	130	130	130	ND	ND	*900*	*1290*	*2623*
NB-2	0-0.5	ND	ND	150	ND	ND	ND	14	34	150	150	ND	33	150	150	150	150	ND	ND	99	ND	420	ND	ND	ND	150	150	150	150	150	150	150	ND	ND	*681*	*1131*	*2700*
NB-2	1.0-2.0	ND	ND	16	ND	ND	ND	67	81	86	72	ND	200	150	100	43	17	ND	ND	84	ND	350	ND	ND	ND	120	57	160	350	120	120	120	ND	ND	*672*	*832*	*2313*
NB-4	0-0.5	ND	ND	180	ND	ND	ND	27	48	41	59	ND	90	56	45	180	180	ND	ND	140	ND	490	ND	ND	ND	180	180	180	180	180	180	180	ND	ND	*501*	*906*	*2796*
NB-4	0.5-1.0	ND	ND	155	ND	ND	ND	43	56	34	37	ND	100	82	52	155	155	ND	ND	97	ND	410	ND	ND	ND	155	155	155	68	155	155	155	ND	ND	*507*	*869*	*2374*
NB-3	0-0.5	ND	8	12	ND	ND	ND	32	59	64	48	ND	83	57	61	75	32	ND	ND	48	ND	200	ND	ND	ND	75	54	40	74	68	92	77	ND	ND	*363*	*531*	*1259*
NB-3	1.7-2.5	ND	ND	65	ND	ND	ND	17	26	27	20	ND	42	40	38	65	65	ND	ND	50	ND	190	ND	ND	ND	65	65	48	120	40	65	65	ND	ND	*237*	*405*	*1113*
NB-5	0-0.5	ND	ND	90	ND	ND	ND	35	66	90	93	ND	63	83	65	25	79	ND	ND	90	ND	90	ND	ND	ND	90	65	93	90	78	190	180	80	ND	*520*	*689*	*1735*
NB-5	3.0-4.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0*	*0*	*0*
NB-6	0-0.5	ND	ND	60	ND	ND	ND	6	10	60	60	ND	13	60	60	60	60	ND	ND	36	ND	160	ND	ND	ND	39	60	27	95	60	60	60	ND	ND	*269*	*449*	*1046*
NB-6	0.5-1.0	ND	ND	60	ND	ND	ND	60	60	52	60	ND	60	60	60	60	60	ND	ND	39	ND	170	ND	ND	ND	39	60	60	77	60	60	60	ND	ND	*412*	*592*	*1217*
Perch Lake																																					
PL-3	0-0.5	ND	ND	ND	ND	ND	ND	76	85	74	77	ND	140	150	110	44	33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*602*	*789*	*789*
PL-3	0.5-1.0	ND	ND	ND	ND	ND	ND	91	88	77	93	ND	160	150	96	ND	34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*659*	*789*	*789*
PL-2	0-0.5	ND	ND	ND	ND	ND	ND	310	310	310	310	ND	310	310	310	ND	310	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*1860*	*2480*	*2480*
PL-2- DUP	0-0.5	ND	ND	ND	ND	ND	ND	37	52	42	315	ND	50	315	44	ND	315	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*811*	*1170*	*1170*
PL-2	1.0-2.0	ND	ND	ND	ND	ND	ND	23	29	235	235	ND	29	235	235	ND	235	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*786*	*1256*	*1256*
PL-2- DUP	1.0-2.0	ND	ND	ND	ND	ND	ND	26	30	225	225	ND	38	225	225	ND	225	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*769*	*1219*	*1219*
PL-1	0-0.5	ND	ND	ND	ND	ND	ND	26	40	265	265	ND	42	265	265	ND	265	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*903*	*1433*	*1433*
PL-1	1.0-2.0	ND	ND	ND	ND	ND	ND	255	255	130	255	ND	255	255	255	ND	255	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*1405*	*1915*	*1915*
Rask Bay																																					
RB-4	0-0.5	ND	ND	ND	ND	55	ND	13	15	19	17	ND	21	26	17	ND	15	ND	ND	55	ND	55	ND	ND	ND	55	55	55	55	55	24	55	ND	ND	*166*	*143*	*662*
RB-4	0.5-1.2	ND	ND	ND	ND	55	ND	9	22	25	19	ND	24	25	23	ND	14	ND	ND	55	ND	55	ND	ND	ND	55	55	55	55	55	25	55	ND	ND	*179*	*161*	*681*
RB-1	0-0.5	ND	ND	ND	ND	90	ND	25	31	62	54	ND	77	66	40	34	38	ND	ND	69	ND	260	ND	ND	ND	90	44	56	69	38	88	52	ND	ND	*405*	*427*	*1283*
RB-1	3.0-4.0	ND	ND	ND	ND	95	ND	95	95	130	95	ND	95	95	95	ND	95	ND	ND	93	ND	390	ND	ND	ND	95	95	95	95	95	95	95	ND	ND	*700*	*795*	*2038*
RB-7	0-0.5	ND	ND	ND	ND	10	ND	25	31	49	36	ND	76	67	42	ND	22	ND	ND	66	ND	230	ND	ND	ND	85	53	72	99	69	69	57	ND	ND	*294*	*348*	*1158*
RB-7	3.0-4.0	ND	ND	ND	ND	75	ND	75	75	380	75	ND	75	75	75	ND	75	ND	ND	72	ND	300	ND	ND	ND	75	75	75	75	75	75	75	ND	ND	*830*	*905*	*1877*
RB-2	0-0.5	ND	ND	ND	ND	130	ND	18	25	37	33	ND	36	39	45	ND	130	ND	ND	78	ND	380	ND	ND	ND	130	130	130	130	130	130	130	ND	ND	*318*	*363*	*1861*
RB-2	1.0-2.0	ND	ND	ND	ND	85	ND	85	85	170	85	ND	85	85	85	ND	85	ND	ND	50	ND	190	ND	ND	ND	85	85	85	85	85	85	85	ND	ND	*680*	*765*	*1685*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																			
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
RB-5	0-0.5	ND	ND	ND	ND	80	ND	27	33	29	23	ND	60	46	34	ND	13	ND	ND	48	ND	210	ND	ND	ND	80	80	80	86	80	80	80	ND	ND	*298*	*265*	*1169*
RB-5	1.3-2.0	ND	ND	ND	ND	100	ND	100	100	160	100	ND	100	100	100	ND	100	ND	ND	63	ND	240	ND	ND	ND	100	100	100	100	100	100	100	ND	ND	*760*	*860*	*1963*
RB-10	0-0.5	ND	ND	ND	ND	105	ND	25	27	26	26	ND	64	38	36	ND	105	ND	ND	81	ND	280	ND	ND	ND	105	105	105	54	105	105	105	ND	ND	*311*	*347*	*1497*
RB-10	1.3-2.0	ND	ND	ND	ND	65	ND	65	65	100	65	ND	65	65	65	ND	65	ND	ND	38	ND	160	ND	ND	ND	65	65	65	50	65	65	65	ND	ND	*490*	*555*	*1258*
RB-3	0-0.5	ND	ND	ND	ND	135	ND	27	38	41	40	ND	81	49	41	ND	135	ND	ND	89	ND	370	ND	ND	ND	135	135	135	135	135	135	135	ND	ND	*411*	*452*	*1991*
RB-3	3.0-4.0	ND	ND	ND	ND	95	ND	95	95	110	95	ND	95	95	95	ND	95	ND	ND	61	ND	260	ND	ND	ND	95	95	95	95	95	95	95	ND	ND	*680*	*775*	*1856*
RB-8	0-0.5	ND	ND	ND	ND	75	ND	11	9	9	16	ND	25	18	13	ND	75	ND	ND	51	ND	200	ND	ND	ND	36	75	75	60	75	75	75	ND	ND	*164*	*177*	*974*
RB-8	1.0-1.7	ND	ND	ND	ND	60	ND	60	60	15	60	ND	60	60	60	ND	60	ND	ND	39	ND	170	ND	ND	ND	60	60	60	60	60	60	60	ND	ND	*375*	*435*	*1124*
RB-11	0-0.5	ND	ND	ND	ND	12	ND	32	34	28	35	ND	73	56	39	ND	16	ND	ND	71	ND	290	ND	ND	ND	53	95	95	44	56	95	95	ND	ND	*270*	*313*	*1219*
RB-11	0.5-1.0	ND	ND	ND	ND	80	ND	9	12	10	80	ND	25	80	80	ND	80	ND	ND	56	ND	220	ND	ND	ND	80	80	80	80	80	80	80	ND	ND	*296*	*376*	*1292*
RB-6	3.0-4.0	ND	ND	ND	ND	9	ND	9	9	19	9	ND	9	9	9	ND	9	ND	ND	5	ND	23	ND	ND	ND	9	9	9	9	9	9	9	ND	ND	*70*	*79*	*175*
RB-6	0-0.5	ND	ND	ND	ND	13	ND	1	2	2	2	ND	3	13	2	ND	13	ND	ND	8	ND	37	ND	ND	ND	13	13	13	13	13	13	13	ND	ND	*36*	*38*	*187*
RB-9	0-0.5	ND	ND	ND	ND	11	ND	3	3	4	4	ND	6	5	4	ND	3	ND	ND	8	ND	29	ND	ND	ND	11	11	11	11	11	11	11	ND	ND	*37*	*33*	*157*
RB-9	1.0-2.0	ND	ND	ND	ND	7	ND	7	7	8	7	ND	7	7	7	ND	7	ND	ND	5	ND	17	ND	ND	ND	7	7	7	7	7	7	7	ND	ND	*47*	*54*	*127*
Riverside Marina																																					
RSM-1	0-0.5	35	24	140	56	15	20	410	370	320	430	42	930	790	480	220	150	130	ND	65	65	65	43	96	120	150	130	87	71	370	230	160	110	38	*3582*	*4547*	*6362*
RSM-1	1.2-1.8	26	10	14	33	18	16	120	110	39	120	50	120	110	49	38	23	50	ND	120	340	310	89	170	230	150	410	450	480	180	150	220	50	50	*786*	*928*	*4345*
RSM-2	0-0.5	110	39	72	26	110	43	140	250	270	240	110	440	370	390	160	120	120	ND	110	110	110	110	110	110	120	90	77	84	250	180	150	75	110	*2220*	*2900*	*4806*
RSM-2	1.7-2.5	74	260	580	240	54	150	1400	2400	2400	2500	340	4600	3700	3400	1300	1100	1100	ND	465	465	465	250	230	1300	850	1100	1000	990	2500	1900	1600	1200	420	*18698*	*25544*	*40333*
RSM-3	0-0.5	83	50	270	140	60	270	850	520	390	570	60	1100	1600	790	250	240	220	70	130	150	200	170	84	420	350	710	720	700	620	570	600	65	65	*5963*	*7403*	*13087*
RSM-3	0.5-1.0	65	8	15	8	65	20	40	60	51	63	65	110	88	79	33	30	65	ND	65	65	65	65	40	47	66	74	95	87	90	36	65	65	65	*659*	*801*	*1856*
RSM-4	0-0.5	115	41	67	29	17	50	150	290	330	320	115	520	420	440	190	190	180	ND	115	115	460	115	115	115	115	100	98	75	300	230	180	90	53	*2464*	*3447*	*5740*
RSM-4	1.6-2.2	11	14	25	17	15	26	96	90	84	98	55	200	170	130	67	45	44	ND	27	42	31	28	59	130	130	180	220	230	190	110	110	190	55	*901*	*1172*	*2919*
RSM-5	0-0.5	48	48	48	48	48	48	14	14	17	10	48	23	28	26	12	11	48	ND	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	*442*	*491*	*1259*
RSM-5	0.5-1.0	50	6	14	50	50	50	38	77	81	88	50	120	110	100	41	55	46	ND	50	50	50	50	50	50	23	50	50	50	74	46	28	50	50	*784*	*976*	*1747*
Spirit Lake																																					
SL-39	0-0.5	44	26	230	72	80	25	480	380	370	390	52	850	730	500	180	210	170	ND	80	80	80	80	56	60	120	120	160	160	340	310	300	80	80	*3729*	*4709*	*6895*
SL-39- DUP	0-0.5	19	24	39	21	80	80	96	170	190	180	80	290	290	250	98	130	91	ND	80	80	80	80	80	41	81	83	91	100	170	190	200	80	80	*1559*	*2048*	*3644*
SL-39	1.0-2.0	65	65	10	65	65	65	12	64	64	46	65	120	110	77	54	44	46	ND	65	65	65	65	65	65	41	28	65	65	80	51	65	65	65	*816*	*972*	*1952*
SL-39- DUP	1.0-2.0	65	65	10	65	65	65	13	78	78	61	65	130	110	110	53	50	55	ND	65	65	65	65	65	65	34	32	65	65	110	65	37	65	65	*870*	*1073*	*2066*
SL-32	0-0.7	95	95	95	95	95	95	95	15	95	95	95	12	95	12	95	95	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*1072*	*1274*	*2794*
SL-32- DUP	0-0.7	95	95	95	95	95	95	11	23	23	18	95	29	29	26	95	13	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*798*	*932*	*2452*
SL-32	3.0-4.0	75	12	14	10	75	75	68	91	150	130	75	110	160	130	51	160	75	ND	75	34	75	75	75	75	100	200	310	310	190	300	290	240	75	*1045*	*1386*	*3885*
SL-32- DUP	3.0-4.0	75	8	75	75	75	75	39	69	120	90	75	75	110	88	38	110	75	ND	75	75	34	75	63	80	100	150	220	220	140	240	340	270	75	*961*	*1197*	*3429*
SL-19	0-0.5	95	95	95	95	95	95	95	20	16	95	95	19	95	15	95	95	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*1005*	*1210*	*2730*
SL-19	3.0-4.0	10	24	130	33	75	75	240	540	560	460	69	950	910	790	390	290	310	ND	75	33	36	36	55	110	280	240	290	250	650	410	75	75	75	*4076*	*5781*	*8546*
SL-38	0-0.5	50	50	50	50	50	50	50	50	200	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*800*	*950*	*1750*
SL-38	1.6-2.4	55	55	55	55	55	55	55	55	110	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*770*	*935*	*1815*
SL-52	0-0.5	24	110	300	80	15	75	480	1200	1300	1300	200	2000	1800	1800	650	640	640	ND	105	105	105	105	105	50	280	230	160	130	920	640	340	160	94	*8884*	*12599*	*16143*
SL-52	1.7-2.7	18	41	160	60	12	38	280	660	730	580	95	1200	1200	1000	480	380	410	ND	75	48	48	53	66	80	350	350	340	200	780	520	370	75	75	*5074*	*7332*	*10774*
SL-48	0-0.7	13	59	220	62	24	77	240	1500	2000	1300	250	2000	2600	2900	1100	1100	1100	ND	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	*10345*	*16521*	*17895*
SL-48- DUP	0-0.7	13	46	220	68	20	61	220	1400	1700	1200	200	2100	2500	2600	1100	930	960	ND	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	*9748*	*15318*	*16688*
SL-48	1.5-2.5	55	55	55	55	55	55	55	55	32	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*692*	*857*	*1737*
SL-48- DUP	1.5-2.5	55	55	55	55	55	55	55	55	19	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*679*	*844*	*1724*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																			
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
SL-49	0-0.5	85	26	42	22	13	56	77	200	240	240	85	320	370	310	170	160	120	ND	85	85	85	85	37	44	53	190	190	170	250	300	300	85	85	*1776*	*2523*	*4580*
SL-49	0.5-1.0	90	34	190	51	12	32	180	1400	1500	1100	170	2000	2100	2200	1000	810	860	ND	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	*8859*	*13717*	*15079*
SL-50	0-0.5	55	55	55	55	55	55	55	7	55	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*667*	*832*	*1712*
SL-50	0.8-1.3	55	55	55	55	55	55	55	55	39	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*699*	*864*	*1744*
SL-51	0-0.5	100	100	100	100	100	100	14	33	31	22	100	42	41	42	100	19	100	ND	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	*883*	*1044*	*2644*
SL-51	3.0-4.0	8	11	23	12	80	80	56	130	160	160	80	190	250	200	67	130	58	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*1240*	*1615*	*2895*
SL-44	0-0.5	80	80	80	80	80	80	80	80	55	80	80	80	80	80	80	80	80	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*1015*	*1255*	*2535*
SL-44	0.9-1.7	60	60	60	60	60	60	60	60	27	60	60	60	60	60	60	60	60	ND	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	*747*	*927*	*1887*
SL-46	0-0.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	ND	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	*631*	*776*	*1552*
SL-46	0.7-1.5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*650*	*800*	*1600*
SL-53	0-0.5	60	60	60	60	60	60	60	60	61	60	60	12	60	60	60	60	60	ND	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	*733*	*913*	*1873*
SL-53- DUP	0-0.5	60	60	60	60	60	60	60	9	27	60	60	60	60	60	60	60	60	ND	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	*696*	*876*	*1836*
SL-53	1.0-1.8	55	55	55	55	55	55	55	55	37	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*697*	*862*	*1742*
SL-53- DUP	1.0-1.8	50	50	50	50	50	50	50	50	39	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*639*	*789*	*1589*
SL-54	0-0.5	36	120	450	150	27	140	1000	1000	890	980	120	1900	1900	1300	620	480	450	ND	64	61	430	82	90	63	360	450	200	190	980	680	410	90	90	*8713*	*11536*	*15803*
SL-54	1.0-2.0	91	83	200	260	41	84	370	1300	800	460	120	1800	1900	1200	490	480	380	ND	61	82	530	110	95	150	270	650	490	390	820	860	760	95	95	*7509*	*10018*	*15517*
SL-40	0-0.7	80	10	20	80	80	80	50	100	120	110	80	150	180	140	96	83	65	ND	80	80	80	80	80	36	80	89	110	130	100	80	80	80	80	*1140*	*1444*	*2789*
SL-40- DUP	0-0.7	85	8	24	10	85	85	50	84	100	100	85	150	160	140	77	77	61	ND	85	85	85	85	85	85	85	77	94	120	110	85	85	85	85	*1026*	*1296*	*2717*
SL-40	3.0-4.0	93	53	690	260	23	67	1400	2200	2100	1700	260	3800	4200	2900	1700	1100	1200	ND	85	150	480	170	240	280	1400	1000	500	640	2400	1500	1100	80	80	*16846*	*23723*	*33851*
SL-40- DUP	3.0-4.0	68	56	600	200	23	68	1100	2100	2000	1600	250	3500	3900	2800	1600	1100	1200	ND	73	130	440	200	240	270	1200	970	570	640	2300	1500	1100	75	75	*15465*	*22142*	*31948*
SL-33	0-0.5	90	90	15	90	90	90	35	67	83	67	90	100	130	110	49	53	90	ND	90	90	90	90	90	90	90	90	90	55	60	90	90	90	90	*1037*	*1249*	*2624*
SL-33	3.0-4.0	85	85	85	85	85	85	85	15	550	85	85	16	20	13	85	85	85	ND	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	*1366*	*1549*	*2909*
SL-21	0-0.5	75	75	75	75	75	75	24	41	43	42	75	66	80	60	24	26	75	ND	75	75	75	75	75	75	75	75	75	75	42	75	75	75	75	*821*	*931*	*2098*
SL-21	3.0-4.0	28	53	170	69	19	58	470	550	490	600	65	820	1100	690	250	320	220	ND	40	68	350	65	86	180	270	620	430	310	460	870	610	390	65	*4492*	*5953*	*10786*
SL-15	0-0.5	85	85	85	85	85	85	25	42	280	32	85	53	79	59	21	34	85	ND	85	85	85	85	85	85	85	85	38	54	85	85	85	85	85	*1106*	*1220*	*2502*
SL-15	2.2-3.2	75	75	75	75	75	75	19	33	200	32	75	46	64	55	75	25	75	ND	75	75	75	75	75	75	75	75	75	38	75	75	75	75	75	*919*	*1074*	*2237*
SL-41	0-0.5	85	85	11	85	85	85	25	42	51	41	85	70	74	71	29	31	85	ND	85	85	85	85	85	85	85	85	85	55	44	45	85	85	85	*824*	*955*	*2204*
SL-41- DUP	0-0.5	90	90	90	90	90	90	18	31	180	28	90	49	47	50	90	21	90	ND	90	90	90	90	90	90	90	90	90	51	90	90	90	90	90	*983*	*1144*	*2545*
SL-41	3.0-4.0	65	65	65	65	65	65	65	8	470	65	65	65	65	65	65	65	65	ND	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*1193*	*1388*	*2428*
SL-41- DUP	3.0-4.0	65	65	65	65	65	65	65	65	460	65	65	65	65	65	65	65	65	ND	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*1240*	*1435*	*2475*
SL-42	0-0.5	75	75	75	75	75	75	18	32	160	31	75	43	53	48	75	23	75	ND	75	75	75	75	75	75	75	75	75	43	75	39	75	75	75	*862*	*1008*	*2140*
SL-42	3.0-4.0	85	85	85	85	85	85	12	17	190	85	85	85	23	85	85	85	85	ND	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	*1007*	*1262*	*2622*
SL-43	0-0.5	90	30	130	37	12	29	150	780	980	650	100	1100	1400	1400	550	570	540	ND	90	50	91	70	160	240	270	540	270	550	920	880	830	90	90	*5488*	*8536*	*13689*
SL-43	0.5-1.0	30	84	670	150	36	83	660	3300	3700	2300	360	4800	6500	5300	1700	2000	2300	ND	95	180	670	210	350	440	1500	1600	780	670	3400	2600	2000	90	90	*22673*	*33937*	*48648*
SL-47	0-0.5	50	50	50	50	50	50	50	50	21	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*615*	*764*	*1556*
SL-47	1.0-2.0	50	50	50	50	50	50	50	50	17	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*611*	*760*	*1552*
SL-37	0-0.5	95	11	21	95	95	95	47	130	210	150	95	190	260	240	80	95	82	ND	95	95	95	95	95	95	49	130	110	140	150	210	220	95	95	*1494*	*1896*	*3760*
SL-37	1.0-2.0	54	34	550	160	90	90	850	1700	1700	1300	78	370	2800	2600	1000	750	920	ND	43	93	120	120	150	160	890	730	560	400	2000	1200	850	90	85	*9776*	*14956*	*22537*
SL-45	0-0.5	55	55	55	55	55	55	55	55	91	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*751*	*916*	*1796*
SL-45	1.0-1.5	55	55	55	55	55	55	55	55	68	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*728*	*893*	*1773*
SL-27	0-0.5	100	100	100	100	100	100	25	45	50	47	100	75	73	69	32	32	100	ND	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	*1015*	*1148*	*2748*
SL-27- DUP	0-0.5	95	95	95	95	95	95	24	53	54	42	95	76	72	78	24	31	95	ND	95	95	95	95	95	95	95	95	95	95	43	95	95	95	95	*986*	*1119*	*2587*
SL-27	3.0-4.0	95	95	95	95	95	95	95	12	550	95	95	95	95	12	95	95	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*1607*	*1809*	*3329*
SL-27- DUP	3.0-4.0	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*1235*	*1520*	*3040*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																			
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
SL-34	0-0.5	95	95	95	95	95	95	29	48	53	49	95	97	76	75	31	32	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*1017*	*1155*	*2675*
SL-34	2.0-2.8	13	80	16	15	80	80	70	25	80	14	80	67	62	80	80	80	80	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*682*	*922*	*2202*
SL-26	0-0.5	90	10	21	90	90	90	48	76	88	77	90	140	150	130	59	57	90	ND	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	*1060*	*1306*	*2746*
SL-26	3.0-4.0	72	58	360	140	23	62	760	1200	1300	1000	150	2600	2400	2100	790	660	740	ND	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	*10125*	*14392*	*15540*
SL-20	0-0.5	8	48	84	33	19	100	130	310	360	350	63	580	670	560	200	220	180	ND	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	*2755*	*3896*	*5040*
SL-20	1.0-1.7	47	47	47	47	47	47	47	47	47	47	47	6	47	47	47	47	47	ND	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	*564*	*703*	*1447*
SL-35	0-0.5	80	80	80	80	80	80	25	33	40	32	80	62	65	80	80	25	80	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*817*	*1002*	*2282*
SL-35	3.0-4.0	80	86	370	140	50	170	680	1300	880	1100	160	2300	2800	2100	820	910	790	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*10116*	*14686*	*15936*
SL-36	0-0.5	85	85	85	85	85	85	11	21	24	20	85	30	29	24	85	14	85	ND	85	85	85	85	85	85	37	85	85	85	85	85	85	85	85	*730*	*853*	*2165*
SL-36	2.0-3.0	70	39	480	150	80	18	730	1300	1300	1000	140	2600	2400	1900	960	600	680	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*10307*	*14367*	*15647*
SL-29	0-0.5	95	95	95	95	95	95	16	30	28	19	95	44	47	95	95	19	95	ND	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	*849*	*1058*	*2578*
SL-29- DUP	0-0.5	90	90	90	90	90	90	21	36	38	34	90	64	51	49	90	25	90	ND	90	90	90	90	90	90	90	90	90	43	45	90	90	90	90	*874*	*1038*	*2386*
SL-29	3.0-4.0	270	130	1900	600	29	57	3100	5000	2100	3400	510	9500	8500	6900	3100	1900	2200	36	200	380	700	420	430	310	2800	2500	1300	880	6100	2800	1600	770	170	*35096*	*49167*	*70592*
SL-29- DUP	3.0-4.0	180	110	1300	410	23	44	2100	3400	3200	2500	330	6900	5700	5000	2000	1400	1600	ND	140	260	590	280	270	96	2000	1500	830	610	4700	2000	1100	490	120	*26197*	*36174*	*51183*
SL-28	0-0.5	80	80	80	80	80	80	16	26	29	21	80	45	39	43	80	18	80	ND	80	80	80	80	80	80	80	80	80	170	48	80	80	80	80	*736*	*877*	*2215*
SL-28	3.0-4.0	100	100	100	100	100	100	100	100	140	100	100	22	100	16	100	100	100	ND	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	*1262*	*1478*	*3078*
SL-14	0-0.5	65	65	65	65	65	65	32	27	26	25	65	55	46	35	65	11	65	ND	65	65	65	65	65	65	65	65	65	92	35	65	65	65	65	*666*	*777*	*1814*
SL-14	3.0-4.0	9	21	26	15	60	60	88	130	160	150	60	220	210	180	64	91	54	ND	60	60	60	60	32	39	98	180	200	170	170	210	180	120	60	*1209*	*1538*	*3297*
SL-22	0-0.5	90	90	90	90	90	90	18	31	36	26	90	53	50	52	90	21	90	ND	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	*844*	*1007*	*2447*
SL-22	3.0-4.0	140	83	1100	320	18	33	1700	3000	3000	2300	350	5700	5400	4500	1800	1400	1600	ND	110	230	200	240	300	140	1700	1500	690	720	4000	1800	1300	520	140	*23144*	*32426*	*46034*
SL-9	0-0.5	65	65	65	65	65	65	10	14	16	11	65	20	22	16	65	12	65	ND	65	65	65	65	65	65	65	65	65	30	65	65	65	65	65	*548*	*641*	*1646*
SL-9	3.0-4.0	60	60	60	60	60	60	25	39	68	60	60	59	65	56	18	49	60	ND	60	60	60	60	60	60	37	50	120	160	80	120	110	81	60	*736*	*859*	*2097*
SL-5	0-0.5	55	55	55	55	55	55	10	11	8	55	55	18	16	9	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*502*	*621*	*1501*
SL-5	0.7-1.2	50	6	50	50	50	50	6	13	16	12	50	16	18	15	50	10	50	ND	50	50	50	50	50	50	50	50	50	50	50	22	50	50	50	*387*	*462*	*1234*
SL-2	0-0.5	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*715*	*880*	*1760*
SL-2	0.8-1.6	60	13	11	60	60	60	60	52	72	63	60	110	120	70	35	56	60	ND	60	60	60	60	60	60	35	120	160	120	110	89	110	60	60	*801*	*962*	*2246*
SL-1	0-0.5	50	50	50	50	50	50	50	50	50	50	50	6	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*606*	*756*	*1556*
SL-1	1.0-2.0	50	50	50	50	50	50	9	10	9	8	50	16	15	11	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*418*	*529*	*1329*
SL-3	0-0.5	55	55	55	55	55	55	7	14	58	8	55	14	18	14	55	55	55	ND	55	55	55	55	55	55	55	55	30	29	55	55	55	55	55	*503*	*627*	*1456*
SL-3- DUP	0-0.5	55	55	55	55	55	55	6	12	12	8	55	11	15	13	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*449*	*572*	*1452*
SL-3	1.0-2.0	50	50	50	50	50	50	50	50	130	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*730*	*880*	*1680*
SL-3- DUP	1.0-2.0	50	50	50	50	50	50	50	50	89	50	50	50	50	50	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*689*	*839*	*1639*
SL-4	0-0.5	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	ND	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	*780*	*960*	*1920*
SL-4	1.0-2.0	60	60	60	60	60	60	18	24	24	23	60	49	37	33	17	18	60	ND	60	60	60	60	60	60	60	60	60	38	43	60	60	60	60	*595*	*663*	*1584*
SL-11	0-0.5	60	60	60	60	60	60	8	12	11	8	60	21	18	16	60	60	60	ND	60	60	60	60	60	60	60	60	60	30	60	60	60	60	60	*498*	*634*	*1564*
SL-11	1.0-2.0	70	9	9	70	70	70	26	48	68	56	70	82	74	66	24	45	70	ND	70	70	70	70	70	70	30	71	130	150	100	100	100	60	70	*721*	*856*	*2157*
SL-6	0-0.5	60	60	60	60	60	60	13	12	9	10	60	20	16	10	60	60	60	ND	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	*499*	*629*	*1589*
SL-6	2.5-3.5	60	60	60	60	60	60	9	13	11	9	60	21	17	15	60	60	60	ND	60	60	60	60	60	60	60	60	60	70	60	60	60	60	60	*500*	*635*	*1605*
SL-10	0-0.7	65	65	65	65	65	65	6	11	9	65	65	16	65	10	65	65	65	ND	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*627*	*767*	*1807*
SL-10- DUP	0-0.7	65	65	65	65	65	65	7	13	13	10	65	17	15	13	65	65	65	ND	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*530*	*673*	*1713*
SL-10	1.8-2.5	65	10	12	9	65	65	37	65	90	93	65	130	170	91	37	56	65	ND	65	28	65	65	49	87	74	380	470	330	160	230	200	130	65	*875*	*1059*	*3522*
SL-10- DUP	1.8-2.5	65	7	65	65	65	65	21	44	63	60	65	75	74	57	24	36	65	ND	65	65	65	65	65	65	40	160	220	200	120	130	130	78	65	*734*	*851*	*2449*
SL-30	0-0.5	105	105	18	105	105	105	37	75	82	60	105	130	120	130	53	49	105	ND	105	105	105	105	105	105	105	105	82	76	120	105	105	105	105	*1152*	*1384*	*3027*
SL-30	1.3-2.3	12	38	38	14	13	36	97	210	240	220	110	360	440	340	160	140	110	ND	110	93	110	110	93	180	270	490	590	430	390	250	280	110	110	*1828*	*2565*	*6194*

Sample Location	Sample Depth (ft)	PAHs (µg/kg dry weight)[1]																																			
		Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Benz(a)anthracene	Benzo (a) pyrene	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene	C1- Napthalene	C2- Napthalene	C3- Napthalene	C4- Napthalene	C1- Fluorenes	C2- Fluorenes	C3- Fluorenes	C1- Phenanthrene/anthracene	C2- Phenanthrene/anthracene	C3- Phenanthrene/anthracene	C4- Phenanthrene/anthracene	C1- Pyrene/ fluoranthenes	C1- Benzanthracene /chrysenes	C2- Benzanthracene /chrysenes	C3- Benzanthracene /chrysenes	C4- Benzanthracene /chrysenes	*Priority PAH 13 (MPCA, 2003)[2]*	*EPA PAH 16[3]*	*Total PAH 34[4]*
SL-23	0-0.6	115	115	15	115	115	115	33	75	83	67	115	130	110	130	52	43	115	ND	115	115	115	115	115	115	110	115	115	69	110	62	115	115	115	*1203*	*1428*	*3159*
SL-23- DUP	0-0.6	115	19	27	115	115	115	57	120	120	100	115	210	180	200	90	63	115	ND	115	115	115	115	115	115	230	63	55	98	190	70	115	115	115	*1408*	*1761*	*3617*
SL-31	0-0.5	120	120	120	120	120	120	26	54	55	42	120	98	79	98	31	29	120	ND	120	120	120	120	120	120	120	120	71	160	91	120	120	120	120	*1194*	*1352*	*3234*
SL-31	0.8-1.5	100	13	20	100	100	100	54	110	130	110	100	180	180	170	67	90	70	ND	100	100	100	100	100	100	50	80	94	120	160	120	120	100	100	*1297*	*1594*	*3238*
SL-24	0-0.5	135	135	135	135	135	135	135	53	58	135	135	83	86	66	135	35	135	ND	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	*1495*	*1731*	*3891*
SL-25	0-0.5	50	11	21	50	50	50	32	78	72	73	50	140	110	100	42	38	38	ND	50	50	50	50	50	50	34	25	50	50	83	39	50	50	50	*787*	*955*	*1736*
SL-25	0.5-1.0	55	55	55	55	55	55	55	55	63	55	55	8	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*676*	*841*	*1721*
SL-16	0-0.5	80	12	36	13	80	80	64	230	260	190	80	370	380	420	170	160	150	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*1875*	*2695*	*3975*
SL-16	0.5-1.0	80	27	49	21	13	29	100	290	370	270	80	460	80	520	220	200	170	ND	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	*1869*	*2966*	*4179*
SL-17	0-0.5	80	80	80	80	80	80	19	45	49	37	80	58	64	66	20	32	80	ND	80	80	80	80	80	80	80	80	80	48	57	80	80	80	80	*832*	*950*	*2175*
SL-17	0.7-1.3	16	65	130	56	16	34	290	500	540	450	100	890	1100	740	340	280	240	ND	51	53	100	56	74	110	300	380	380	450	750	650	400	100	100	*4187*	*5771*	*9741*
SL-18	0-0.5	55	55	55	55	55	55	5	29	25	25	55	39	39	37	17	11	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*547*	*612*	*1492*
SL-18	1.0-1.7	55	55	55	55	55	55	55	55	84	55	55	55	55	55	55	55	55	ND	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	*744*	*909*	*1789*
SL-12	0-0.5	135	26	62	31	21	45	130	350	410	330	135	730	690	640	370	230	250	ND	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	*3095*	*4564*	*6610*
SL-7	0-0.5	85	11	32	17	85	85	69	180	200	160	85	310	340	330	130	110	120	ND	85	85	85	85	85	85	97	85	73	120	270	170	85	85	85	*1659*	*2264*	*3929*
SL-13	0-0.5	50	50	50	50	50	50	14	19	16	14	50	30	27	28	50	50	50	ND	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	*470*	*598*	*1398*
SL-13	0.5-1.0	50	13	30	7	50	50	86	66	62	58	50	150	140	90	35	26	50	ND	50	50	50	50	50	50	30	50	50	50	50	50	50	50	50	*812*	*963*	*1743*
SL-8	0-0.5	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	ND	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	*845*	*1040*	*2080*
Tallas Island Flats																																					
TIF-3	0-0.7	ND	8	13	7	ND	28	27	49	58	48	ND	81	79	92	41	31	ND	ND	ND	ND	ND	ND	ND	ND	48	49	54	85	83	67	84	38	ND	*399*	*563*	*1071*
TIF-3- DUP	0-0.7	ND	10	16	8	ND	21	30	63	70	54	ND	97	91	100	47	31	ND	ND	ND	ND	ND	ND	ND	ND	41	41	32	60	83	60	63	34	ND	*460*	*638*	*1052*
TIF-3	1.4-1.9	ND	65	65	65	ND	65	65	65	27	65	ND	65	65	65	65	65	ND	ND	ND	ND	ND	ND	ND	ND	65	65	65	43	65	65	65	65	ND	*612*	*807*	*1305*
TIF-3- DUP	1.4-1.9	ND	65	65	65	ND	65	65	65	65	65	ND	65	65	65	65	65	ND	ND	ND	ND	ND	ND	ND	ND	65	65	65	75	65	65	65	65	ND	*650*	*845*	*1375*
TIF-2	0-0.5	ND	50	50	50	ND	50	50	7	50	50	ND	7	50	50	50	50	ND	ND	ND	ND	ND	ND	ND	ND	50	50	50	50	50	50	50	50	ND	*414*	*564*	*964*
TIF-2	0.5-1.0	ND	50	50	50	ND	50	50	50	50	50	ND	50	50	50	50	50	ND	ND	ND	ND	ND	ND	ND	ND	50	50	50	50	50	50	50	50	ND	*500*	*650*	*1050*
TIF-4	0-0.5	ND	18	38	12	ND	65	120	150	140	140	ND	280	230	180	65	72	72	ND	ND	ND	ND	ND	ND	ND	65	65	65	65	65	65	65	65	ND	*1193*	*1582*	*2102*
TIF-4	1.0-2.0	ND	60	60	60	ND	20	14	21	19	20	ND	33	39	27	60	10	ND	ND	ND	ND	ND	ND	ND	ND	60	60	60	60	60	60	60	60	ND	*346*	*443*	*923*
TIF-5	0-0.5	ND	49	49	49	ND	49	7	12	14	14	ND	10	49	19	49	9	ND	ND	ND	ND	ND	ND	ND	ND	49	49	49	49	49	49	49	49	ND	*302*	*379*	*771*
TIF-5	0.5-1.2	16	55	24	18	ND	15	73	47	45	46	ND	90	87	57	28	21	ND	ND	ND	ND	ND	ND	ND	ND	23	34	34	44	48	29	55	55	ND	*516*	*622*	*944*
TIF-1	0-0.5	ND	50	50	ND	ND	50	50	50	50	50	ND	50	50	50	50	50	ND	ND	ND	ND	ND	ND	ND	ND	50	50	50	50	50	50	50	50	ND	*450*	*600*	*1000*
TIF-1	0.5-1.0	ND	50	50	50	ND	50	50	50	50	50	ND	50	50	50	50	50	ND	ND	ND	ND	ND	ND	ND	ND	50	50	50	50	50	50	50	50	ND	*500*	*650*	*1050*

Notes:

1. Non-detect data are handled using the following assumptions:
   - Zero for the PAHs that are all non-detects within a study area
   - 1/2 of the reporting limit for the PAHs that are detected in more than one sample within a study area
2. PAHs-13 is the Priority PAHs per MCPA (2007)
3. PAHs-16 is the EPA Priority Pollutant PAHs
4. PAHs -34 is the Total PAHs per USEPA (2003)

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg) [1]	% Water Content	% Less Than # 200 Sieve
Chambers Grove Reach						
CGR-1	0-0.5	2600	5800	23000	29.3	11.7
CGR-1	1.2-2.2	1500	13000	15000	43.3	72.4
Cedar Yard Bay						
CYB-1	0-0.5	-	81000	90000	185.7	67.7
CYB-1	0.5-1.0	-	97000	88000	209.4	63.8
CYB-2	0-0.5	9500	180000	89000	318.6	20.2
CYB-2	0.8-1.3	1200	23000	14000	80.1	76.4
Steelton Bay						
SB-6	0-0.5	-	41000	250000	121.1	90.8
SB-6	1.0-2.0	-	26000	15000	87.0	93.7
SB-7	0-0.5	2100	14000	5000	30.8	39.9
SB-7- DUP	0-0.5	1800	13000	14000	-	-
SB-7	1.7-2.5	3700	23000	43000	48.2	71.1
SB-7- DUP	1.7-2.5	5100	34000	140000	-	-
SB-4	0-0.5	-	51000	26000	103.5	76.0
SB-4	0.5-1.0	-	33000	8800	47.2	85.2
SB-8	0-0.5	1900	21000	26000	60.4	59.3
SB-8	0.8-1.3	930	7900	32000	30.3	29.9
SB-2	0-0.5	-	4500	1300	28.9	46.7
SB-2	0.6-1.2	-	1300	1250	28.6	60.4
SB-1	0-0.5	810	9300	21000	48.7	33.0
SB-5	0-0.5	12000	20000	41000	297.6	41.5
SB-5- DUP	0-0.5	14000	19000	57000	-	-
SB-3	0-0.5	-	7400	1350	43.3	87.7
SB-3	0.5-1.0	-	13000	6800	42.9	92.6
Fond Du Lac Stretch						
FDLS-2	0-0.5	-	10000	43000	34.6	14
FDLS-2	0.5-1.1	-	8600	17000	34.8	18
FDLS-4	0-0.5	1100	16000	34000	50.3	46
FDLS-4	1.6-2.6	1000	13000	23000	35.9	48
FDLS-1	0-0.5	4700	18000	15000	53.8	95
FDLS-1	0.5-1.3	3900	17000	11000	53.0	96
FDLS-3	0-0.5	-	12000	23000	56.7	65
FDLS-3	1.0-2.0	-	3700	4800	27.1	24
Indian Point Waterfront						
IPW-6	0-0.5	28000	140000	190000	189	72
IPW-6	2-2.8	3000	24000	8800	72	97
IPW-4	0-0.5	-	16000	25000	38	65
IPW-4	0.8-1.3	-	53000	29000	41	89
IPW-2	0-0.5	-	57000	14000	152	96
IPW-2- DUP	0-0.5	-	56000	23000	-	-
IPW-2	2.2-3.0	-	83000	290000	116	94
IPW-2- DUP	2.2-3.0	-	69000	650000	-	-

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg) [1]	% Water Content	% Less Than # 200 Sieve
IPW-3	0-0.5	25000	150000	94000	188	84
IPW-3	1.7-2.2	8000	55000	26000	98	92
IPW-5	0-0.5	14000	55000	47000	103	74
IPW-5	0.8-1.3	8600	51000	82000	119	98
IPW-1	0-0.5	-	57000	24000	160	91
IPW-1	2.2-2.8	-	14000	3500	48	67
Kingsbury Bay						
KB-1	0-0.5	13000	93000	110000	93	86
KB-1- DUP	0-0.5	14000	99000	180000	-	-
KB-1	1.4-2.4	13000	79000	400000	62	49
KB-1- DUP	1.4-2.4	21000	60000	540000	-	-
KB-3	0-0.5	-	83000	100000	110	77
KB-3	1.0-1.7	-	67000	150000	83	86
KB-2	0-0.5	6000	69000	89000	73	69
KB-2	1.5-2.3	20000	100000	1100000	71	95
KB-5	0-0.5	13000	180000	42000	238	86
KB-5	2.0-2.6	4300	29000	11000	56	98
KB-4	0-0.5	-	9800	220000	65	77
KB-4	1.0-1.7	-	49000	13000	42	75
Minnesota Channel						
MC-2	0-0.5	2600	13000	14000	44	67
MC-2	1.0-1.7	1900	11000	5100	33	61
MC-3	0-0.5	-	36000	70000	75	76
MC-3	1.7-2.7	-	3400	1200	22	20
MC-1	0-0.5	-	36000	240000	77	58
MC-1	3.0-4.0	-	13000	4500	43	83
Mud Lake						
ML-1	0-0.5	-	380000	56000	273	72
ML-1	1.0-2.0	-	600000	21000	326	71
ML-6	0-0.5	-	130000	48000	191	95
ML-6- DUP	0-0.5	-	130000	54000	-	-
ML-6	1.4-2.4	-	100000	54000	149	89
ML-6- DUP	1.4-2.4	-	93000	21000	-	-
ML-3	0-0.5	-	130000	92000	167	76
ML-3	0.5-1.0	-	130000	230000	134	41
ML-2	0-0.5	7000	180000	75000	223	87
ML-2	1.8-2.8	4400	120000	57000	145	92
ML-14	0-0.5	-	230000	200000	420	37
ML-15	0-0.5	13000	180000	86000	558	57
ML-15	1.0-2.0	8800	160000	14000	479	62
ML-16	0-0.5	6500	120000	56000	435	68
ML-16	1.5-2.5	2900	240000	9700	244	82
ML-10	0-0.5	19000	220000	230000	480	38
ML-10	0.5-1.5	18000	220000	49000	492	61

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg) [1]	% Water Content	% Less Than # 200 Sieve
ML-12	0-0.5	-	200000	100000	338	48
ML-11	0-0.5	-	230000	160000	441	35
ML-13	0-0.5	11000	170000	52000	533	63
ML-8	0-0.5	-	38000	46000	167	86
ML-8	2.0-3.0	-	32000	5900	81	59
ML-7	0-0.5	5500	61000	80000	131	77
ML-7	1.0-2.0	320	4100	8400	26	47
ML-4	0-0.5	12000	51000	110000	197	91
ML-4	3.0-4.0	1800	42000	8400	117	85
ML-5	0-0.5	-	48000	12000	216	86
ML-5	3.0-4.0	-	10000	5800	35	54
ML-9	0-0.5	3100	950	53000	90	83
ML-9	1.7-2.5	1900	31000	25000	74	86
Munger Landing						
MLA-6	0-0.5	13000	93000	270000	131	86
MLA-6- DUP	0-0.5	13000	95000	590000	-	-
MLA-6	3.0-4.0	1300	20000	5300	40	61
MLA-6- DUP	3.0-4.0	970	9900	4700	-	-
MLA-2	0-0.5	-	21000	24000	65	95
MLA-2	0.8-1.5	-	51000	200000	154	94
MLA-3	0-0.5	7600	57000	120000	167	91
MLA-3	1.0-1.8	2400	62000	22000	131	79
MLA-5	0-0.5	3000	25000	62000	69	40
MLA-5	1.8-2.8	190	1800	1250	23	21
MLA-1	0-0.5	-	140000	140000	301	53
MLA-1	0.5-1.0	-	170000	86000	437	34
MLA-4	0-0.5	-	48000	71000	222	76
MLA-4	1.0-2.0	-	62000	1100000	155	90
New Duluth Stretch						
NDS-3	0-0.5	-	13000	10000	51	66
NDS-3	1.7-2.3	-	20000	44000	60	74
NDS-15	0-0.5	-	10000	14000	48	63
NDS-15	2.0-3.0	-	8400	3600	32	65
NDS-9	0-0.5	1500	7100	3400	33	58
NDS-9	1.0-2.0	1200	7800	9300	27	40
NDS-8	0-0.5	-	51000	44000	134	86
NDS-8	0.5-1.0	-	27000	13000	75	88
NDS-11	0-0.5	-	9100	12000	36	64
NDS-11	1.0-2.0	-	7400	4000	38	54
NDS-7	0-0.5	-	14000	8500	34	64
NDS-7	0.5-1.0	-	14000	18000	35	48
NDS-5	0-0.5	380	8200	5000	29	50
NDS-5	0.5-1.0	570	13000	5900	32	69
NDS-4	0-0.5	-	1300	1200	23	1

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg)[1]	% Water Content	% Less Than # 200 Sieve
NDS-4	0.5-1.0	-	3300	1350	29	4
NDS-14	0-0.5	2800	27000	23000	76	88
NDS-14	1.7-2.5	870	18000	8100	57	95
NDS-13	0-0.5	3100	35000	37000	76	88
NDS-13	0.8-1.7	1200	22000	10000	58	91
NDS-1	0-0.5	2100	980	1200	21	2
NDS-1	0.5-1.0	220	980	1250	18	1
NDS-6	0-0.5	200	700	7700	40	55
NDS-6	0.5-1.2	960	12000	1250	25	19
NDS-10	0-0.5	-	14000	11000	27	34
NDS-10	0.5-1.0	-	12000	17000	28	14
NDS-12	0-0.5	-	13000	12000	41	43
NDS-12	1.0-1.7	-	9900	11000	29	33
NDS-2	0-0.5	230	2200	1200	18	3
NDS-2	0.8-1.7	270	3000	7100	27	7
North Bay						
NB-1	0-0.5	-	54000	30000	188	80
NB-1	0.5-1.0	-	86000	17000	218	65
NB-2	0-0.5	5700	55000	38000	267	92
NB-2	1.0-2.0	4800	59000	36000	197	91
NB-4	0-0.5	-	82000	24000	322	80
NB-4	0.5-1.0	-	420000	18000	292	80
NB-3	0-0.5	2800	21000	14000	84	56
NB-3	1.7-2.5	2500	29000	32000	85	48
NB-5	0-0.5	-	29000	45000	110	85
NB-5	3.0-4.0	-	31000	19000	102	97
NB-6	0-0.5	950	17000	22000	46	52
NB-6	0.5-1.0	900	20000	22000	54	79
Perch Lake						
PL-3	0-0.5	11000	94000	10000	268	39
PL-3	0.5-1.0	14000	150000	4600	433	25
PL-2	0-0.5	-	160000	170000	676	54
PL-2- DUP	0-0.5	-	150000	290000	-	-
PL-2	1.0-2.0	-	160000	20000	393	54
PL-2- DUP	1.0-2.0	-	180000	14000	-	-
PL-1	0-0.5	-	110000	100000	560	71
PL-1	1.0-2.0	-	170000	39000	550	32
Rask Bay						
RB-4	0-0.5	1500	14000	26000	36	63
RB-4	0.5-1.2	1200	16000	34000	38	64
RB-1	0-0.5	2300	27000	53000	121	93
RB-1	3.0-4.0	2500	46000	23000	150	79
RB-7	0-0.5	2200	26000	24000	94	86
RB-7	3.0-4.0	1500	30000	29000	94	83

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg)[1]	% Water Content	% Less Than # 200 Sieve
RB-2	0-0.5	-	37000	14000	200	92
RB-2	1.0-2.0	-	39000	15000	126	82
RB-5	0-0.5	-	25000	23000	117	87
RB-5	1.3-2.0	-	68000	23000	245	76
RB-10	0-0.5	-	39000	34000	139	86
RB-10	1.3-2.0	-	14000	11000	59	84
RB-3	0-0.5	3800	43000	11000	249	87
RB-3	3.0-4.0	2700	41000	27000	151	87
RB-8	0-0.5	3100	36000	31000	85	84
RB-8	1.0-1.7	690	17000	11000	84	65
RB-11	0-0.5	5400	54000	47000	135	88
RB-11	0.5-1.0	3400	48000	44000	93	82
RB-6	3.0-4.0	-	4300	29000	110	92
RB-6	0-0.5	-	38000	35000	211	94
RB-9	0-0.5	-	41000	100000	174	88
RB-9	1.0-2.0	-	40000	10000	66	69
Riverside Marina						
RSM-1	0-0.5	27000	50000	43000	71	11
RSM-1	1.2-1.8	2700	17000	370000	25	45
RSM-2	0-0.5	-	100000	83000	162	97
RSM-2	1.7-2.5	-	110000	950000	135	98
RSM-3	0-0.5	-	48000	450000	60	24
RSM-3	0.5-1.0	-	36000	29000	53	63
RSM-4	0-0.5	12000	140000	27000	173	77
RSM-4	1.6-2.2	6700	19000	91000	37	34
RSM-5	0-0.5	370	1800	5100	20	4
RSM-5	0.5-1.0	2300	11000	81000	32	9
Spirit Lake						
SL-39	0-0.5	-	27000	240000	101	95
SL-39- DUP	0-0.5	-	28000	160000	-	-
SL-39	1.0-2.0	-	17000	20000	59	95
SL-39- DUP	1.0-2.0	-	19000	31000	-	-
SL-32	0-0.7	3000	31000	34000	121	92
SL-32- DUP	0-0.7	4000	32000	33000	-	-
SL-32	3.0-4.0	4400	34000	160000	92	94
SL-32- DUP	3.0-4.0	4000	33000	140000	-	-
SL-19	0-0.5	-	28000	29000	121	94
SL-19	3.0-4.0	-	38000	190000	103	84
SL-38	0-0.5	280	4700	22000	35	39
SL-38	1.6-2.4	310	4400	8500	29	49
SL-52	0-0.5	6700	38000	150000	140	88
SL-52	1.7-2.7	3400	34000	350000	92	85
SL-48	0-0.7	4600	33000	250000	94	83
SL-48- DUP	0-0.7	4400	32000	640000	-	-

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg) [1]	% Water Content	% Less Than # 200 Sieve
SL-48	1.5-2.5	690	13000	9800	35	61
SL-48- DUP	1.5-2.5	670	12000	25000	-	-
SL-49	0-0.5	-	32000	330000	109	91
SL-49	0.5-1.0	-	43000	190000	123	87
SL-50	0-0.5	1500	12000	22000	47	65
SL-50	0.8-1.3	1300	13000	11000	36	75
SL-51	0-0.5	-	37000	71000	130	74
SL-51	3.0-4.0	-	36000	110000	97	86
SL-44	0-0.5	1500	38000	13000	81	81
SL-44	0.9-1.7	1200	15000	3300	44	77
SL-46	0-0.5	110	1000	21000	23	2
SL-46	0.7-1.5	120	1400	7500	21	3
SL-53	0-0.5	-	14000	49000	51	84
SL-53- DUP	0-0.5	-	12000	17000	-	-
SL-53	1.0-1.8	-	9500	4100	33	81
SL-53- DUP	1.0-1.8	-	10000	3200	-	-
SL-54	0-0.5	7100	46000	490000	122	70
SL-54	1.0-2.0	5900	51000	270000	142	78
SL-40	0-0.7	7800	24000	2100	109	97
SL-40- DUP	0-0.7	6700	25000	27000	-	-
SL-40	3.0-4.0	3800	37000	91000	103	92
SL-40- DUP	3.0-4.0	3700	32000	100000	-	-
SL-33	0-0.5	-	25000	33000	116	92
SL-33	3.0-4.0	-	29000	2100	86	97
SL-21	0-0.5	-	20000	96000	86	70
SL-21	3.0-4.0	-	21000	130000	62	92
SL-15	0-0.5	-	23000	18000	112	92
SL-15	2.2-3.2	-	35000	520000	92	93
SL-41	0-0.5	-	22000	24000	123	91
SL-41- DUP	0-0.5	-	22000	42000	-	-
SL-41	3.0-4.0	-	22000	19000	66	94
SL-41- DUP	3.0-4.0	-	21000	1650	-	-
SL-42	0-0.5	2700	20000	18000	84	90
SL-42	3.0-4.0	2100	41000	13000	117	92
SL-43	0-0.5	-	34000	210000	172	96
SL-43	0.5-1.0	-	44000	480000	84	90
SL-47	0-0.5	-	1100	10000	24	7
SL-47	1.0-2.0	-	970	1250	25	13
SL-37	0-0.5	-	33000	99000	125	92
SL-37	1.0-2.0	-	50000	570000	132	84
SL-45	0-0.5	-	6500	7900	38	85
SL-45	1.0-1.5	-	5700	1350	33	63
SL-27	0-0.5	-	29000	41000	144	94
SL-27- DUP	0-0.5	-	27000	37000	-	-

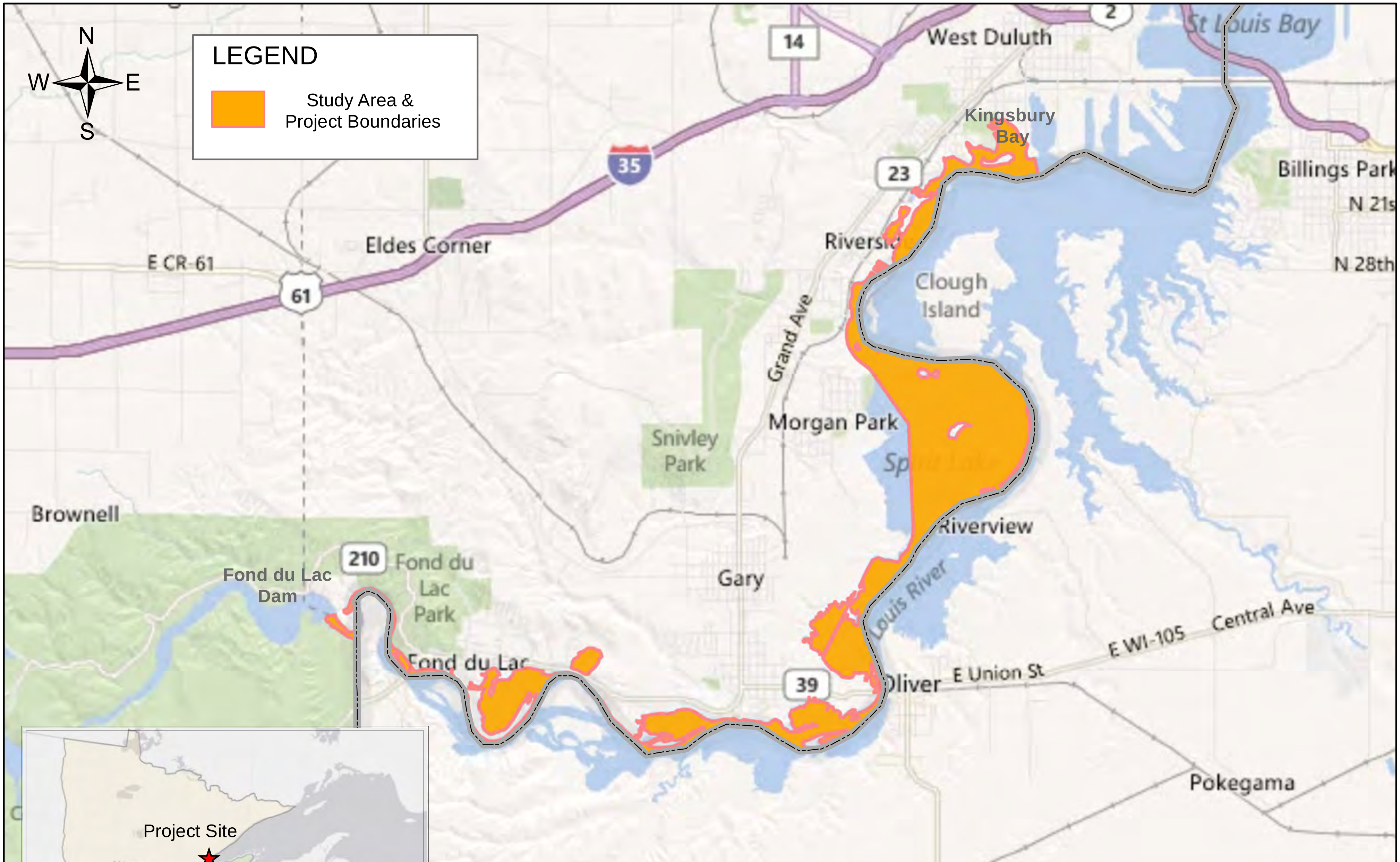
Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (μg/kg)[1]	% Water Content	% Less Than # 200 Sieve
SL-27	3.0-4.0	-	50000	31000	152	88
SL-27- DUP	3.0-4.0	-	45000	18000	-	-
SL-34	0-0.5	2900	28000	48000	142	93
SL-34	2.0-2.8	1700	28000	15000	107	91
SL-26	0-0.5	2900	25000	53000	109	88
SL-26	3.0-4.0	3200	35000	150000	92	93
SL-20	0-0.5	4900	25000	410000	87	72
SL-20	1.0-1.7	320	3300	1150	21	20
SL-35	0-0.5	-	23000	40000	88	77
SL-35	3.0-4.0	-	43000	910000	90	84
SL-36	0-0.5	4700	24000	39000	108	91
SL-36	2.0-3.0	3200	43000	600000	108	91
SL-29	0-0.5	-	27000	26000	135	92
SL-29- DUP	0-0.5	-	27000	20000	-	-
SL-29	3.0-4.0	-	50000	920000	116	85
SL-29- DUP	3.0-4.0	-	47000	770000	-	-
SL-28	0-0.5	3500	23000	20000	97	69
SL-28	3.0-4.0	2300	59000	2450	160	86
SL-14	0-0.5	1500	14000	9000	62	61
SL-14	3.0-4.0	3400	26000	210000	62	84
SL-22	0-0.5	3000	26000	26000	131	91
SL-22	3.0-4.0	3300	47000	350000	132	84
SL-9	0-0.5	-	19000	29000	52	56
SL-9	3.0-4.0	-	24000	150000	65	74
SL-5	0-0.5	-	4700	9700	26	26
SL-5	0.7-1.2	-	6000	21000	32	50
SL-2	0-0.5	1200	9500	4700	36	42
SL-2	0.8-1.6	1900	13000	76000	47	51
SL-1	0-0.5	-	2700	1250	26	8
SL-1	1.0-2.0	-	10000	70000	30	37
SL-3	0-0.5	-	8000	20000	26	31
SL-3- DUP	0-0.5	-	7600	9600	-	-
SL-3	1.0-2.0	-	7300	1300	35	72
SL-3- DUP	1.0-2.0	-	5900	1250	-	-
SL-4	0-0.5	1100	10000	41000	51	42
SL-4	1.0-2.0	3400	17000	14000	58	79
SL-11	0-0.5	-	13000	8000	50	79
SL-11	1.0-2.0	-	30000	150000	75	85
SL-6	0-0.5	990	9900	14000	39	42
SL-6	2.5-3.5	2600	21000	51000	51	36
SL-10	0-0.7	2400	16000	15000	58	72
SL-10- DUP	0-0.7	2100	16000	15000	-	-
SL-10	1.8-2.5	2800	24000	48000	71	77
SL-10- DUP	1.8-2.5	2900	24000	120000	-	-

Sample Location	Sample Depth (ft)	Black Carbon (mg/kg)[1]	Total Organic Carbon, TOCs (mg/kg)[1]	DROs (µg/kg) [1]	% Water Content	% Less Than # 200 Sieve
SL-30	0-0.5	2200	38000	51000	151	88
SL-30	1.3-2.3	5800	71000	540000	196	84
SL-23	0-0.6	-	170000	160000	178	81
SL-23- DUP	0-0.6	-	180000	84000	-	-
SL-31	0-0.5	-	150000	58000	183	86
SL-31	0.8-1.5	-	150000	160000	157	83
SL-24	0-0.5	19000	280000	180000	222	77
SL-25	0-0.5	-	13000	8600	31	23
SL-25	0.5-1.0	-	22000	15000	37	35
SL-16	0-0.5	6000	46000	23000	110	92
SL-16	0.5-1.0	8400	72000	550000	106	91
SL-17	0-0.5	-	1900	56000	99	92
SL-17	0.7-1.3	-	130000	810000	131	81
SL-18	0-0.5	2400	9700	26000	28	13
SL-18	1.0-1.7	1300	22000	9900	40	51
SL-12	0-0.5	20000	300000	170000	26	67
SL-7	0-0.5	-	82000	83000	215	64
SL-13	0-0.5	-	3700	1250	119	21
SL-13	0.5-1.0	-	11000	3900	31	25
SL-8	0-0.5	2300	29000	13000	60	63
Superior Bay						
TIF-3	0-0.7	3200	19000	74000	57	77
TIF-3- DUP	0-0.7	2600	18000	46000	-	-
TIF-3	1.4-1.9	2100	26000	13000	67	55
TIF-3- DUP	1.4-1.9	3000	27000	11000	-	-
TIF-2	0-0.5	-	1900	11000	25	2
TIF-2	0.5-1.0	-	1300	1300	23	2
TIF-4	0-0.5	-	31000	27000	66	26
TIF-4	1.0-2.0	-	22000	8600	49	78
TIF-5	0-0.5	370	2000	26000	22	7
TIF-5	0.5-1.2	790	3100	25000	26	15
TIF-1	0-0.5	-	930	8700	23	6
TIF-1	0.5-1.0	-	3000	1300	25	10

Notes:

1. Non-detect data are handled using the following assumptions:
   - Zero for the analytes that are all non-detects within a study area
   - 1/2 of the reporting limit for the Analytes that are detected in more than one sample within a study area

FIGURES



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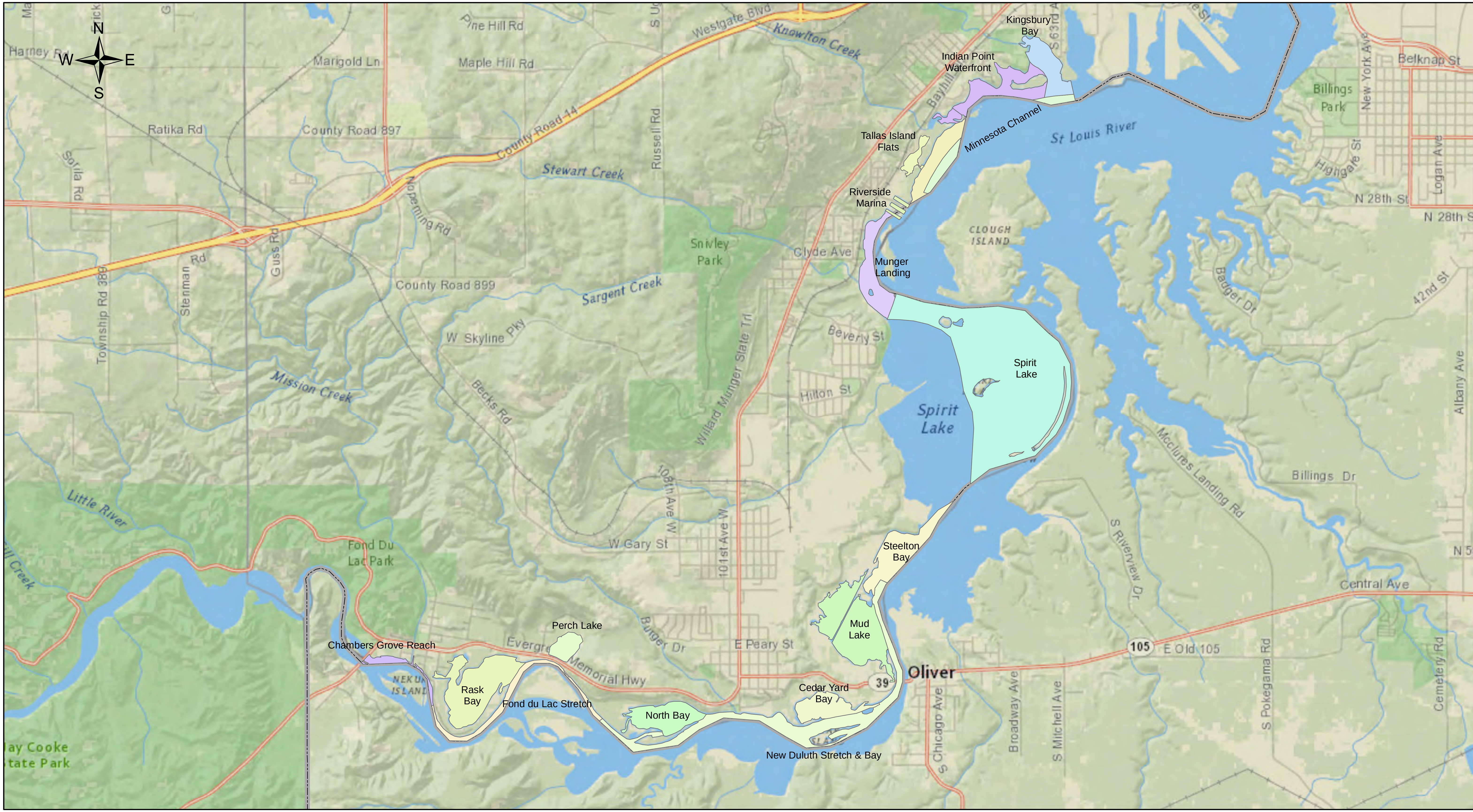
Detroit, Michigan 48226

Project Area and Project Boundaries
Lower St. Louis River Study Area
Sediment Investigation
USACE/MPCA
Duluth, Minnesota

PROJECT NO: E08112	DATE: 05/01/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 1.1
SCALE: AS SHOWN	



LEGEND

Study Areas

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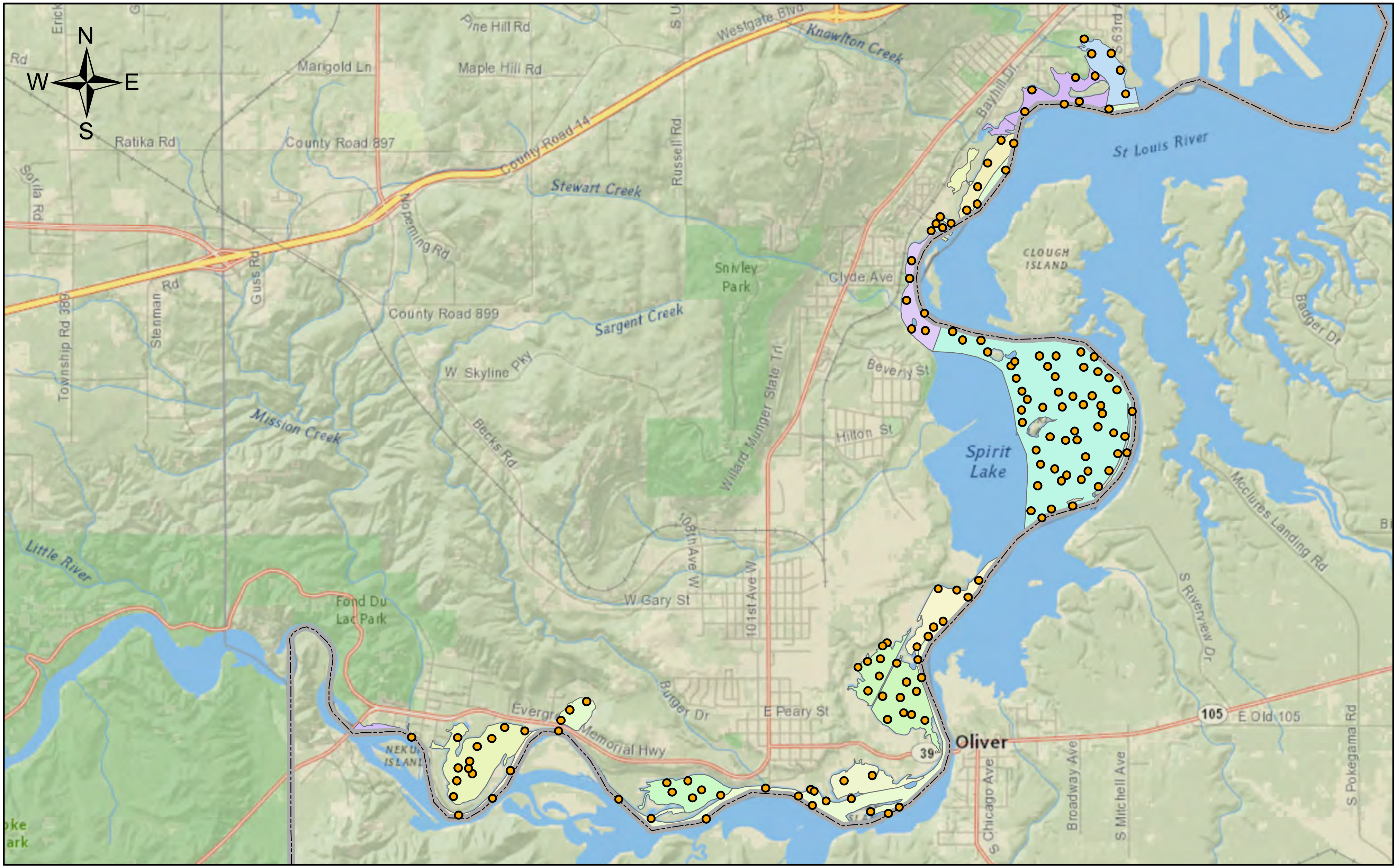
Detroit, Michigan 48226

Study Areas
Lower St. Louis River
Sediment Investigation
USACE/MPCA
Duluth, Minnesota

PROJECT NO: E08112	DATE: 05/01/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 1.2
SCALE: AS SHOWN	



LEGEND

Vibracore Locations

0 4,950 9,900 19,800 Feet

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Sediment Core Sample Locations
Lower St. Louis River
Sediment Investigation
USACE/MPCA
Duluth, Minnesota

PROJECT NO: E08112	DATE: 05/01/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 3.1
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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Mean PEC-Q
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.1
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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Detroit, Michigan 48226

Mean PEC-Q
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.2
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

0 - 0.09	Low Risk
0.1 - 0.6	Moderate Risk
> 0.6	High Risk

0 500 1,000 2,000 Feet

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Mean PEC-Q
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.3
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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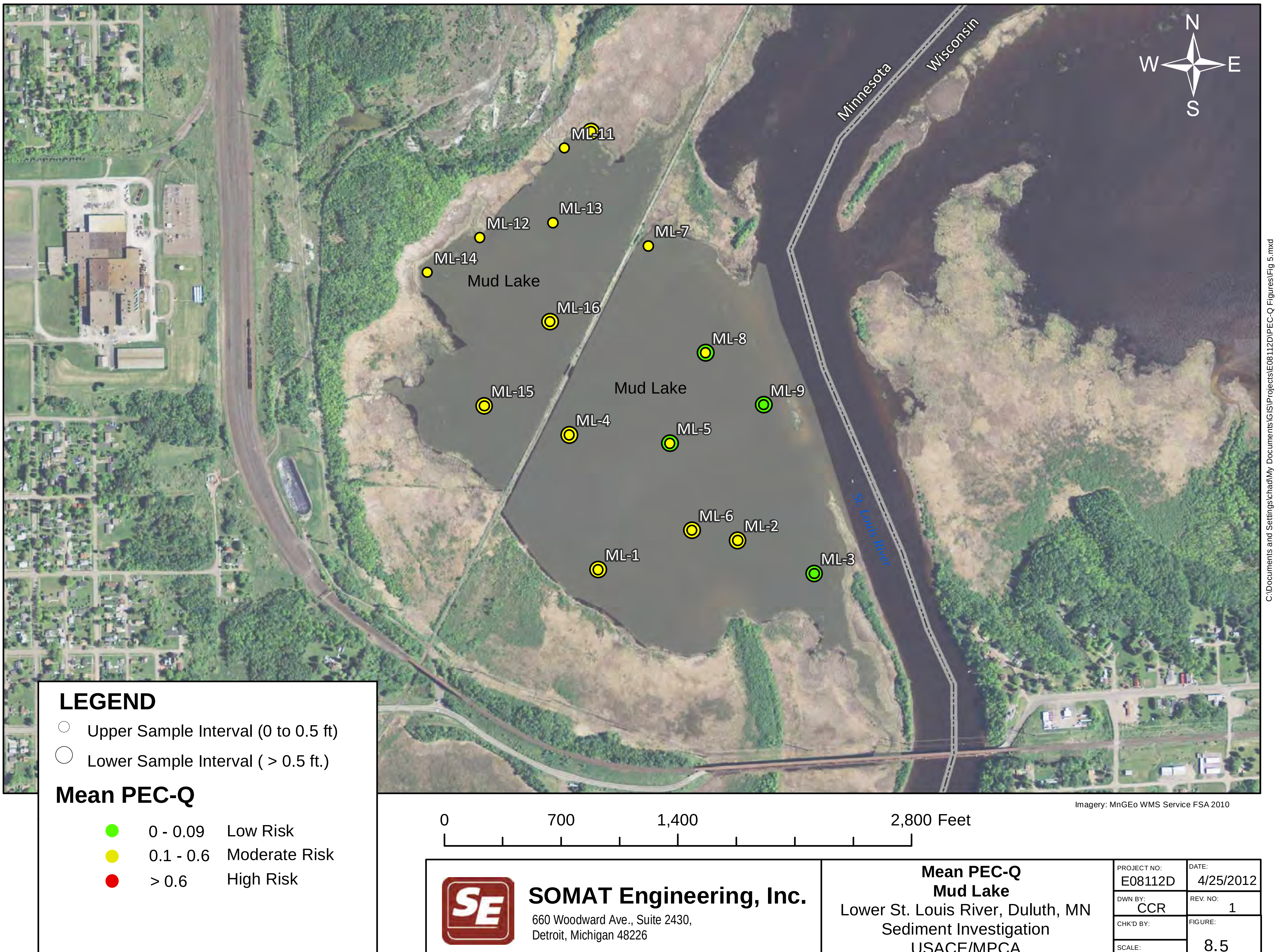
Detroit, Michigan 48226

Mean PEC-Q
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.4
SCALE: AS SHOWN	



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Mean PEC-Q
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.5
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

0 - 0.09	Low Risk
0.1 - 0.6	Moderate Risk
> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

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Detroit, Michigan 48226

Mean PEC-Q
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.6
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

0 1,125 2,250 4,500 Feet

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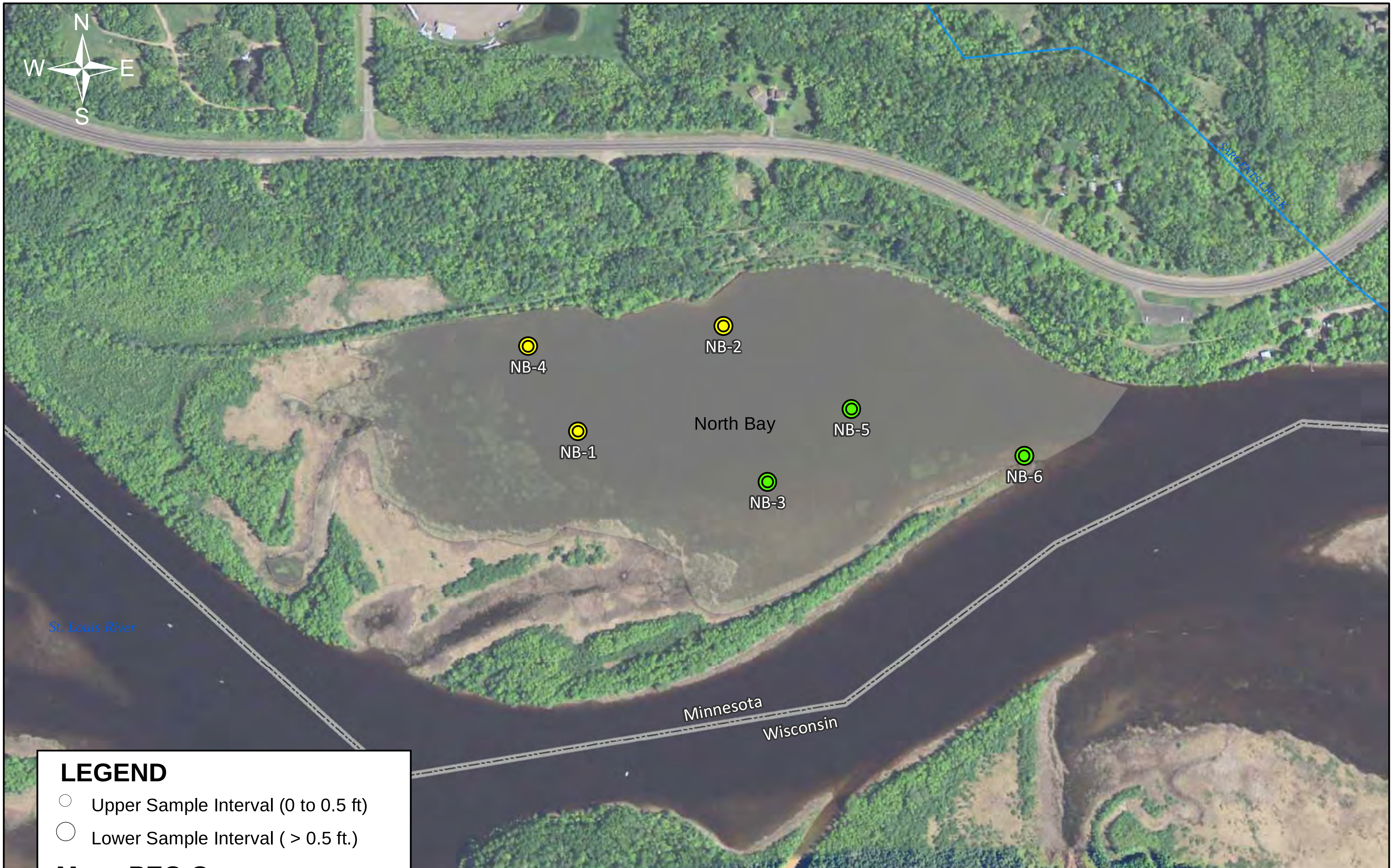
Mean PEC-Q
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.7
SCALE: AS SHOWN	



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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

0 - 0.09	Low Risk
0.1 - 0.6	Moderate Risk
> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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Detroit, Michigan 48226

Mean PEC-Q
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 8
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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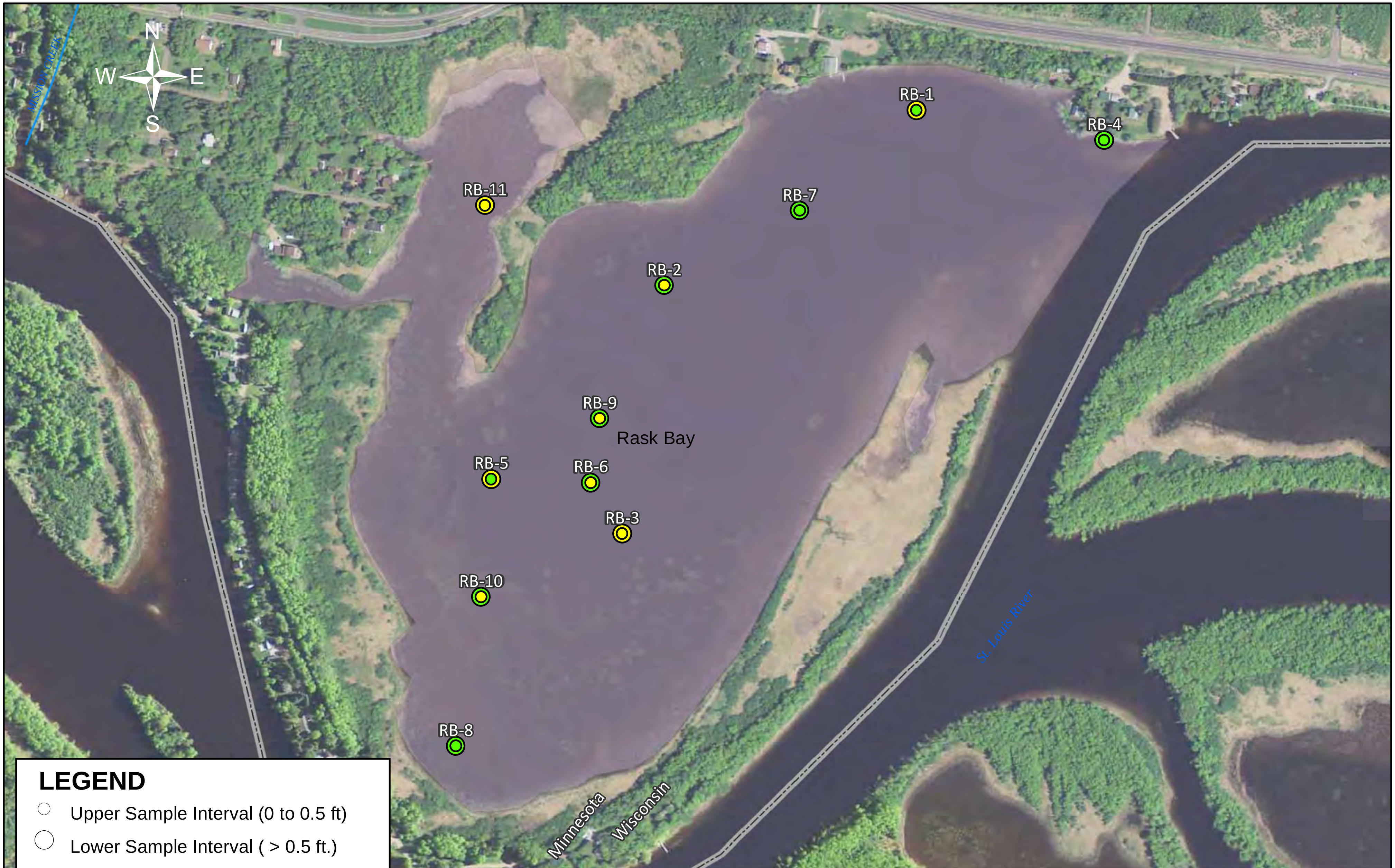
Detroit, Michigan 48226

Mean PEC-Q
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 9
SCALE: AS SHOWN	



LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

SOMAT Engineering, Inc.
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Detroit, Michigan 48226

Mean PEC-Q
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 10
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

● (green)	0 - 0.09	Low Risk
● (yellow)	0.1 - 0.6	Moderate Risk
● (red)	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
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Mean PEC-Q
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.11
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

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Mean PEC-Q
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 12
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

0 800 1,600 3,200 Feet

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Mean PEC-Q
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 13
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

C:\Documents and Settings\chad\My Documents\GIS\Projects\E08112D\PEC-Q Figures\Fig 14.mxd

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mean PEC-Q

●	0 - 0.09	Low Risk
●	0.1 - 0.6	Moderate Risk
●	> 0.6	High Risk

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

Mean PEC-Q
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.14
SCALE: AS SHOWN	

Figure 8.15-a
Summary of Mean PEC-Q Analysis:
Total and Number of Samples in Each Risk Category -
Top of Sediment (0-0.5 feet)

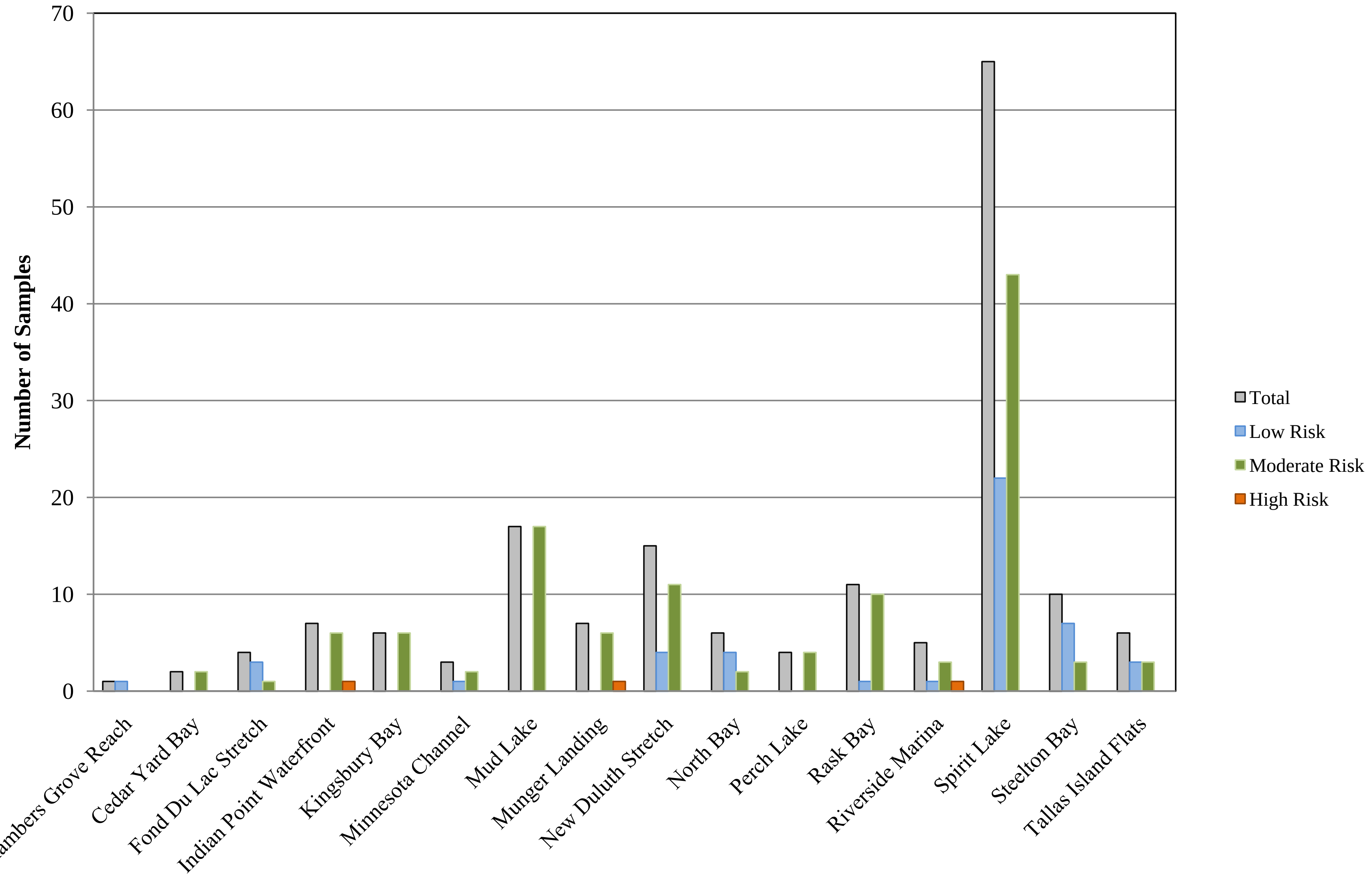


Figure 8.15-b
Summary of Mean PEC-Q Analysis:
Total and Number of Samples in Each Risk Category -
Sample at Depth (> 0.5 feet)

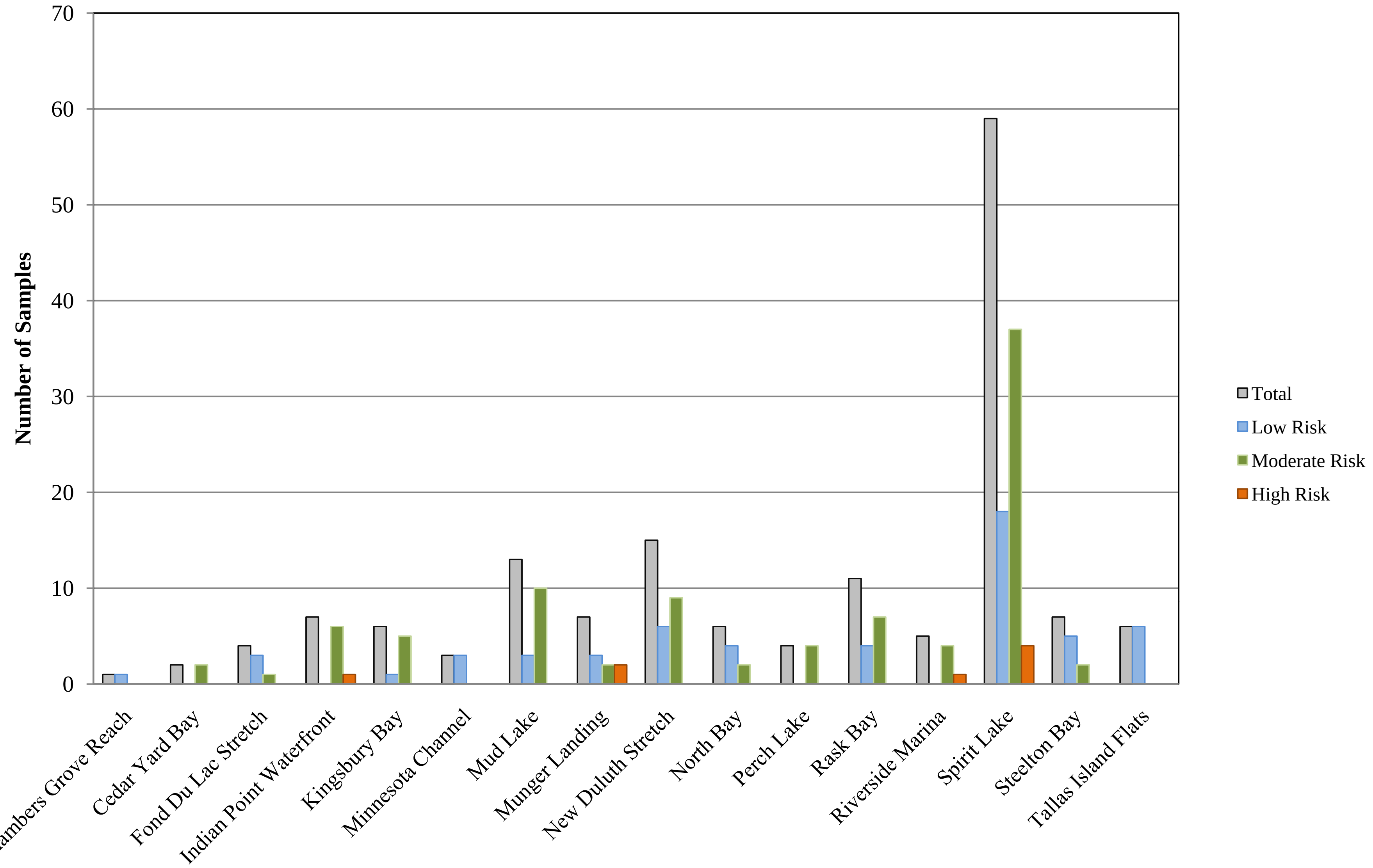


Figure 8.16-a
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Arsenic

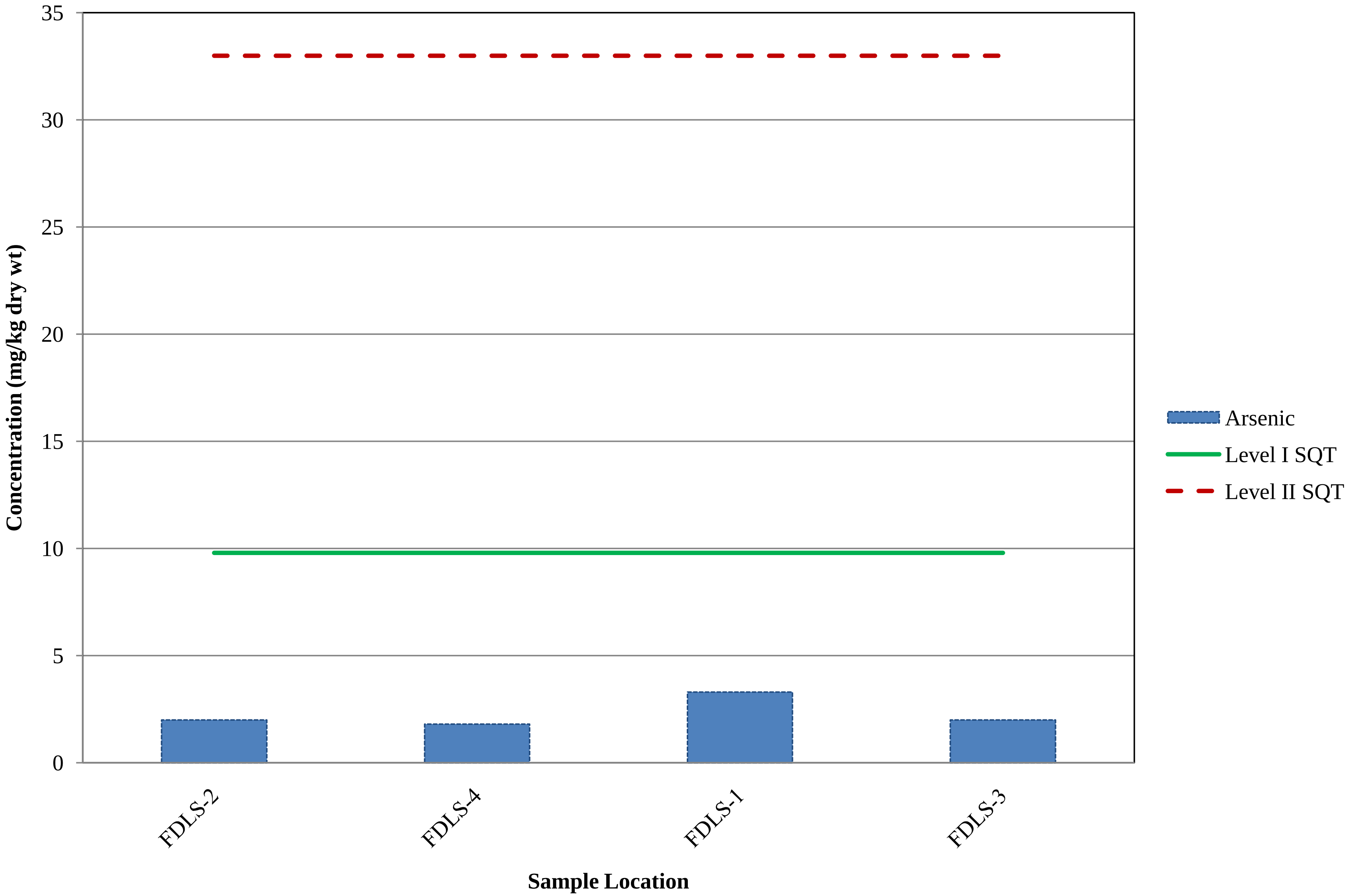


Figure 8.16-b
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Cadmium

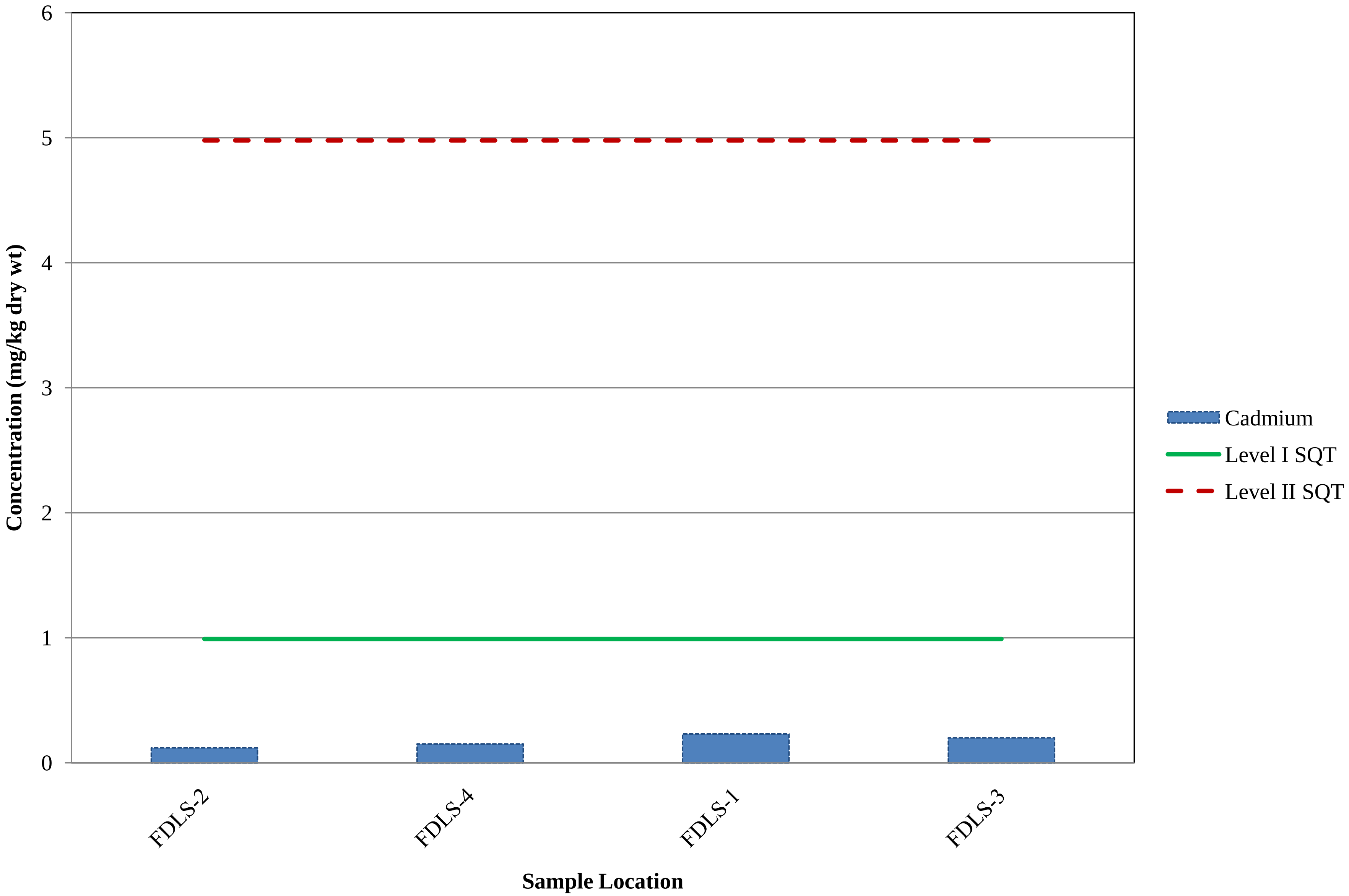


Figure 8.16-c
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Chromium

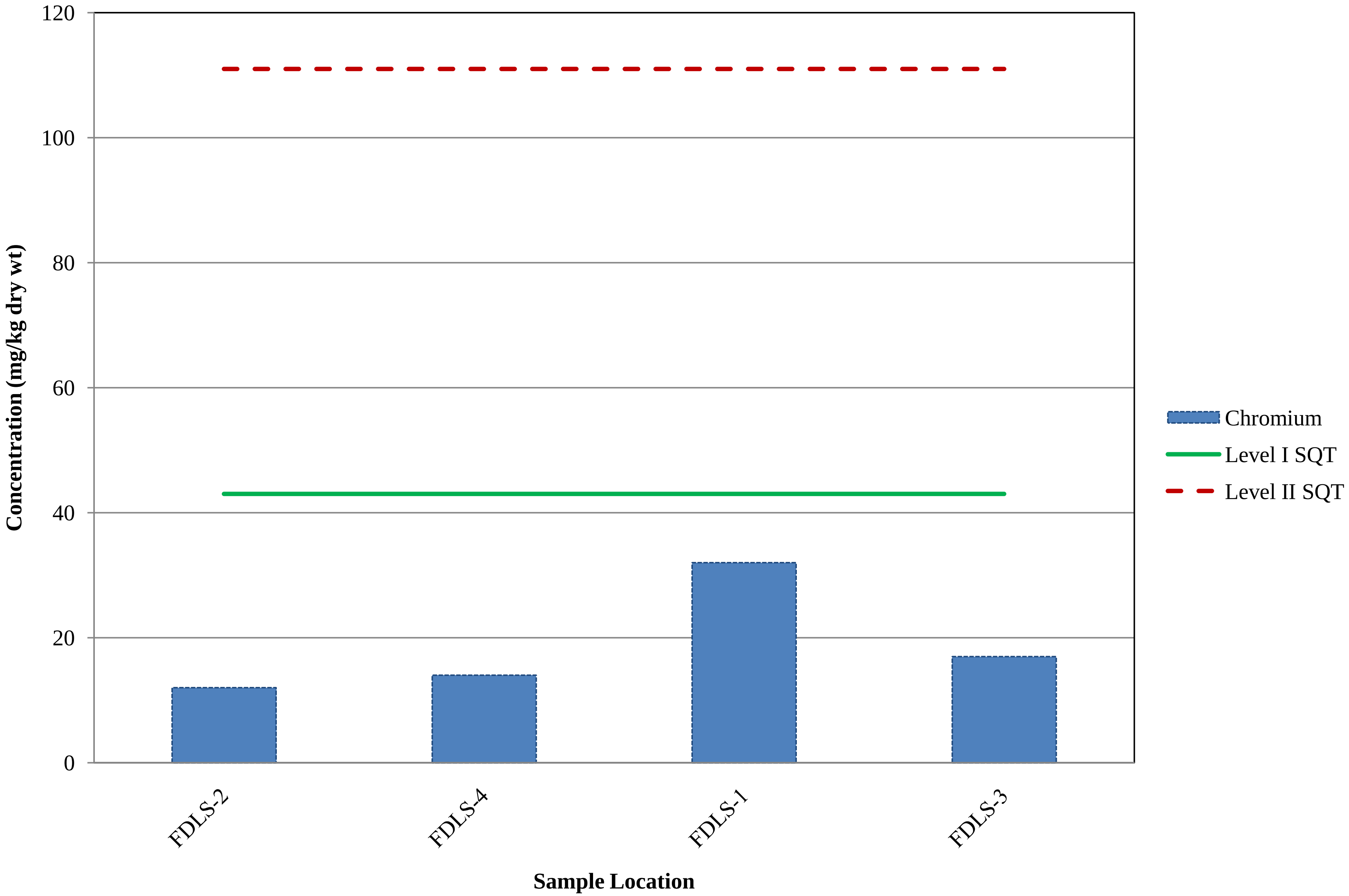


Figure 8.16-d
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Copper

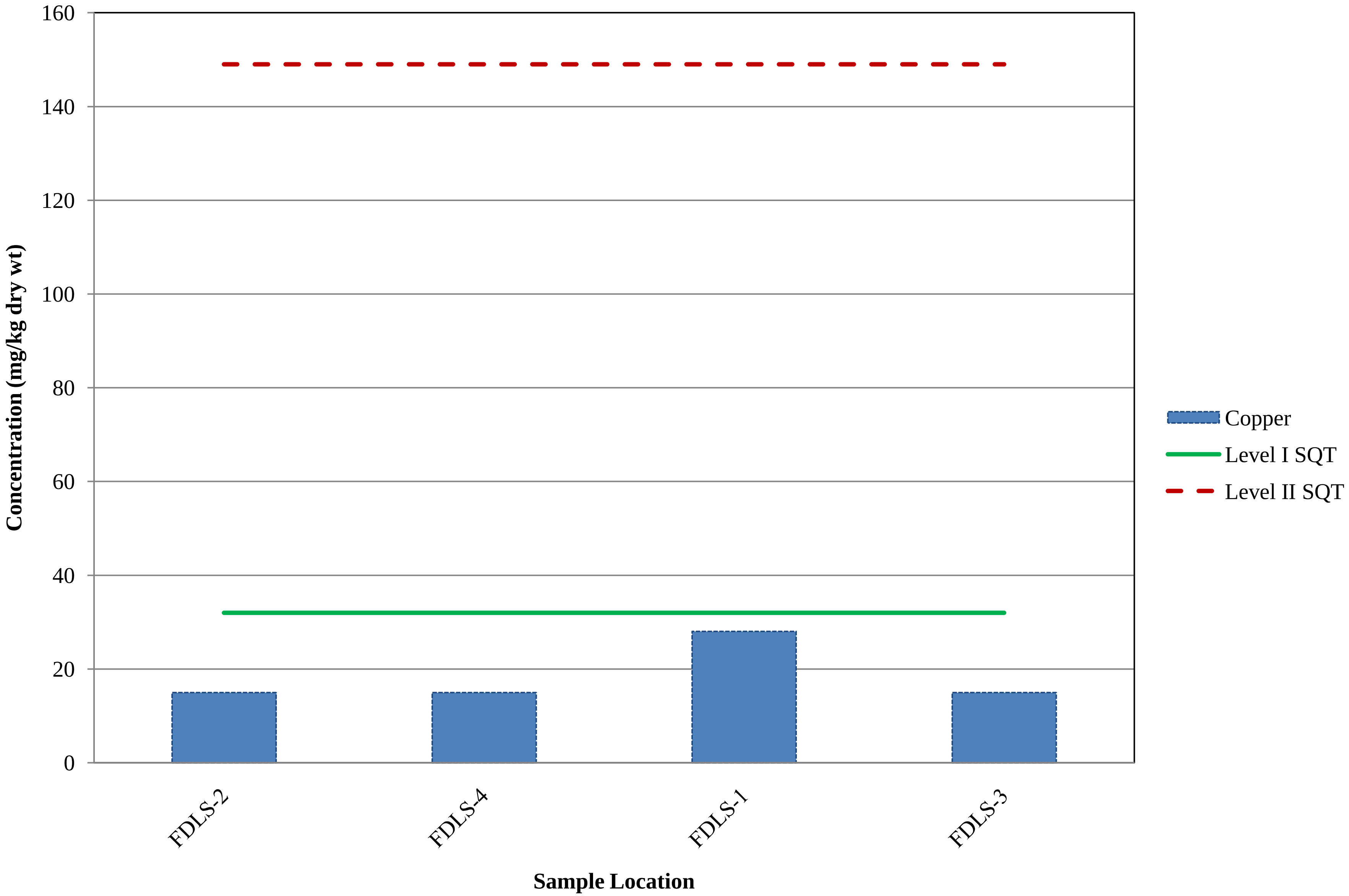


Figure 8.16-e
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Lead

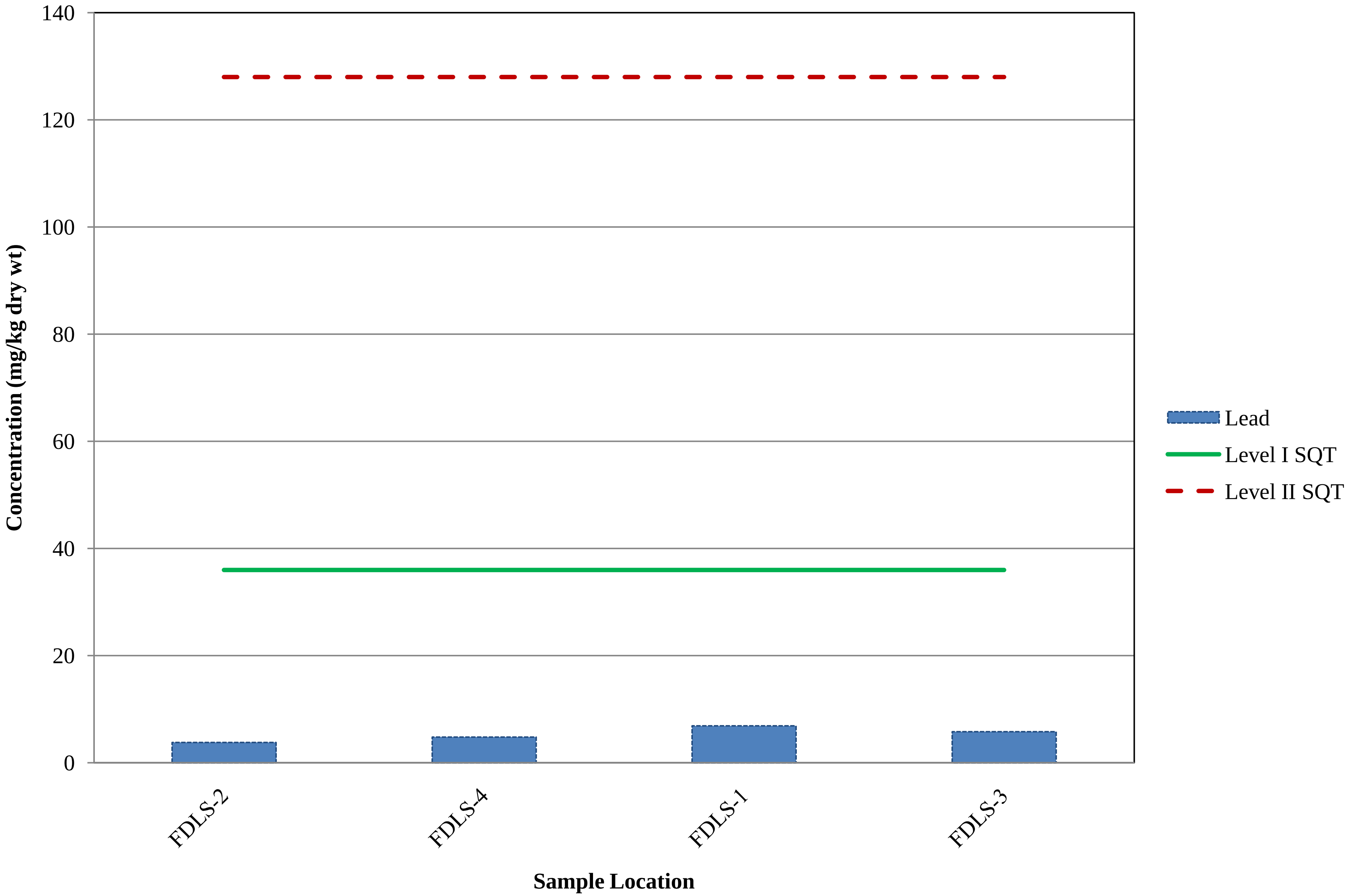


Figure 8.16-f
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Mercury

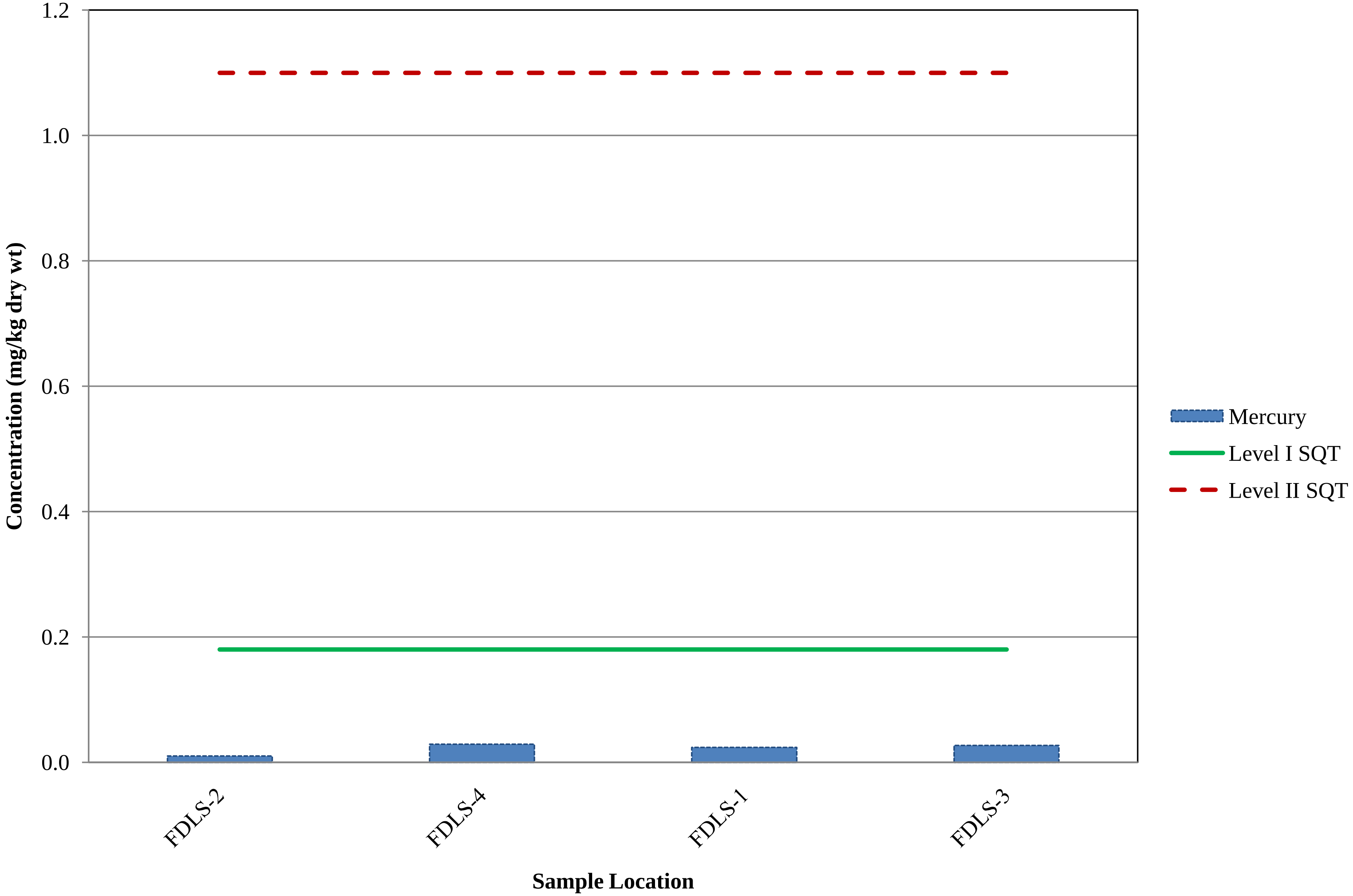


Figure 8.16-g
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Nickel

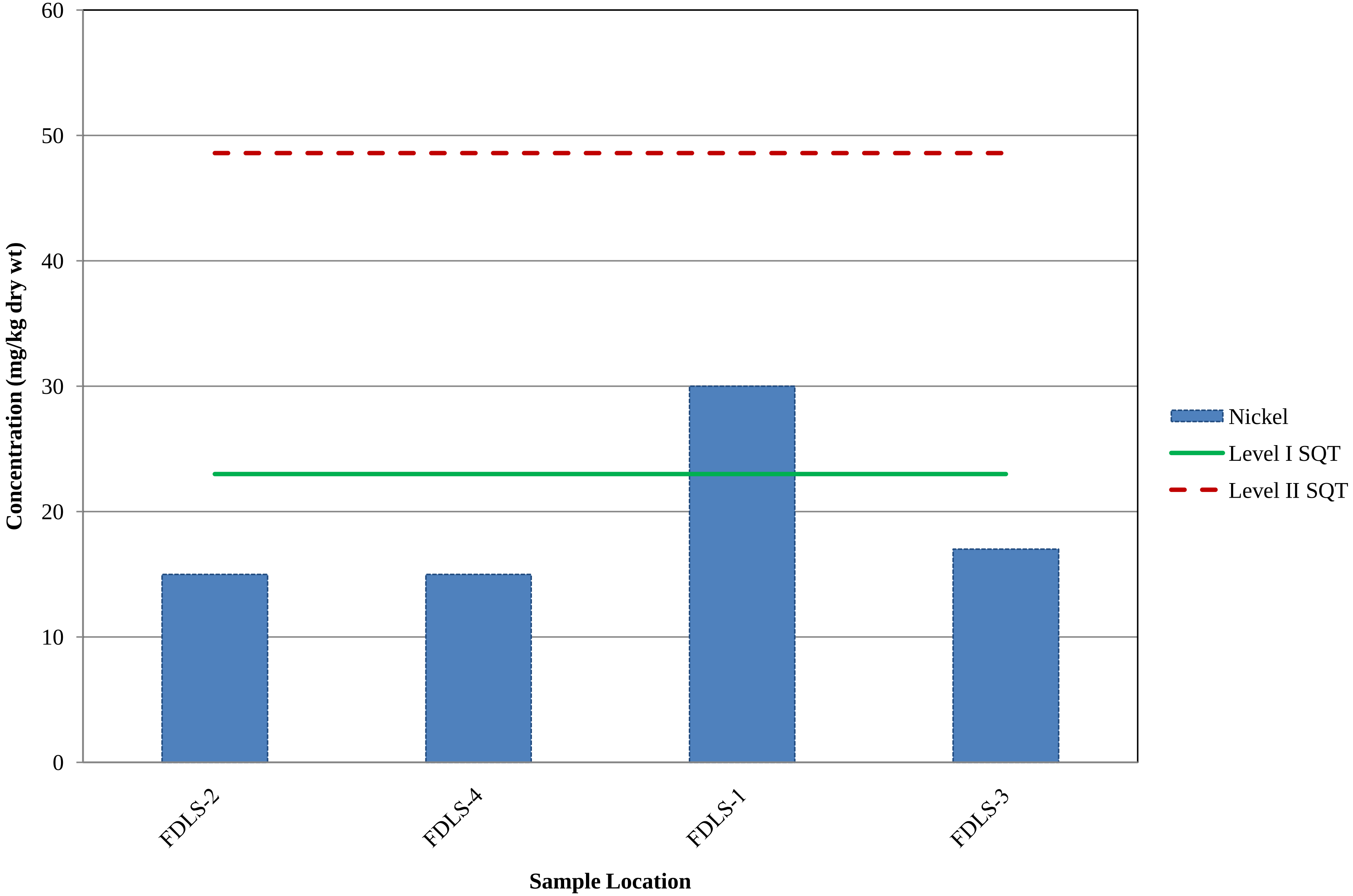


Figure 8.16-h
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Zinc

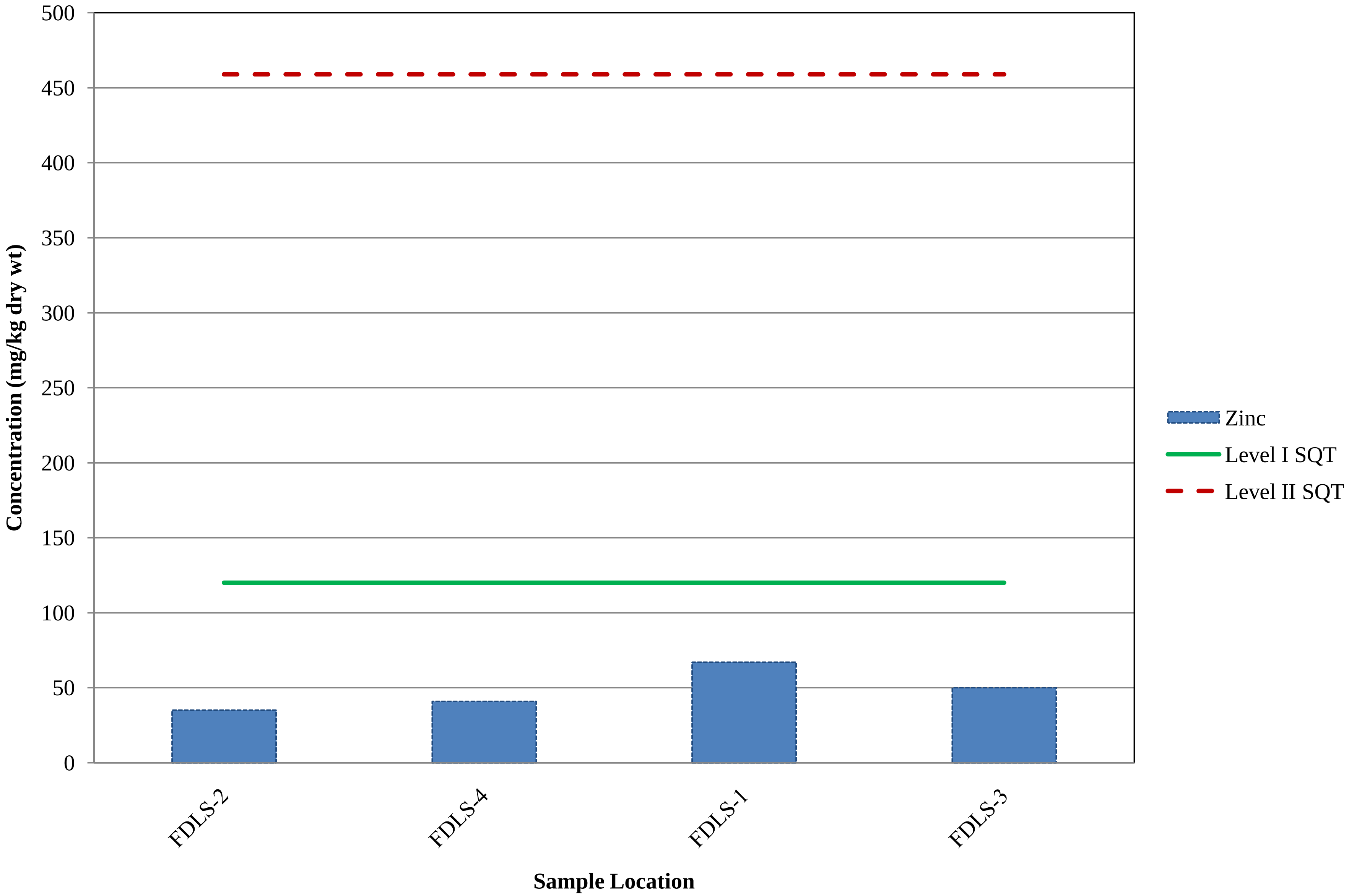


Figure 8.16-i
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - PAHs

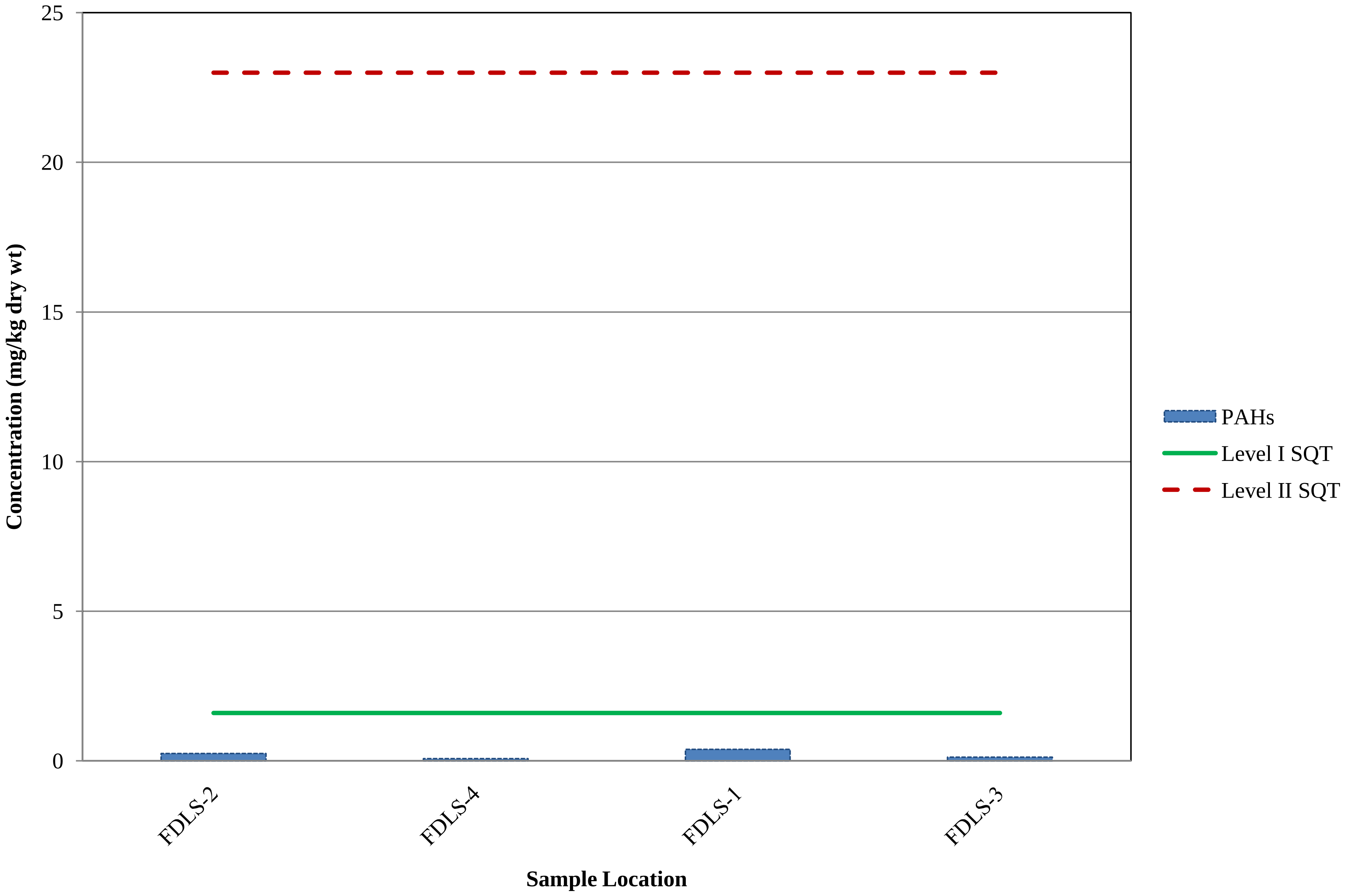


Figure 8.16-j
Fond Du Lac Stretch (Top of Sediment, 0-0.5 ft) - Dioxins

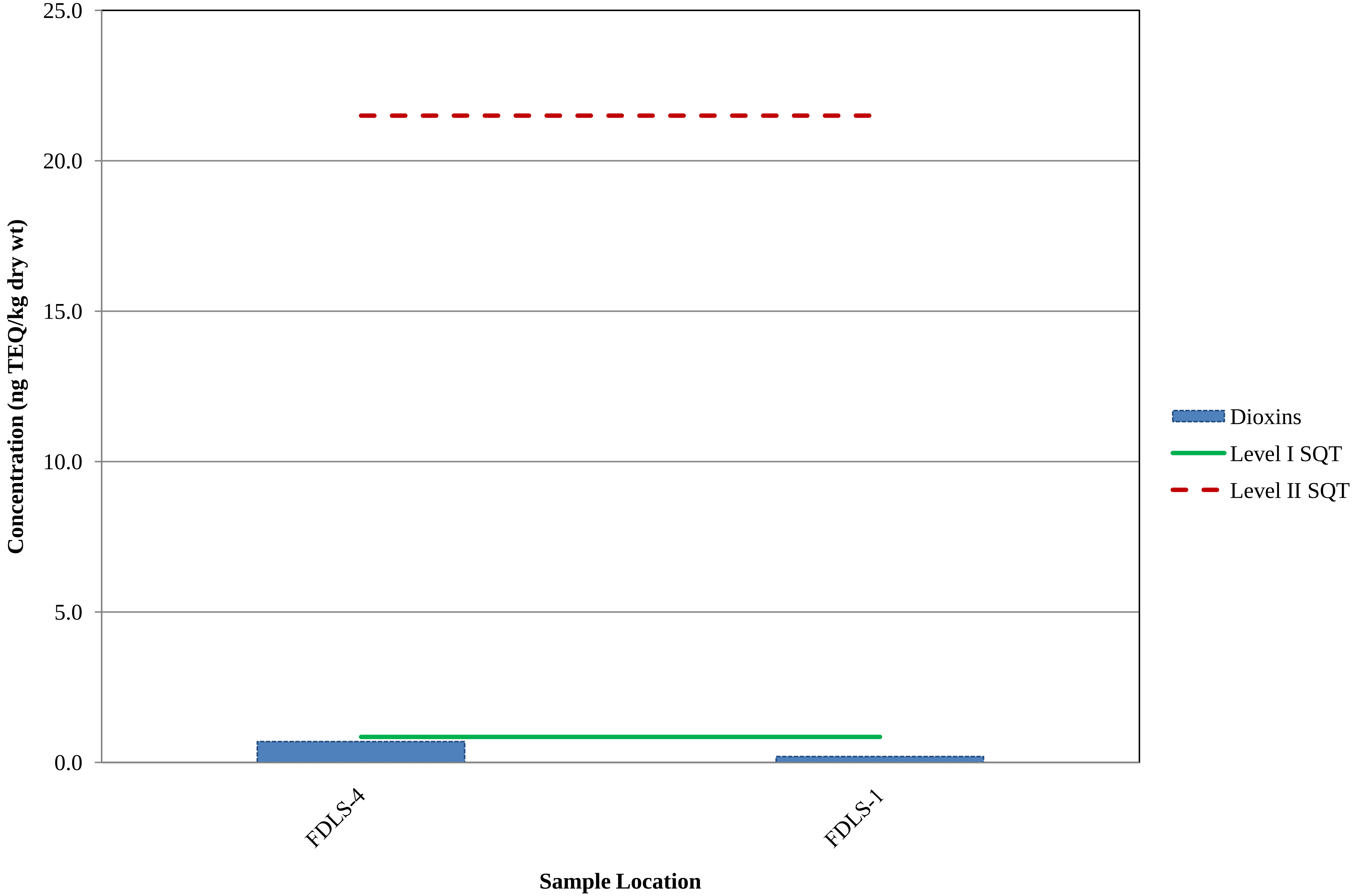


Figure 8.17-a
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Arsenic

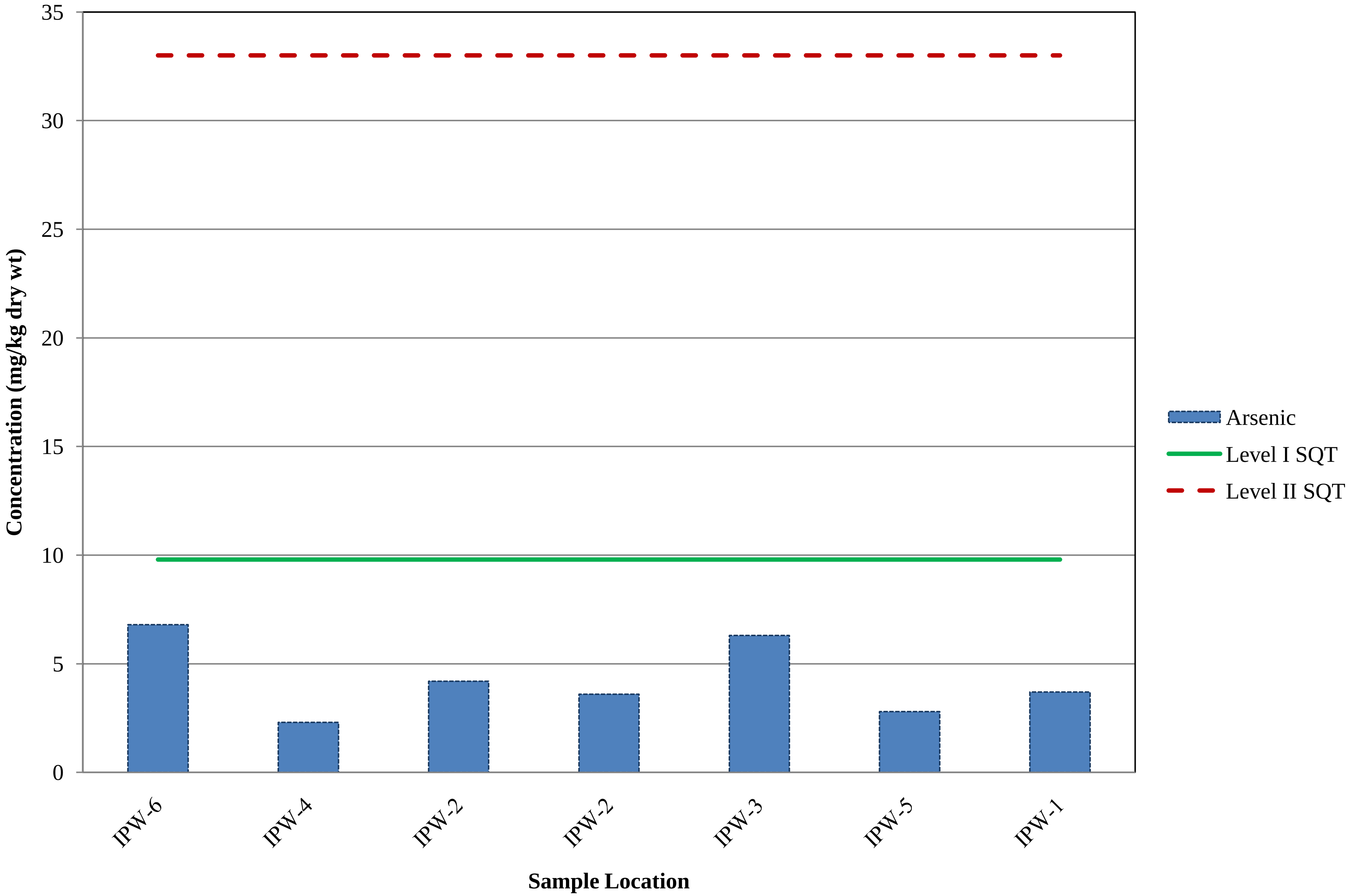


Figure 8.17-b
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Cadmium

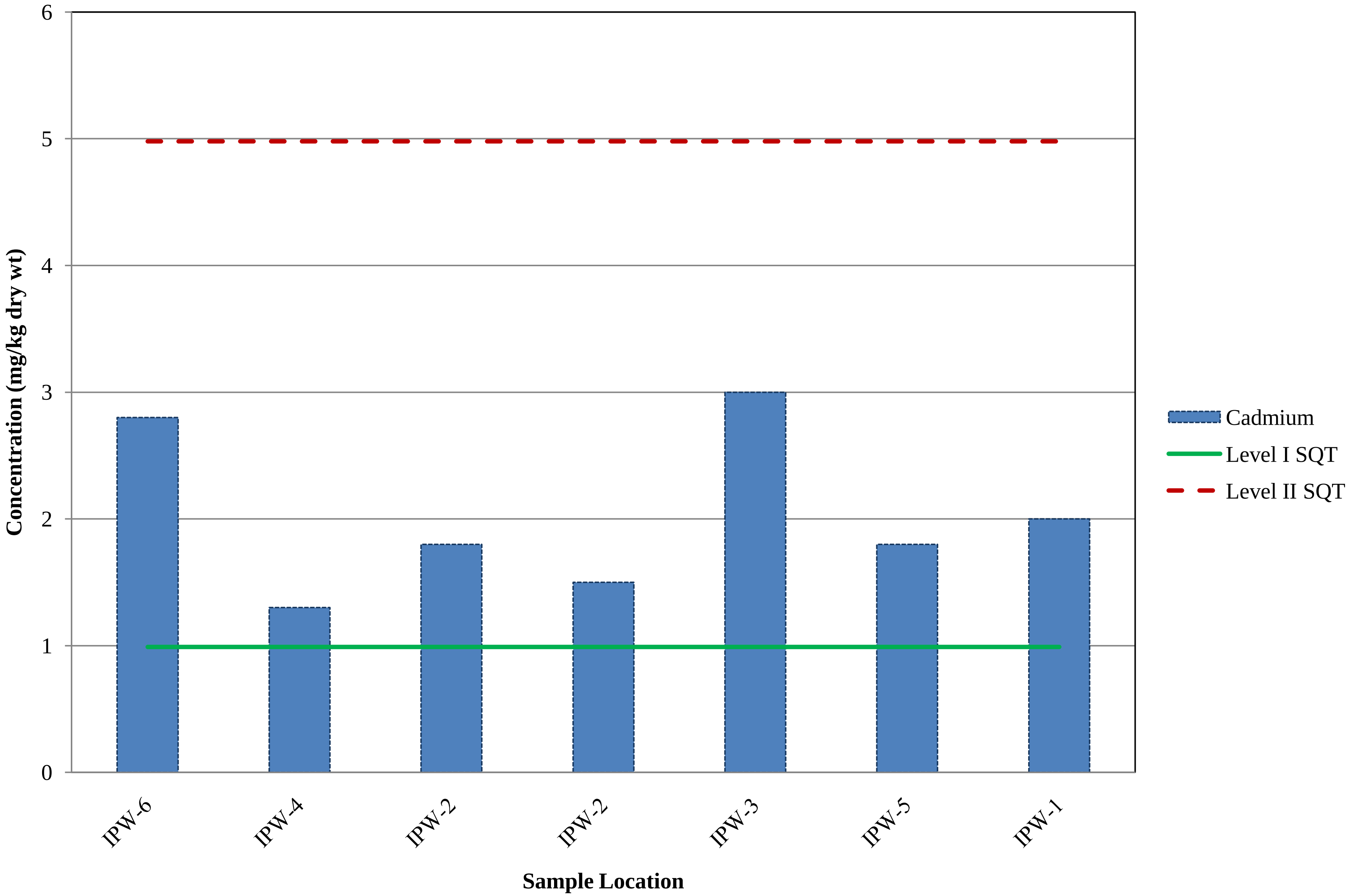


Figure 8.17-c
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Chromium

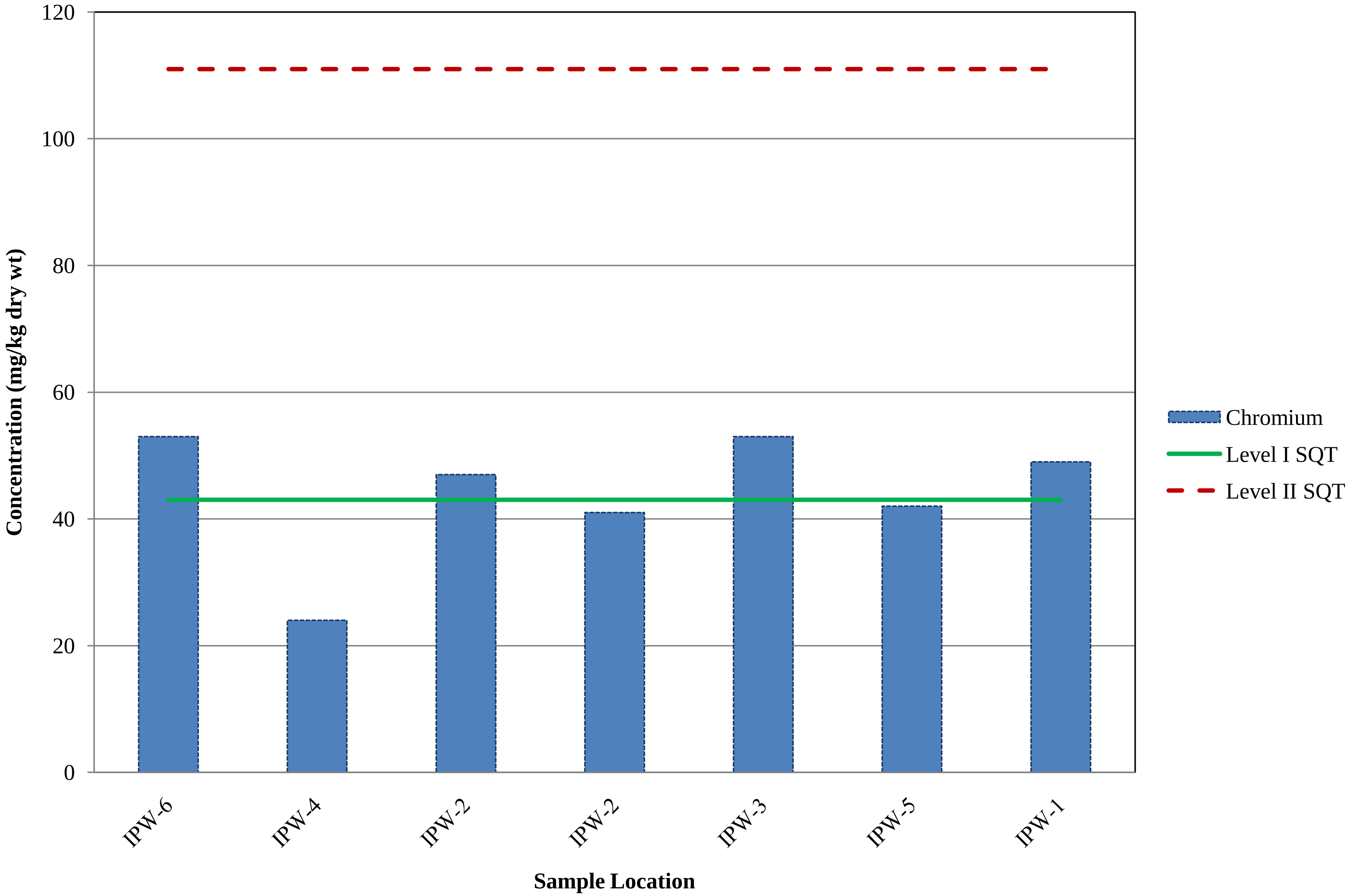


Figure 8.17-d
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Copper

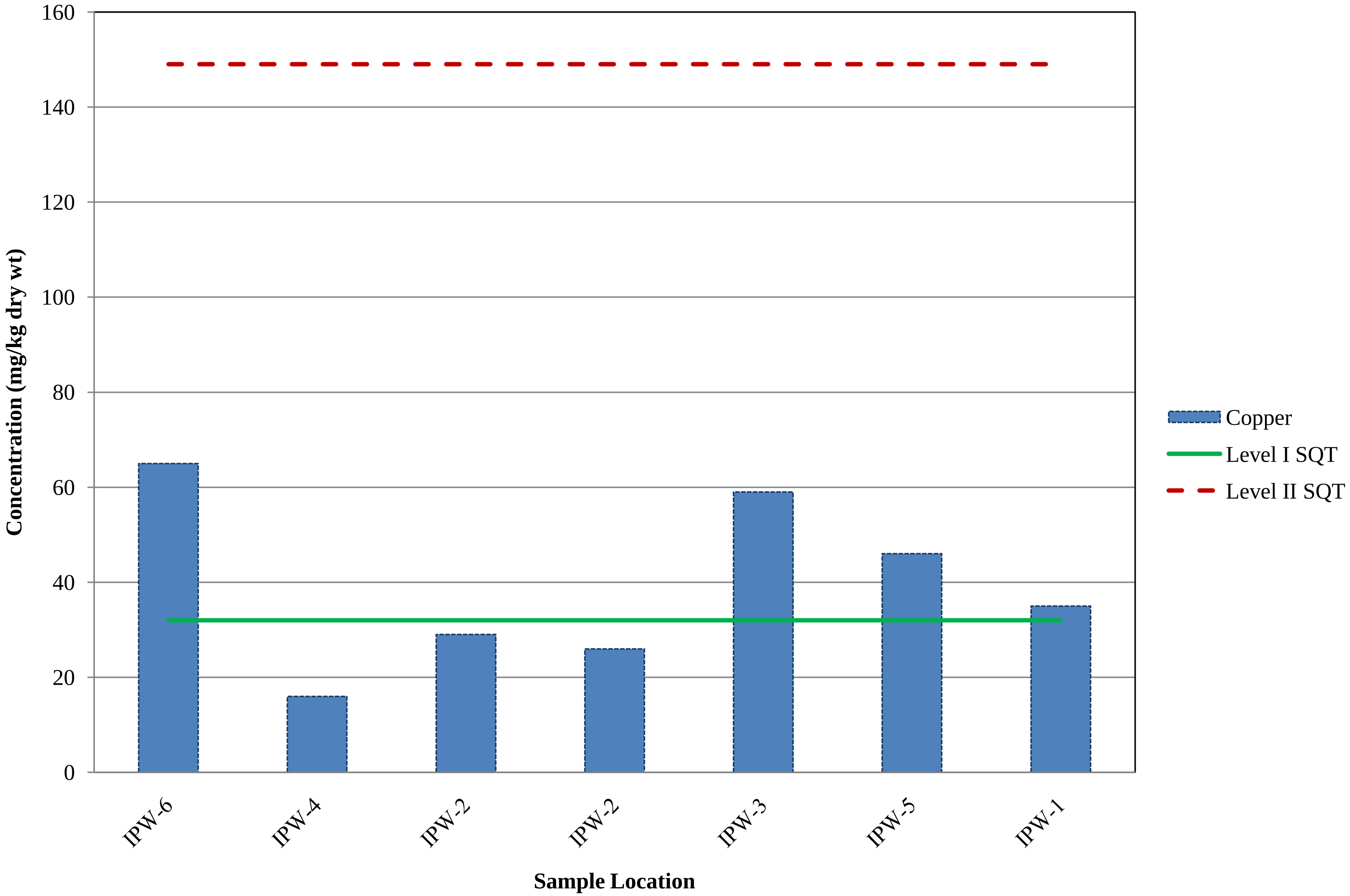


Figure 8.17-e
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Lead

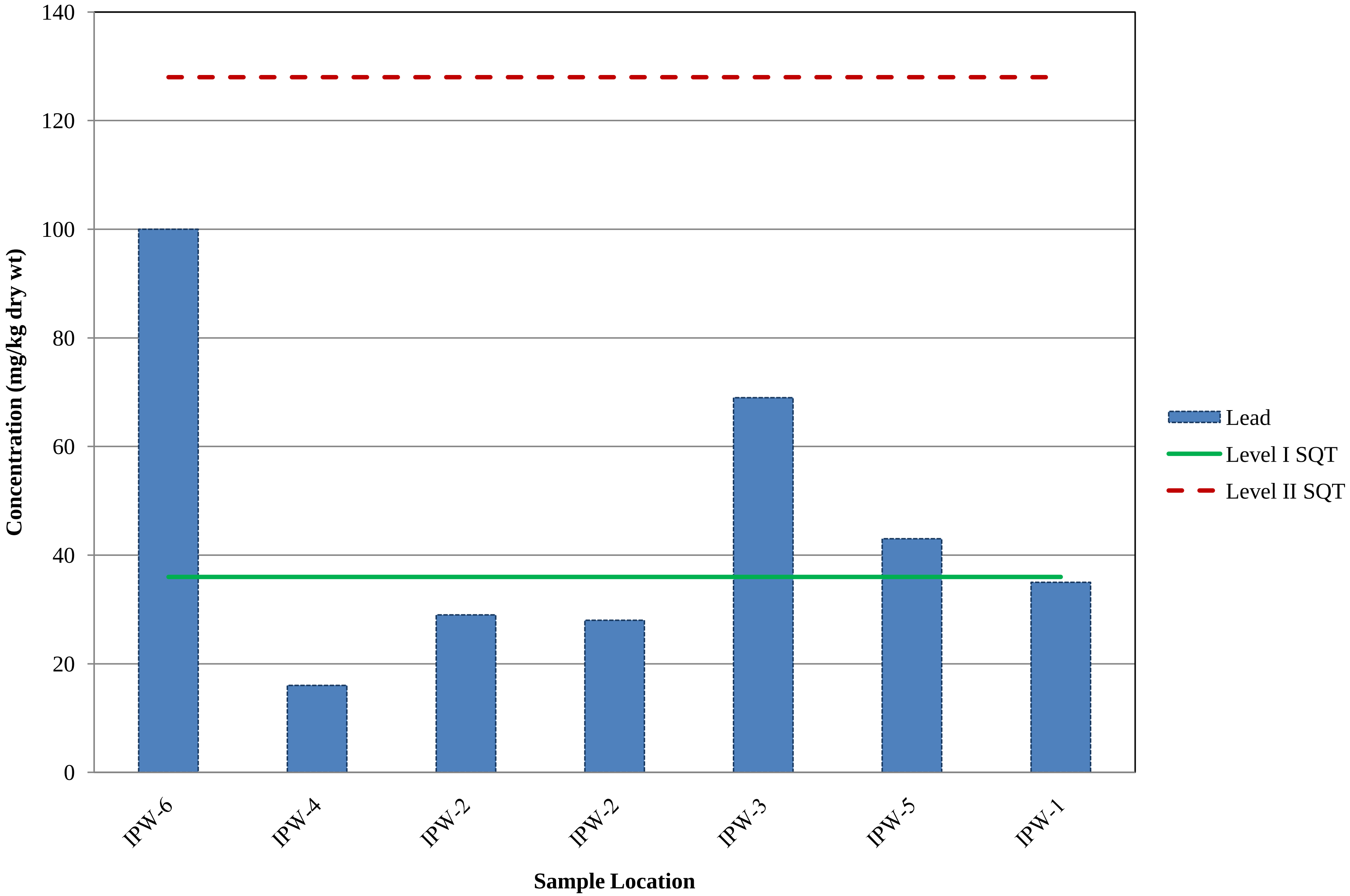


Figure 8.17-f
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Mercury

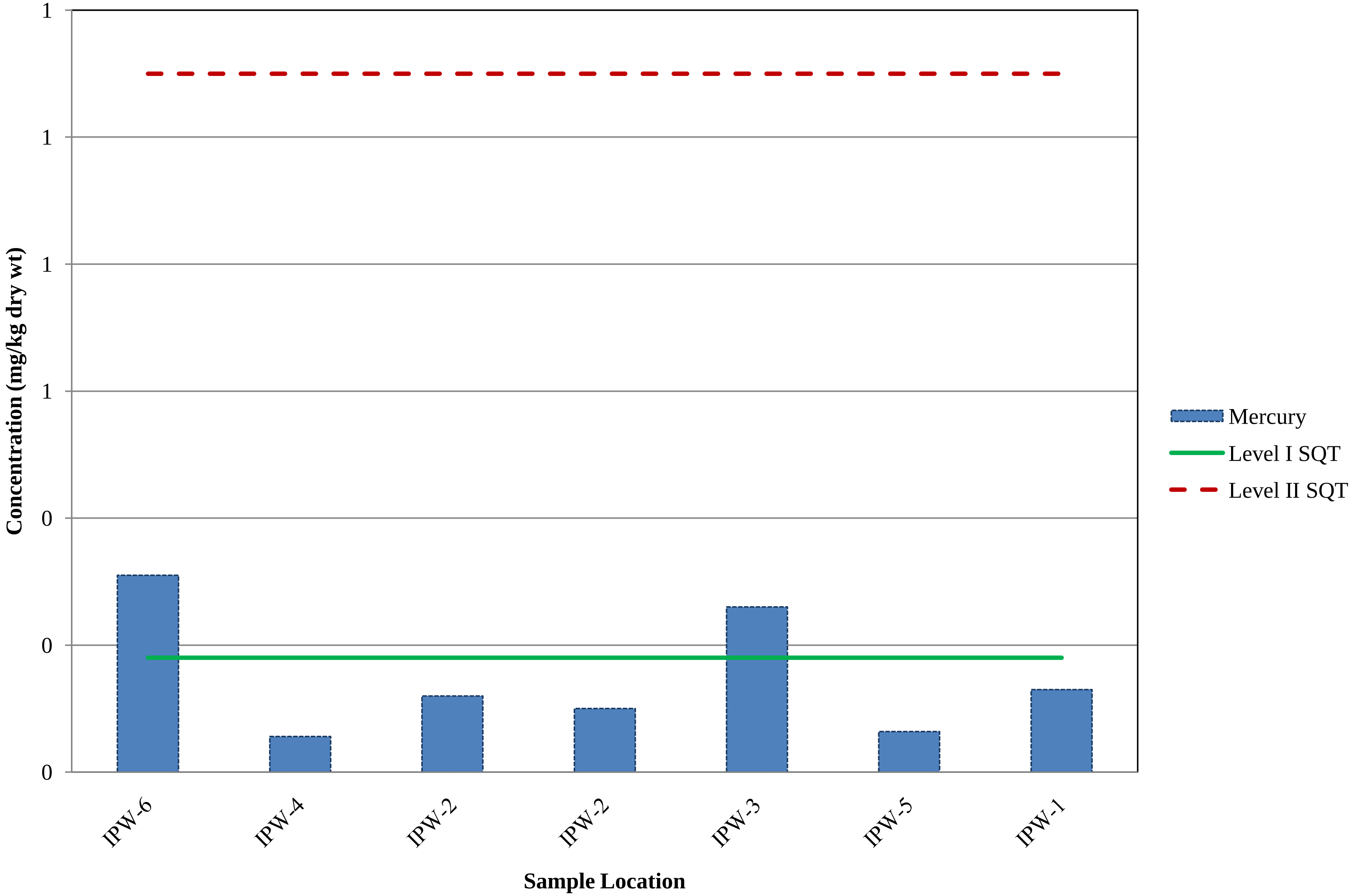


Figure 8.17-g
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Nickel

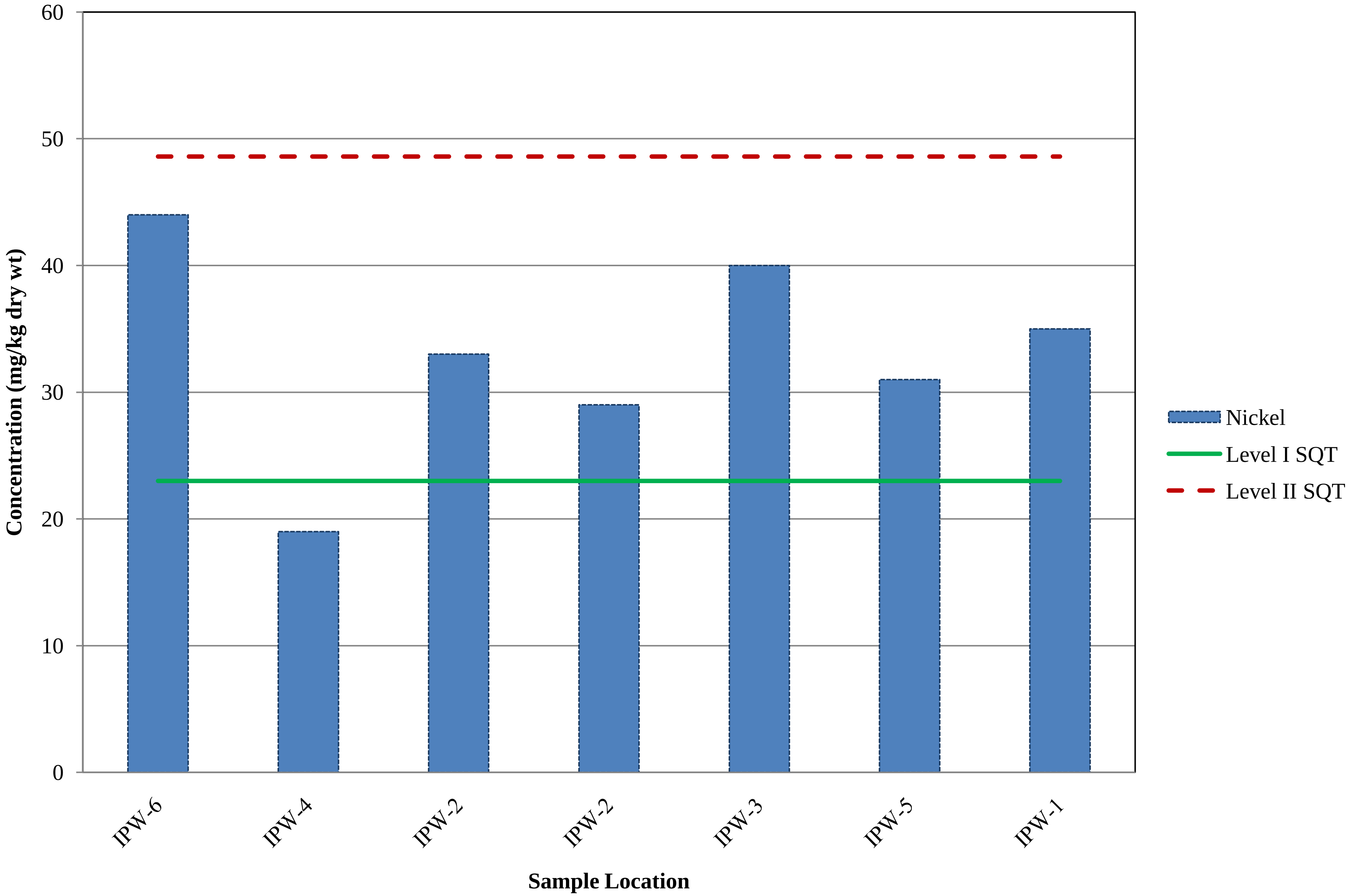


Figure 8.17-h
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Zinc

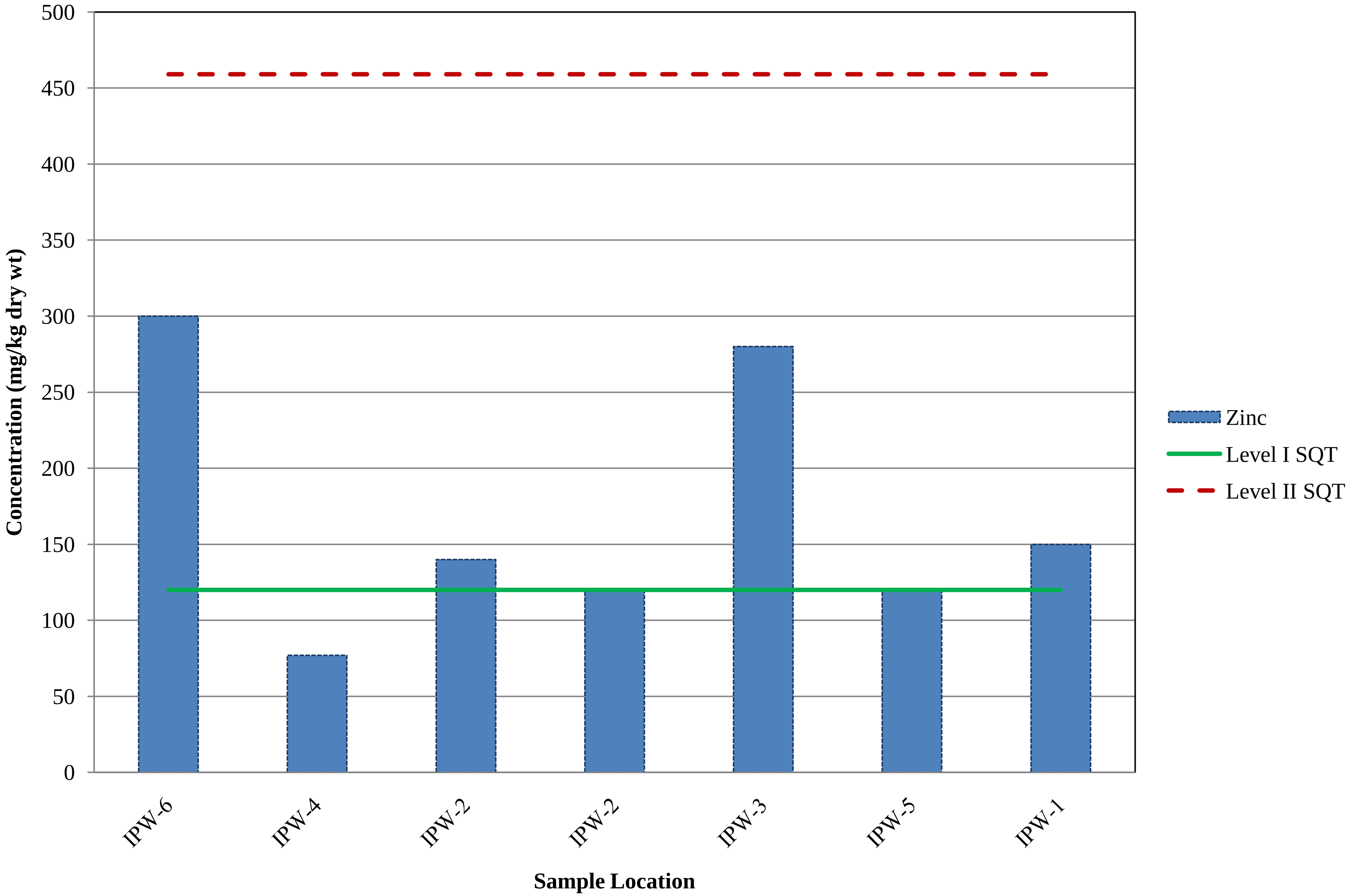


Figure 8.17-i
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - PAHs

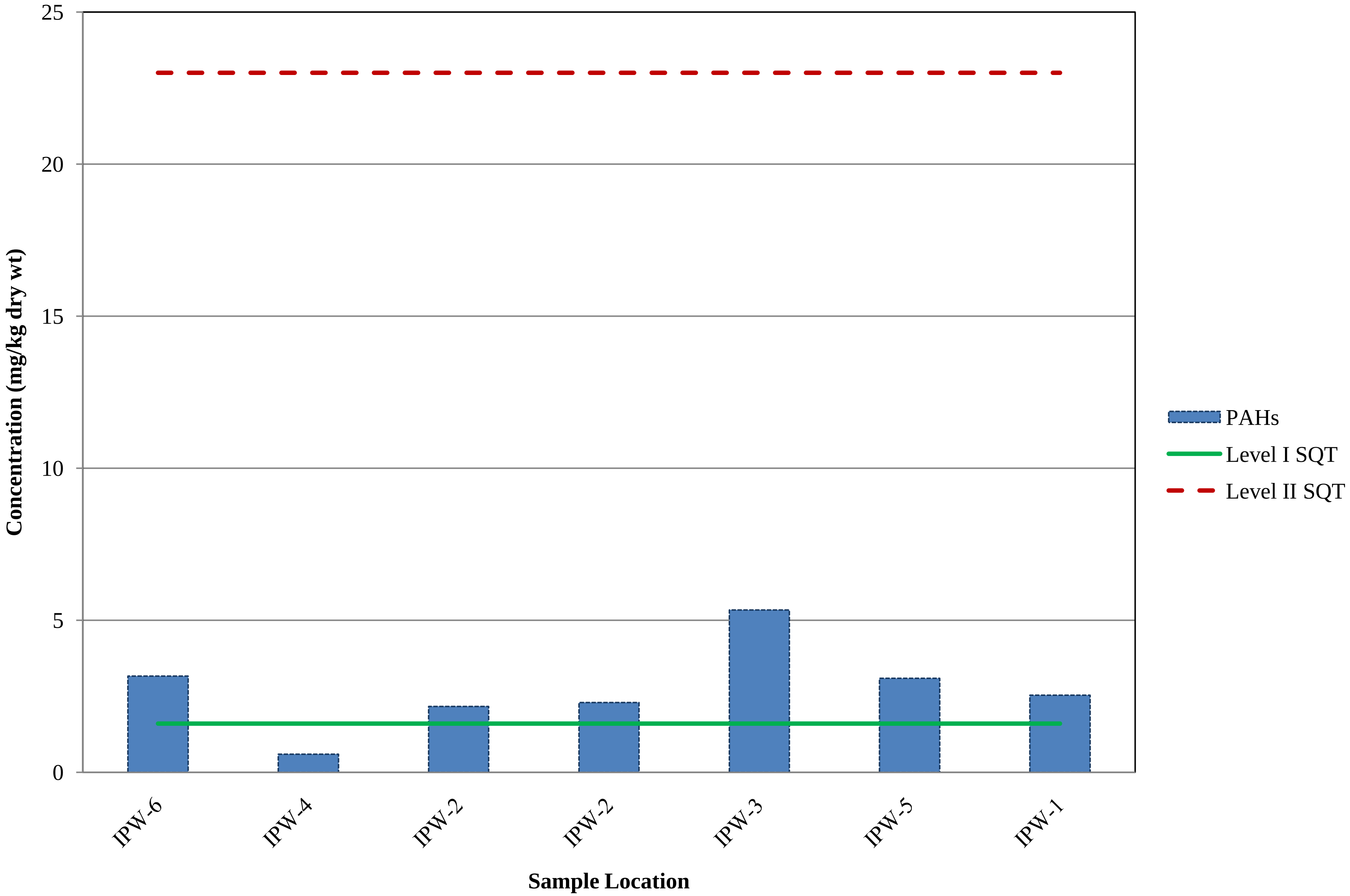


Figure 8.17-j
Indian Point Waterfront (Top of Sediment, 0-0.5 ft) - Dioxins

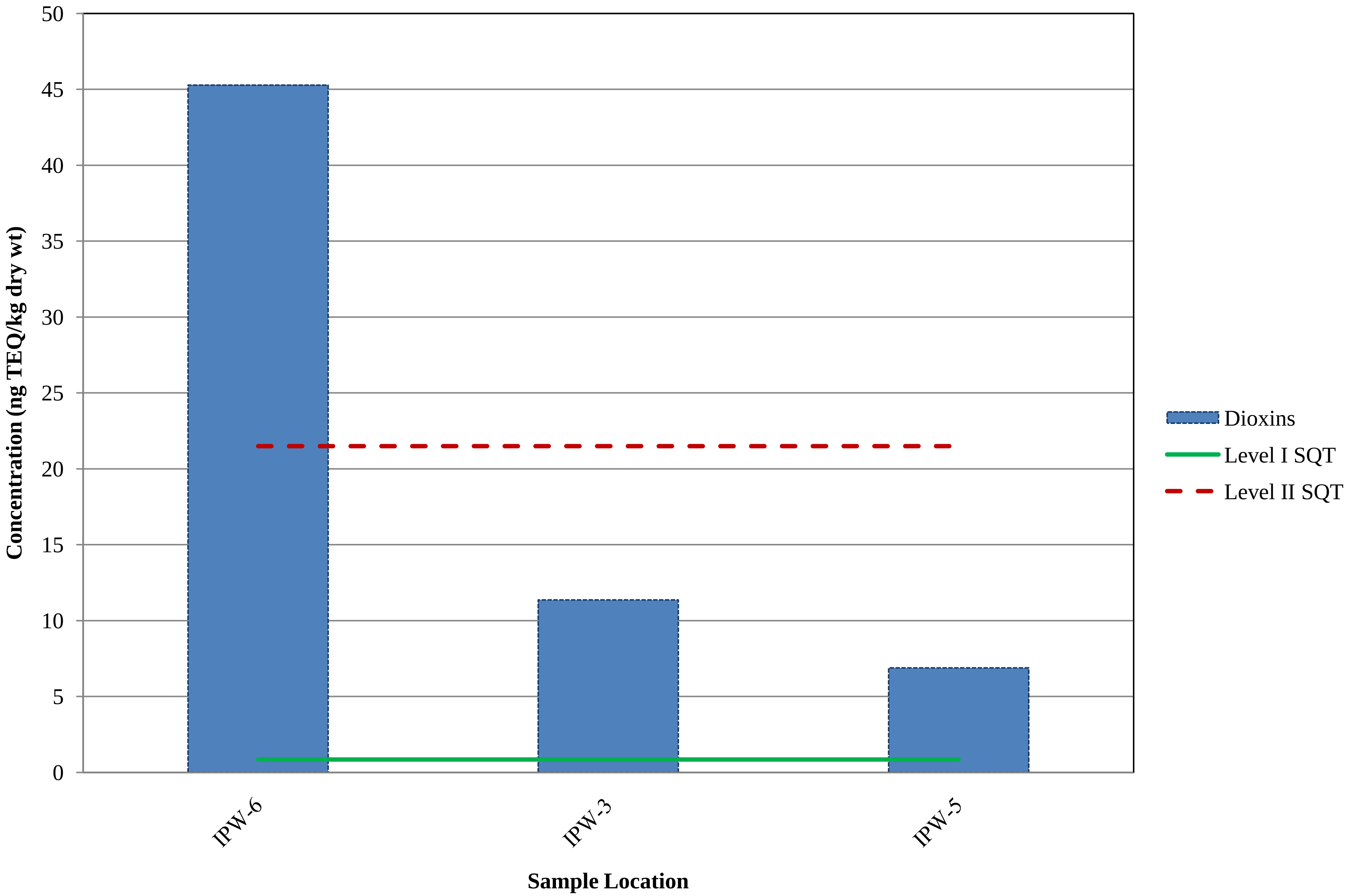


Figure 8.18-a
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Arsenic

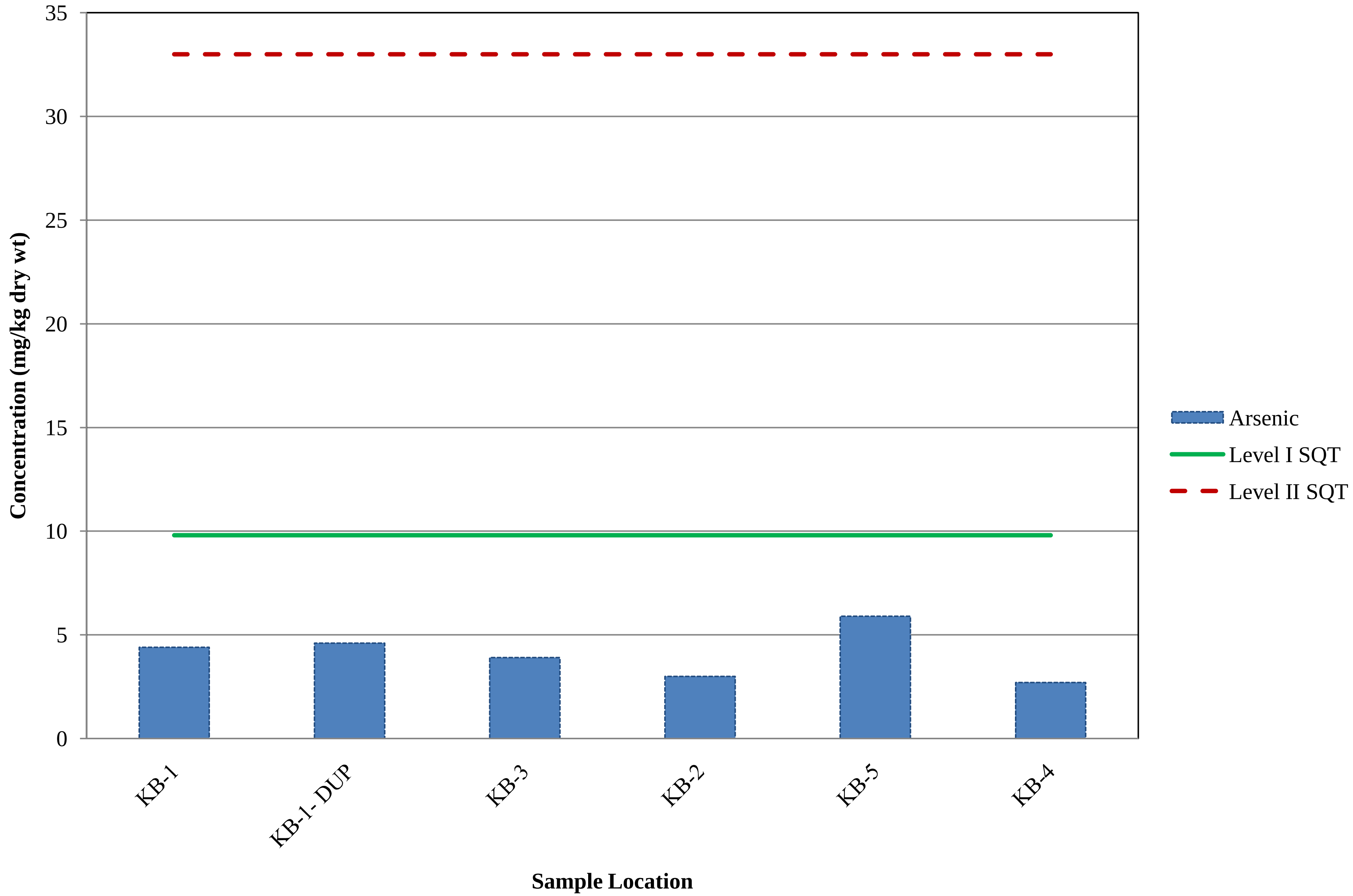


Figure 8.18-b
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Cadmium

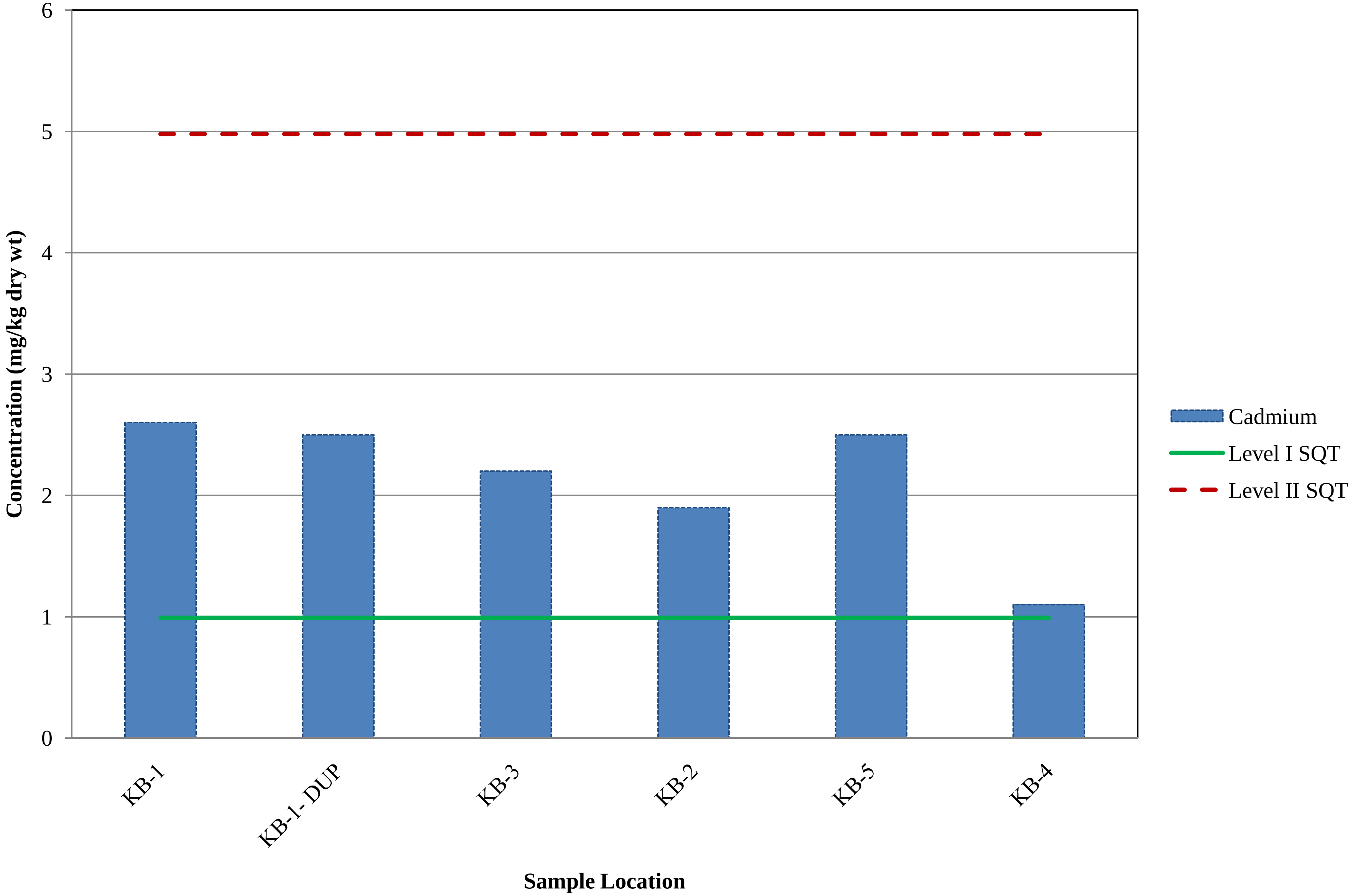


Figure 8.18-c
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Chromium

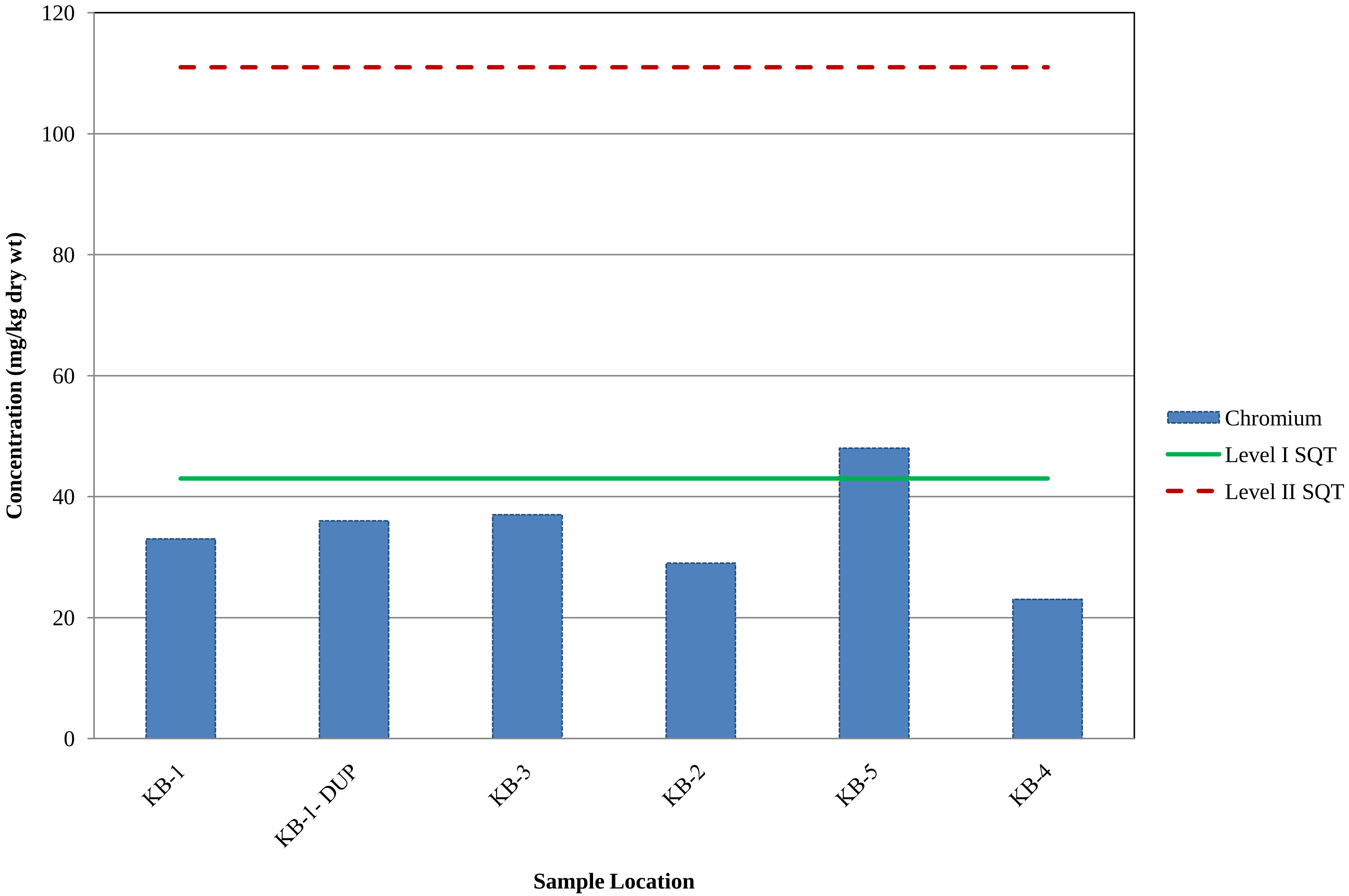


Figure 8.18-d
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Copper

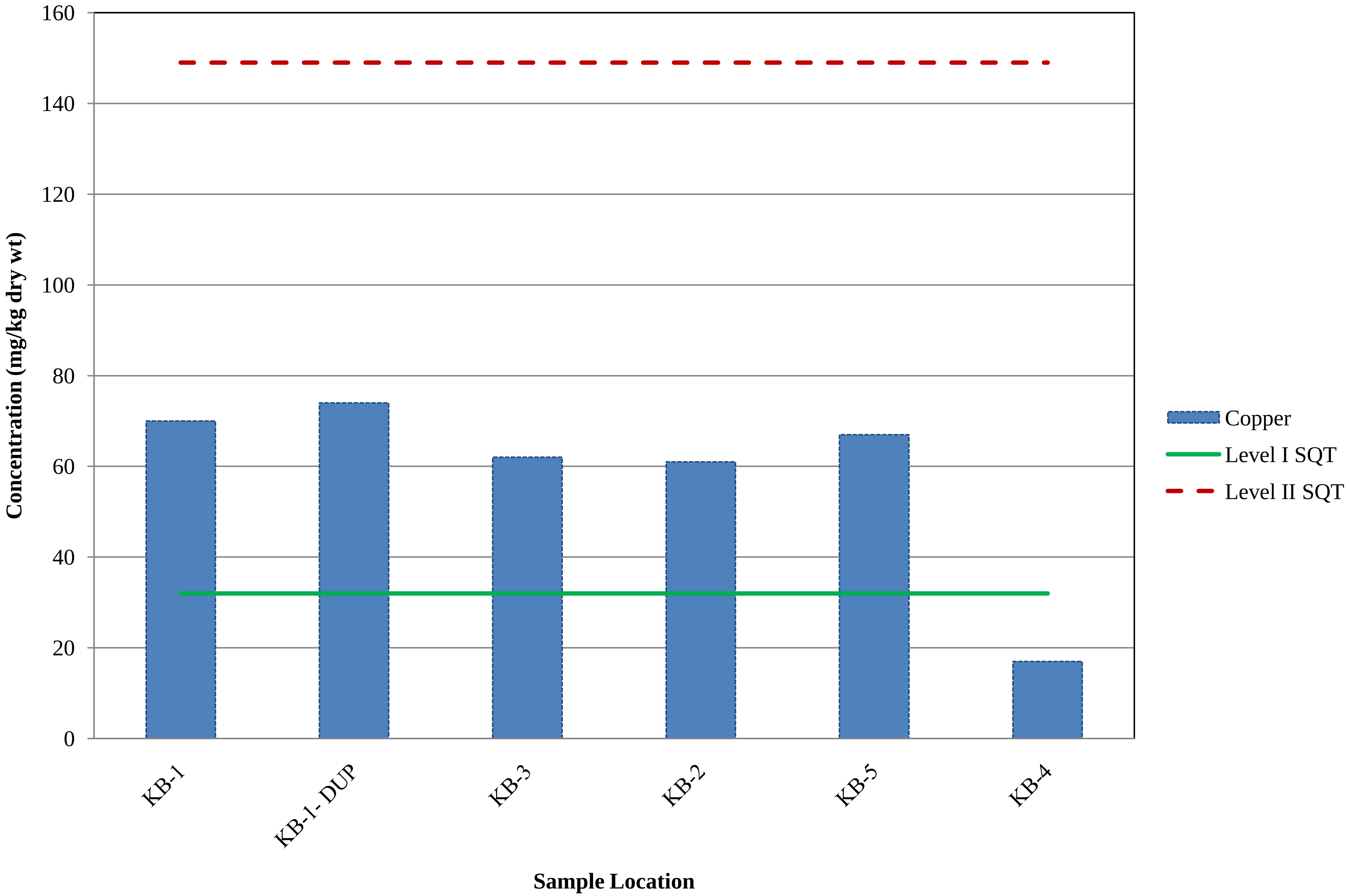


Figure 8.18-e
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Lead

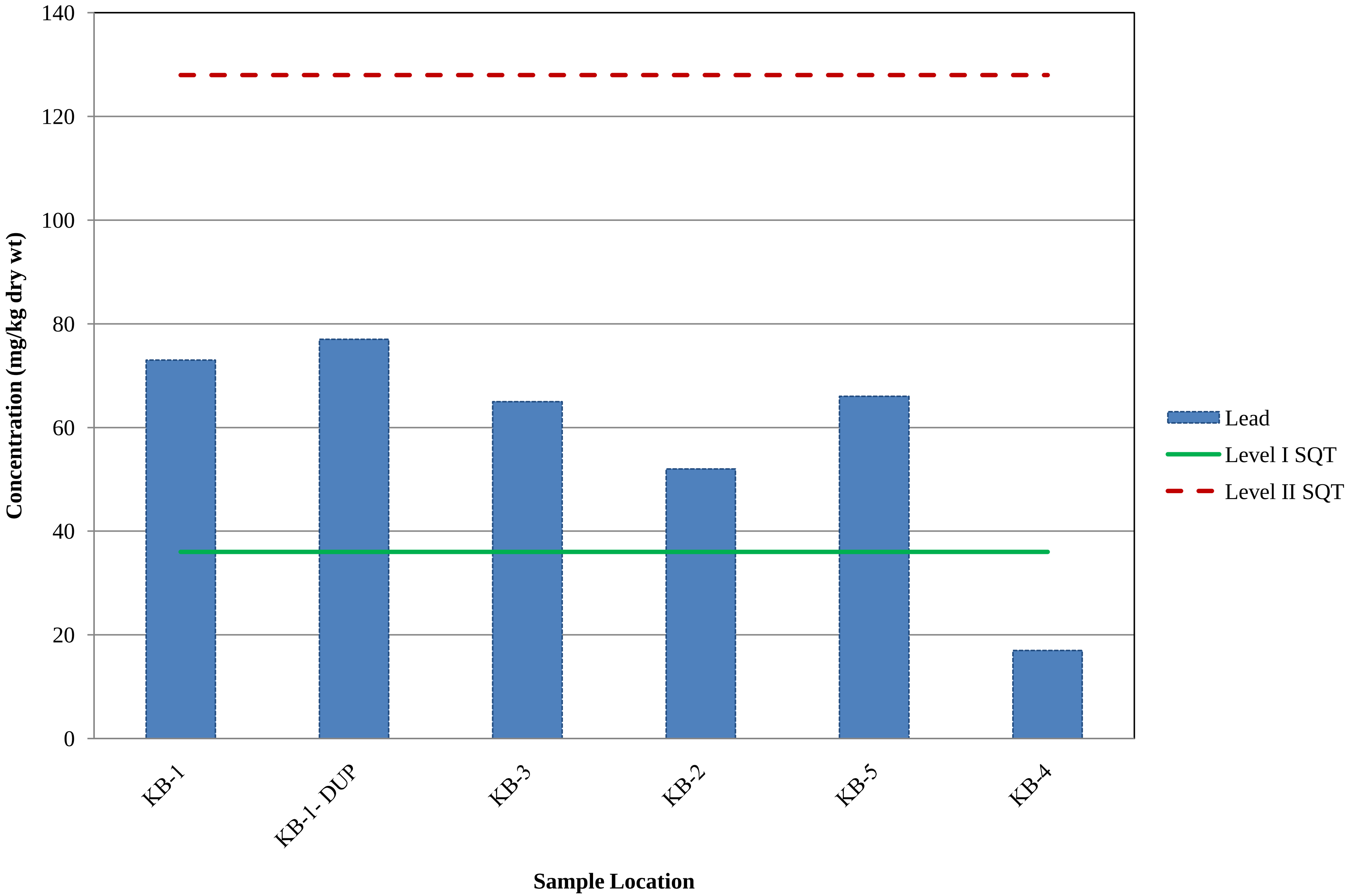


Figure 8.18-f
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Mercury

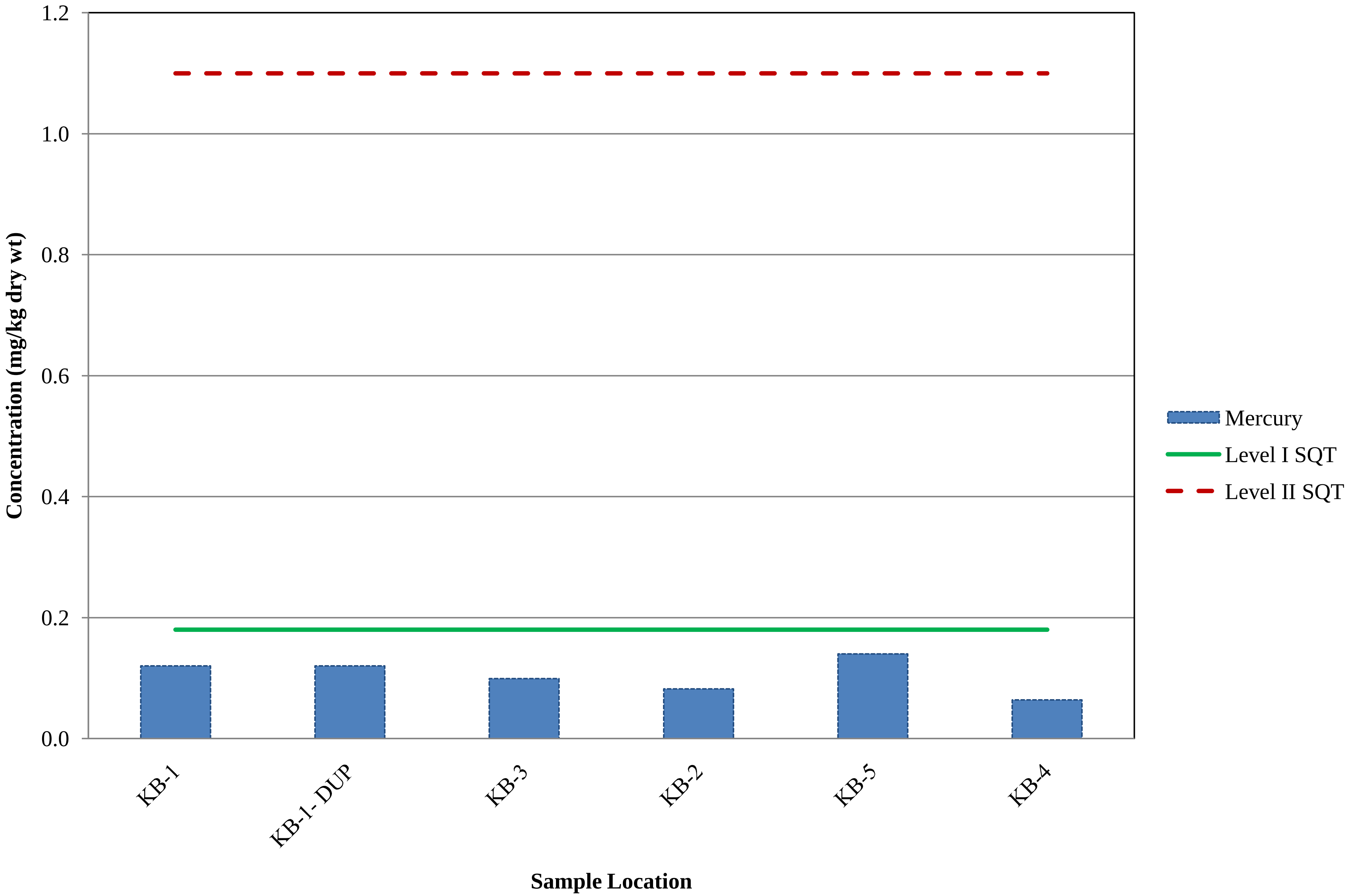
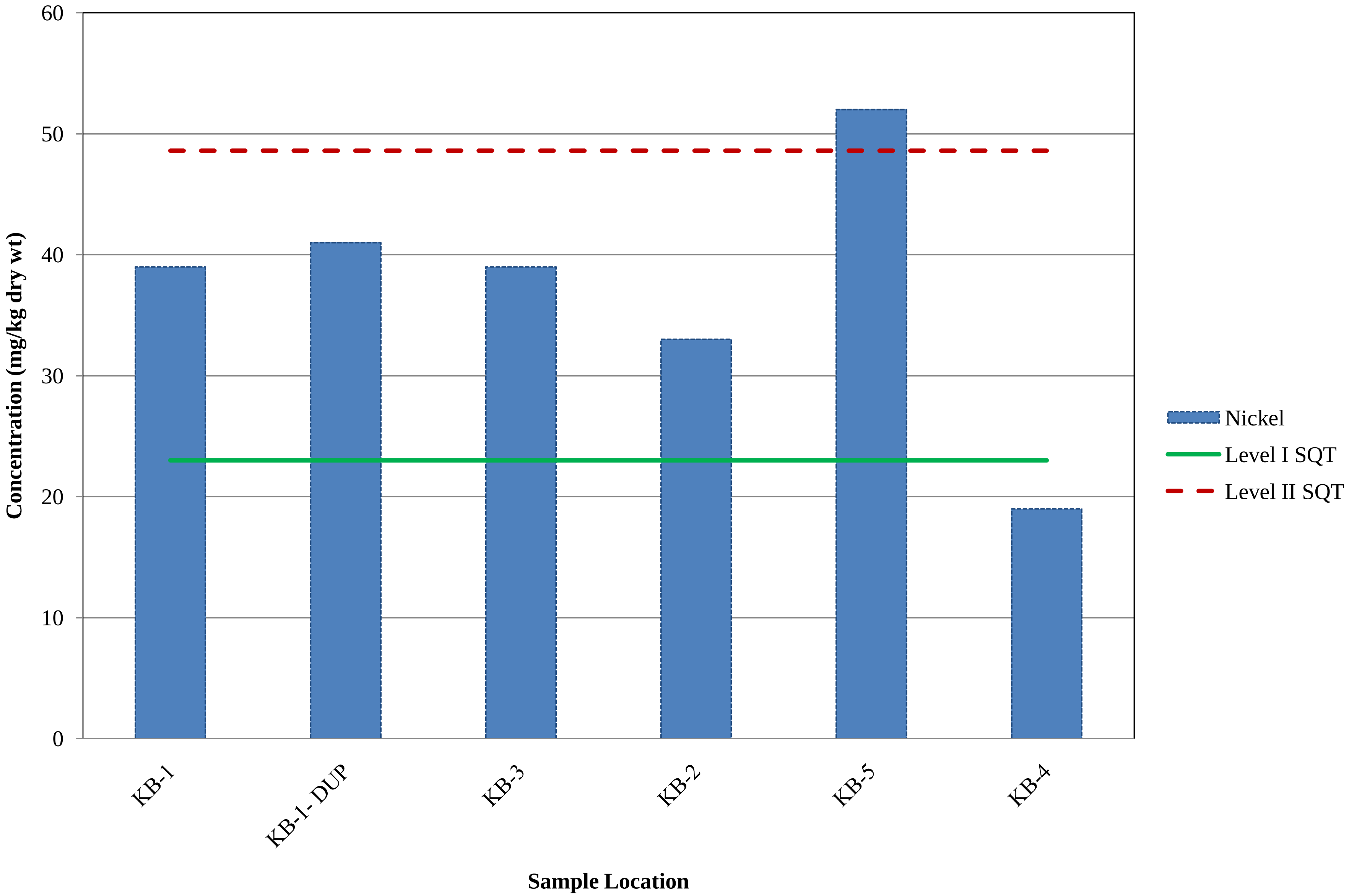


Figure 8.18-g
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Nickel



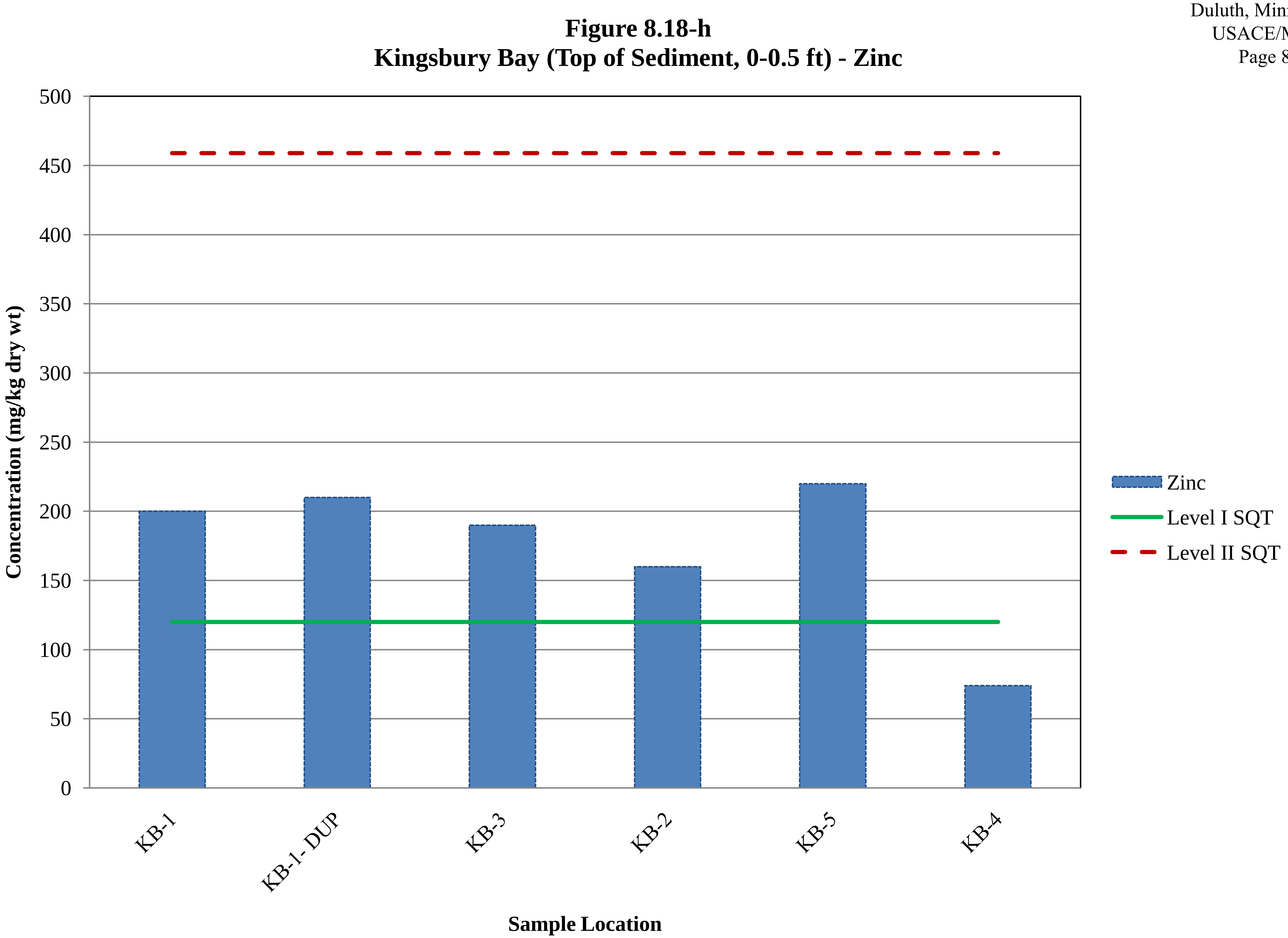


Figure 8.18-h
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Zinc
Concentration (mg/kg dry wt)
500
450
400
350
300
250
200
150
100
50
0
KB-1
KB-1- DUP
KB-3
KB-2
KB-5
KB-4
Sample Location
Zinc
Level I SQT
Level II SQT

Figure 8.18-i
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - PAHs

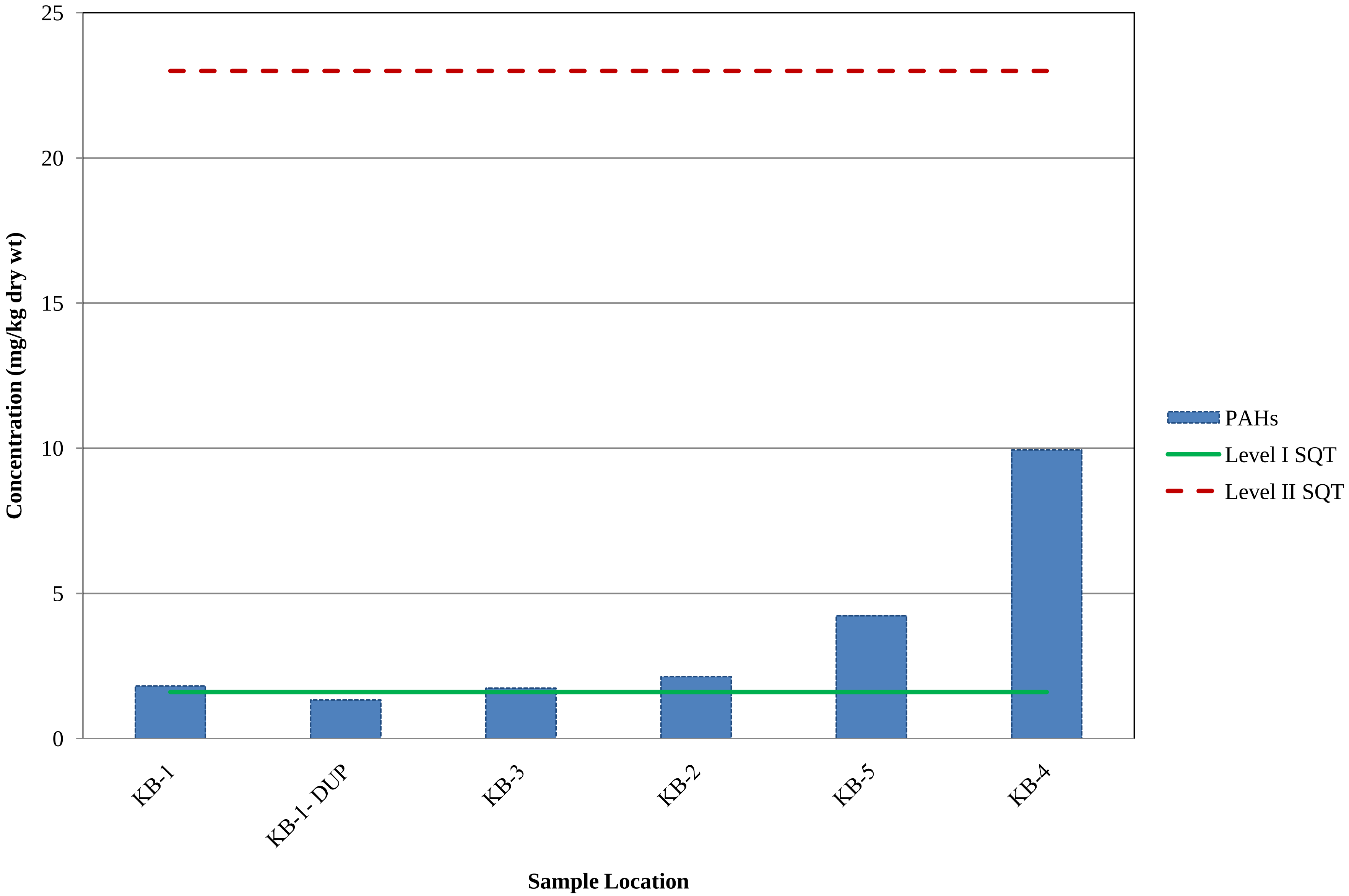


Figure 8.18-j
Kingsbury Bay (Top of Sediment, 0-0.5 ft) - Dioxins

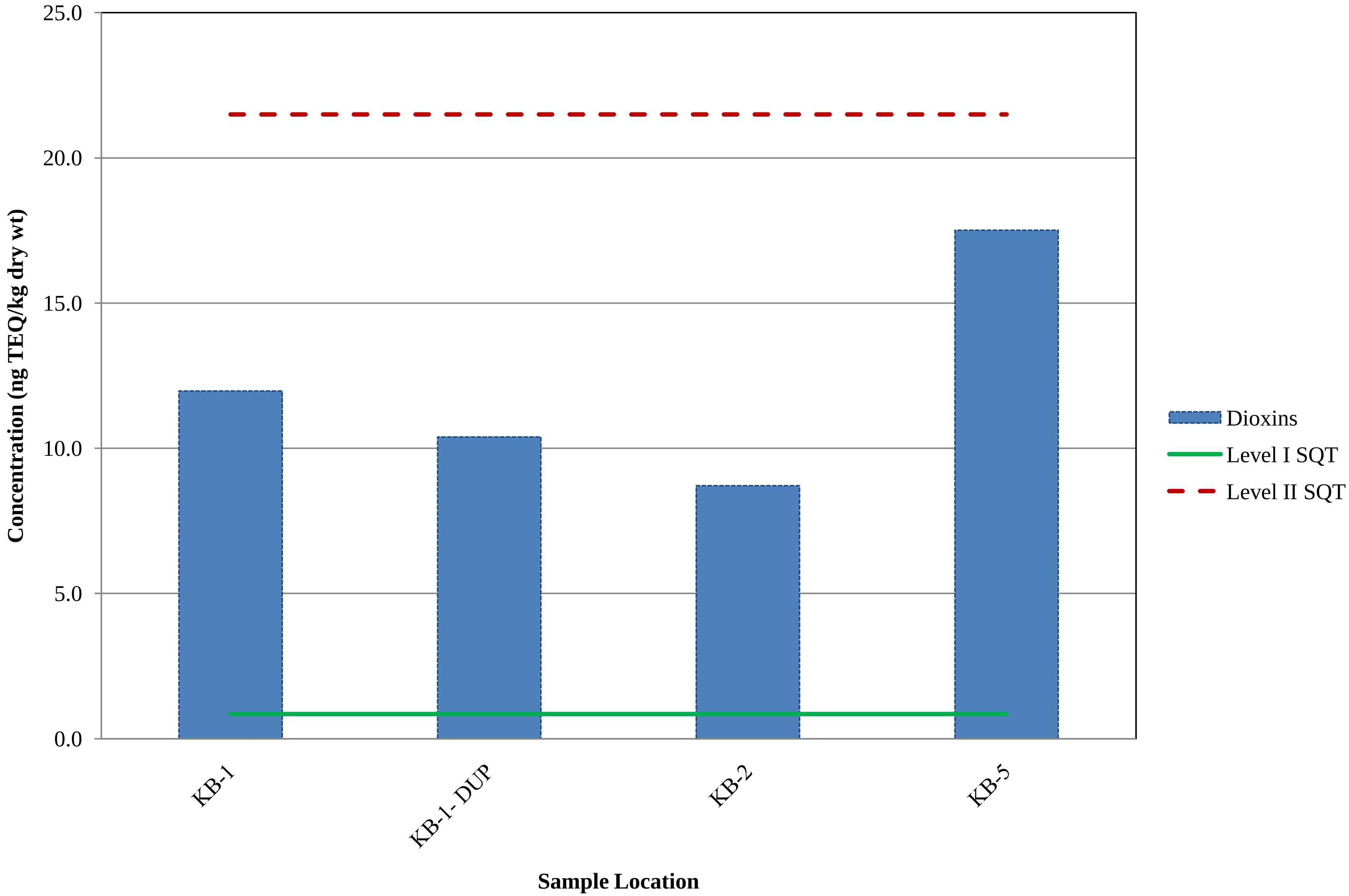


Figure 8.19-a
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Arsenic

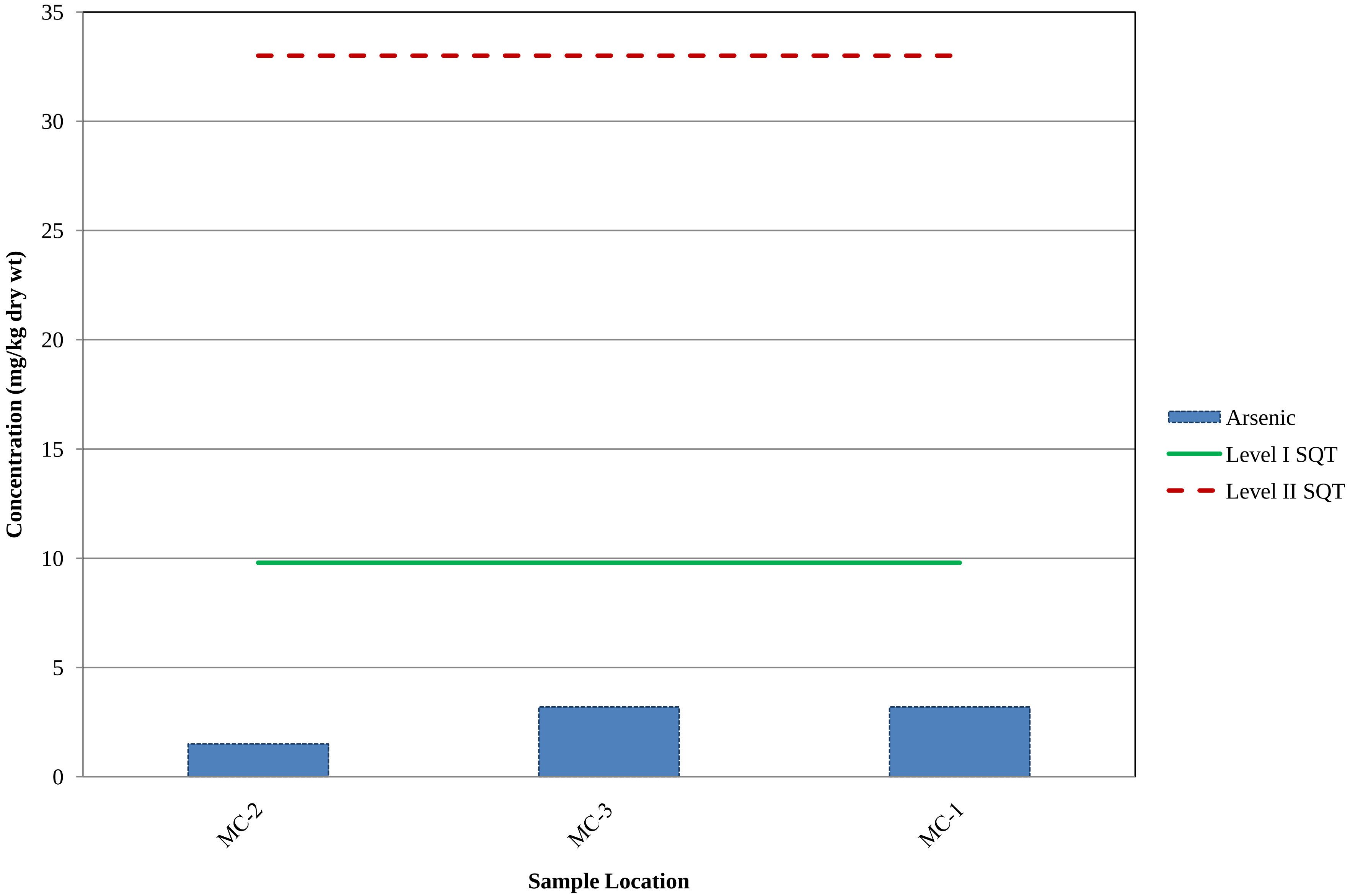


Figure 8.19-b
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Cadmium

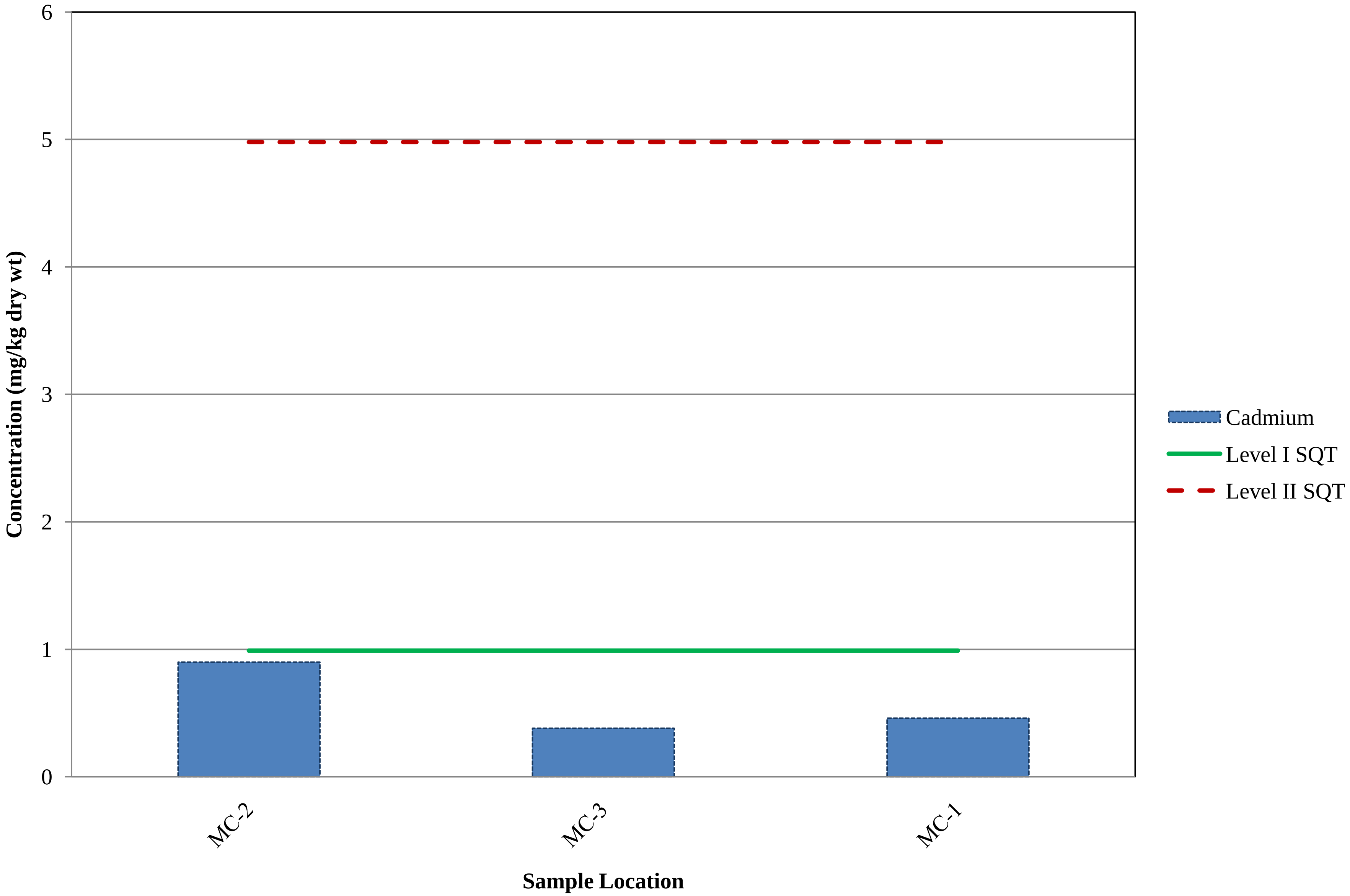


Figure 8.19-c
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Chromium

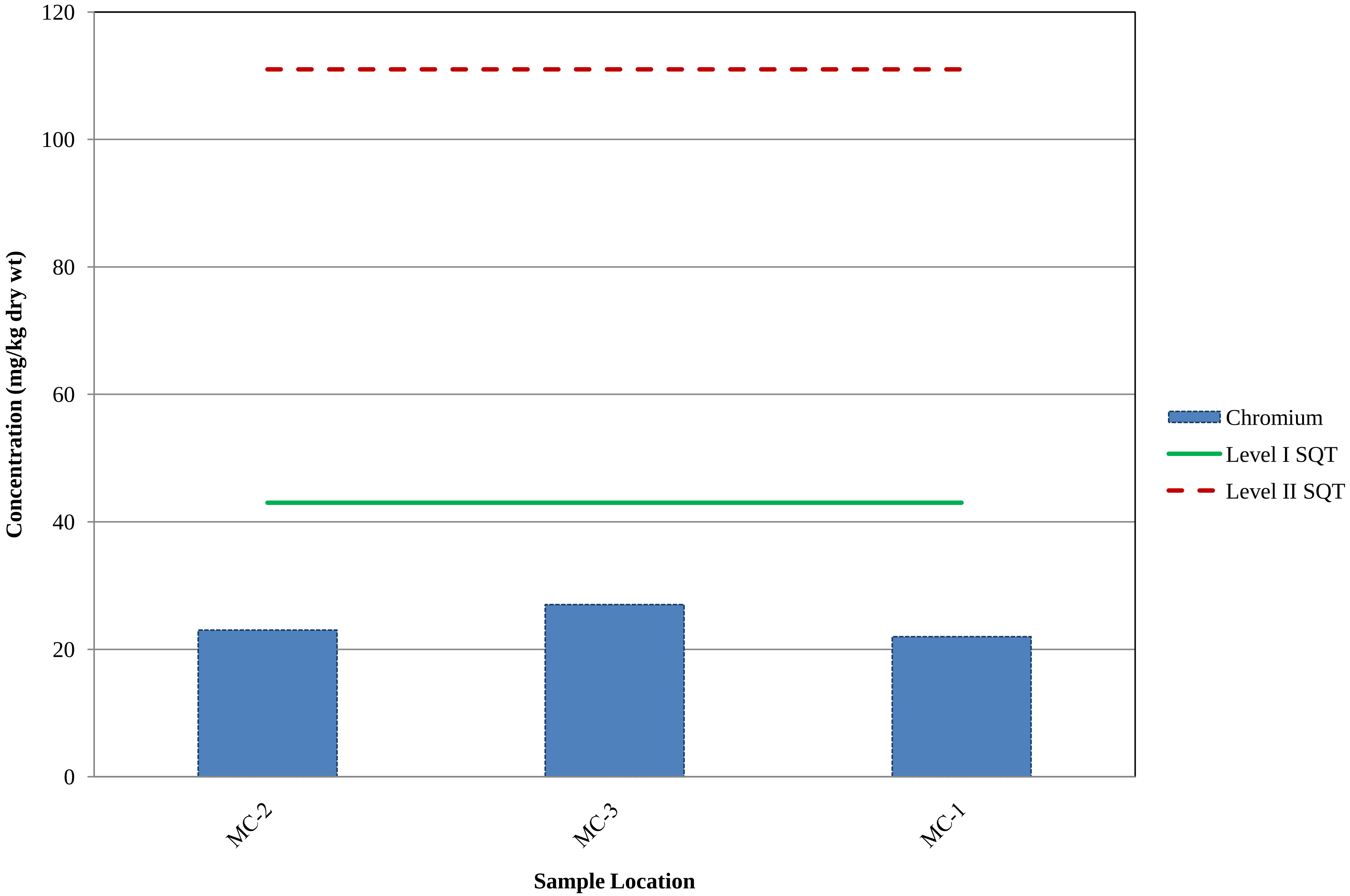


Figure 8.19-d
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Copper

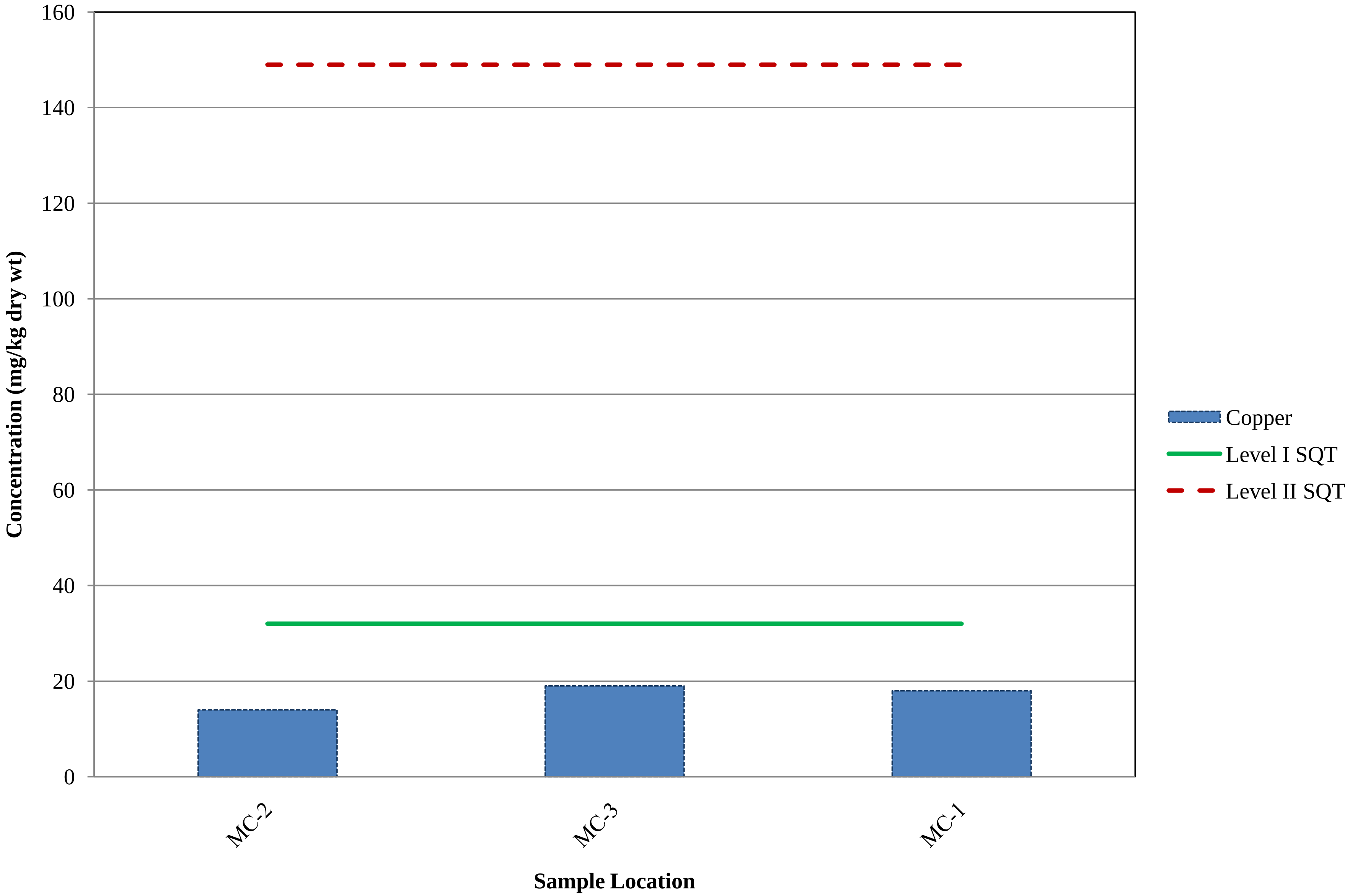


Figure 8.19-e
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Lead

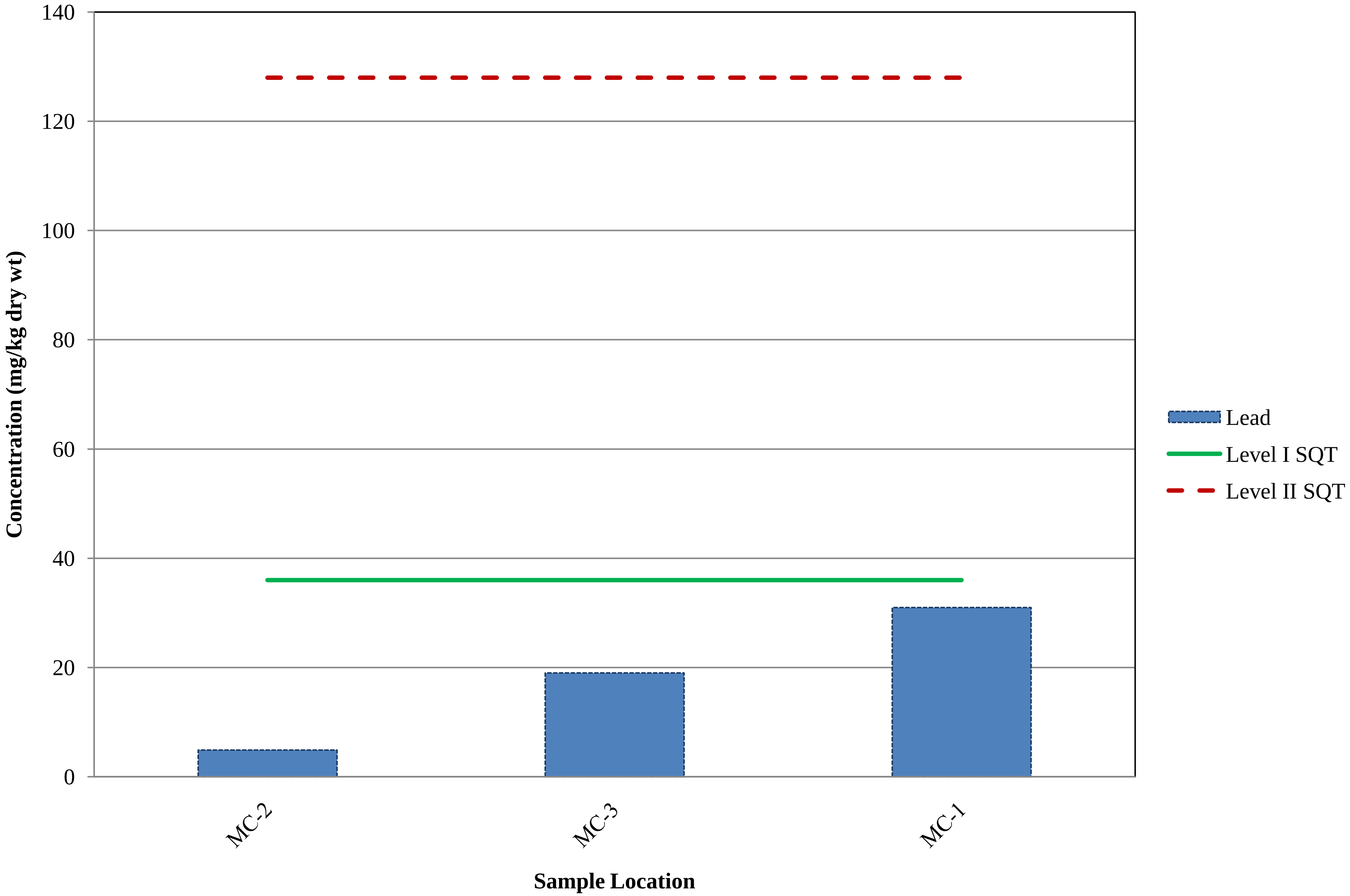


Figure 8.19-f
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Mercury

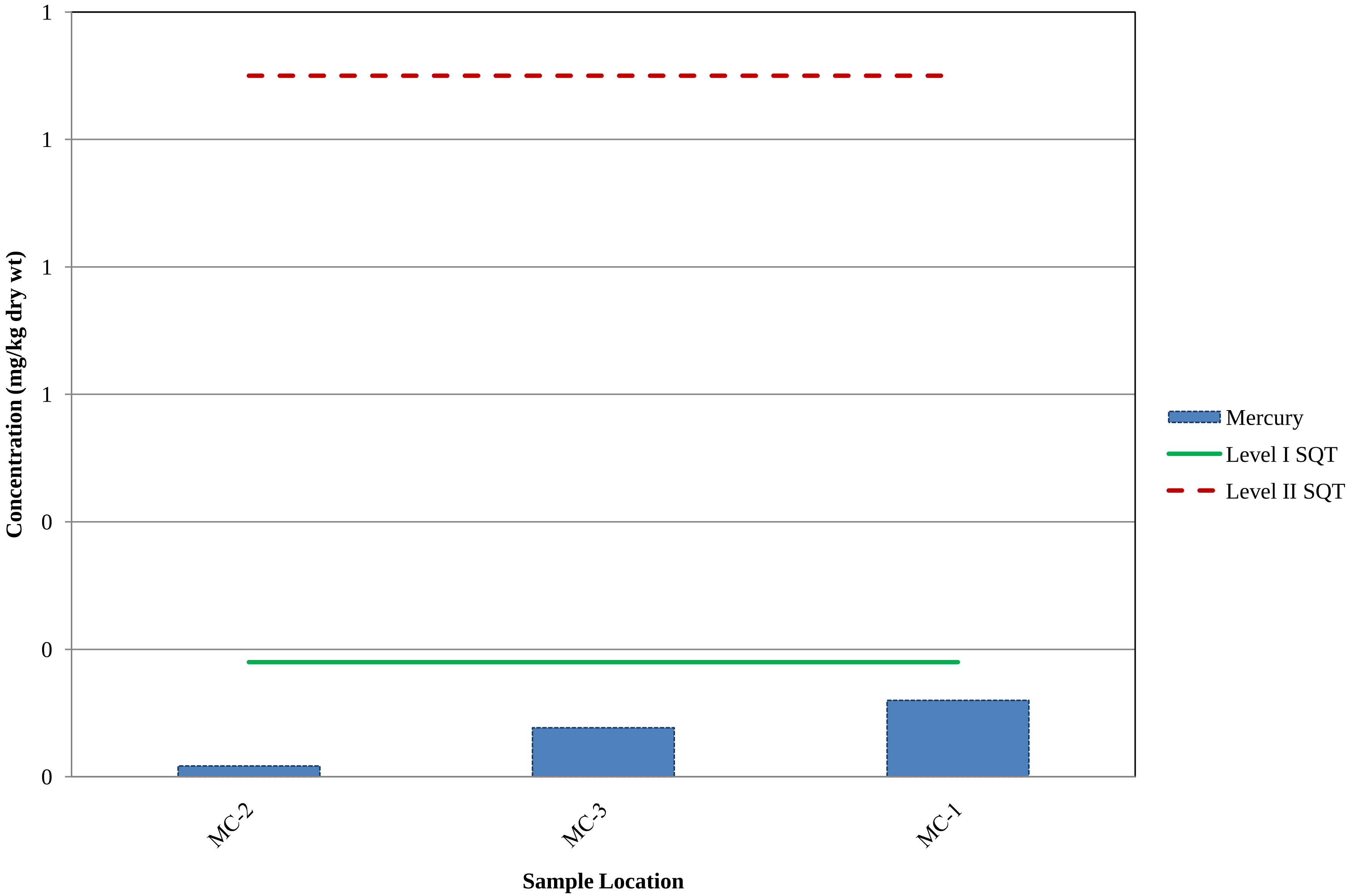


Figure 8.19-g
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Nickel

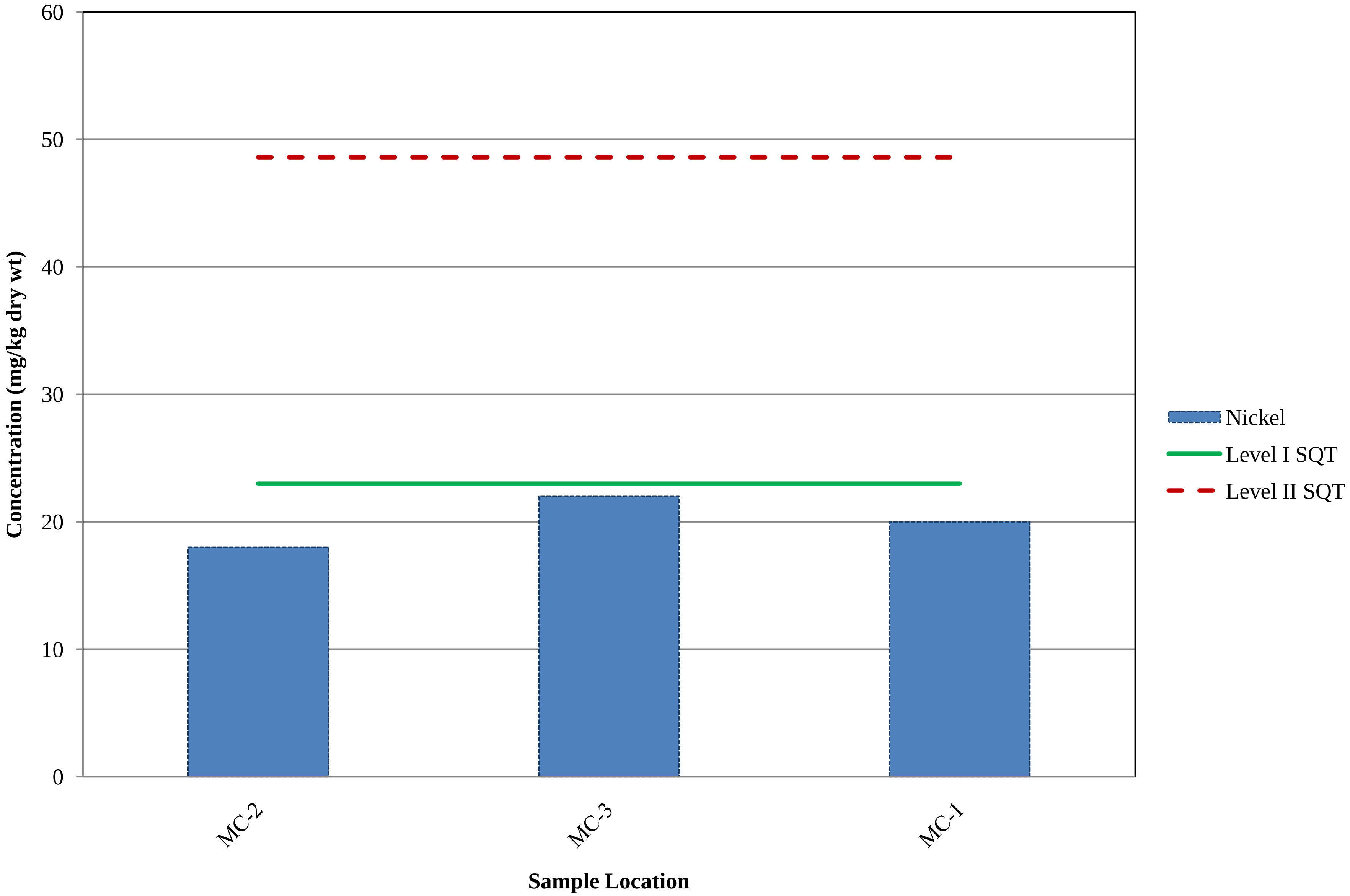


Figure 8.19-h
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Zinc

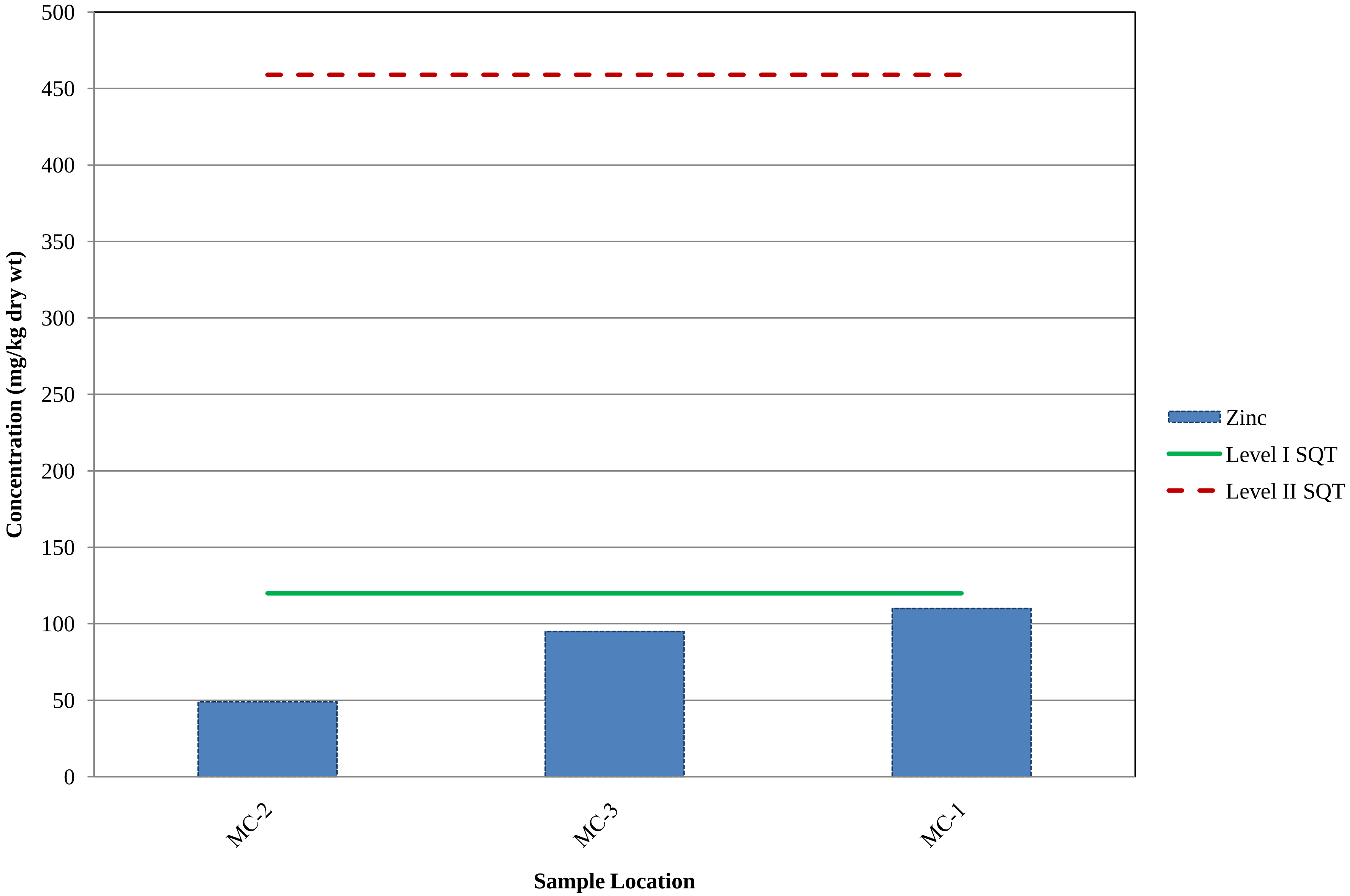


Figure 8.18-i
Minnesota Channel (Top of Sediment, 0-0.5 ft) - PAHs

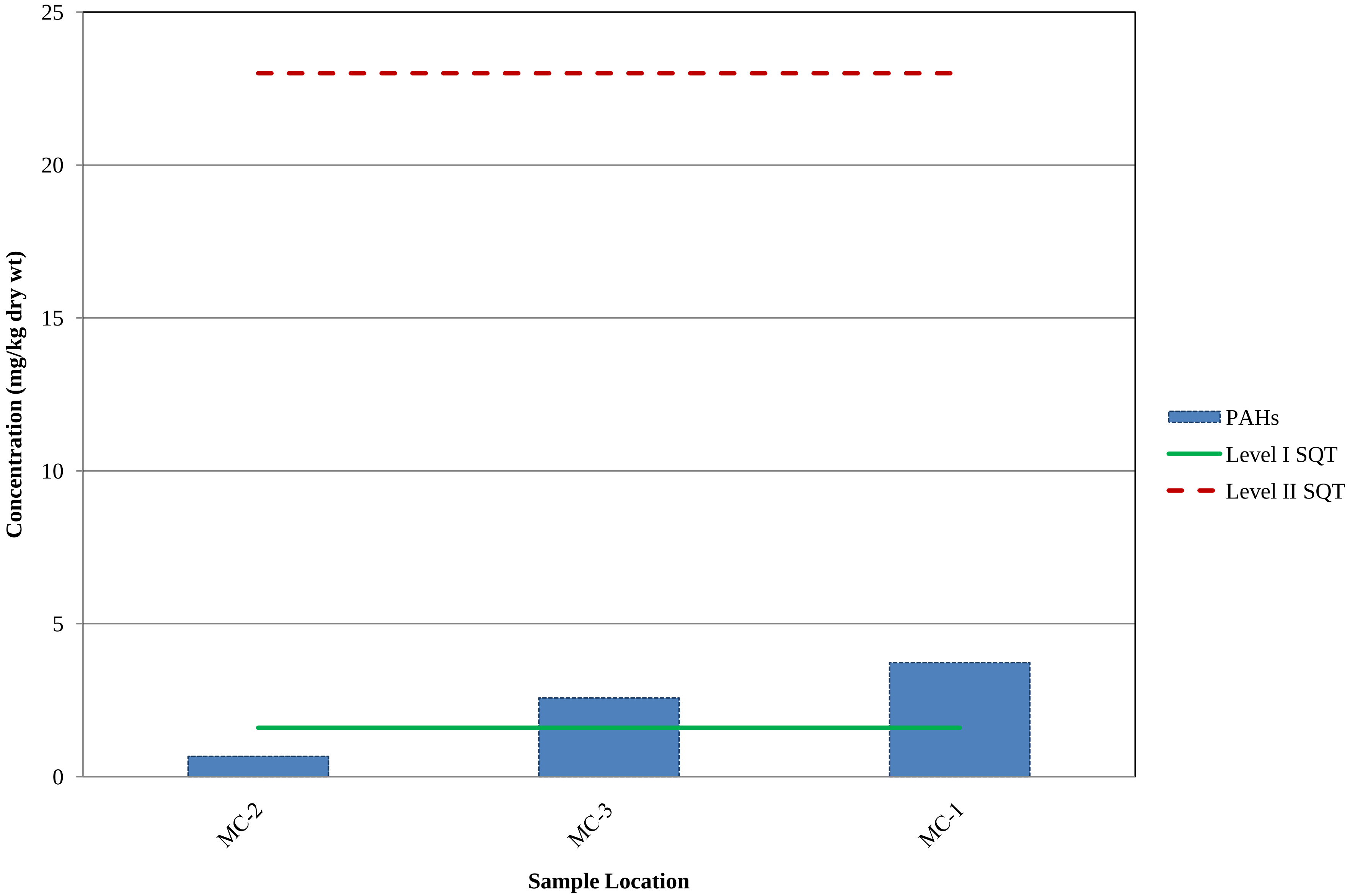


Figure 8.19-j
Minnesota Channel (Top of Sediment, 0-0.5 ft) - Dioxins

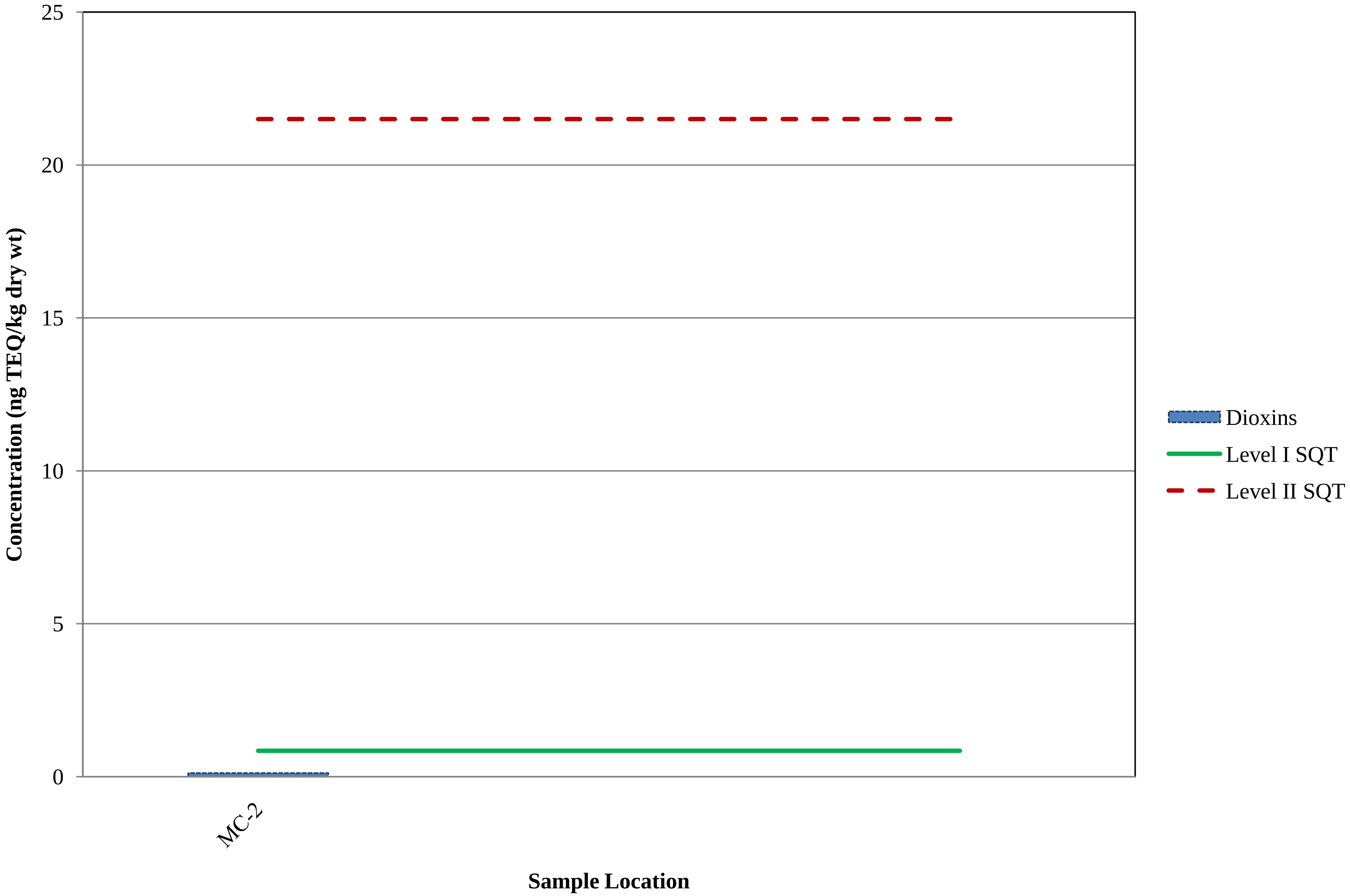


Figure 8.20-a
Mud Lake (Top of Sediment, 0-0.5 ft) - Arsenic

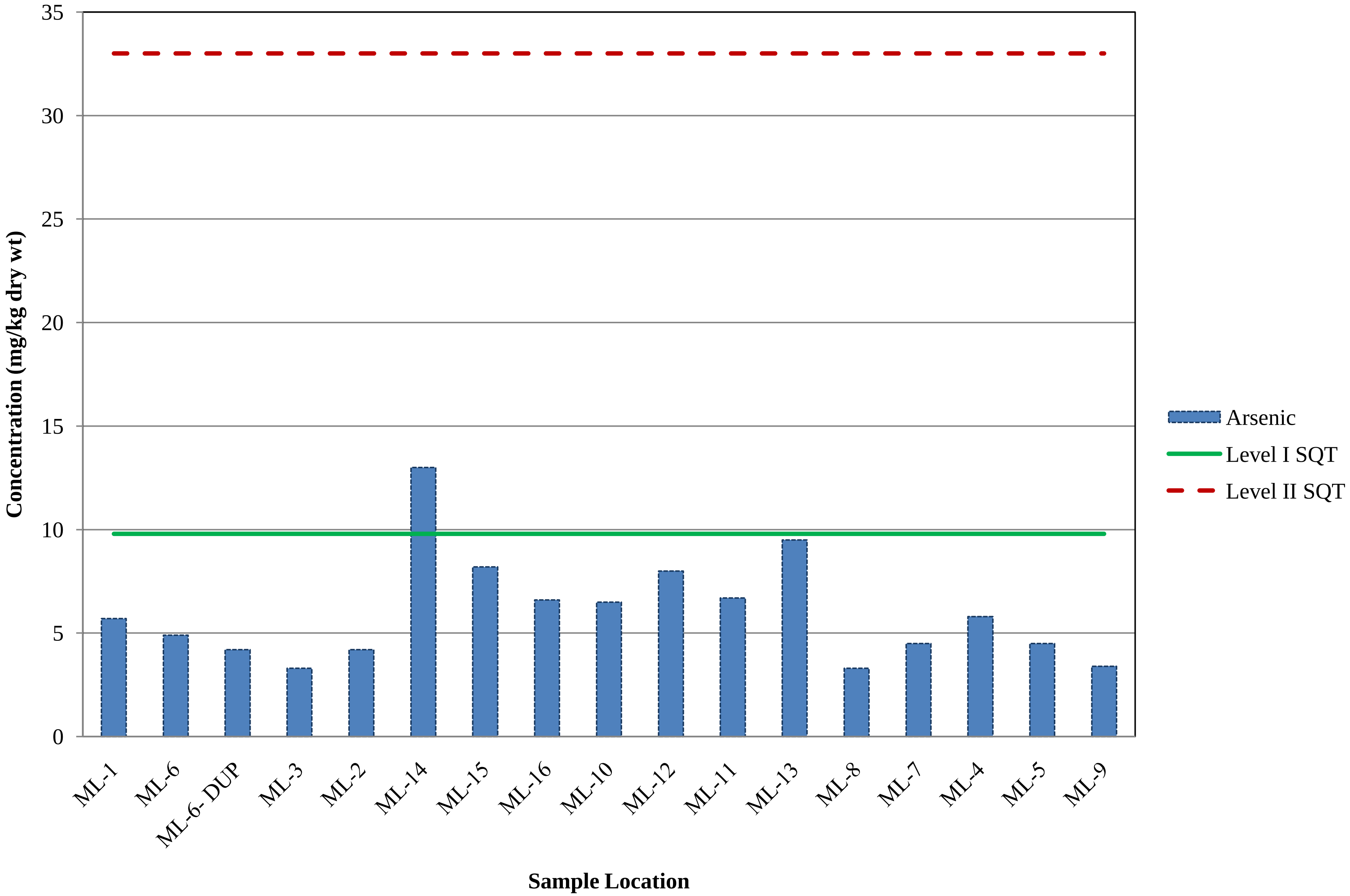


Figure 8.20-b
Mud Lake (Top of Sediment, 0-0.5 ft) - Cadmium

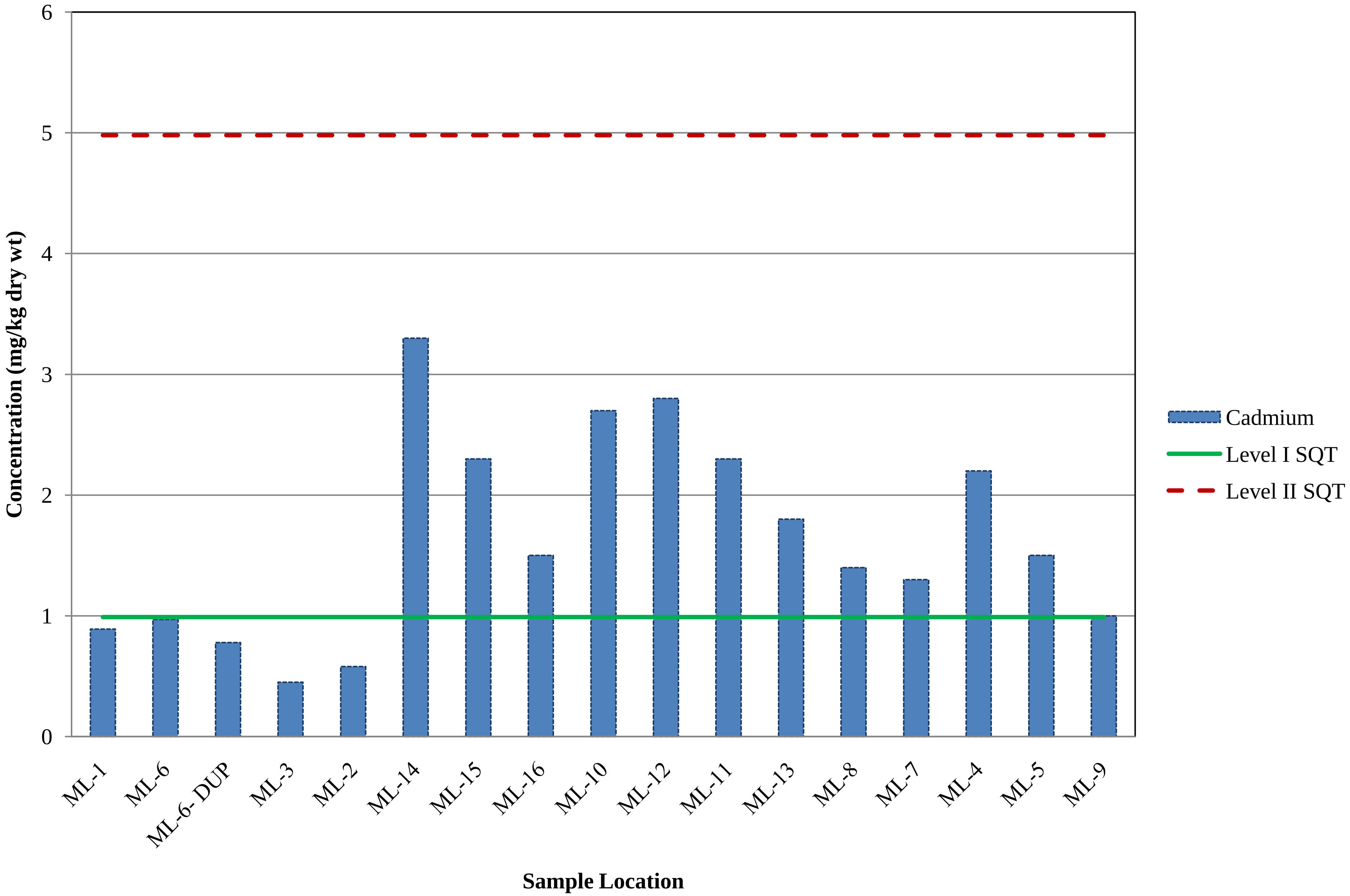


Figure 20-c
Mud Lake (Top of Sediment, 0-0.5 ft) - Chromium

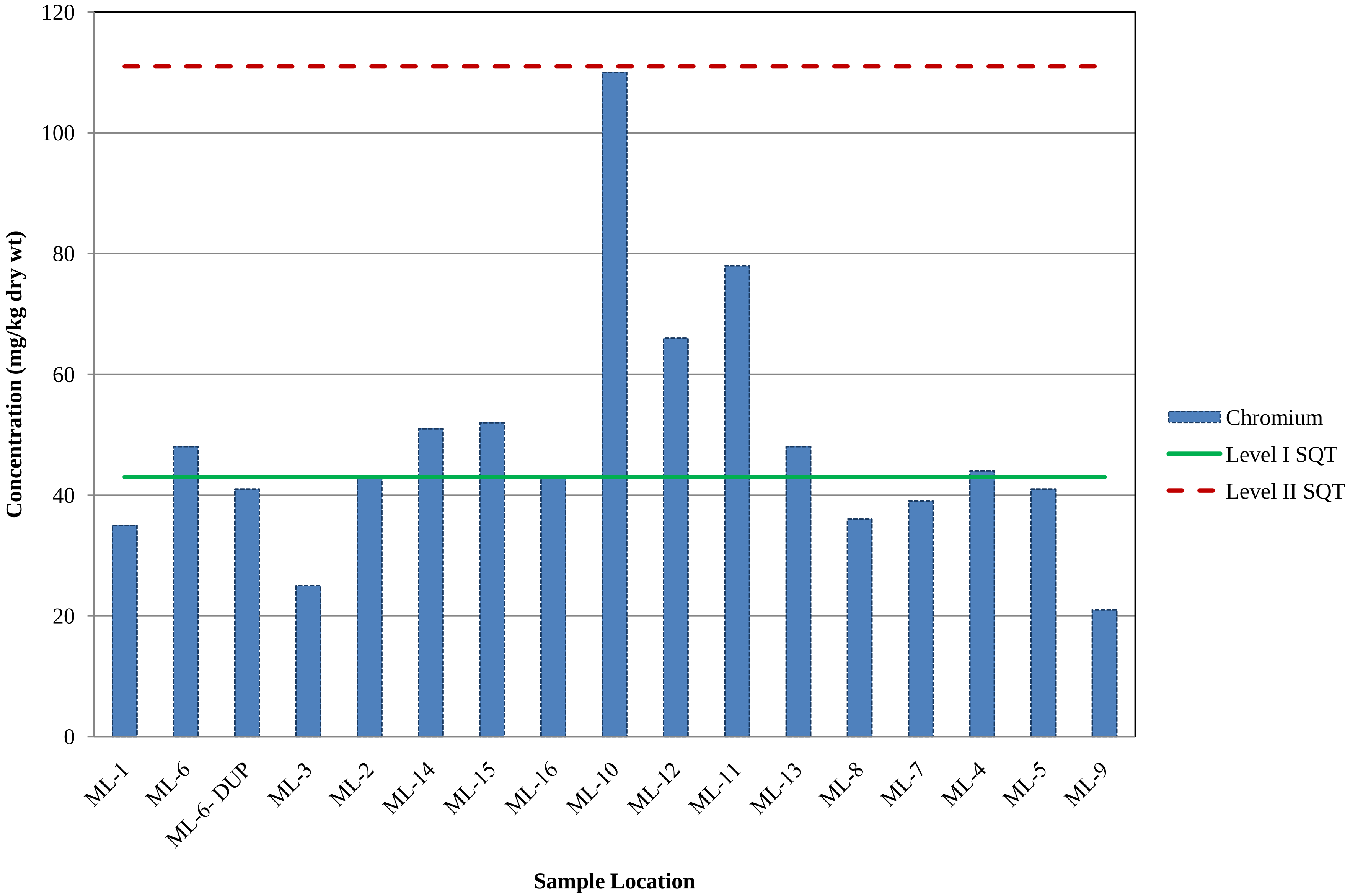


Figure 8.20-d
Mud Lake (Top of Sediment, 0-0.5 ft) - Copper

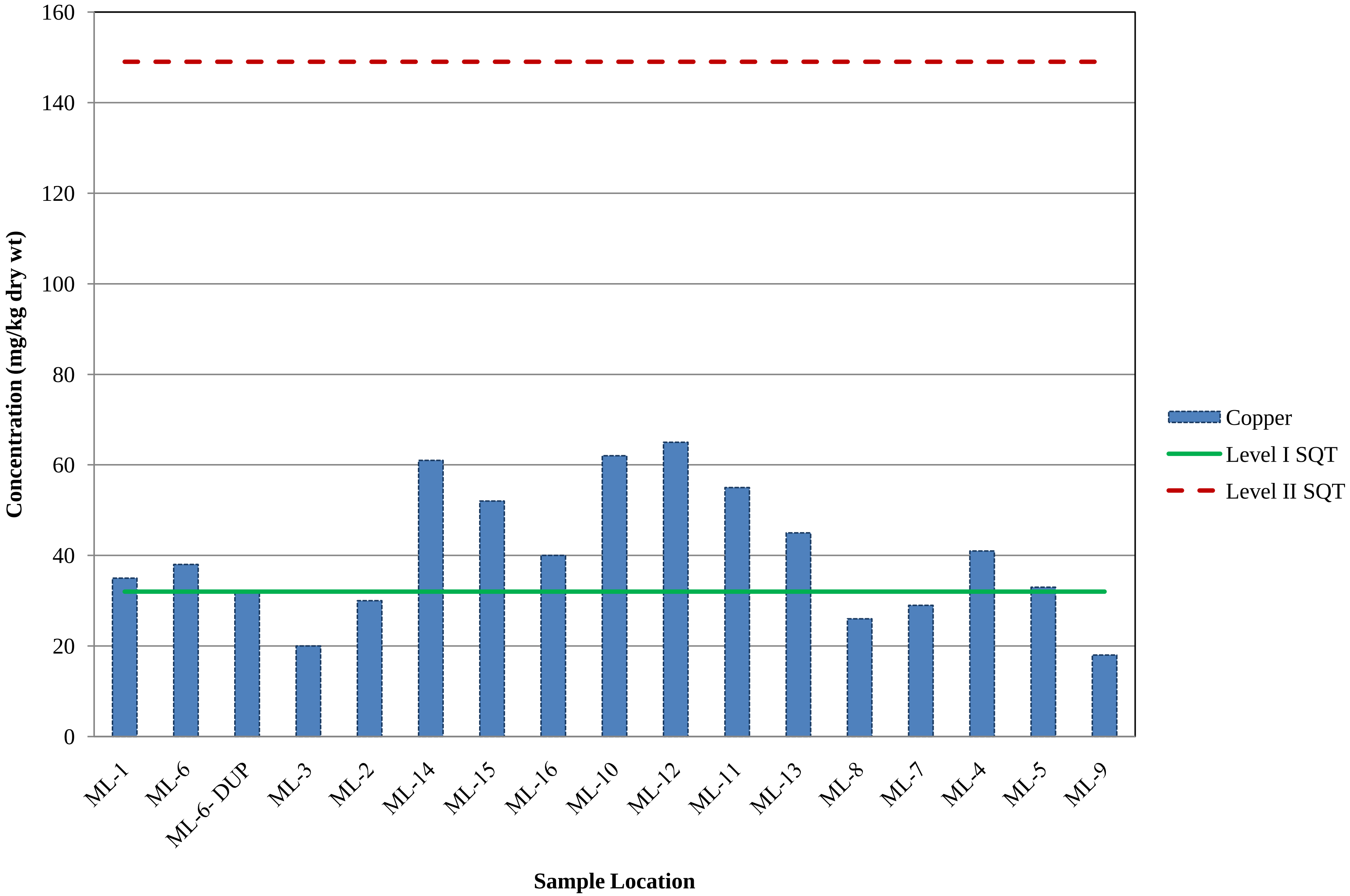


Figure 8.20-e
Mud Lake (Top of Sediment, 0-0.5 ft) - Lead

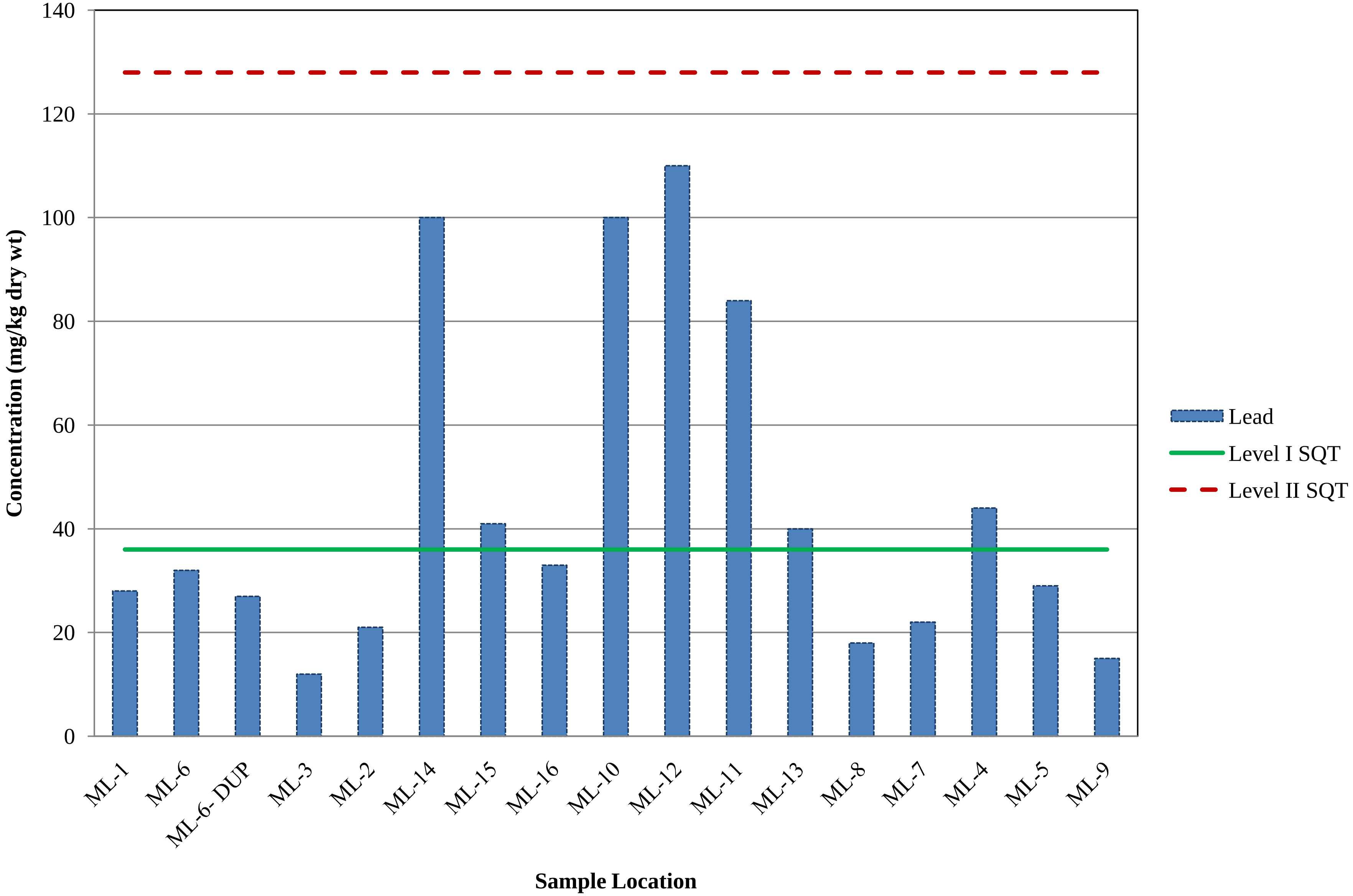


Figure 8.20-f
Mud Lake (Top of Sediment, 0-0.5 ft) - Mercury

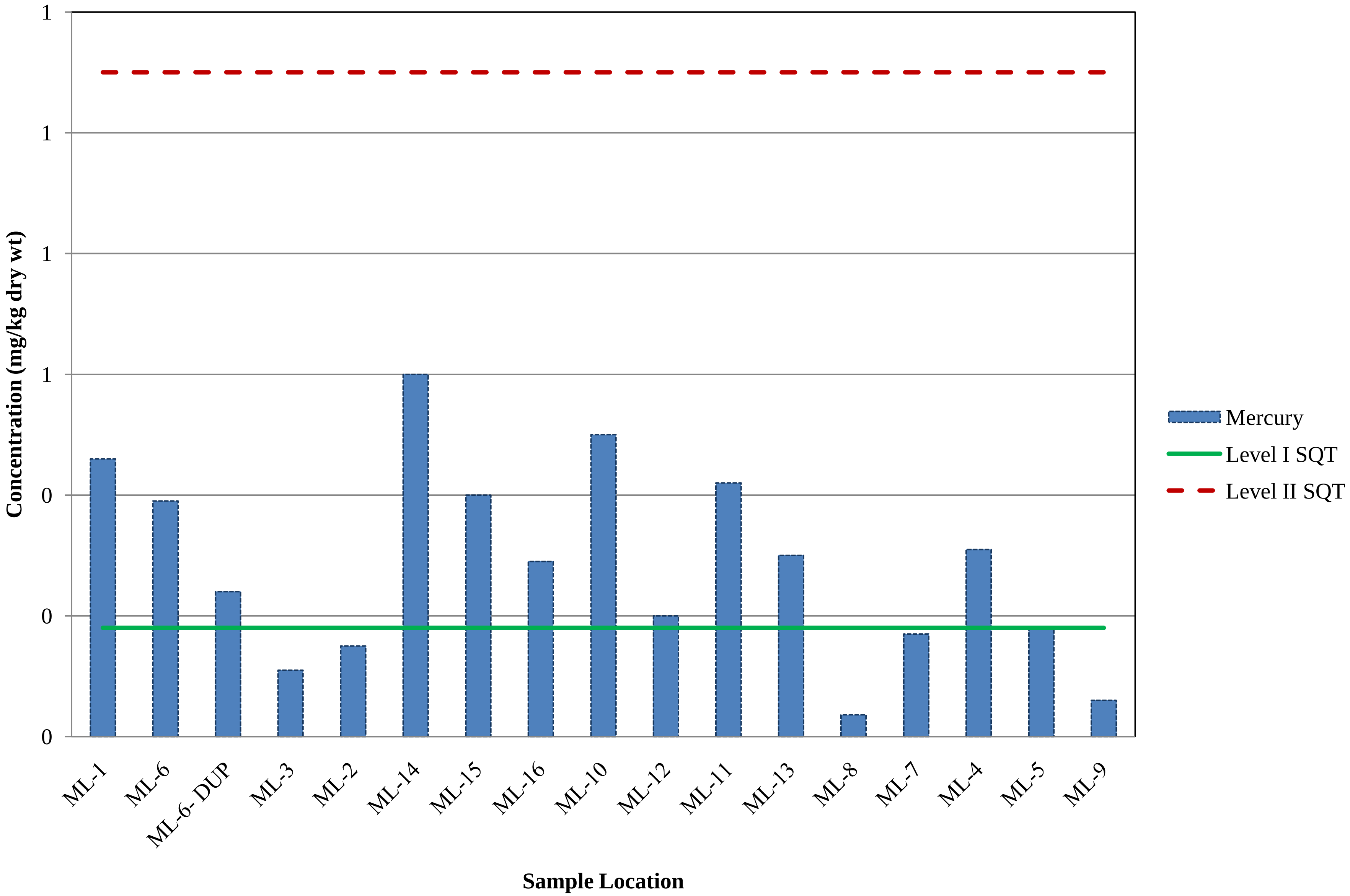


Figure 8.20-g
Mud Lake (Top of Sediment, 0-0.5 ft) - Nickel

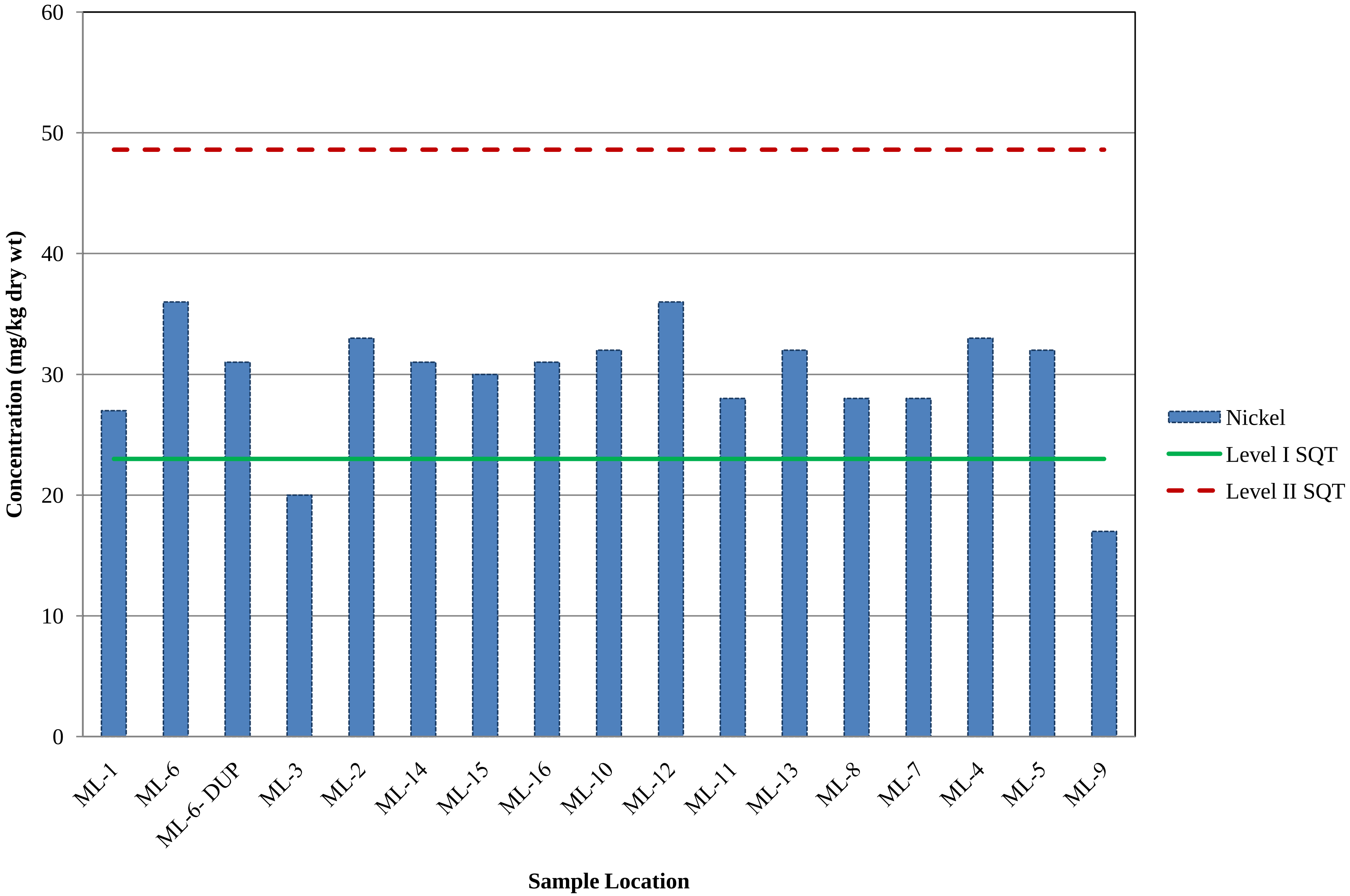


Figure 8.20-h
Mud Lake (Top of Sediment, 0-0.5 ft) - Zinc

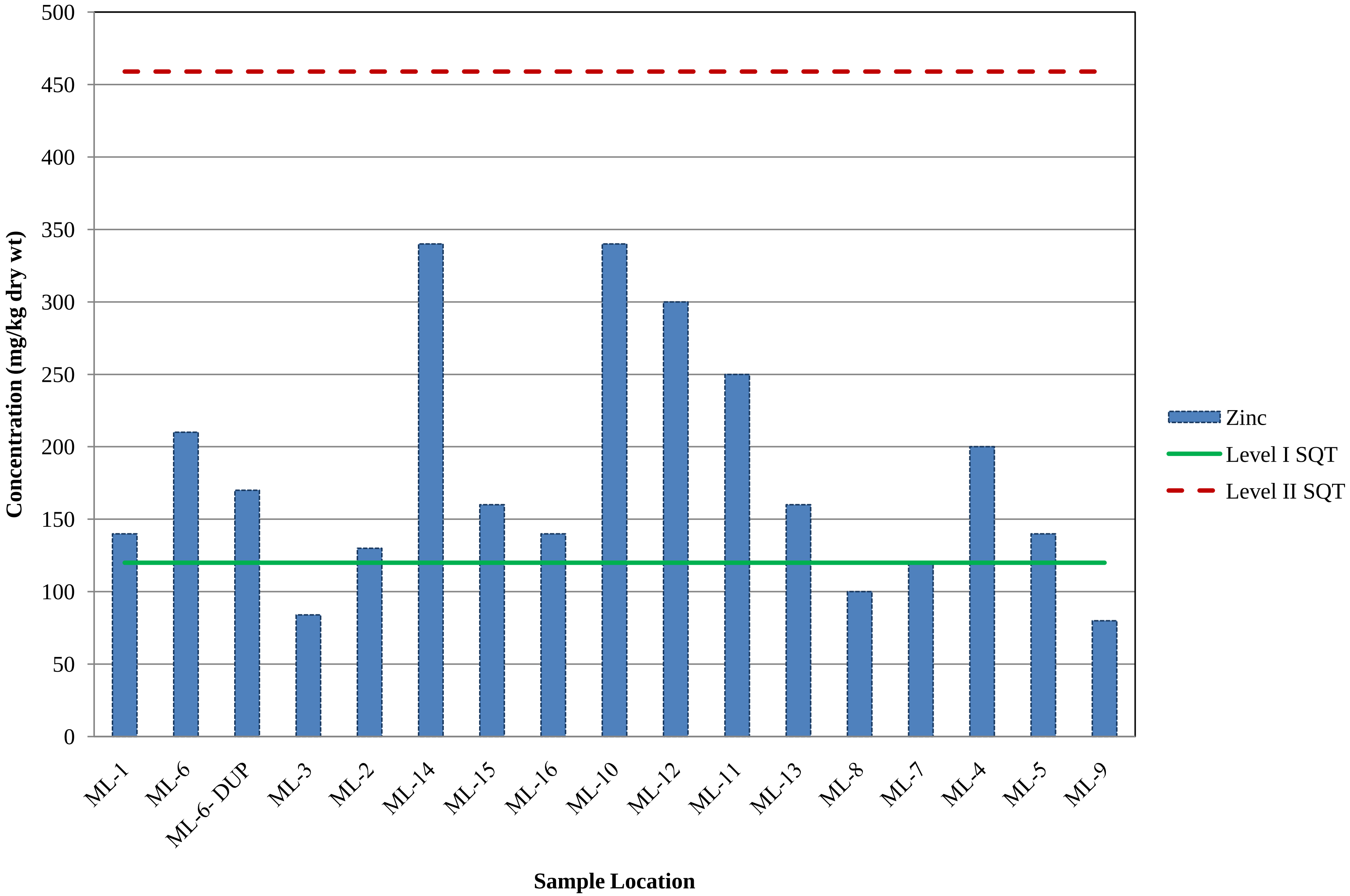


Figure 8.20-i
Mud Lake (Top of Sediment, 0-0.5 ft) - PAHs

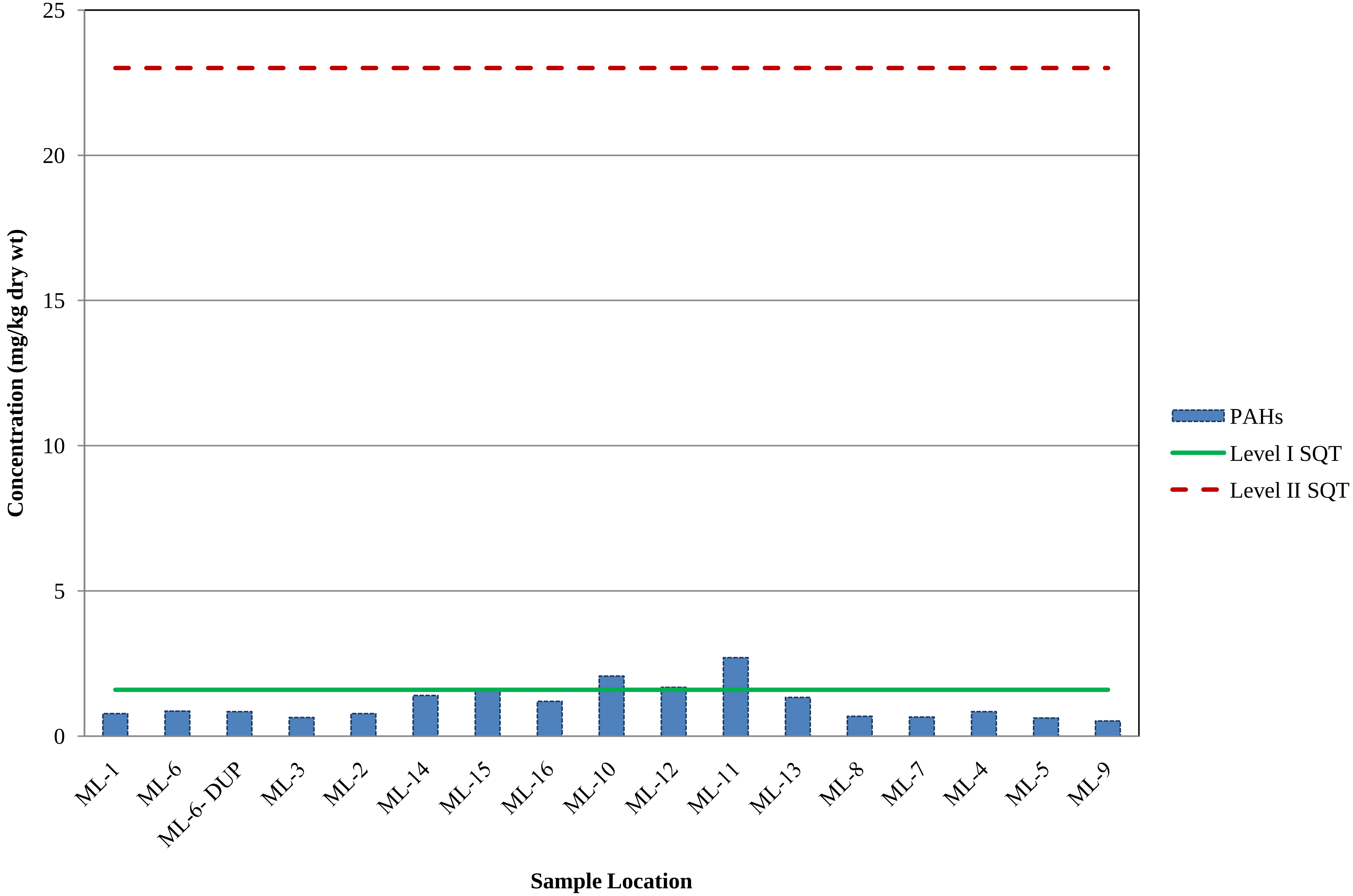


Figure 8.20-j
Mud Lake (Top of Sediment, 0-0.5 ft) - Dioxins

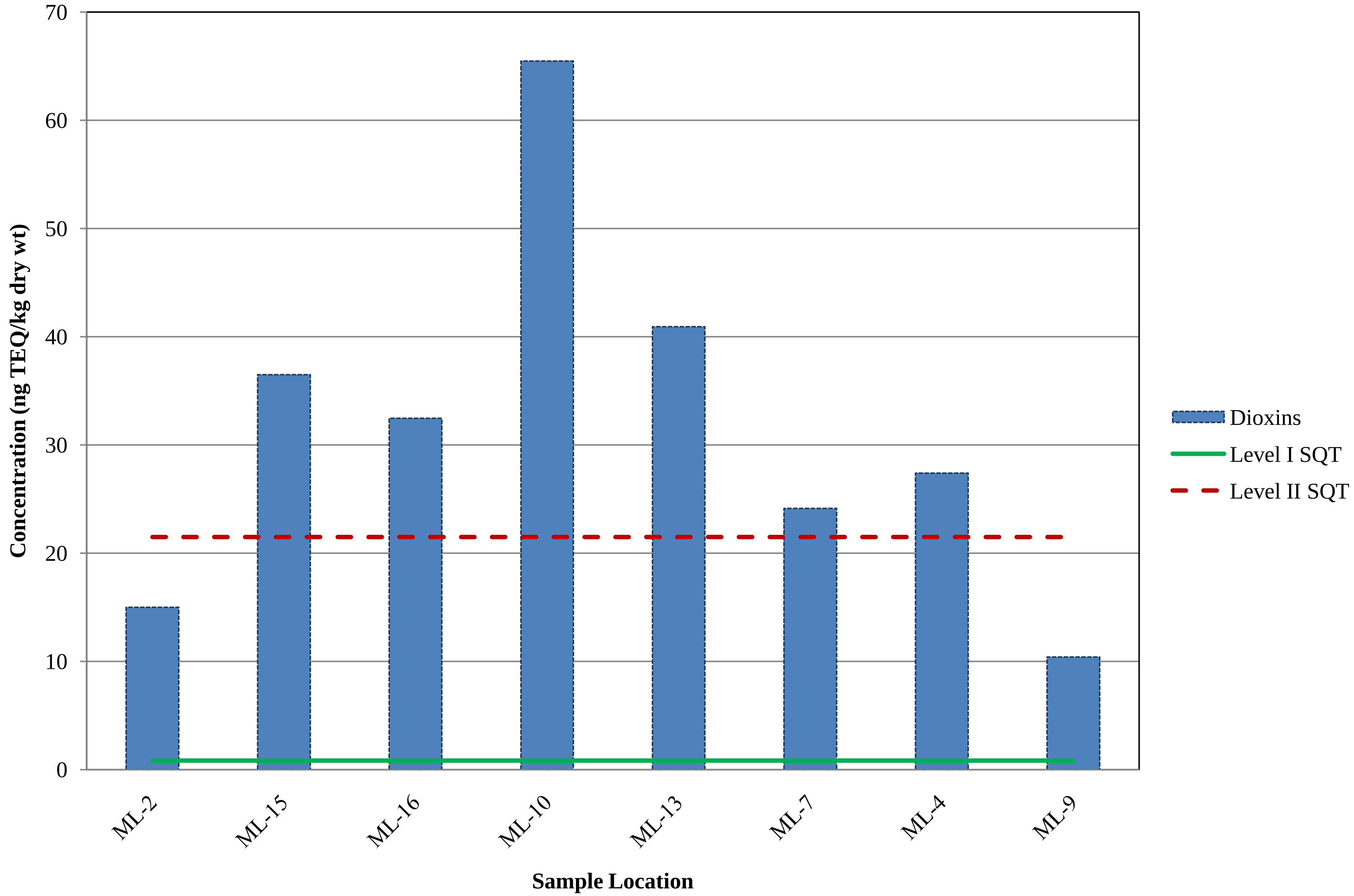


Figure 8.21-a
Munger Landing (Top of Sediment, 0-0.5 ft) - Arsenic

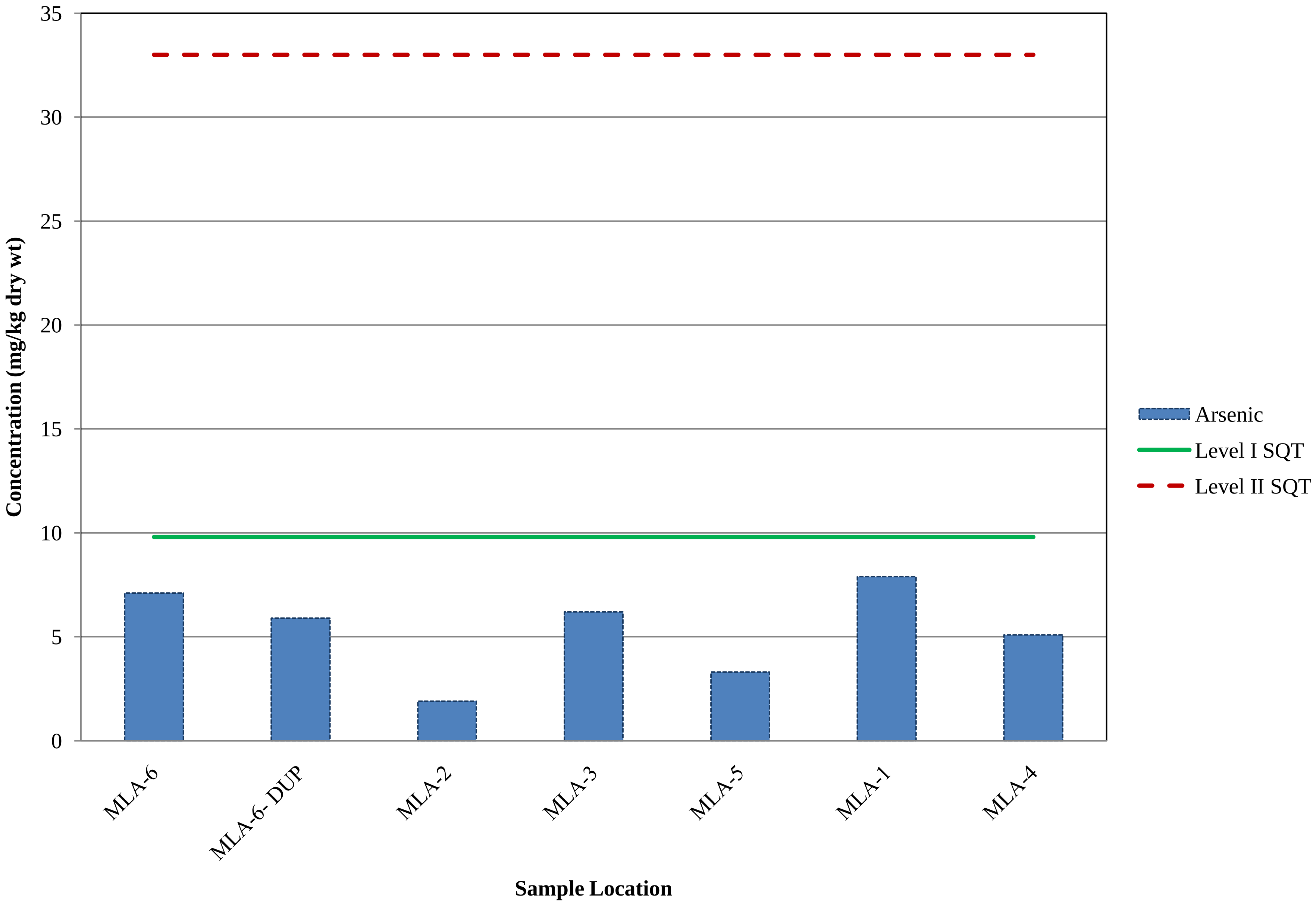


Figure 8.21-b
Munger Landing (Top of Sediment, 0-0.5 ft) - Cadmium

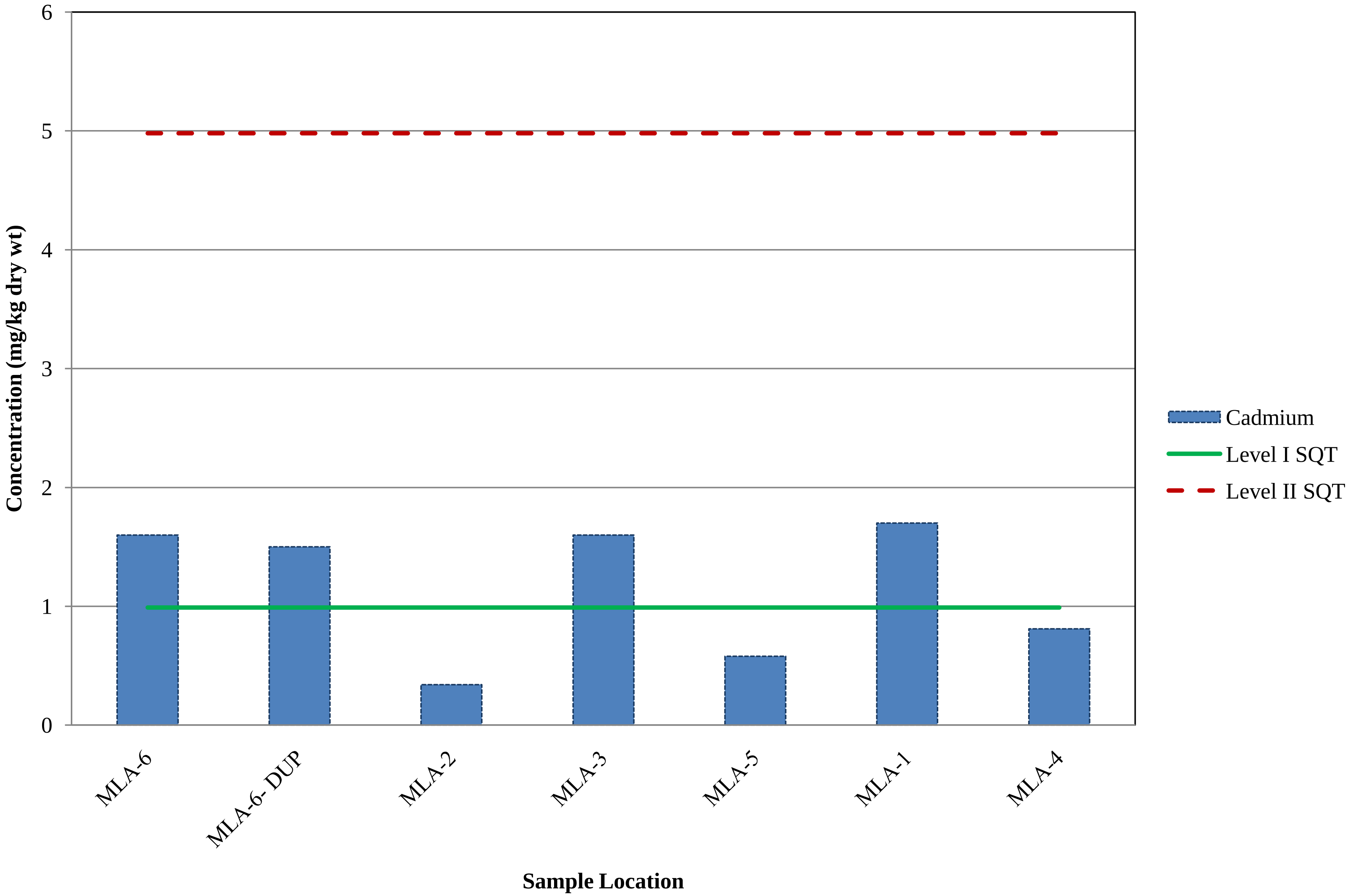


Figure 8.21-c
Munger Landing (Top of Sediment, 0-0.5 ft) - Chromium

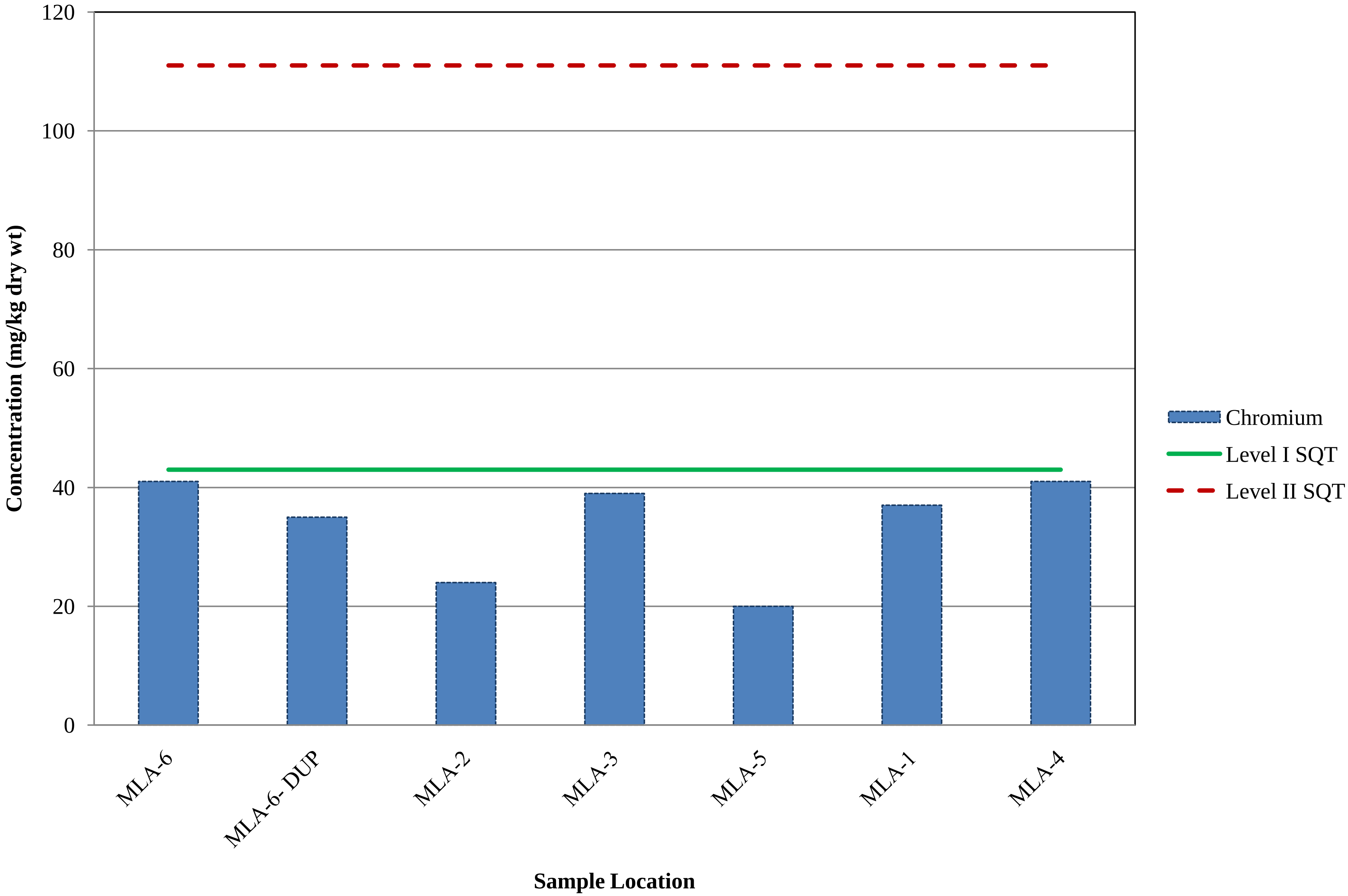


Figure 8.21-d
Munger Landing (Top of Sediment, 0-0.5 ft) - Copper

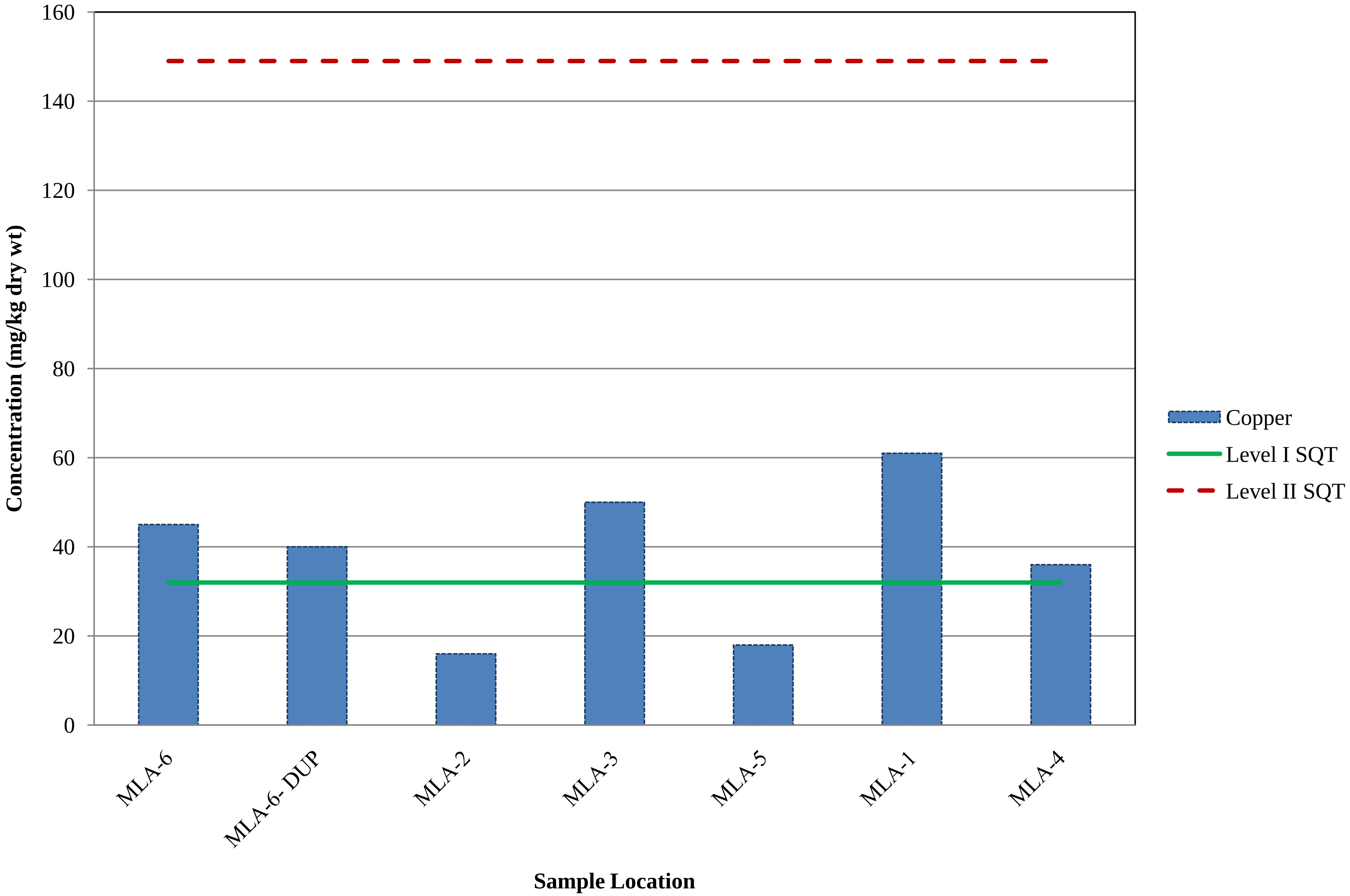


Figure 8.21-e
Munger Landing (Top of Sediment, 0-0.5 ft) - Lead

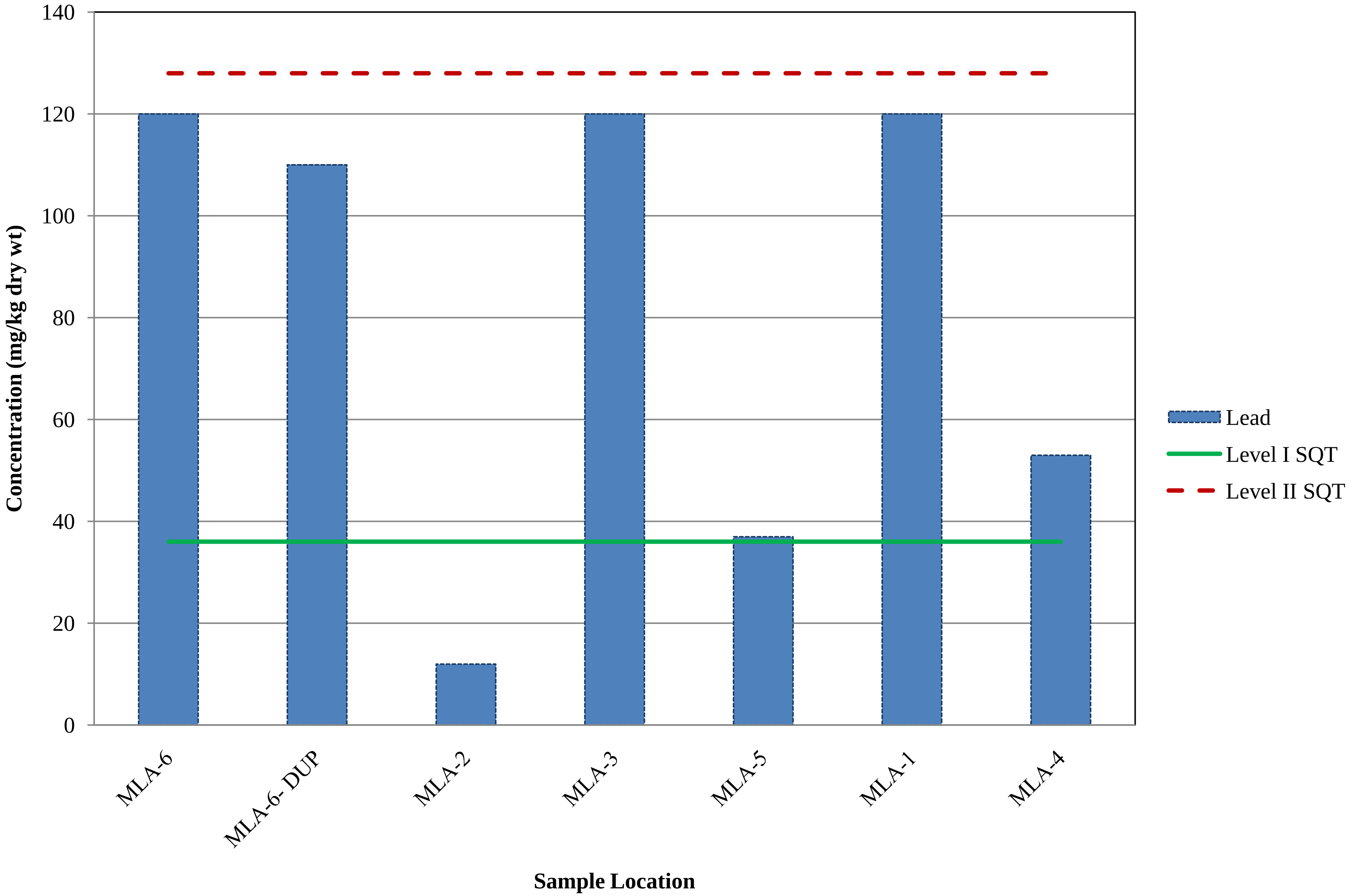


Figure 8.21-f
Munger Landing (Top of Sediment, 0-0.5 ft) - Mercury

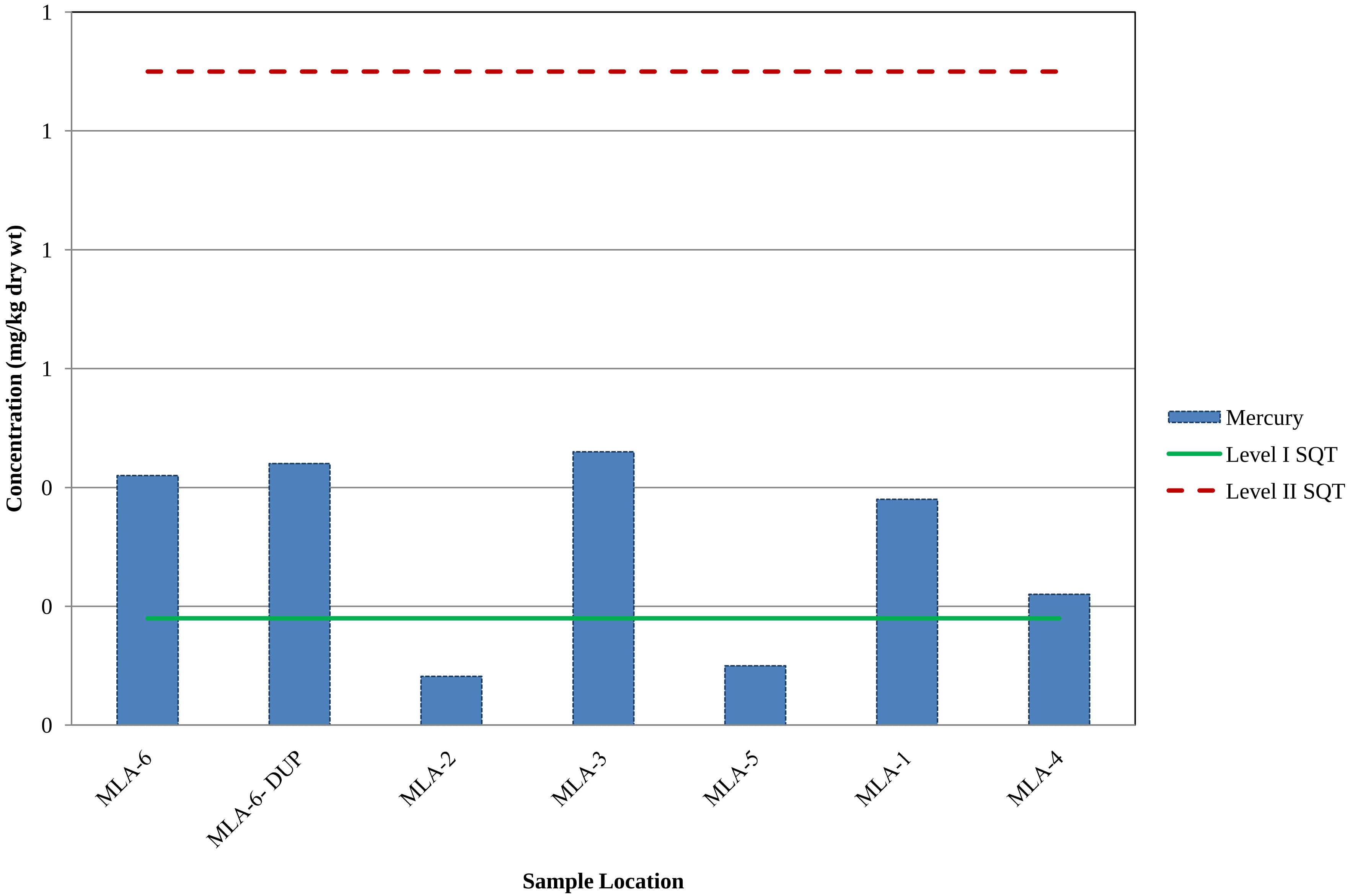


Figure 8.21-g
Munger Landing (Top of Sediment, 0-0.5 ft) - Nickel

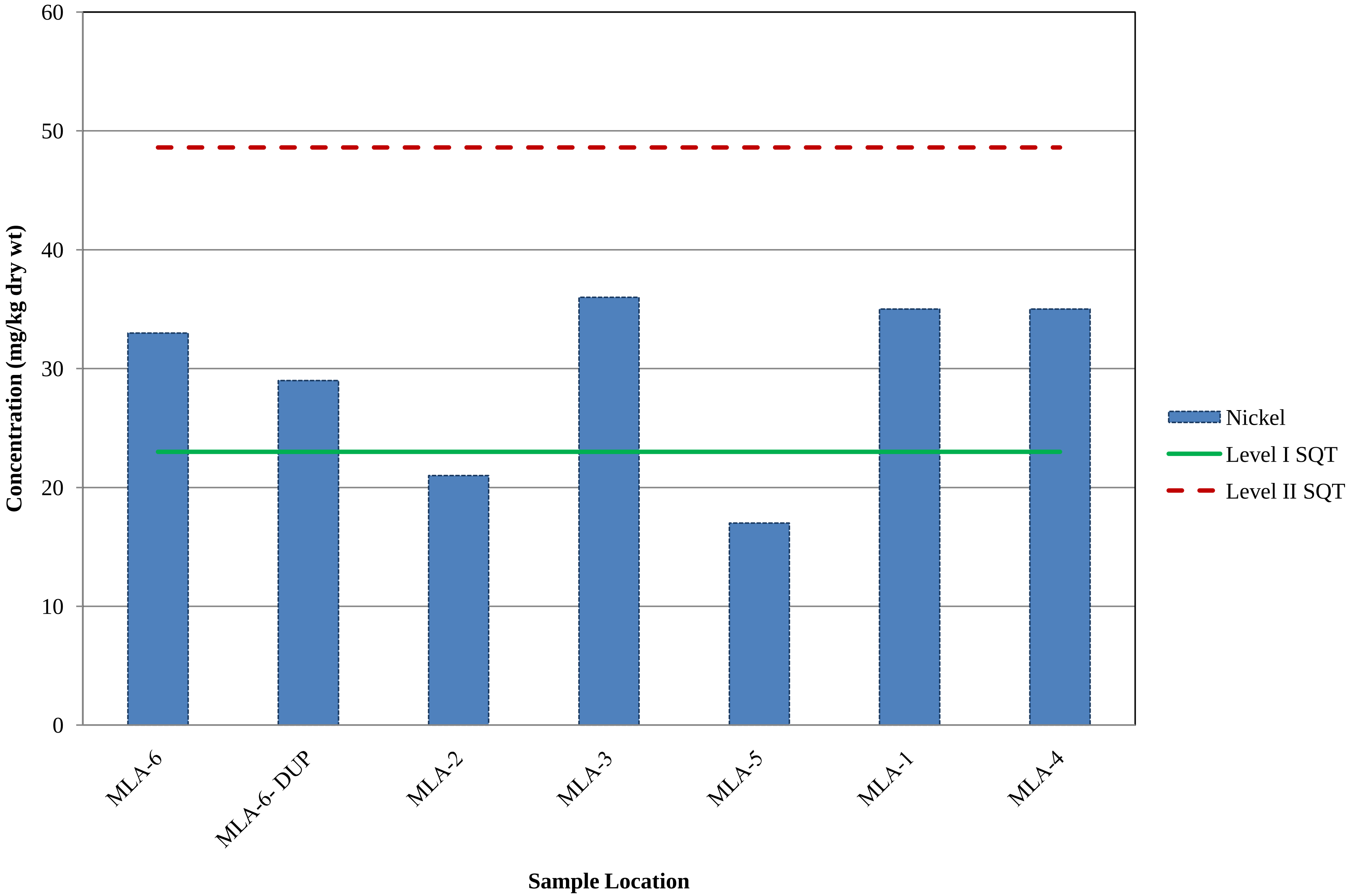


Figure 8.21-h
Munger Landing (Top of Sediment, 0-0.5 ft) - Zinc

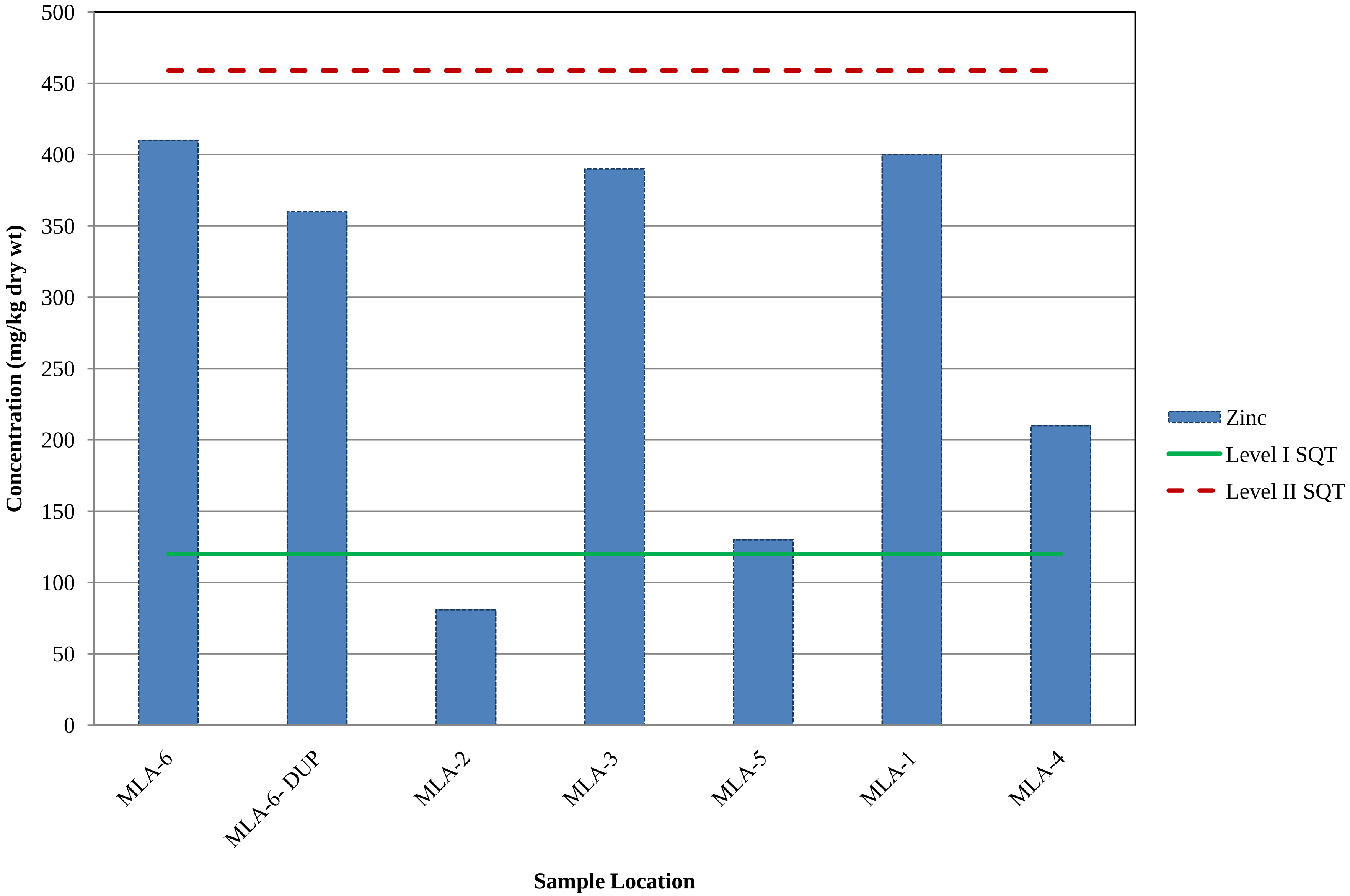


Figure 8.21-i
Munger Landing (Top of Sediment, 0-0.5 ft) - PAHs

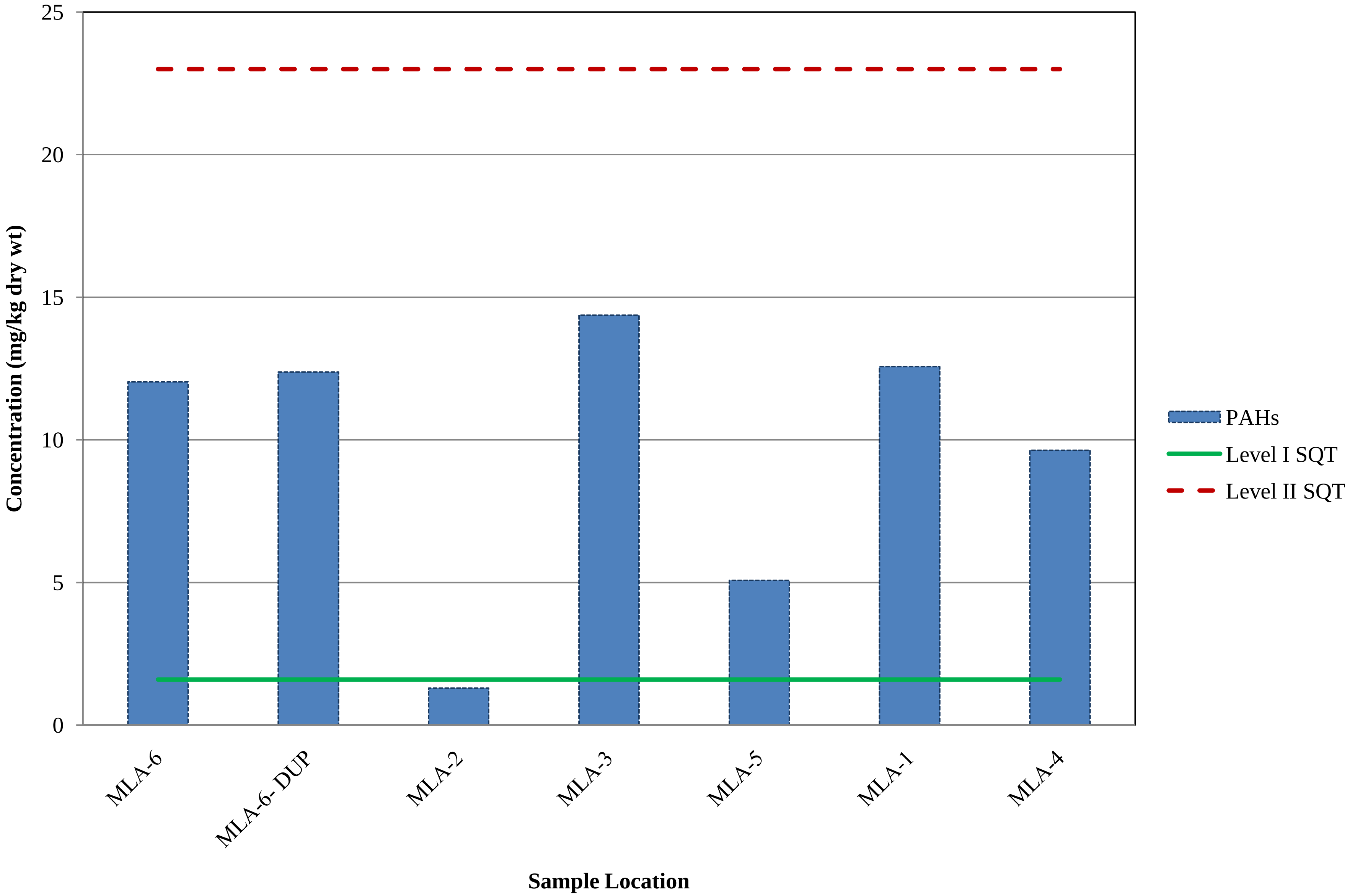


Figure 8.21-j
Munger Landing (Top of Sediment, 0-0.5 ft) - Dioxins

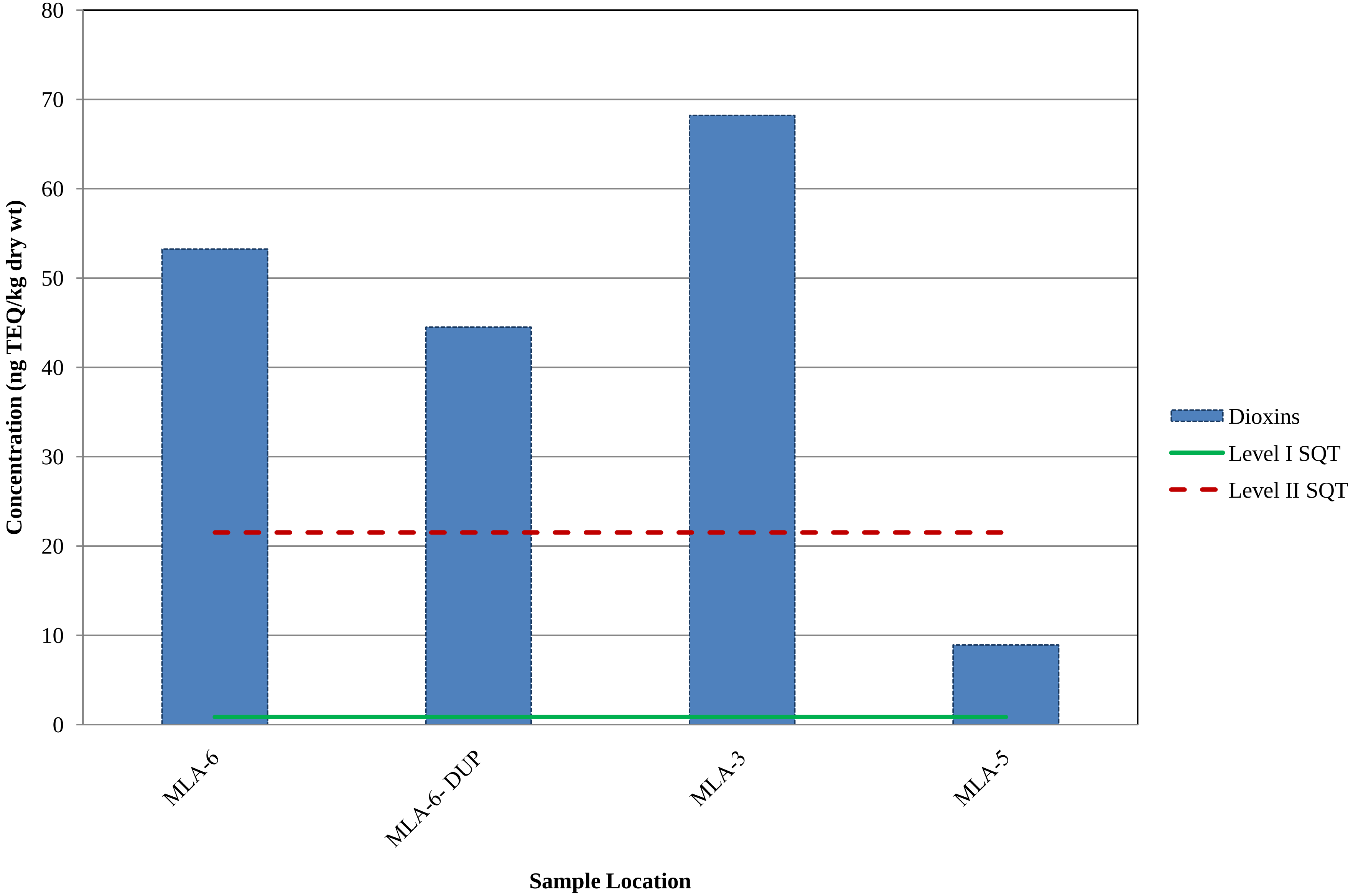


Figure 8.21-k
Munger Landing (Top of Sediment, 0-0.5 ft) - PCBs

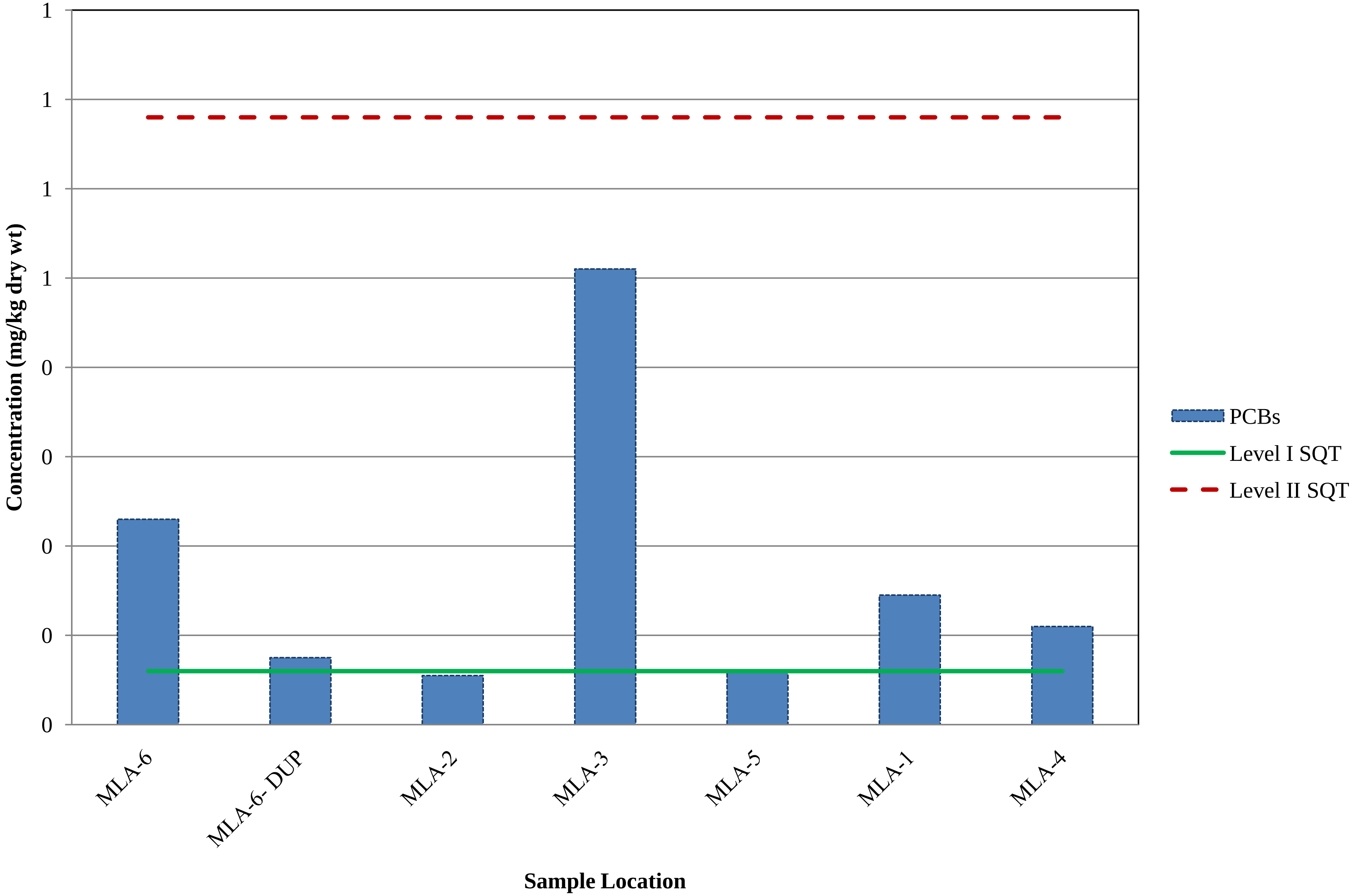


Figure 8.22-a
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Arsenic

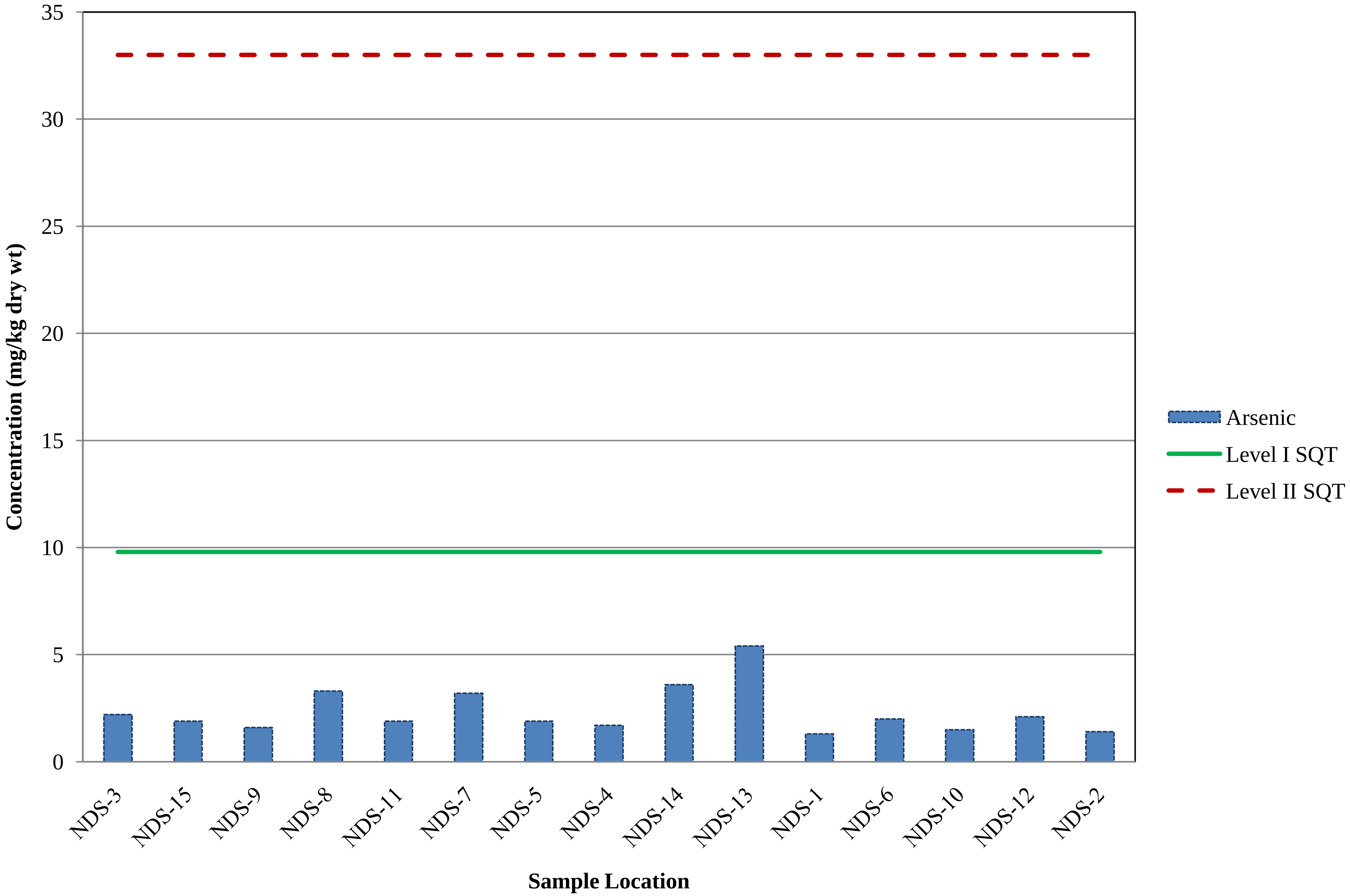


Figure 8.22-b
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Cadmium

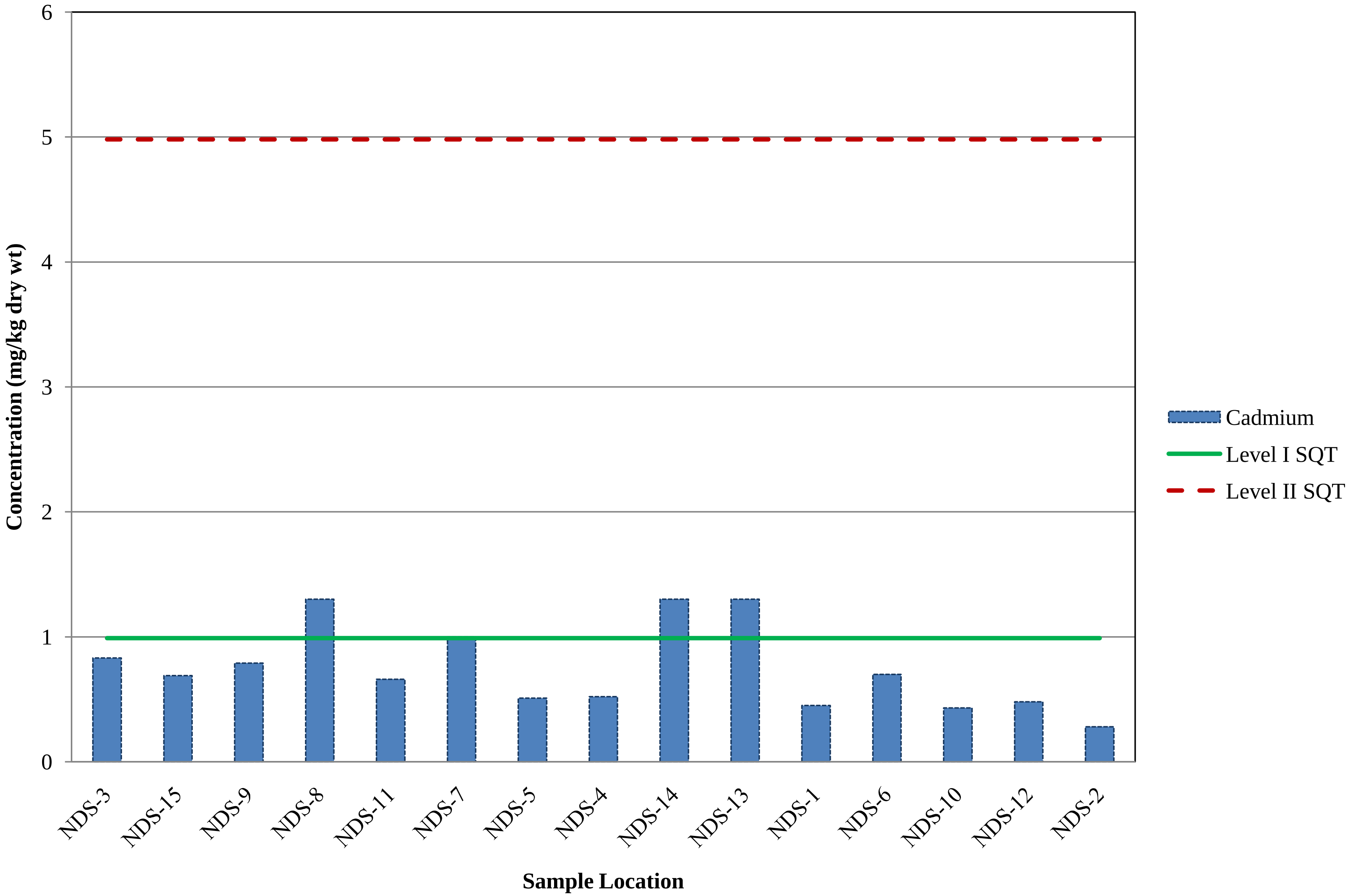


Figure 8.22-c
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Chromium

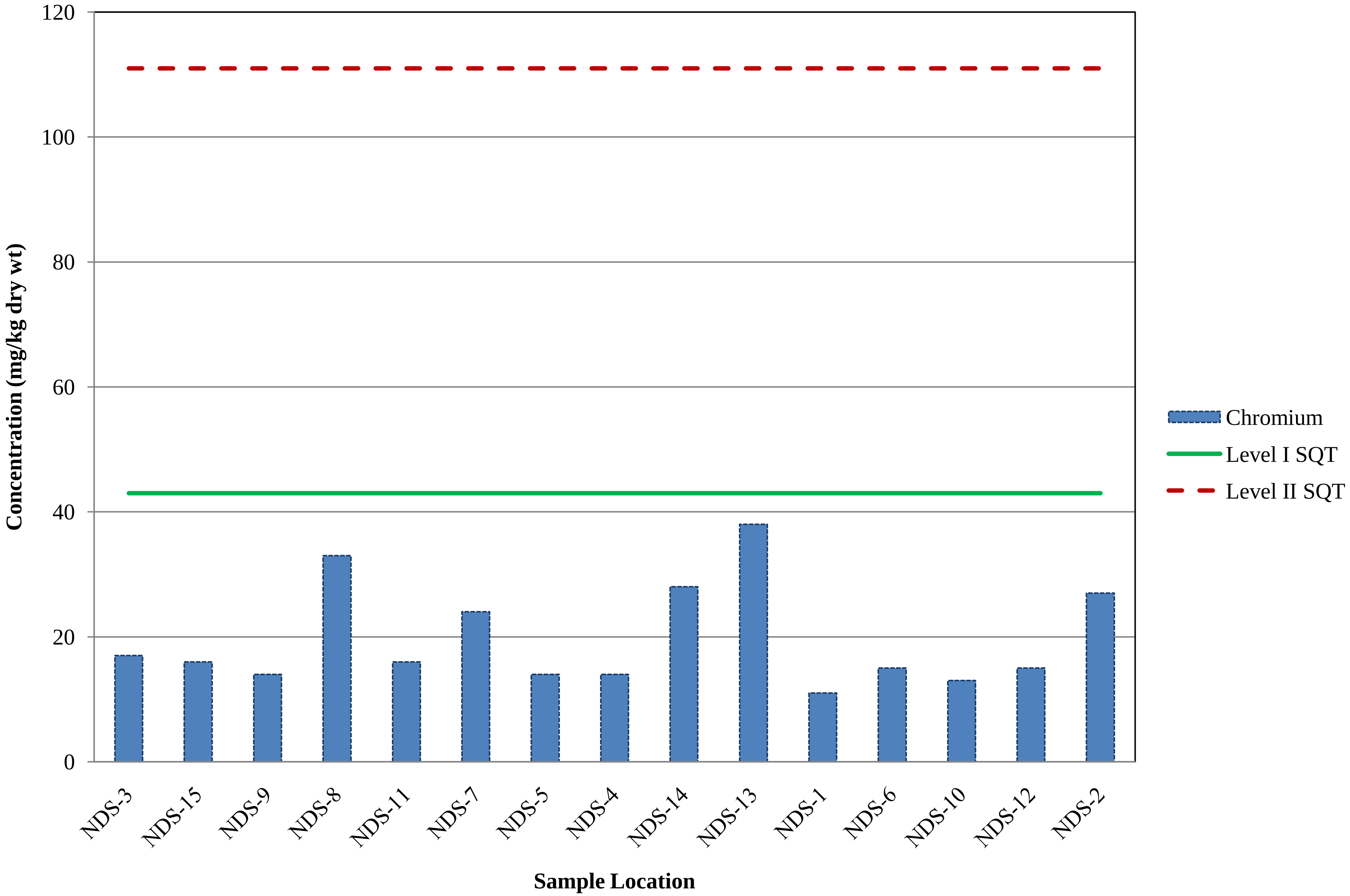


Figure 8.22-d
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Copper

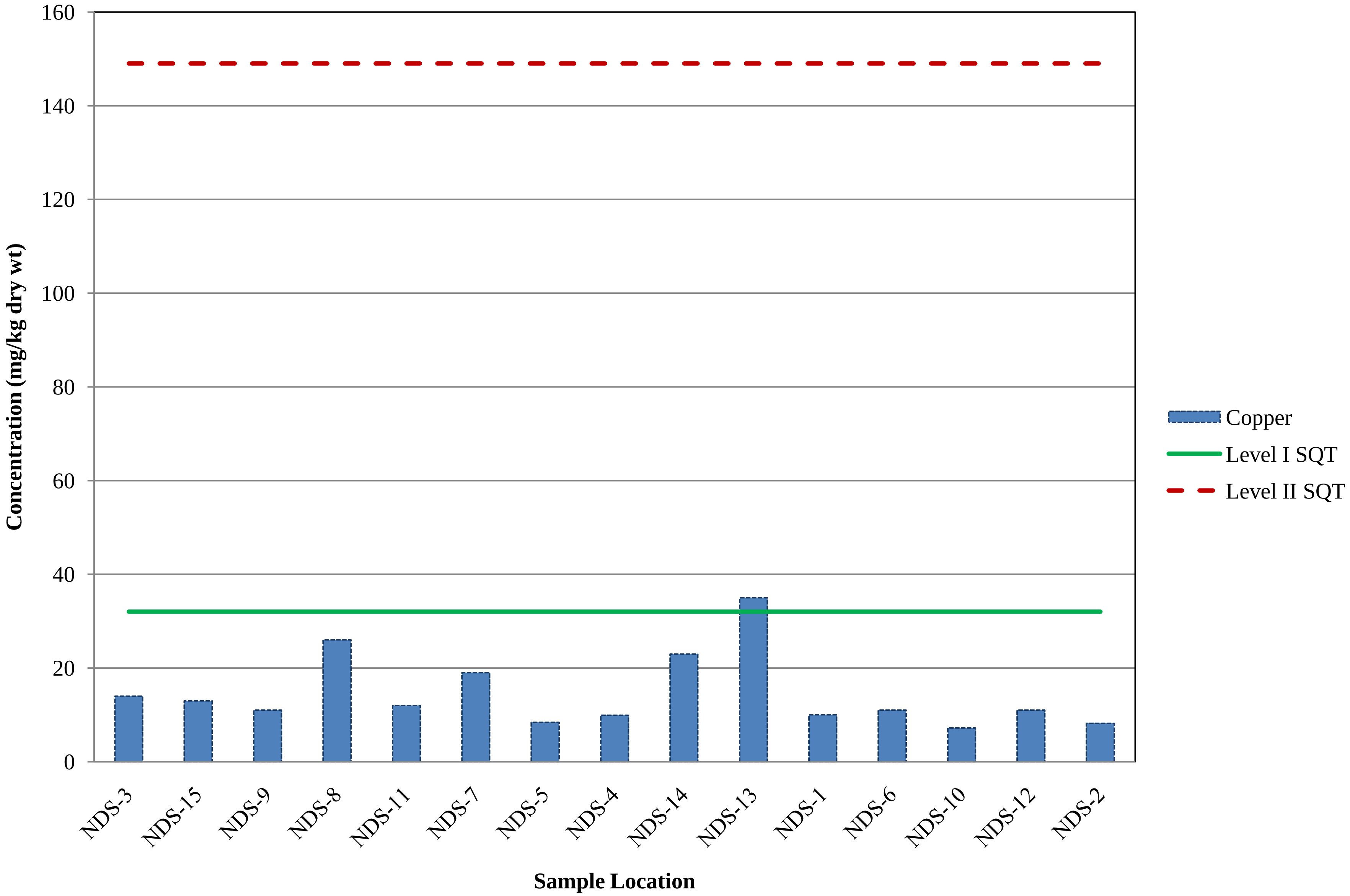


Figure 8.22-e
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Lead

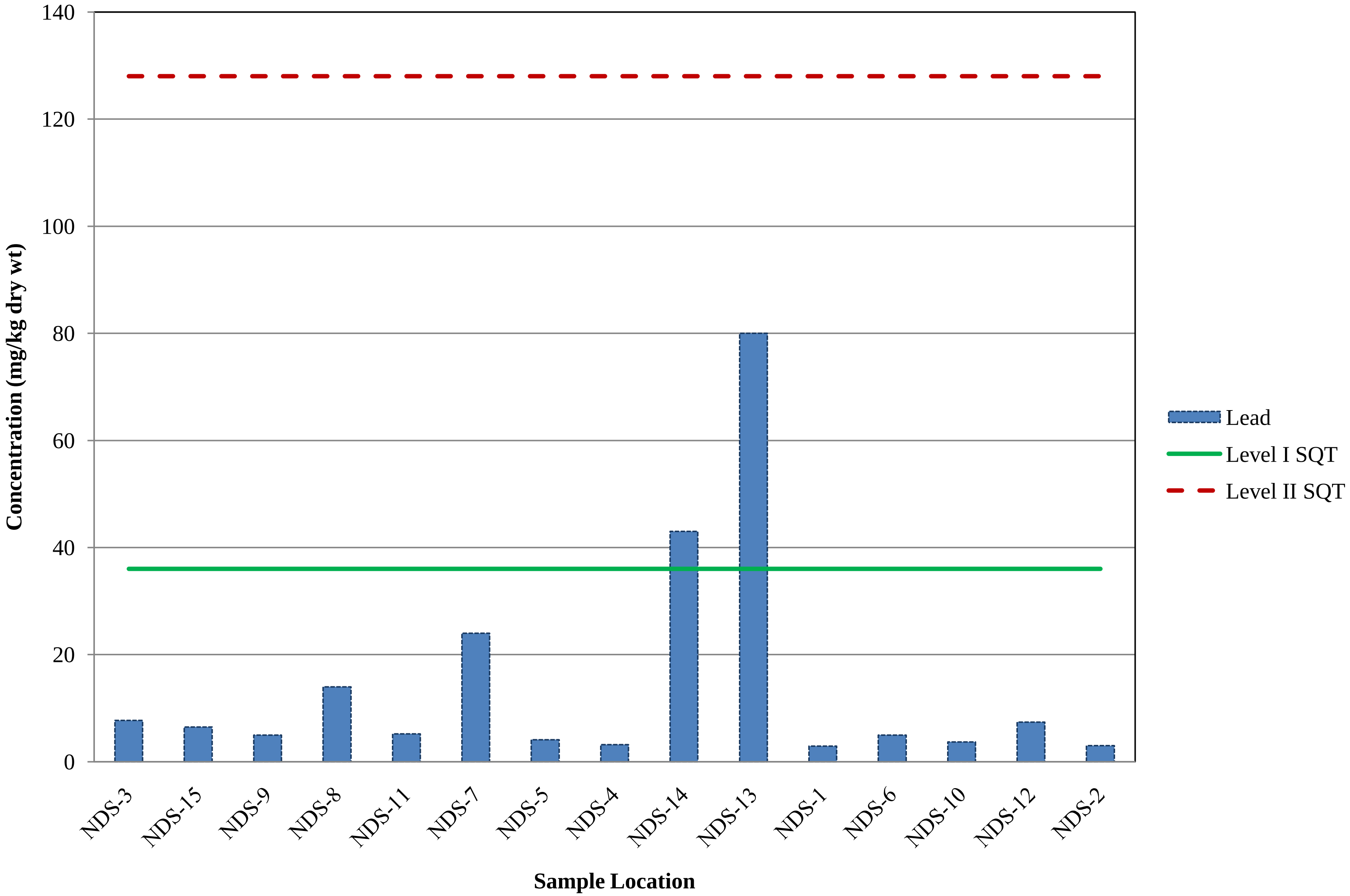


Figure 8.22-f
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Mercury

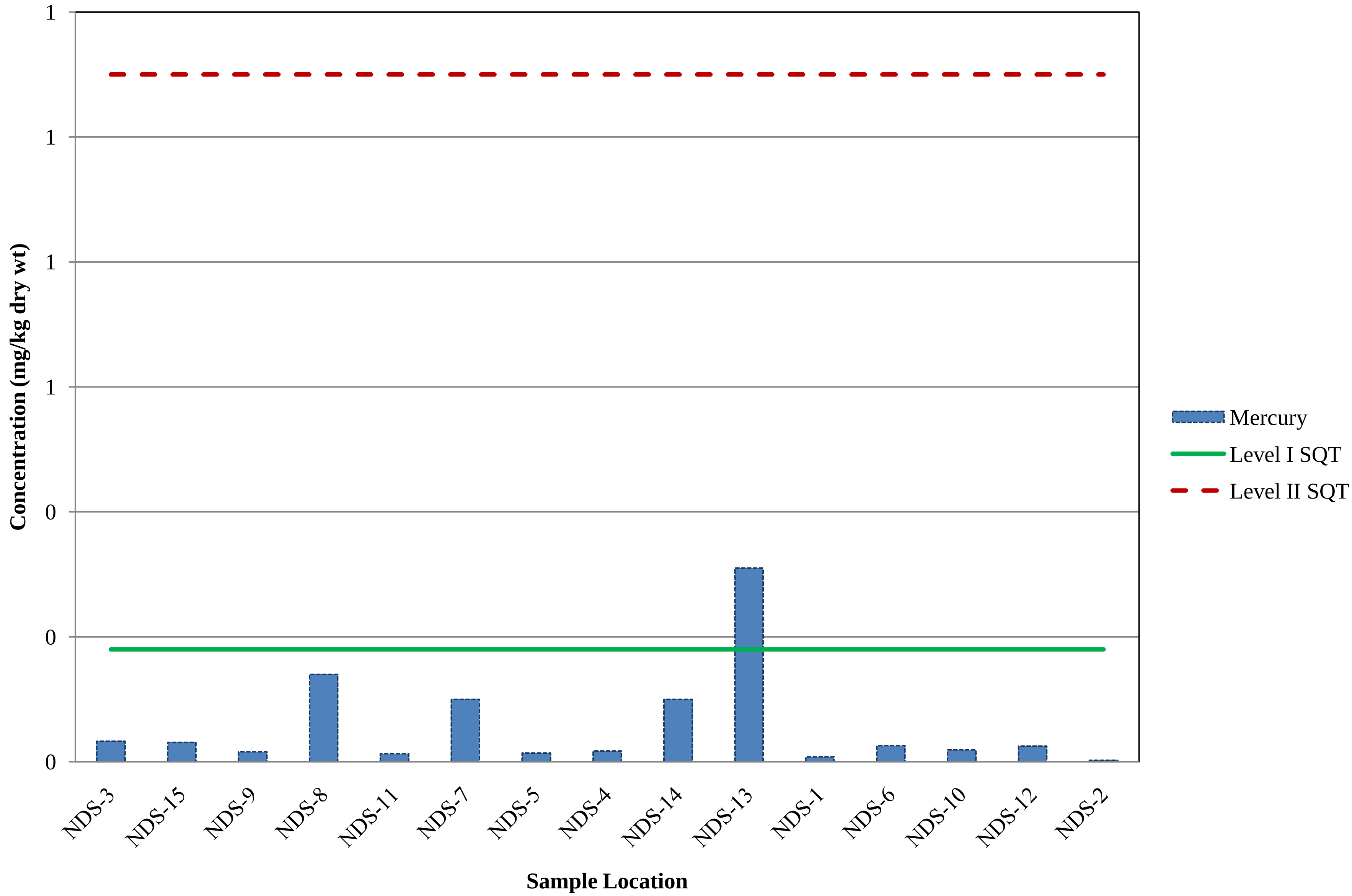


Figure 8.22-g
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Nickel

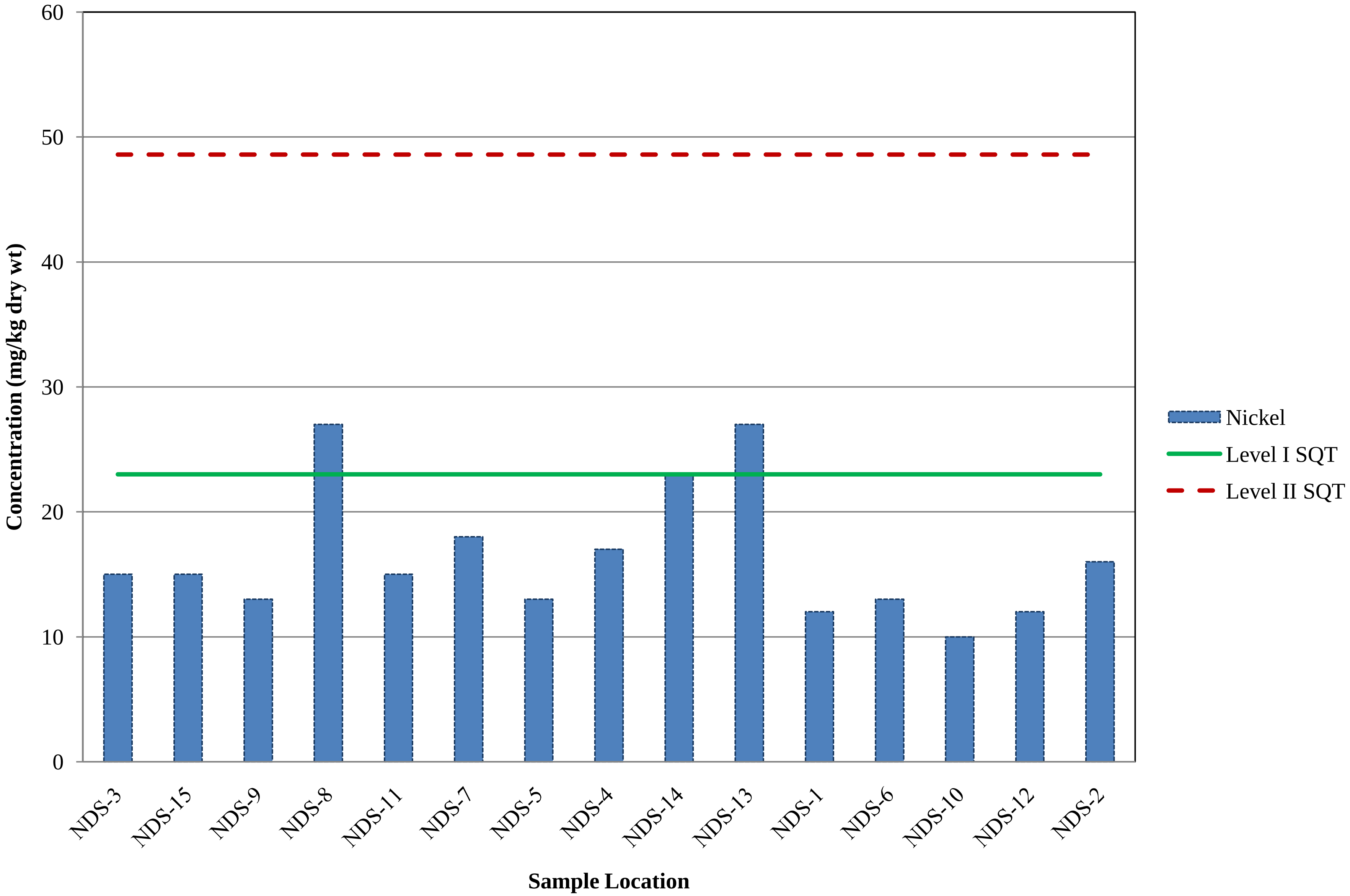


Figure 8.22-h
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Zinc

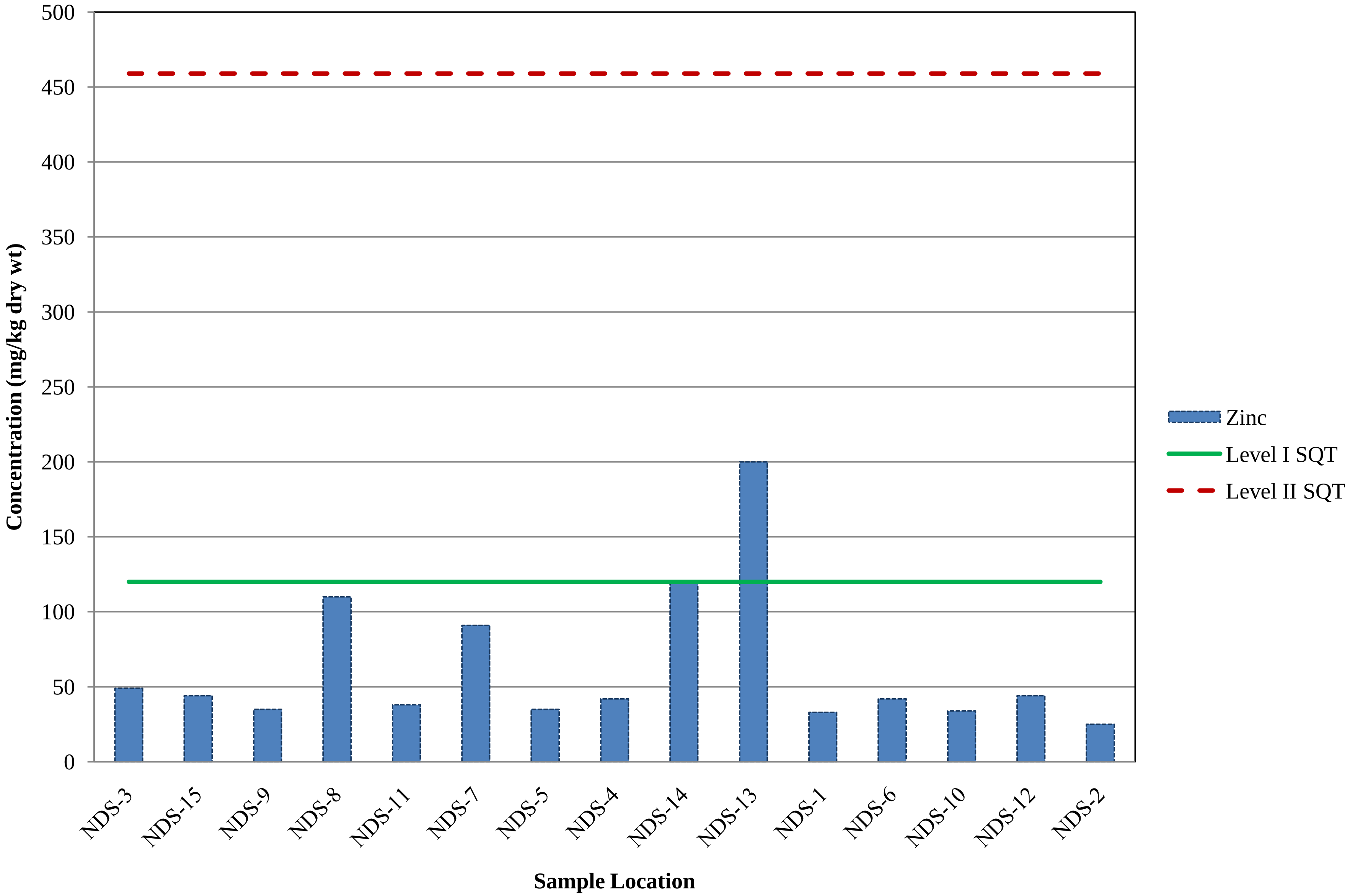


Figure 8.22-i
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - PAHs

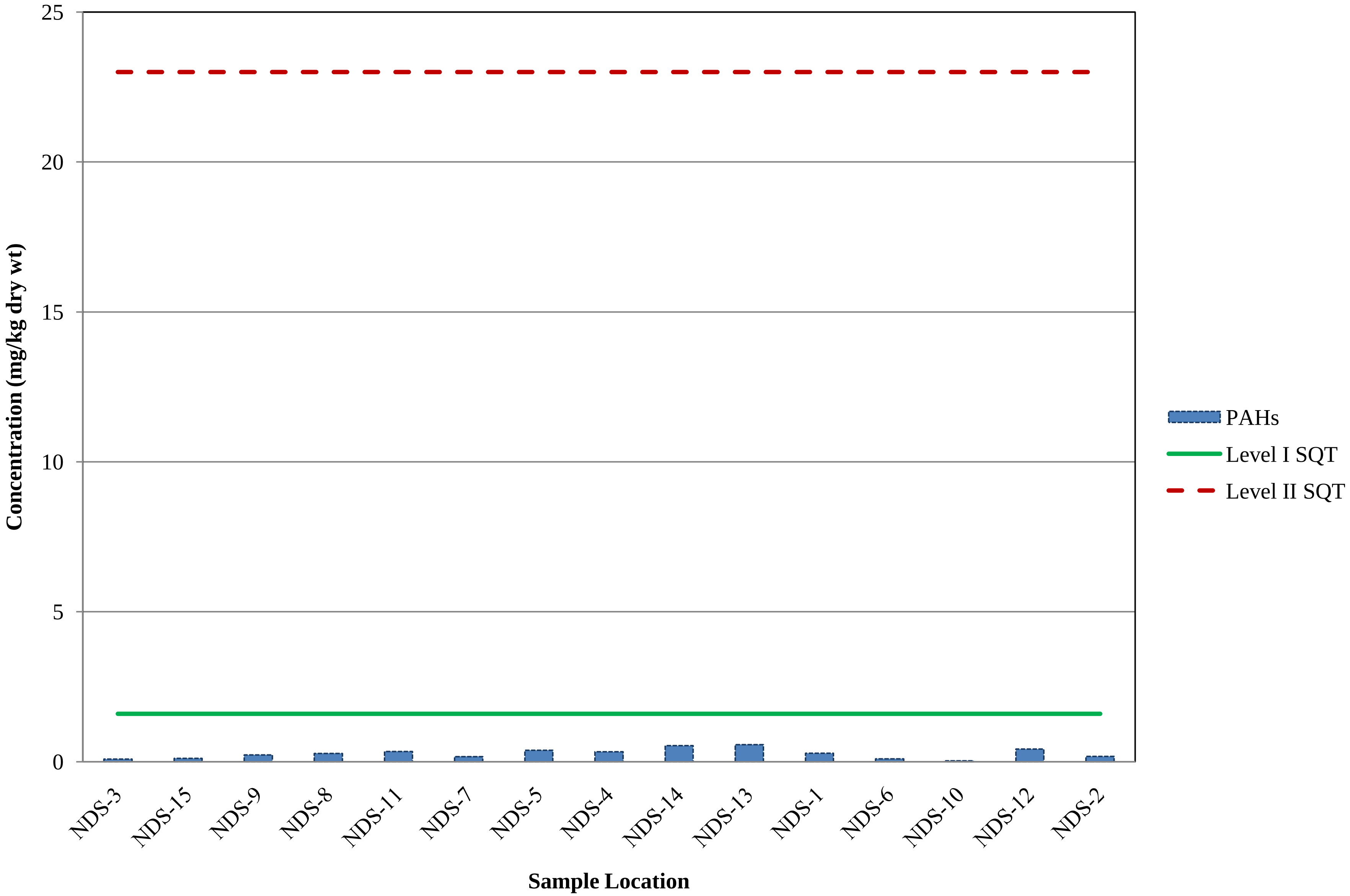


Figure 8.22-j
New Duluth Stretch (Top of Sediment, 0-0.5 ft) - Dioxins

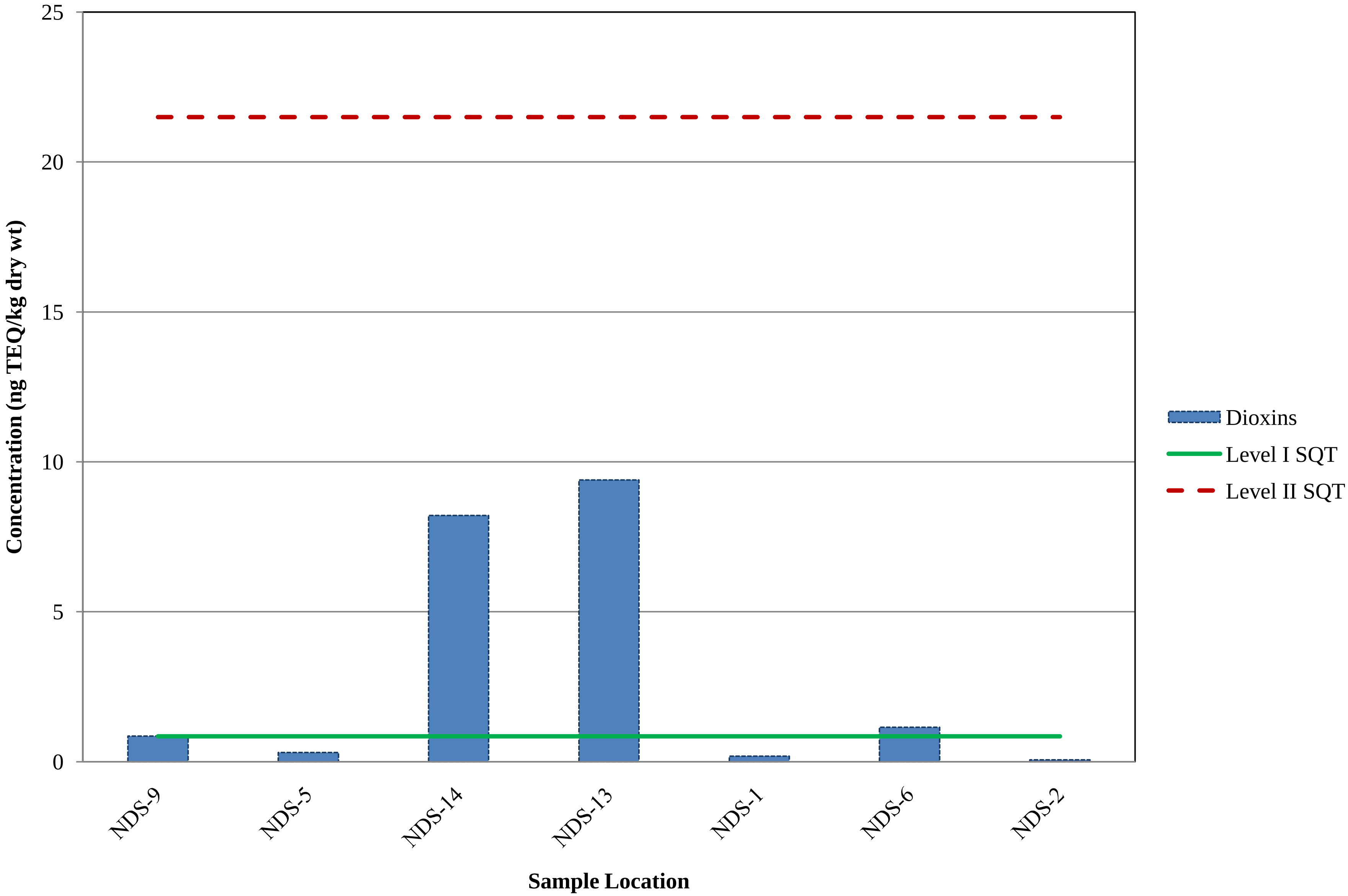


Figure 8.23-a
North Bay (Top of Sediment, 0-0.5 ft) - Arsenic

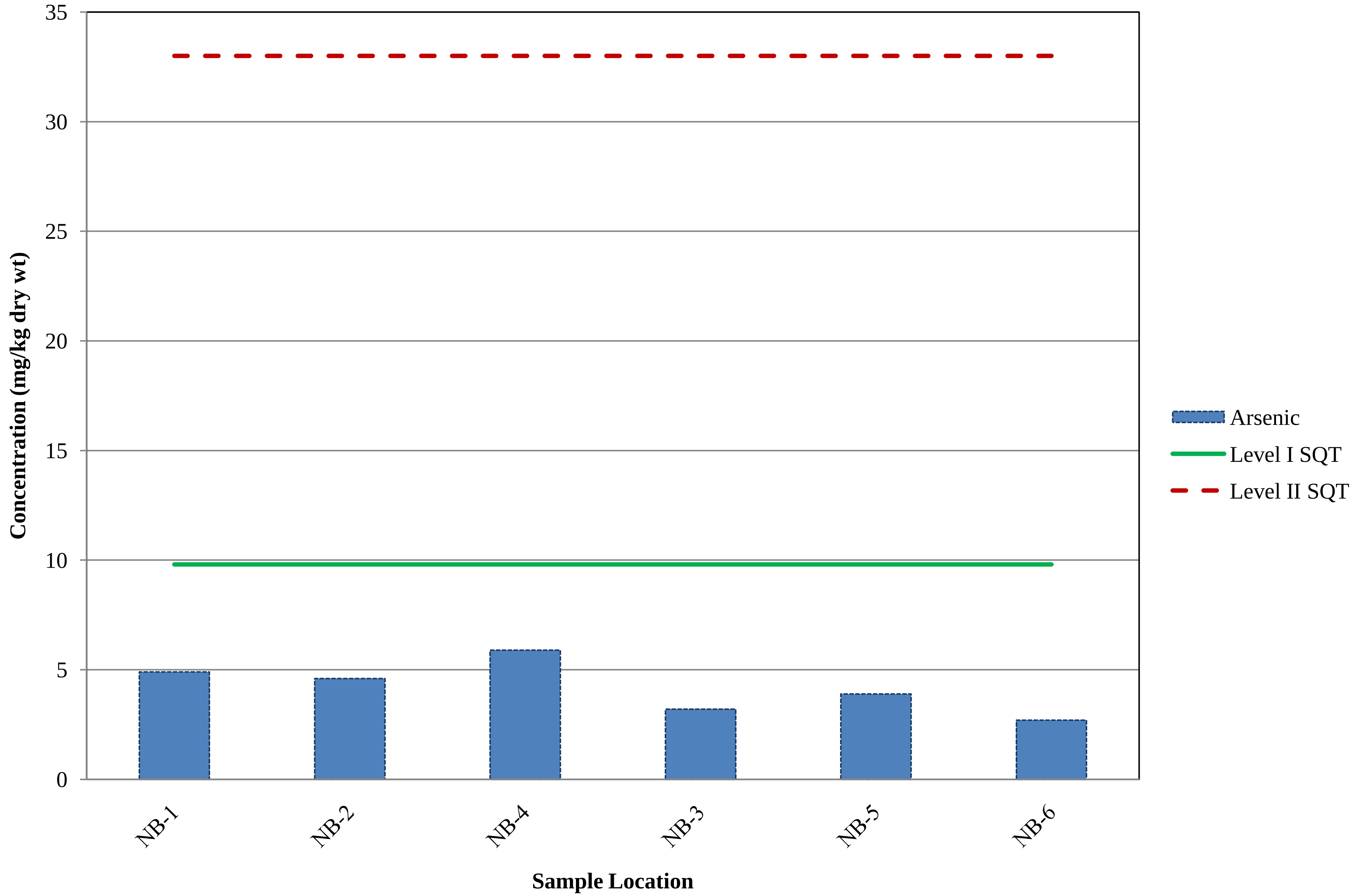


Figure 8.23-b
North Bay (Top of Sediment, 0-0.5 ft) - Cadmium

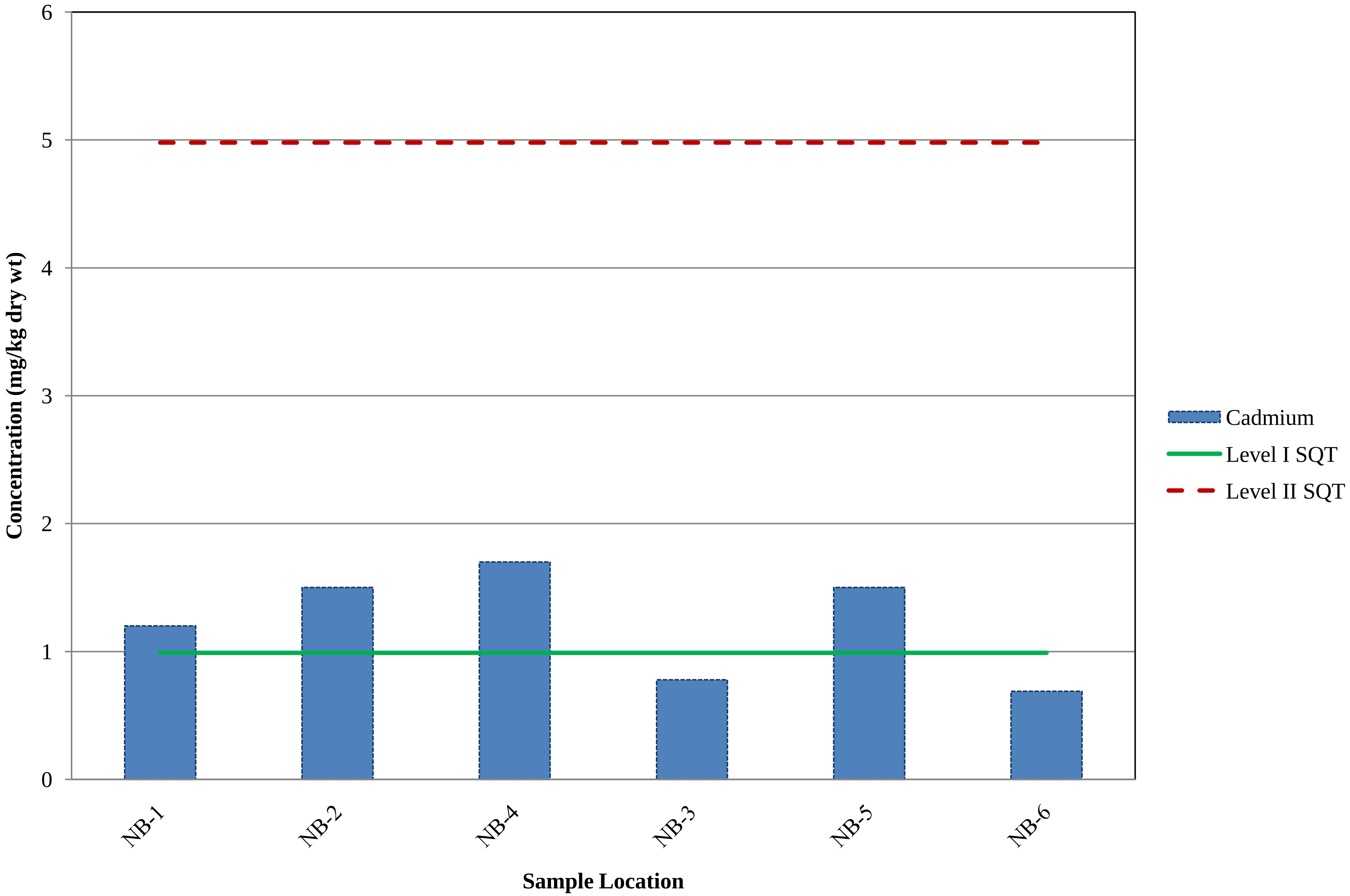


Figure 8.23-c
North Bay (Top of Sediment, 0-0.5 ft) - Chromium

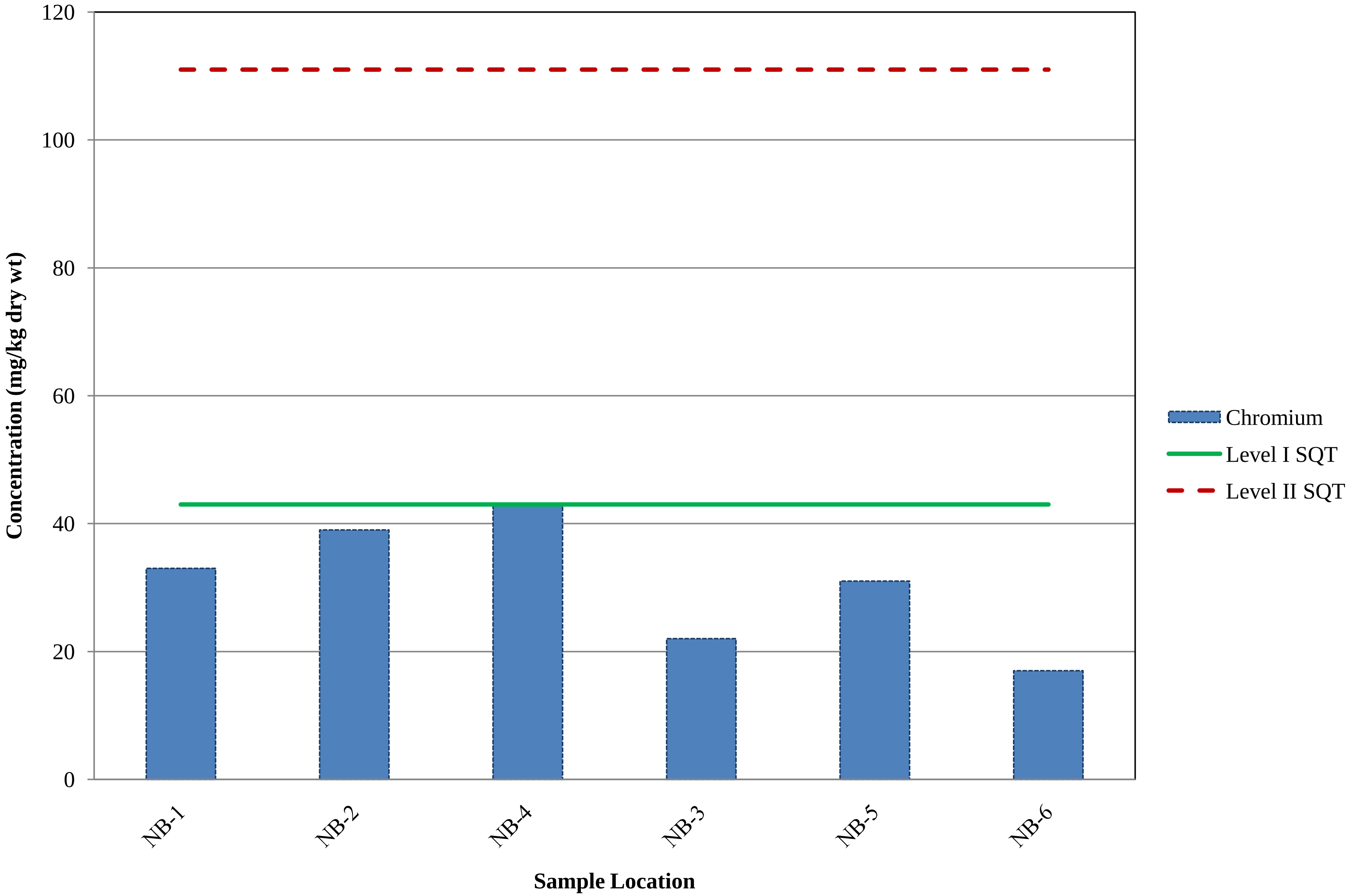


Figure 8.23-d
North Bay (Top of Sediment, 0-0.5 ft) - Copper

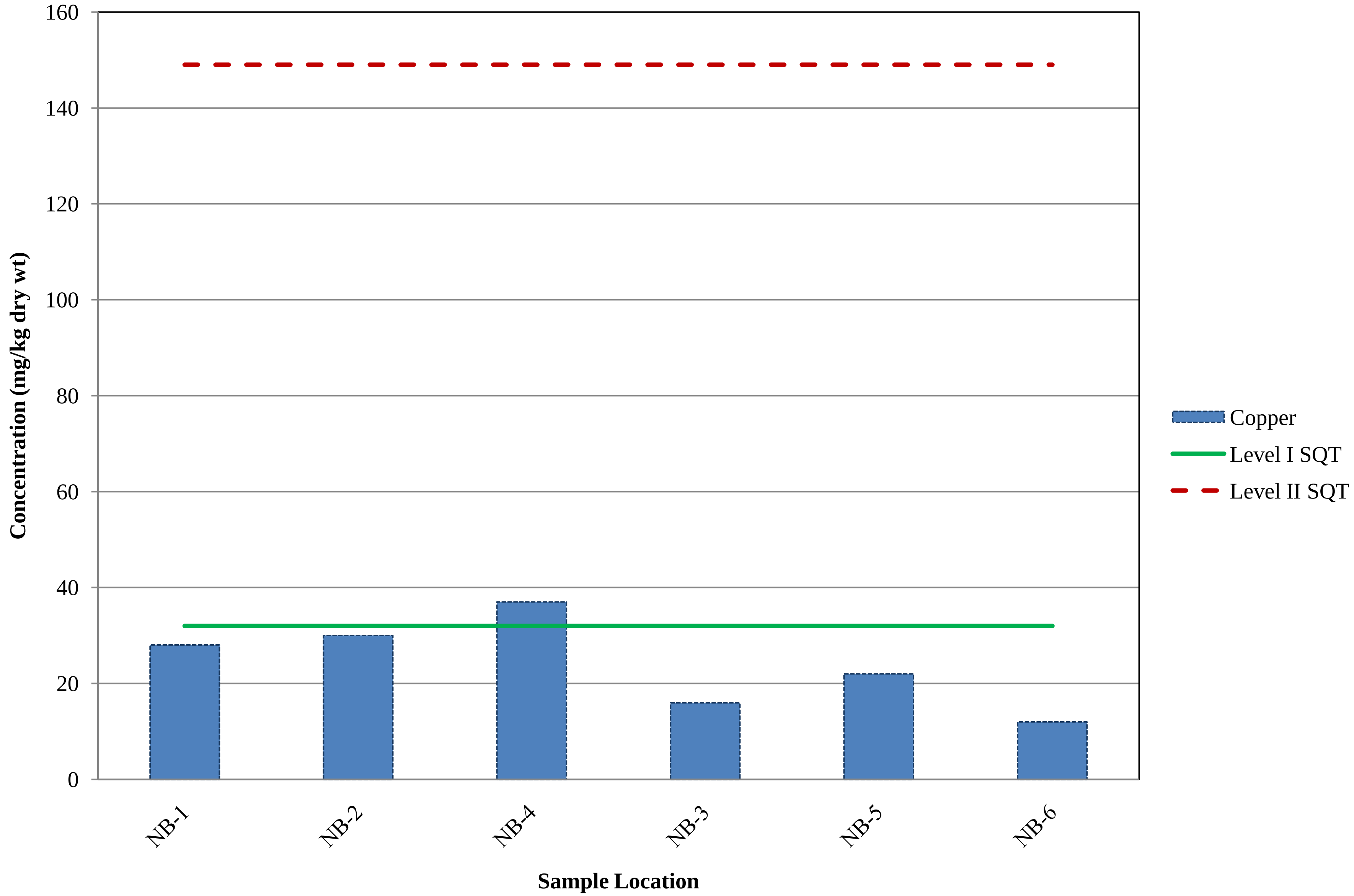


Figure 8.23-e
North Bay (Top of Sediment, 0-0.5 ft) - Lead

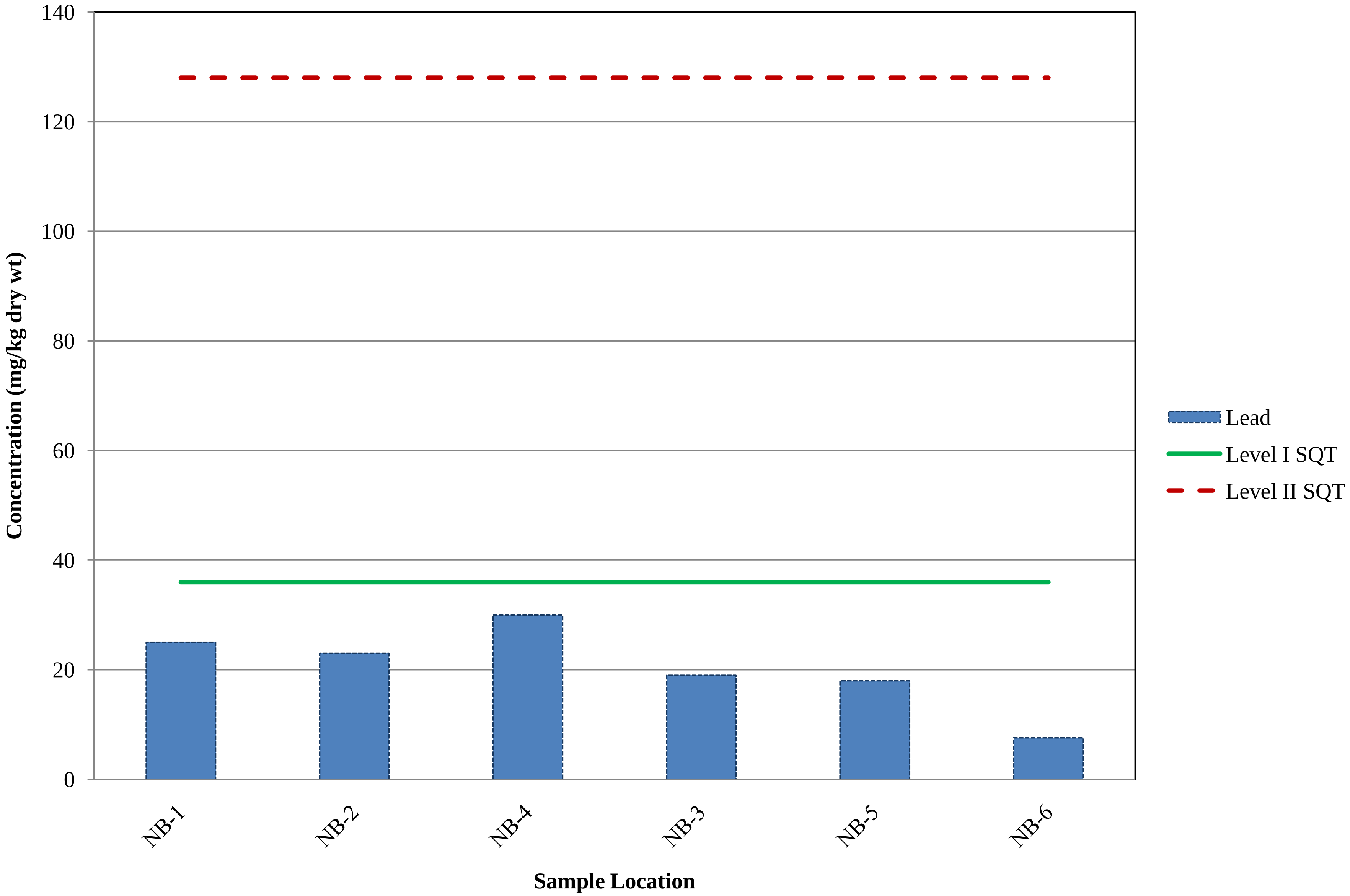


Figure 8.23-f
North Bay (Top of Sediment, 0-0.5 ft) - Mercury

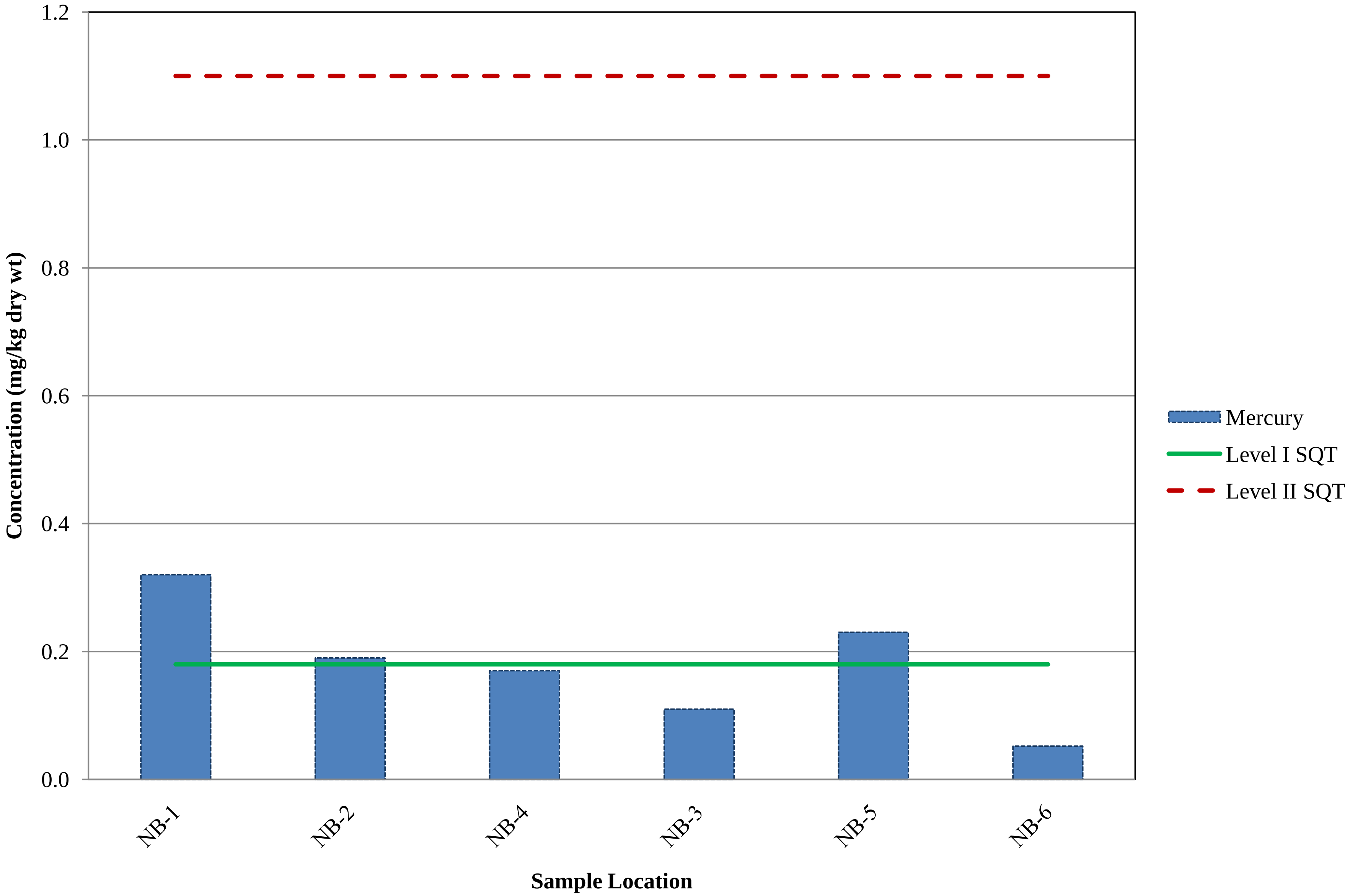


Figure 8.23-g
North Bay (Top of Sediment, 0-0.5 ft) - Nickel

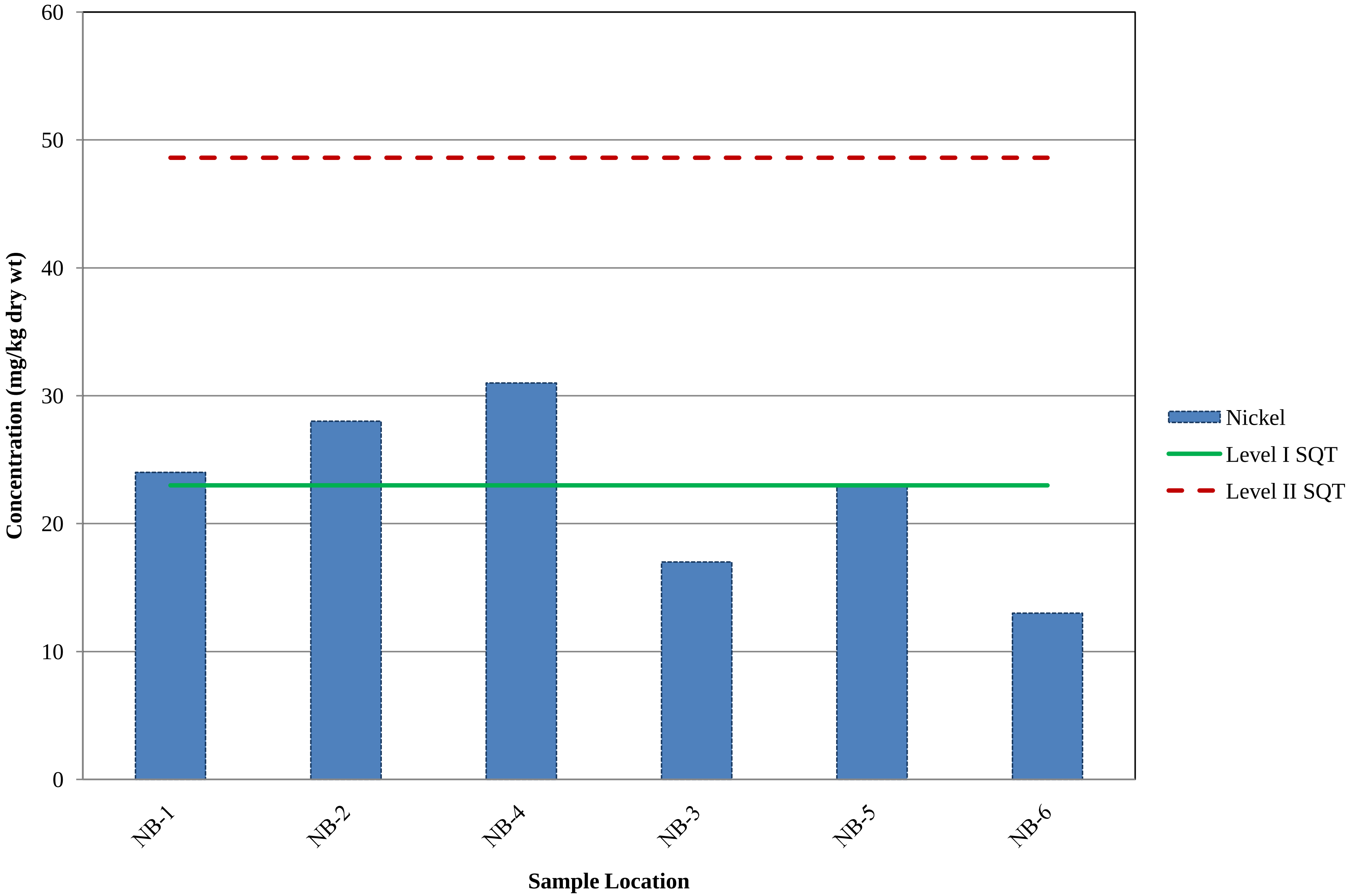


Figure 8.23-h
North Bay (Top of Sediment, 0-0.5 ft) - Zinc

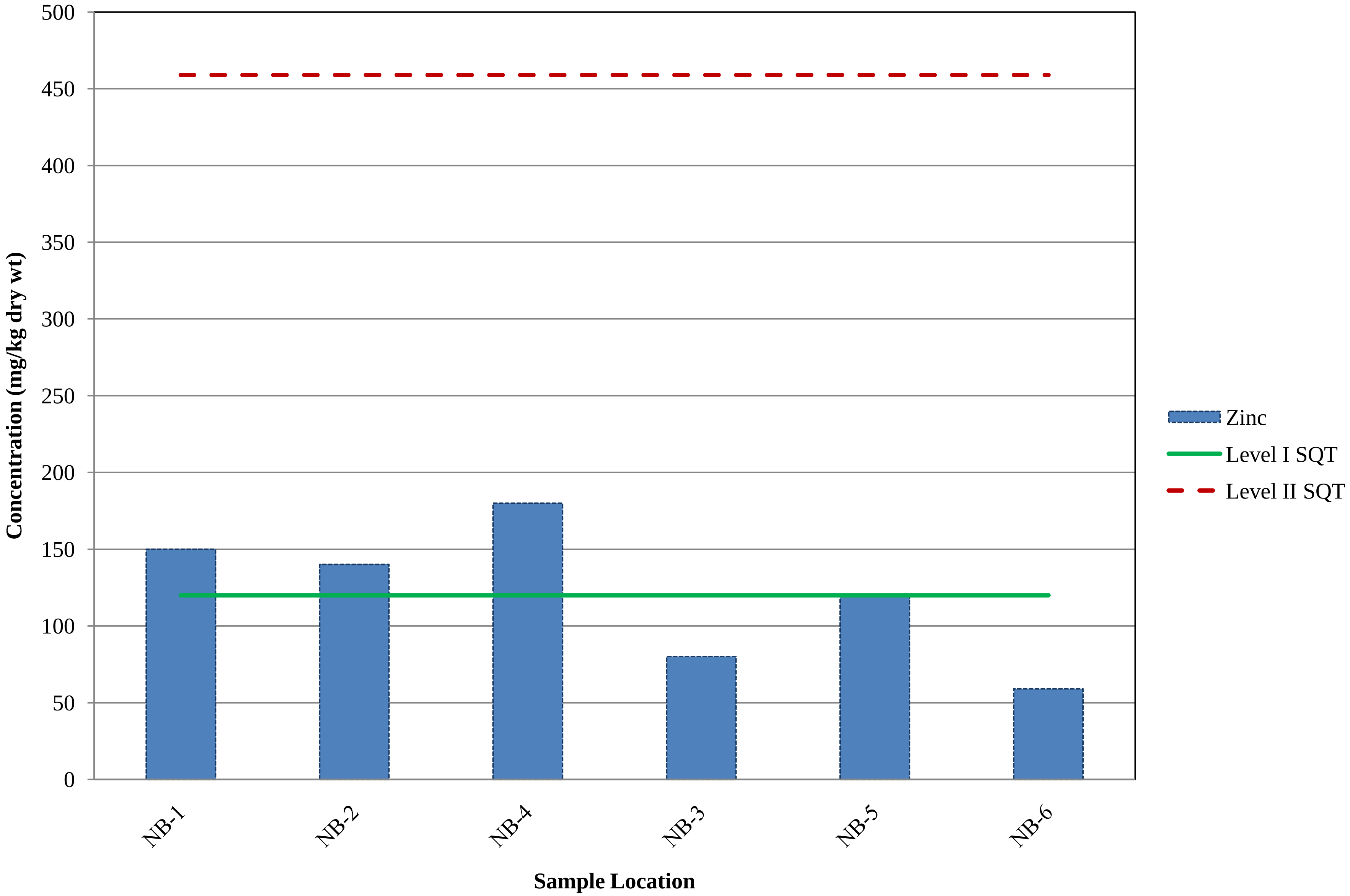


Figure 8.23-i
North Bay (Top of Sediment, 0-0.5 ft) - PAHs

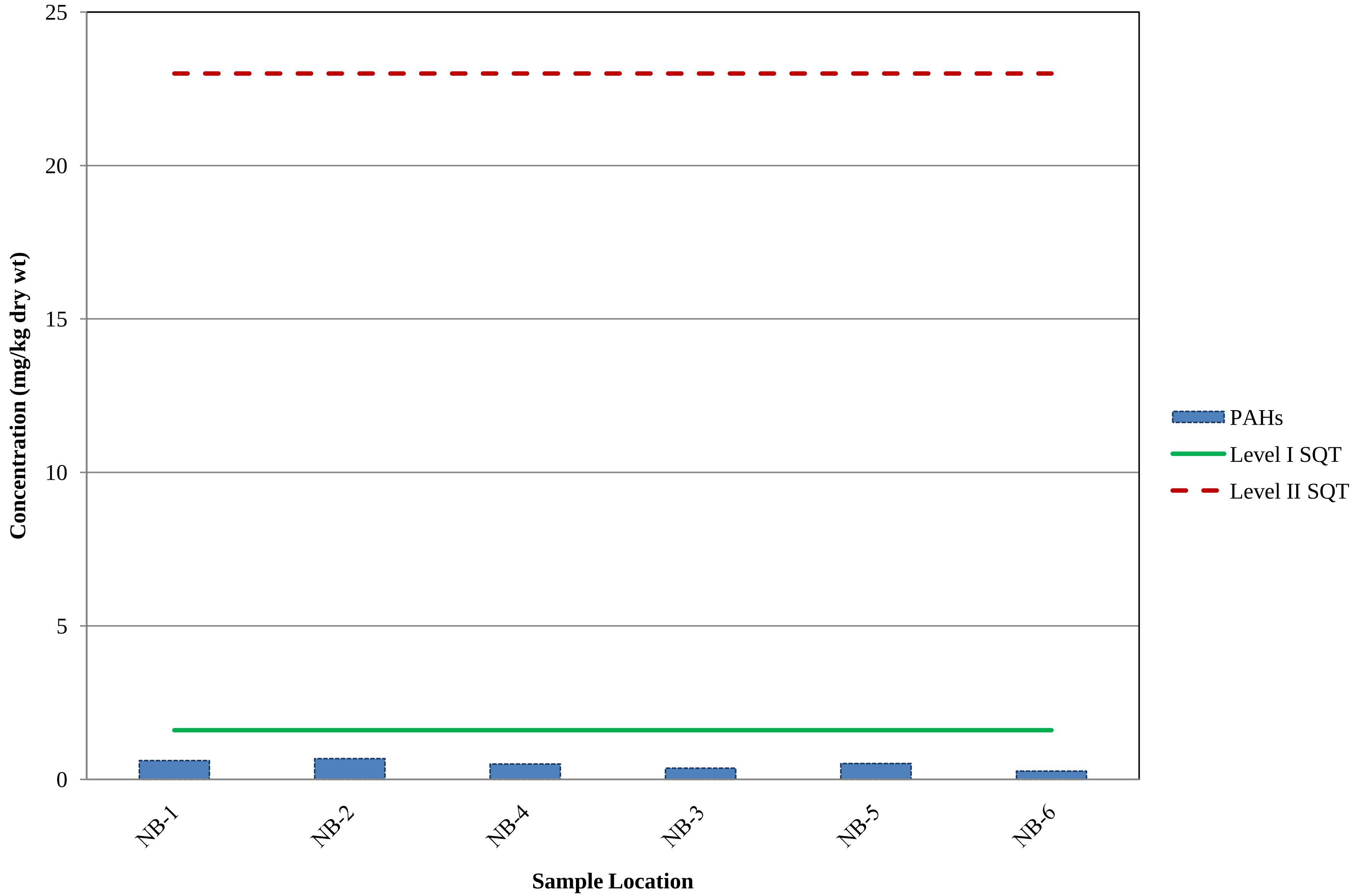


Figure 8.23-j
North Bay (Top of Sediment, 0-0.5 ft) - Dioxins

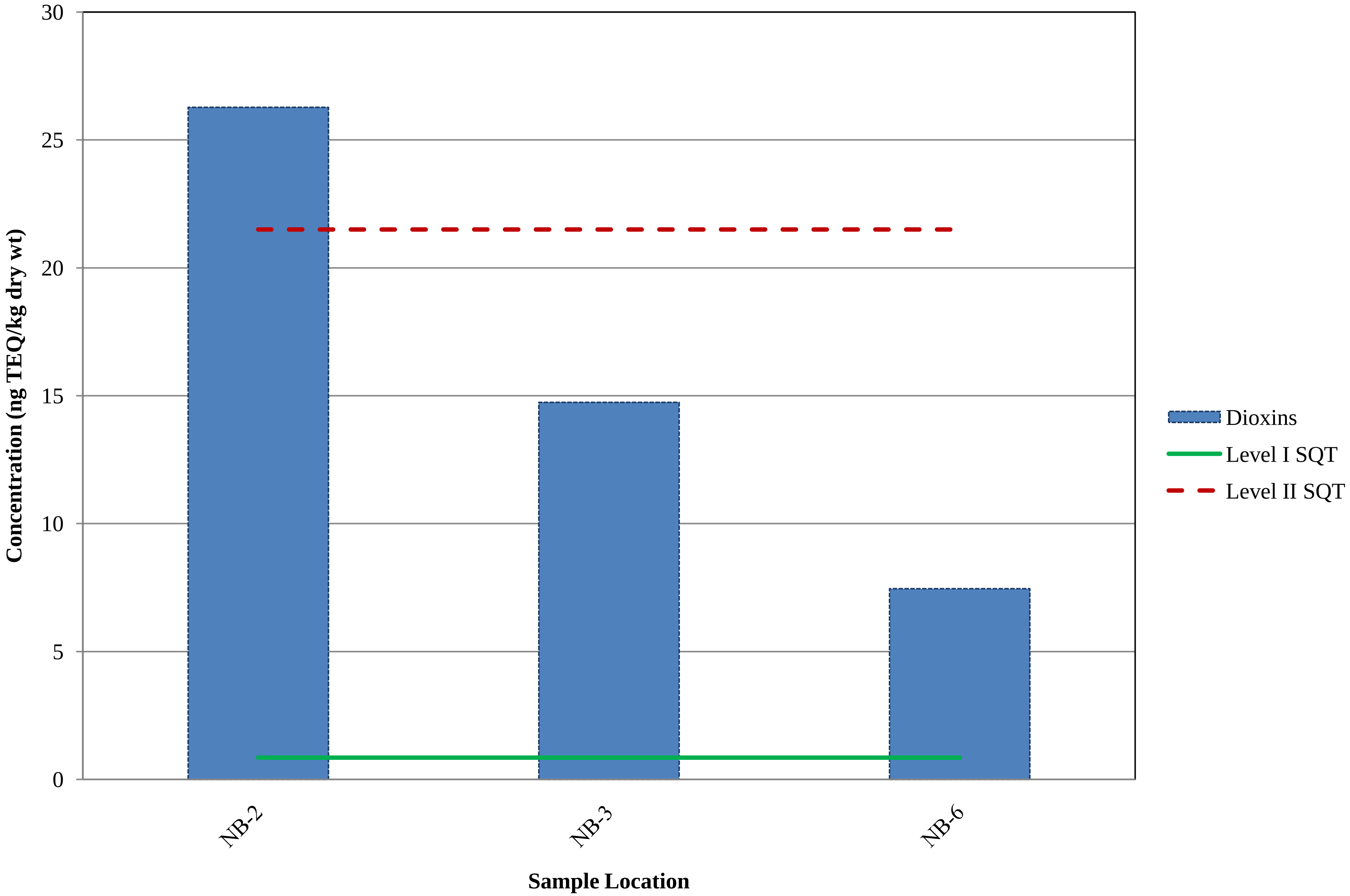


Figure 8.24-a
Perch Lake (Top of Sediment, 0-0.5 ft) - Arsenic

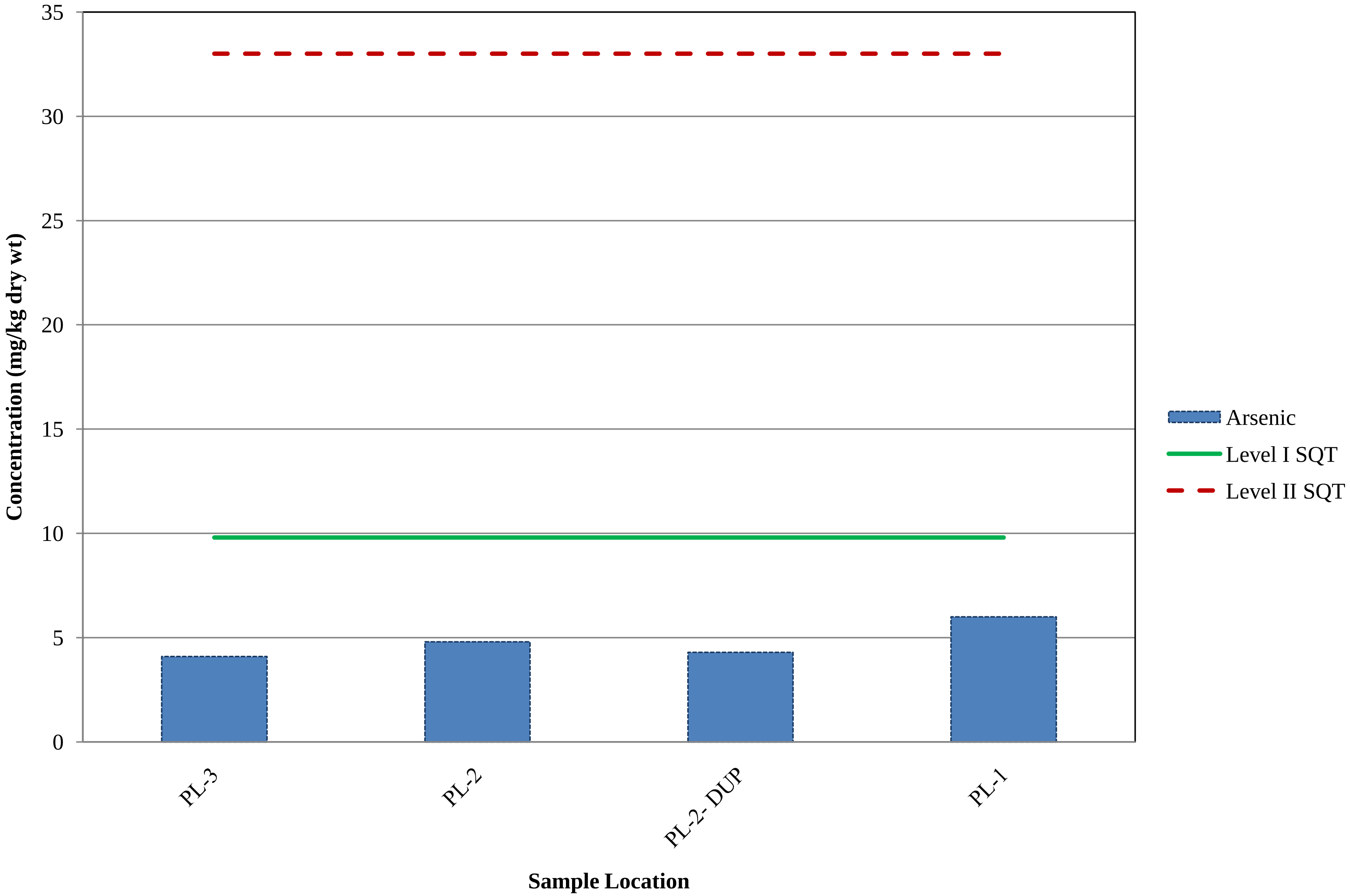


Figure 8.24-b
Perch Lake (Top of Sediment, 0-0.5 ft) - Cadmium

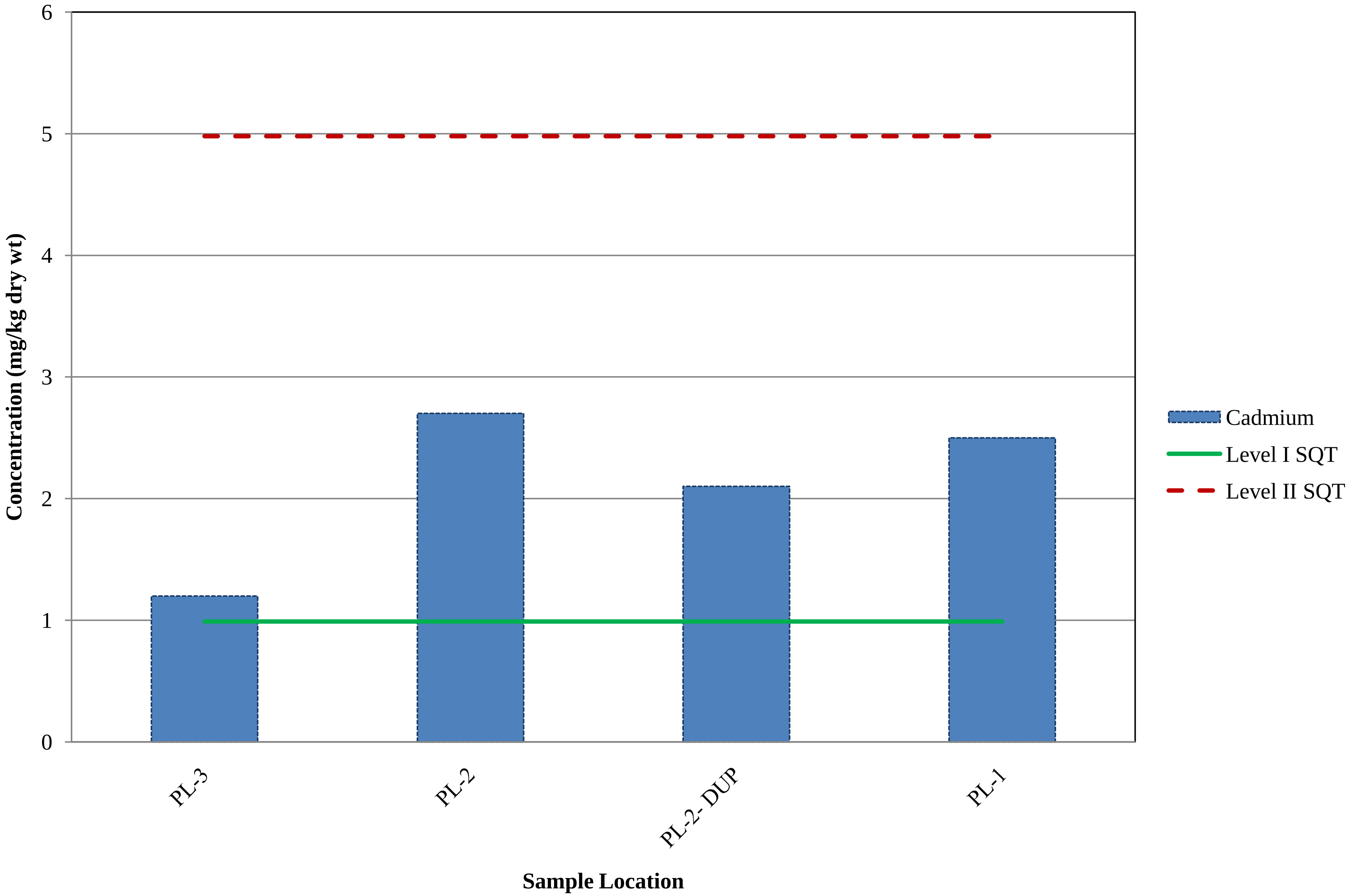


Figure 8.24-c
Perch Lake (Top of Sediment, 0-0.5 ft) - Chromium

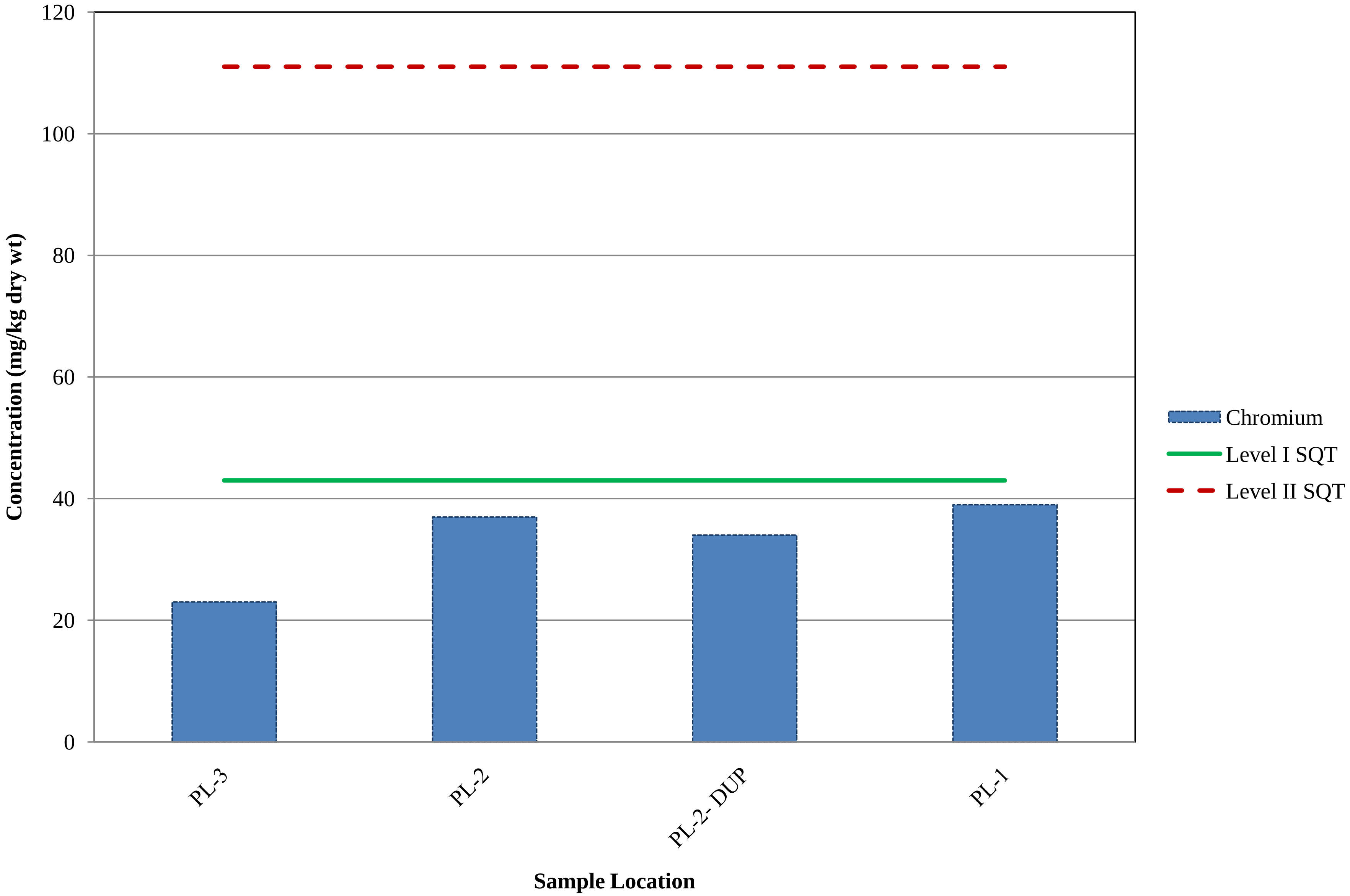


Figure 8.24-d
Perch Lake (Top of Sediment, 0-0.5 ft) - Copper

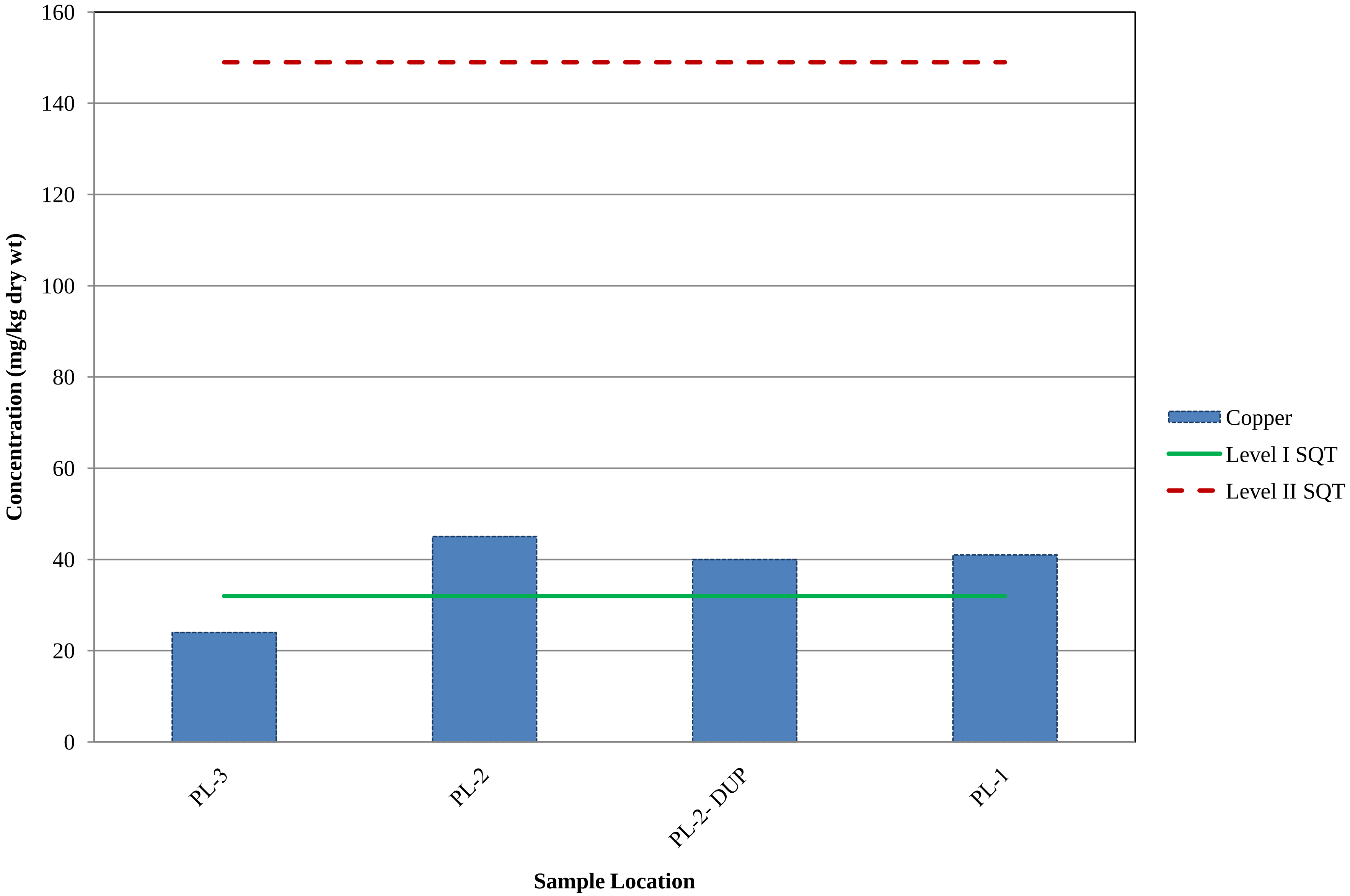


Figure 8.24-e
Perch Lake (Top of Sediment, 0-0.5 ft) - Lead

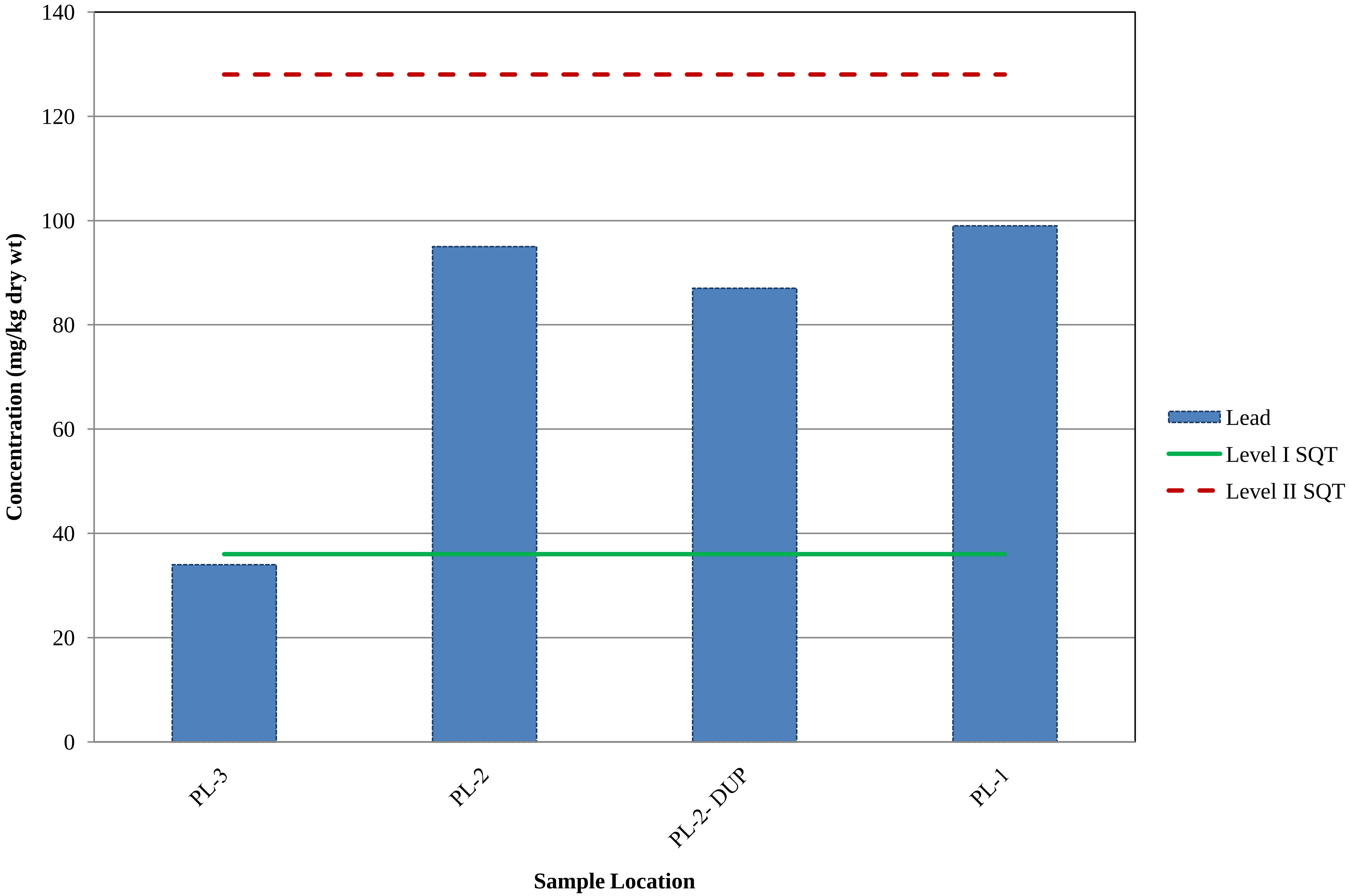


Figure 8.24-f
Perch Lake (Top of Sediment, 0-0.5 ft) - Mercury

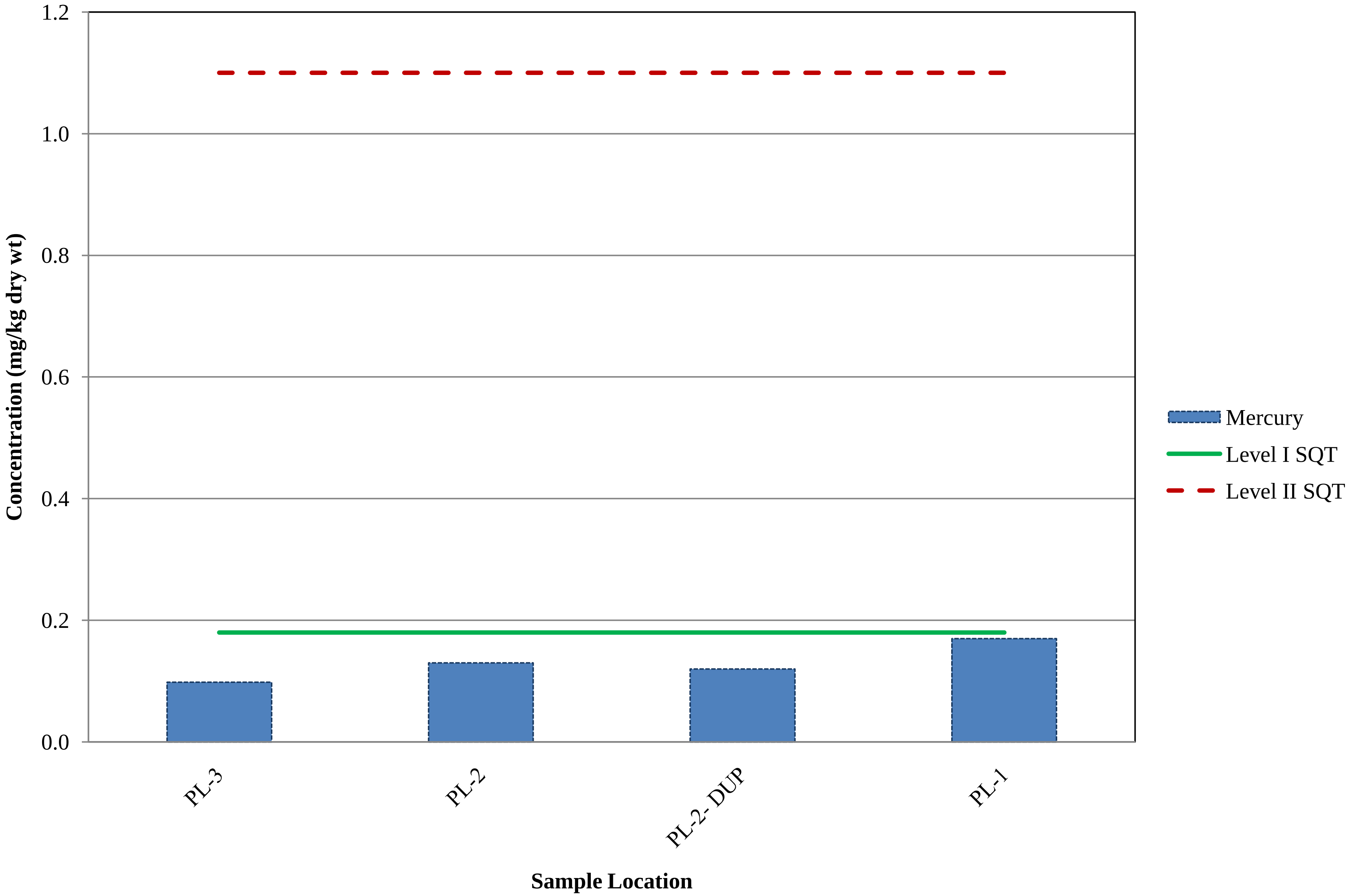


Figure 8.24-g
Perch Lake (Top of Sediment, 0-0.5 ft) - Nickel

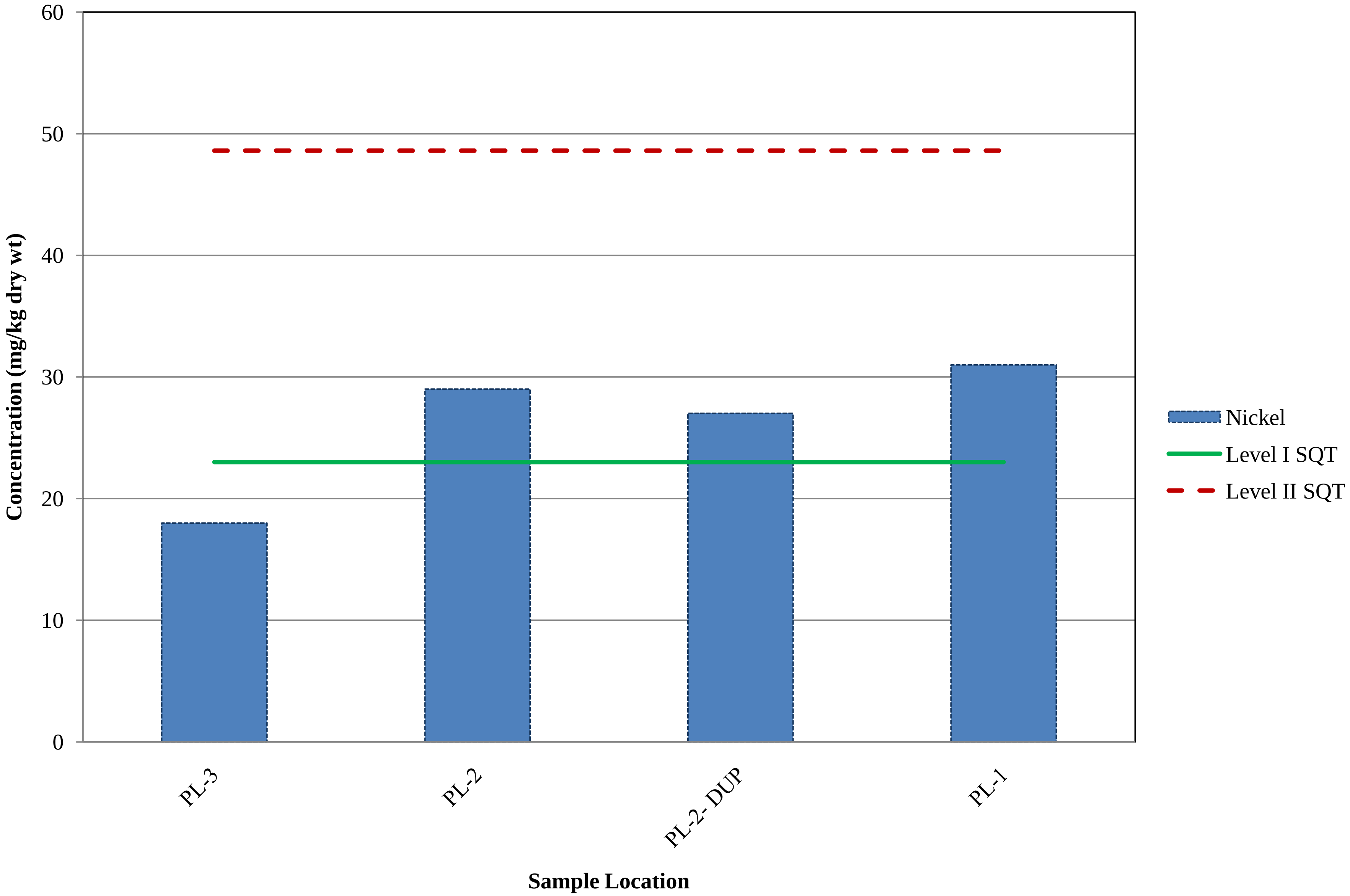


Figure 8.24-h
Perch Lake (Top of Sediment, 0-0.5 ft) - Zinc

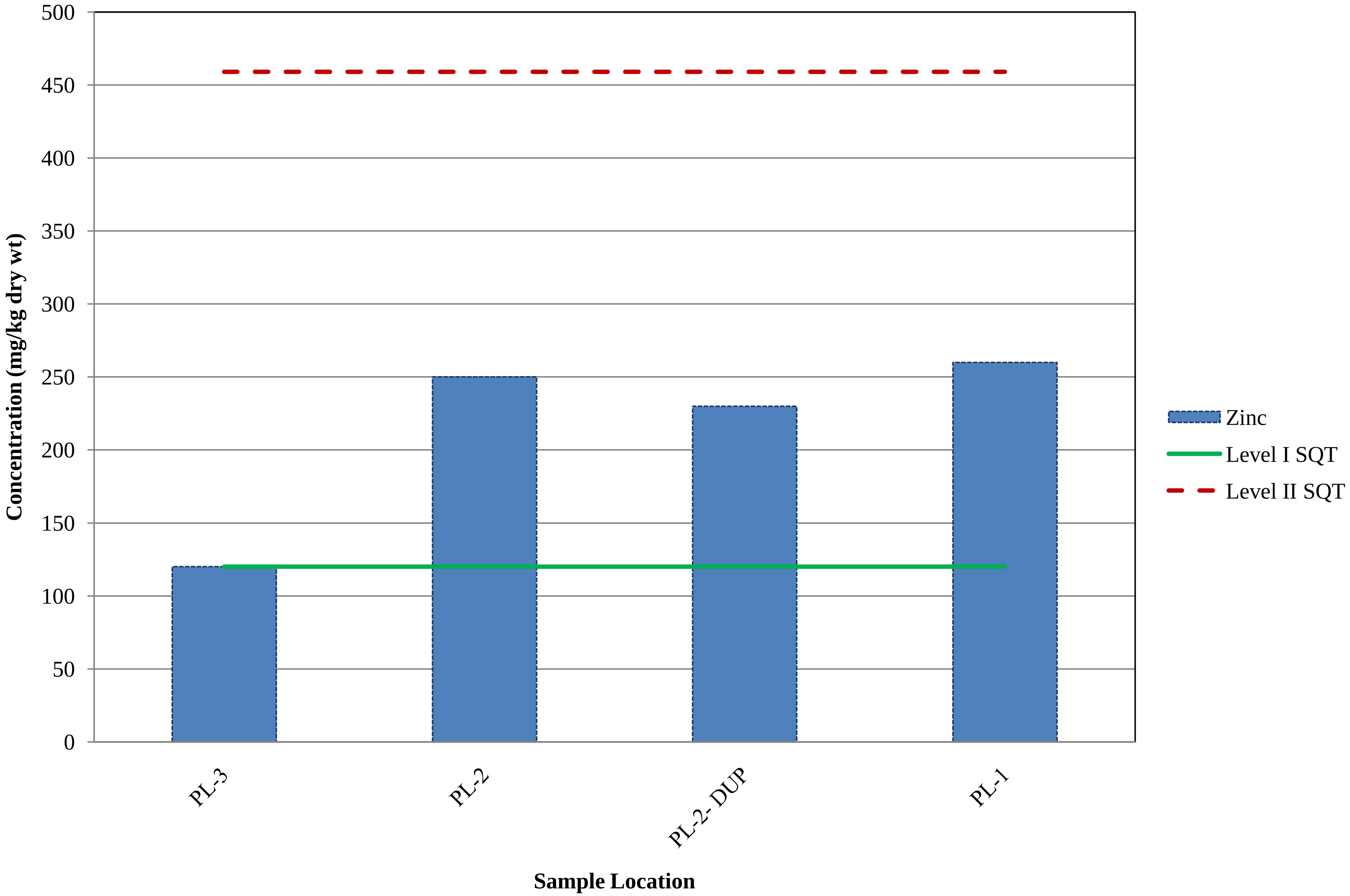


Figure 8.24-i
Perch Lake (Top of Sediment, 0-0.5 ft) - PAHs

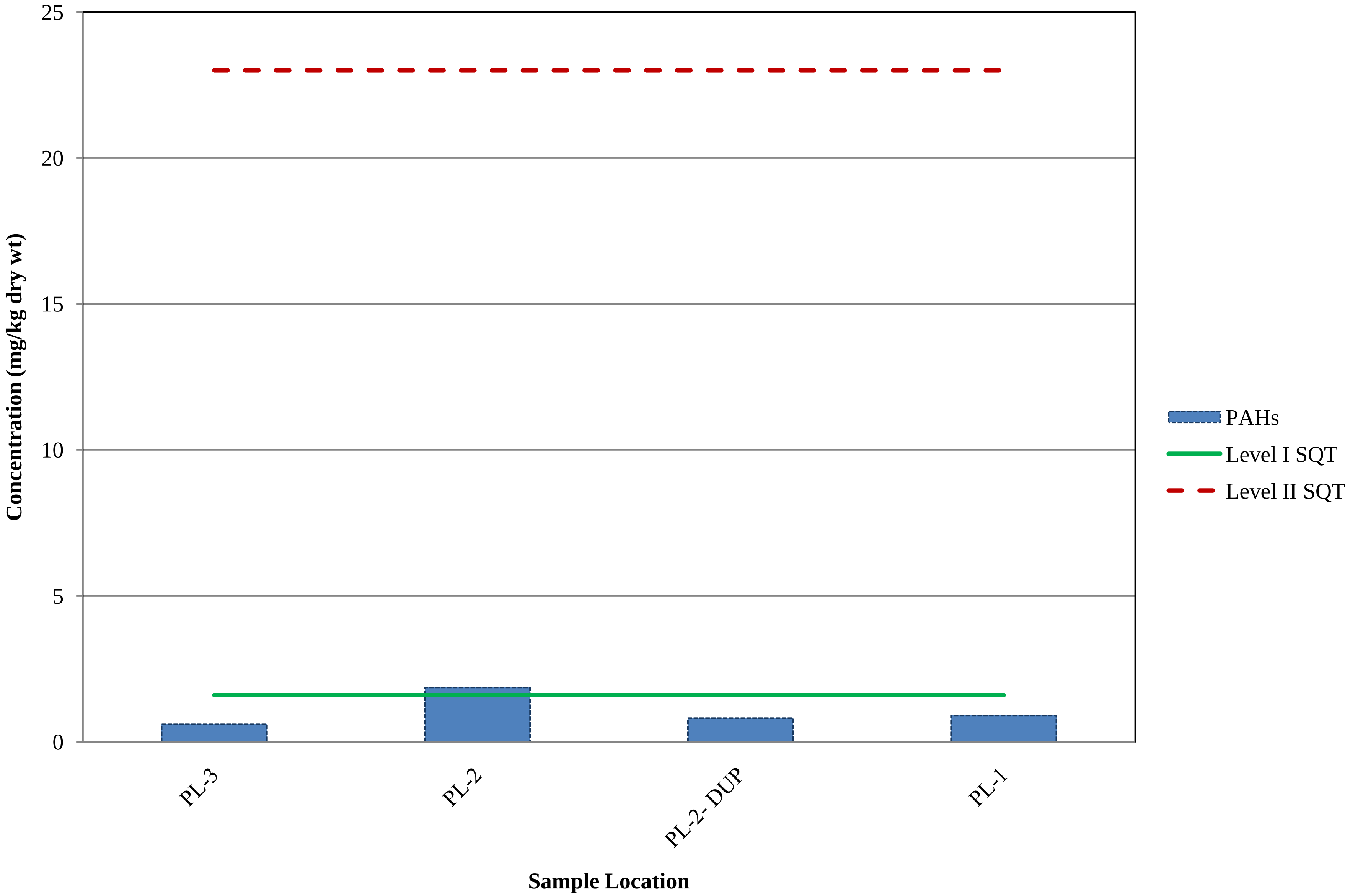


Figure 8.24-j
Perch Lake (Top of Sediment, 0-0.5 ft) - Dioxins

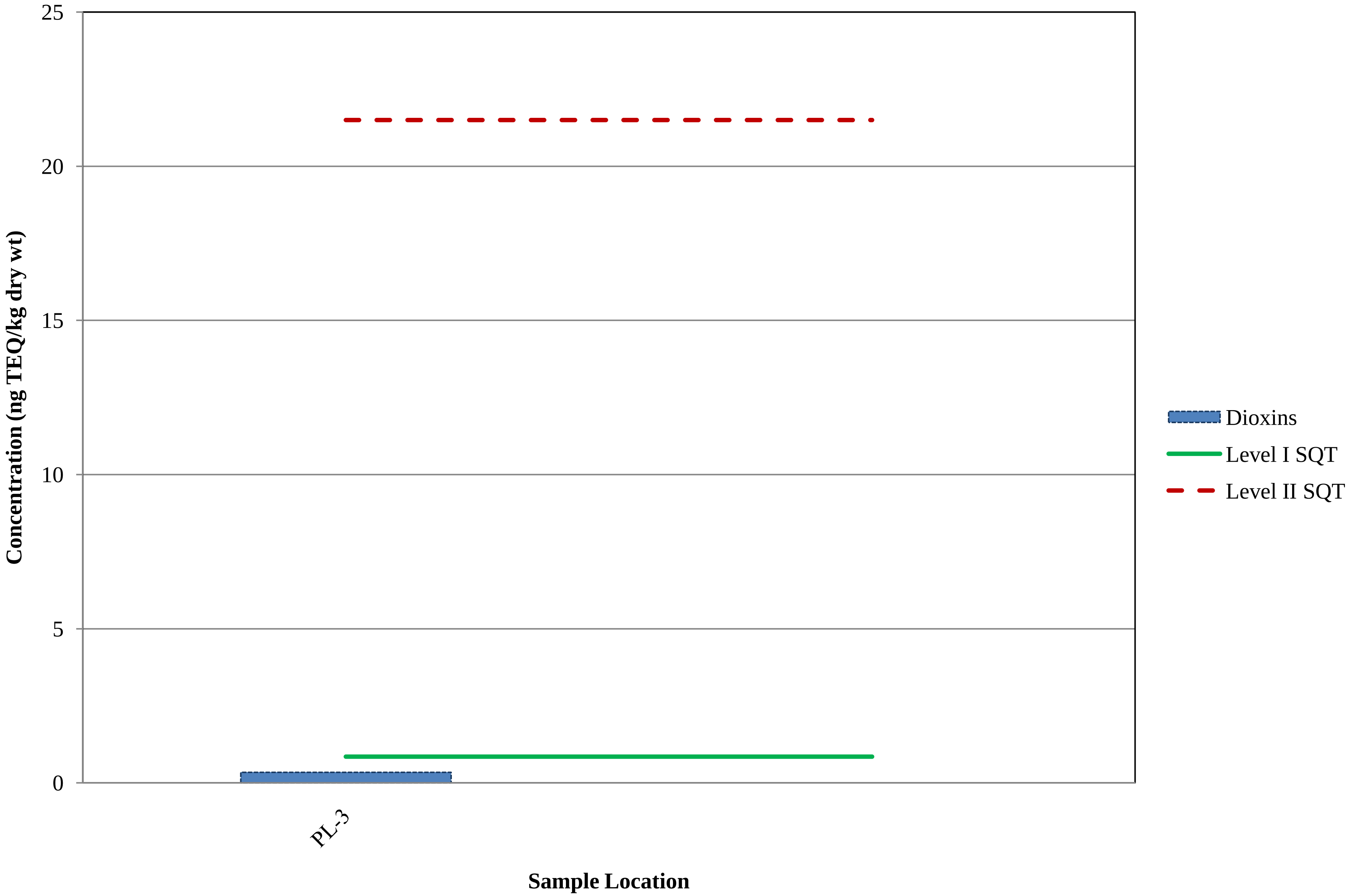


Figure 8.25-a
Rask Bay (Top of Sediment, 0-0.5 ft) - Arsenic

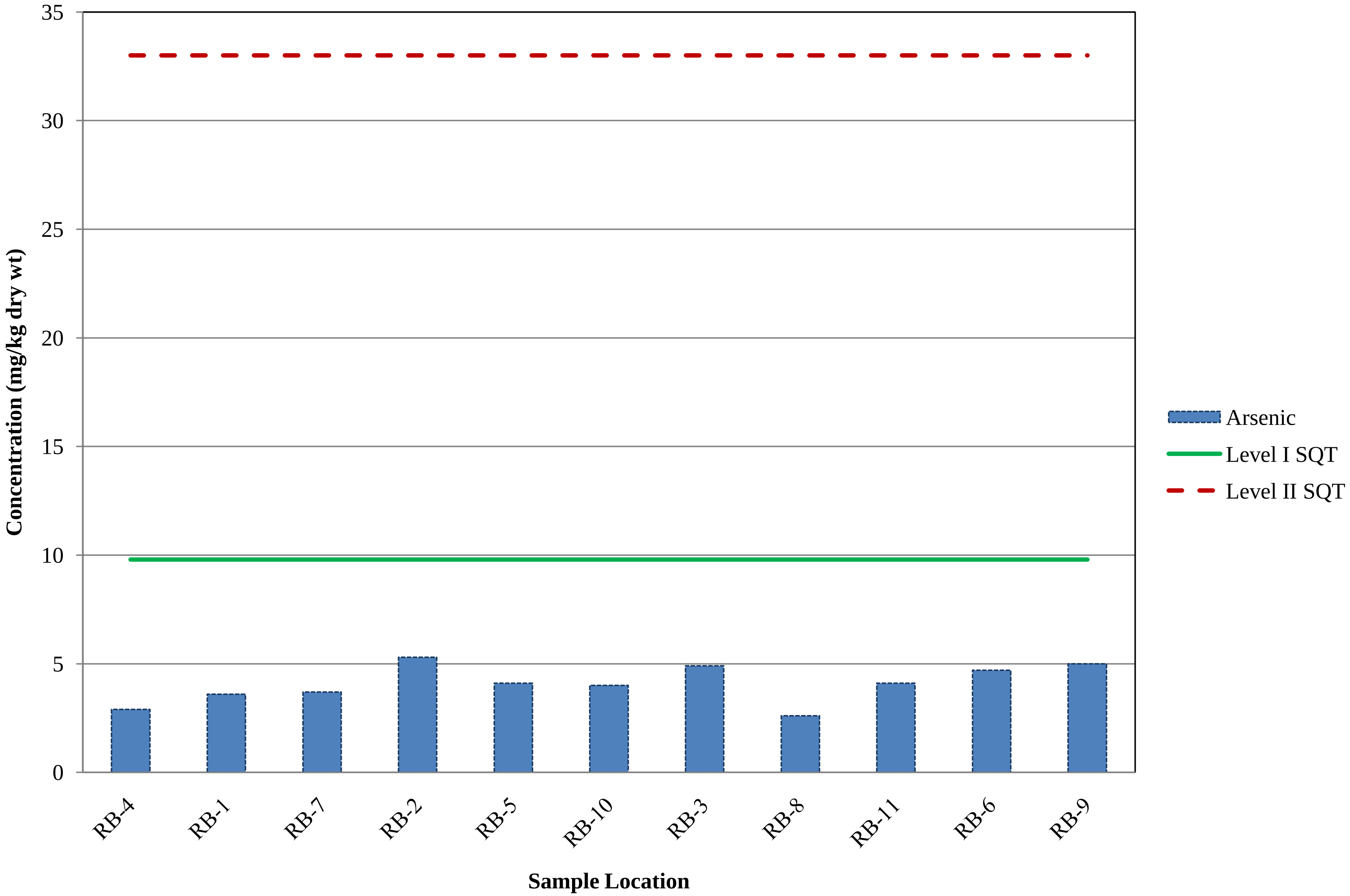


Figure 8.25-b
Rask Bay (Top of Sediment, 0-0.5 ft) - Cadmium

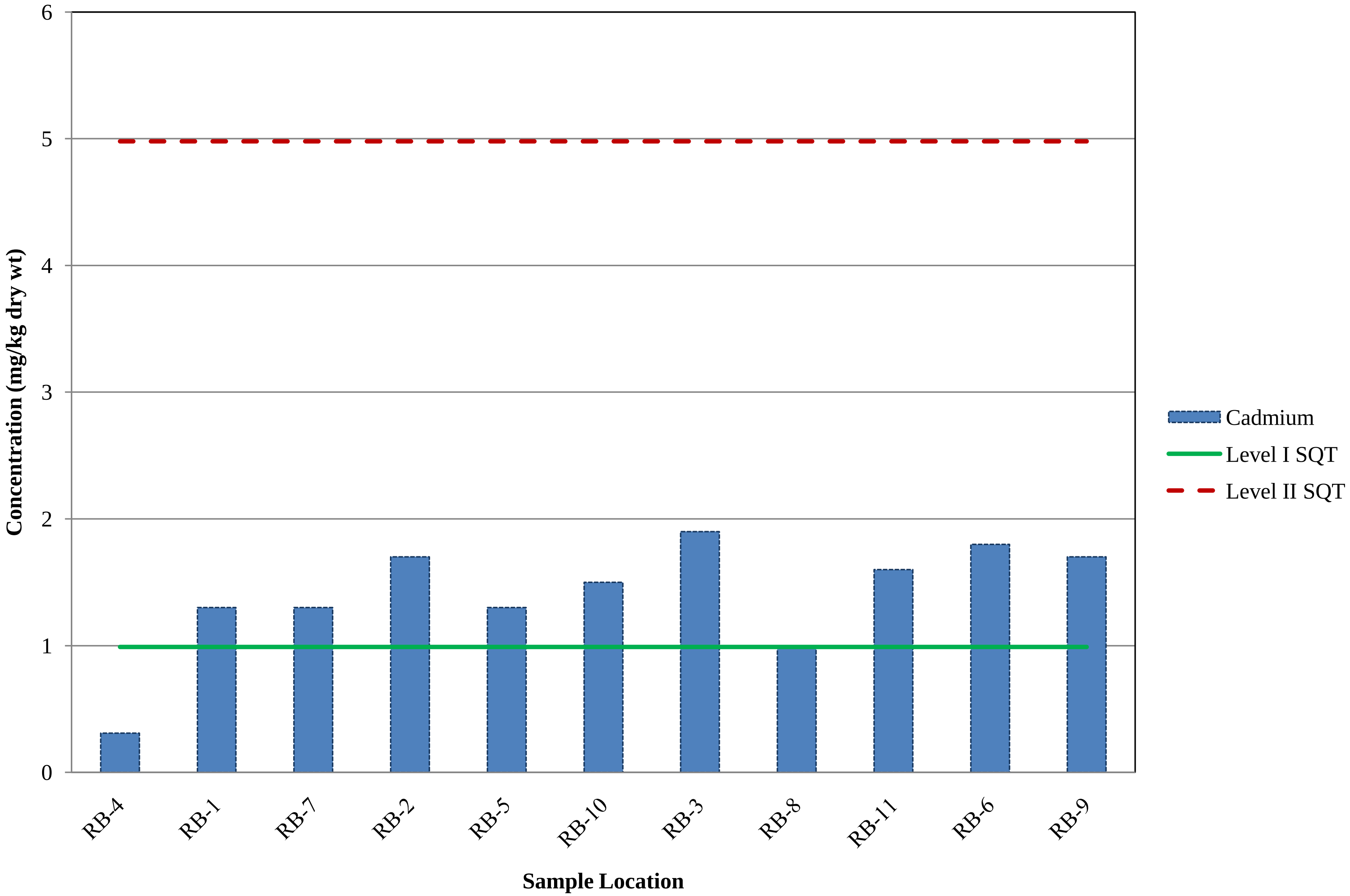


Figure 8.25-c
Rask Bay (Top of Sediment, 0-0.5 ft) - Chromium

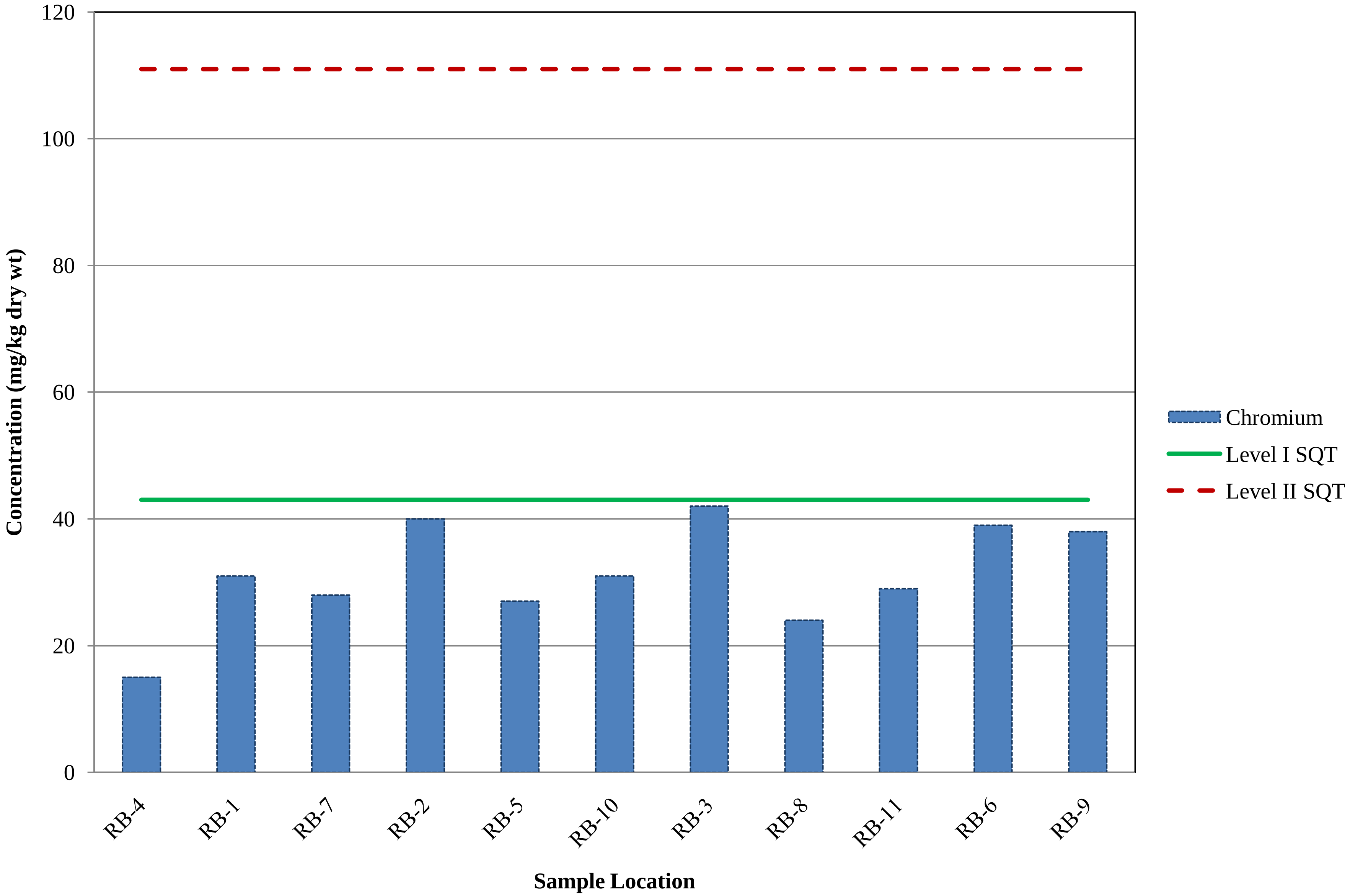


Figure 8.25-d
Rask Bay (Top of Sediment, 0-0.5 ft) - Copper

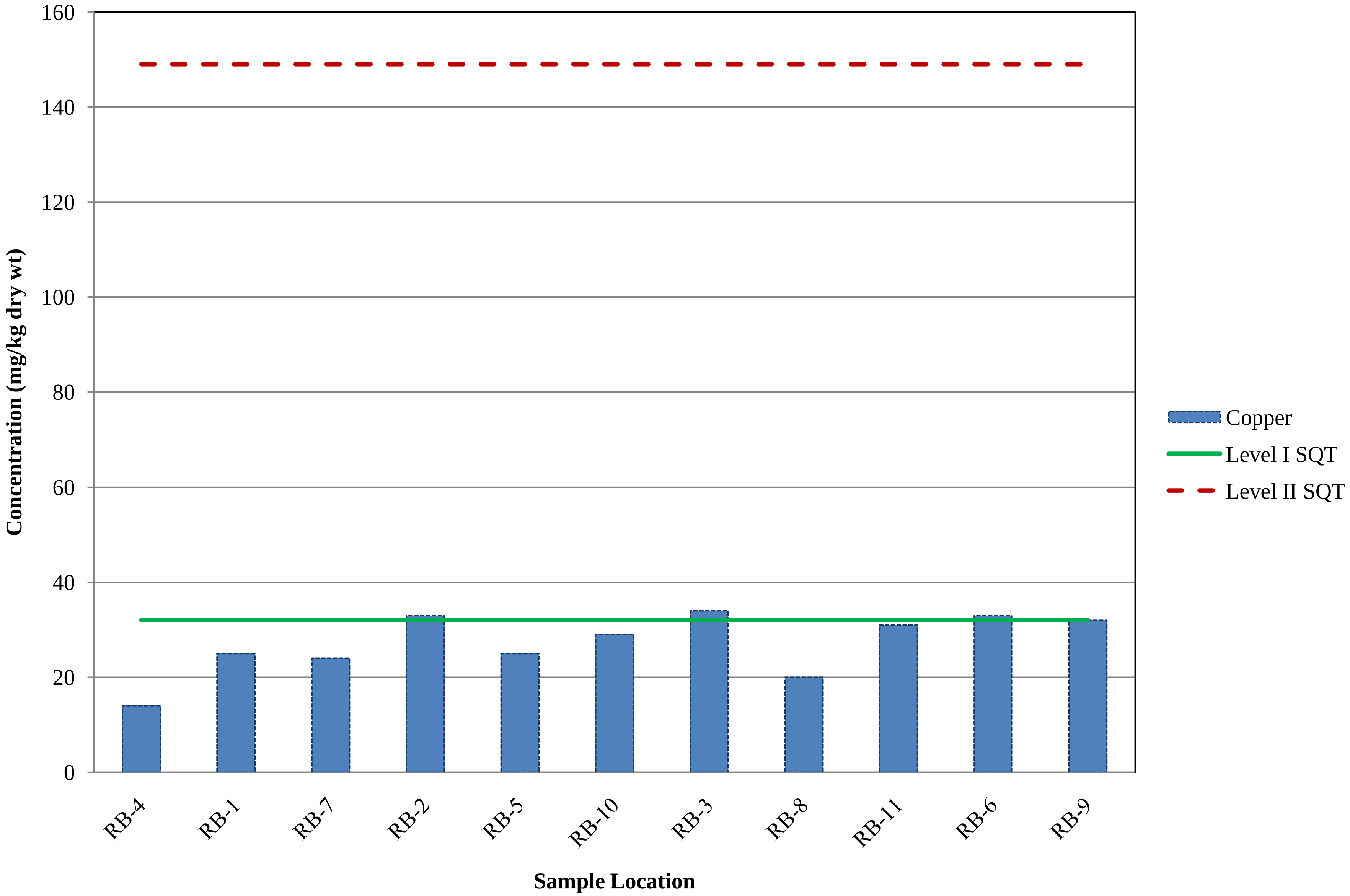


Figure 8.25-e
Rask Bay (Top of Sediment, 0-0.5 ft) - Lead

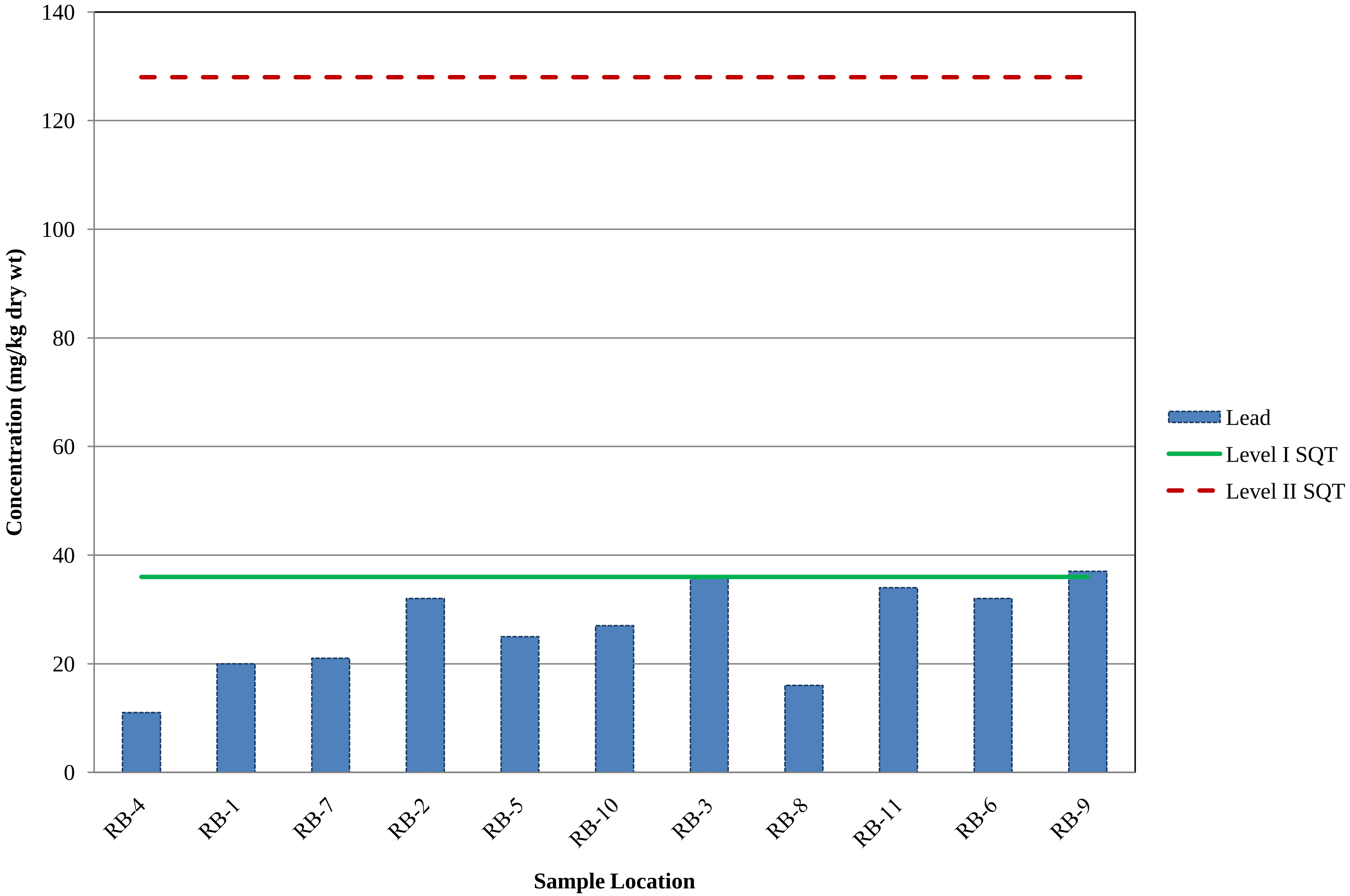


Figure 8.25-f
Rask Bay (Top of Sediment, 0-0.5 ft) - Mercury

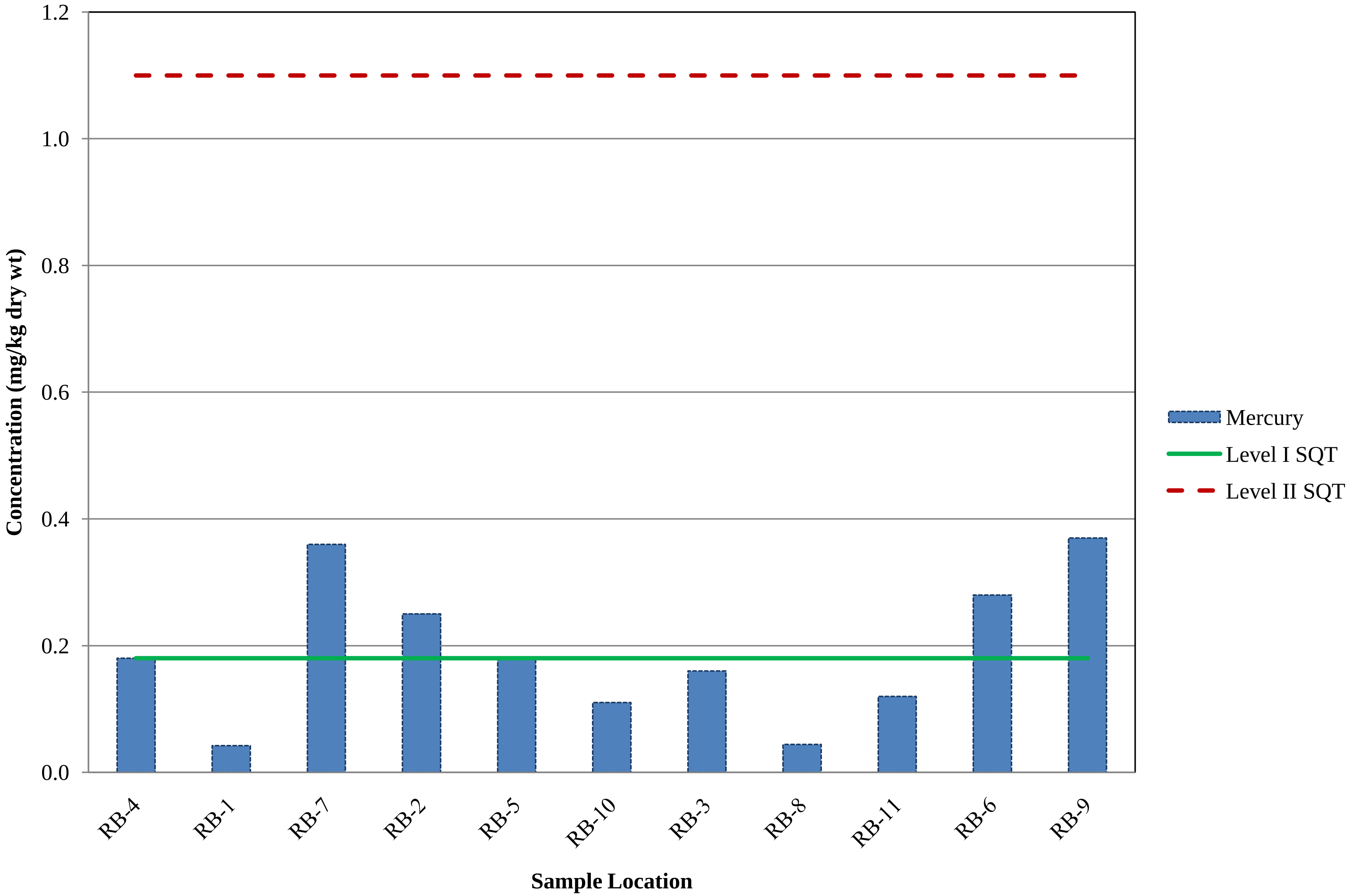


Figure 8.25-g
Rask Bay (Top of Sediment, 0-0.5 ft) - Nickel

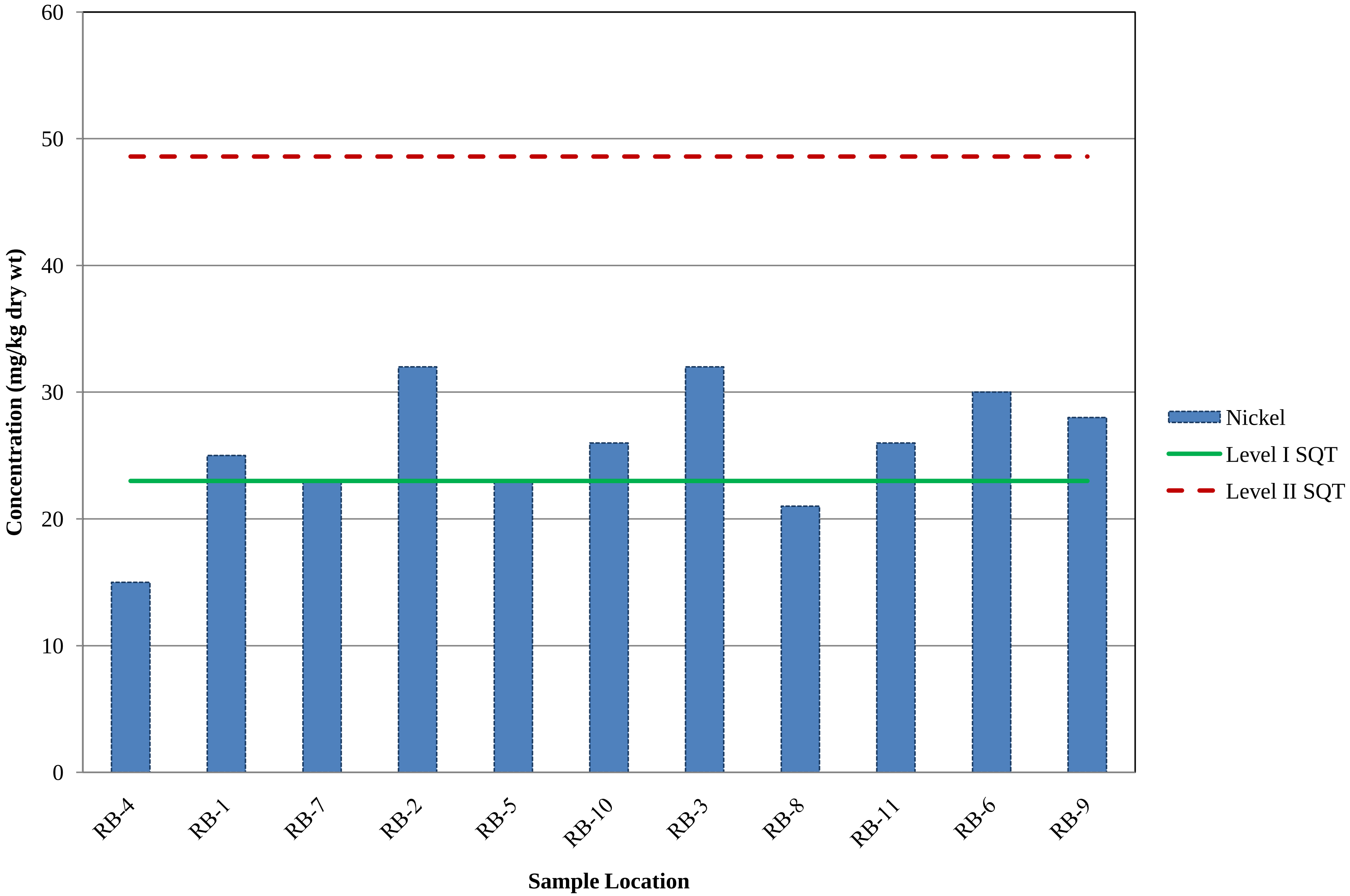


Figure 8.25-h
Rask Bay (Top of Sediment, 0-0.5 ft) - Zinc

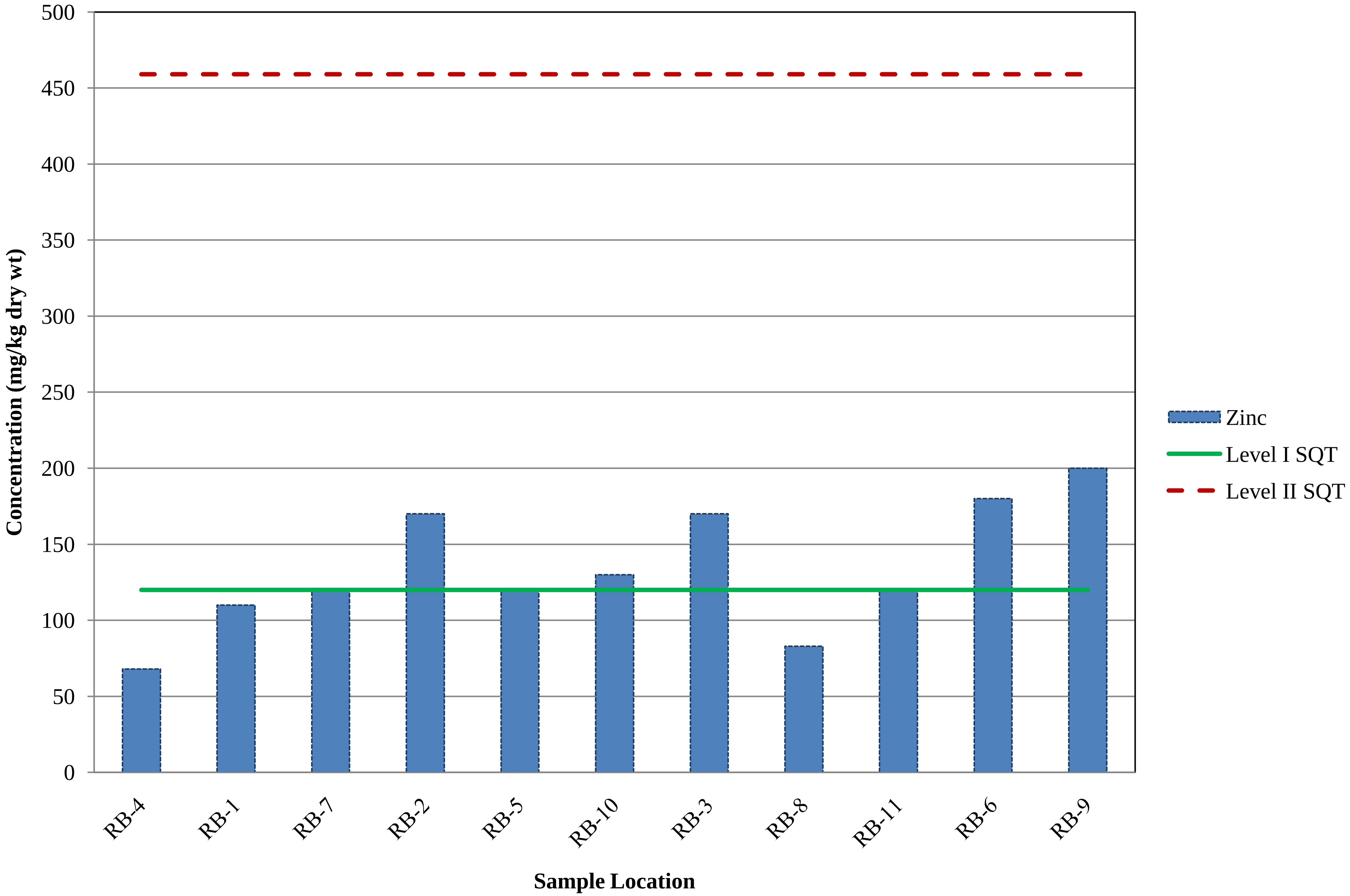


Figure 8.25-i
Rask Bay (Top of Sediment, 0-0.5 ft) - PAHs

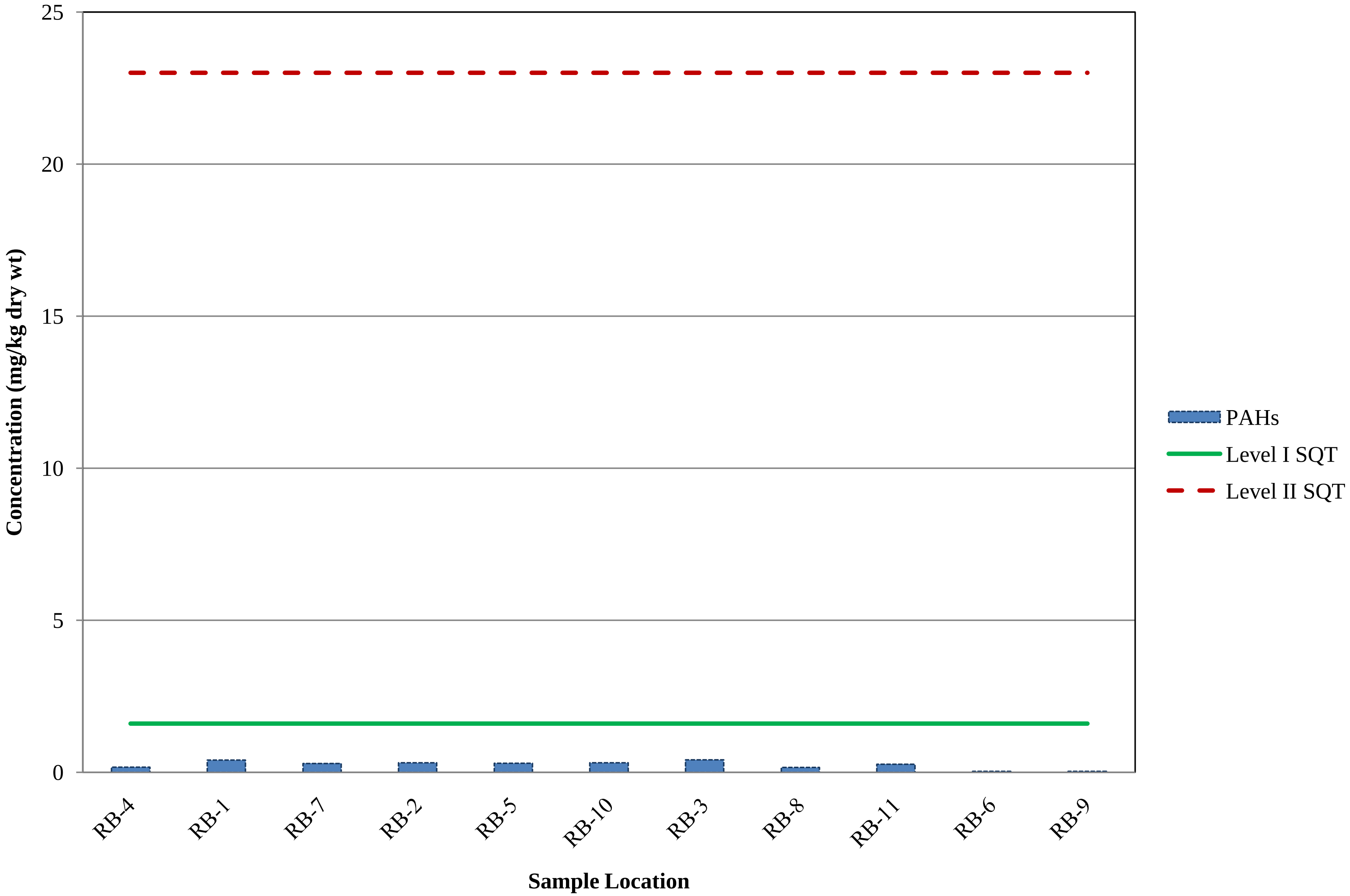


Figure 8.25-j
Rask Bay (Top of Sediment, 0-0.5 ft) - Dioxins

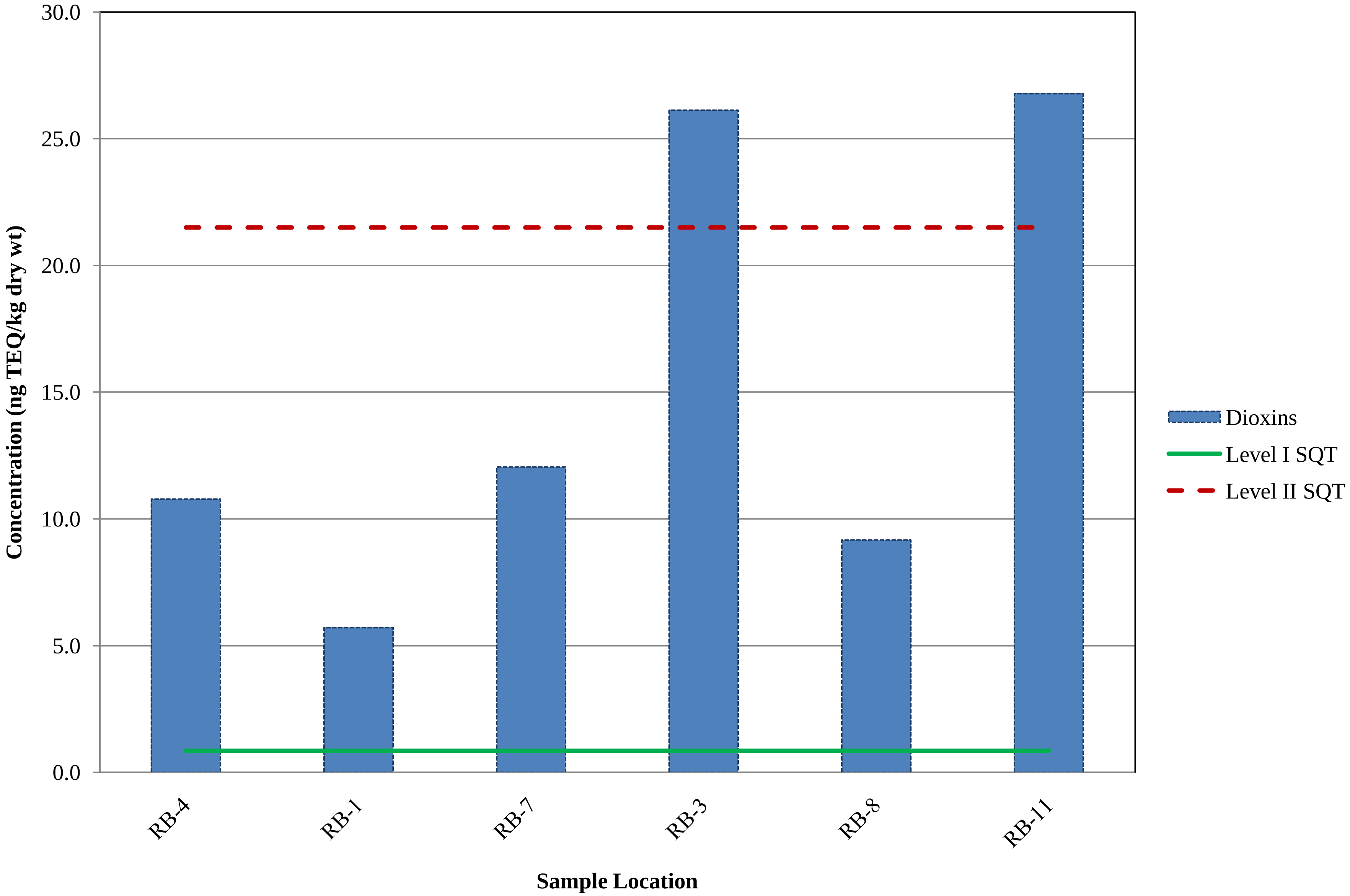


Figure 8.26-a
Riverside Marina (Top of Sediment, 0-0.5 ft) - Arsenic

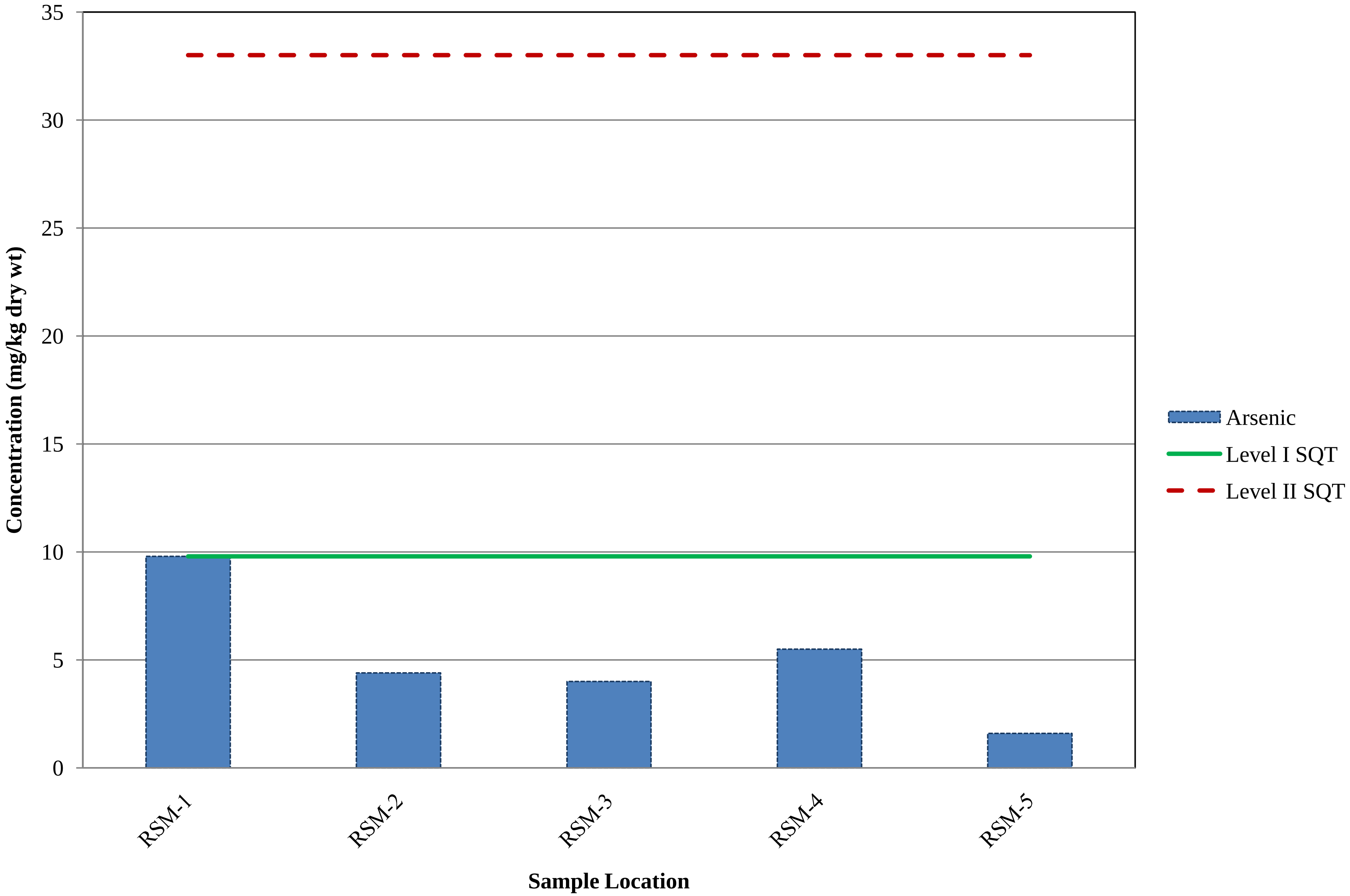


Figure 8.26-b
Riverside Marina (Top of Sediment, 0-0.5 ft) - Cadmium

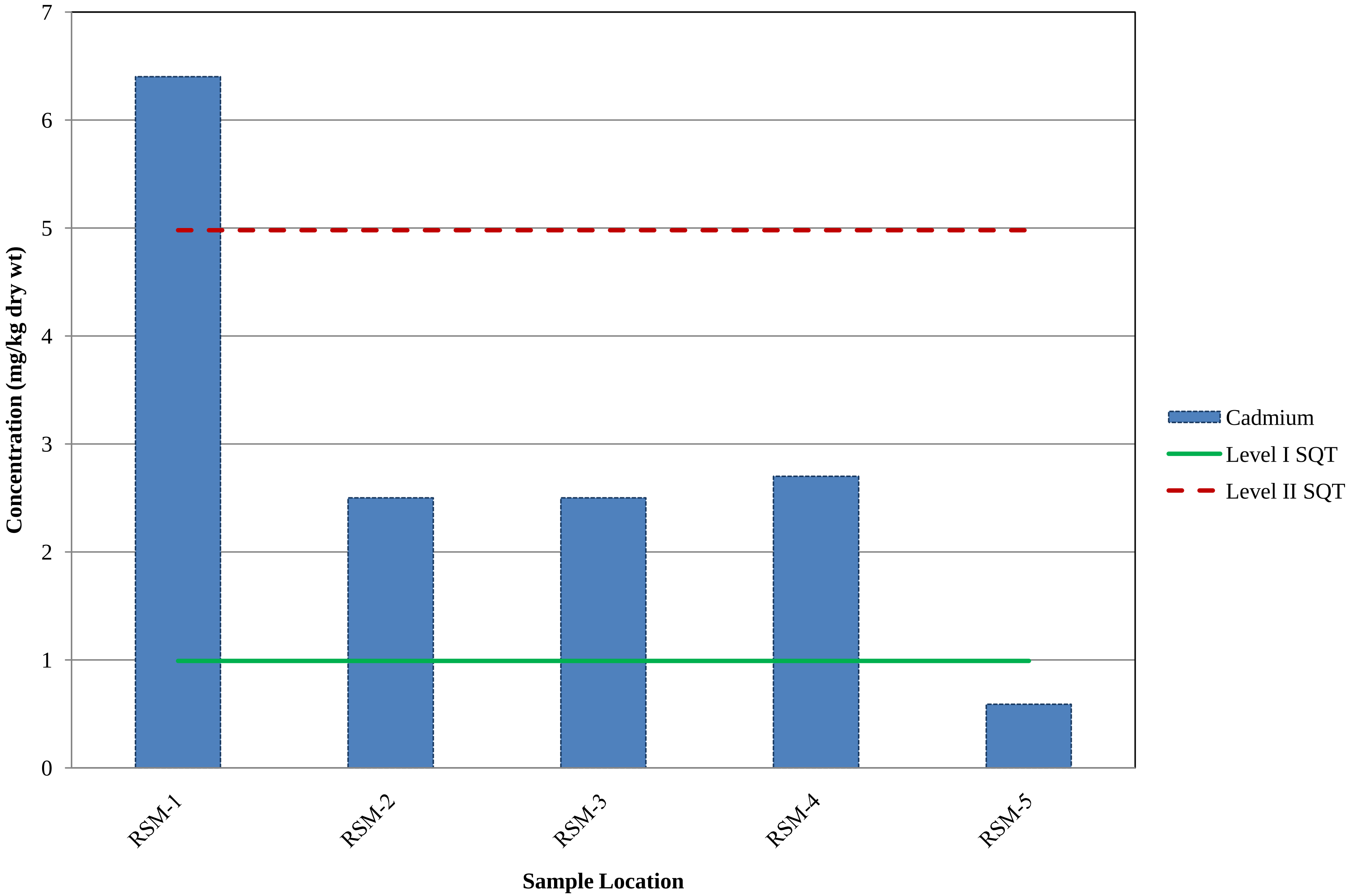


Figure 8.26-c
Riverside Marina (Top of Sediment, 0-0.5 ft) - Chromium

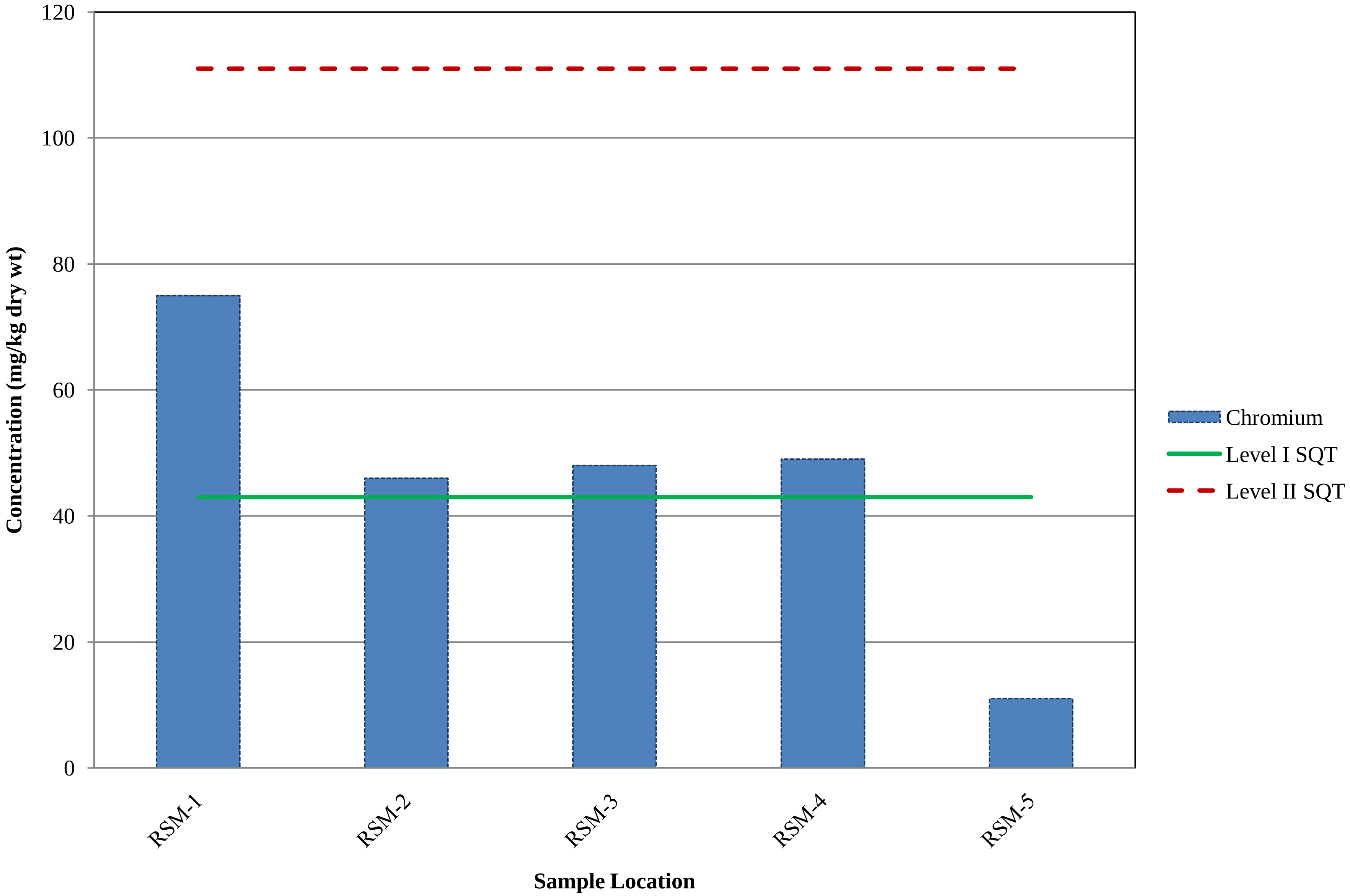


Figure 8.26-d
Riverside Marina (Top of Sediment, 0-0.5 ft) - Copper

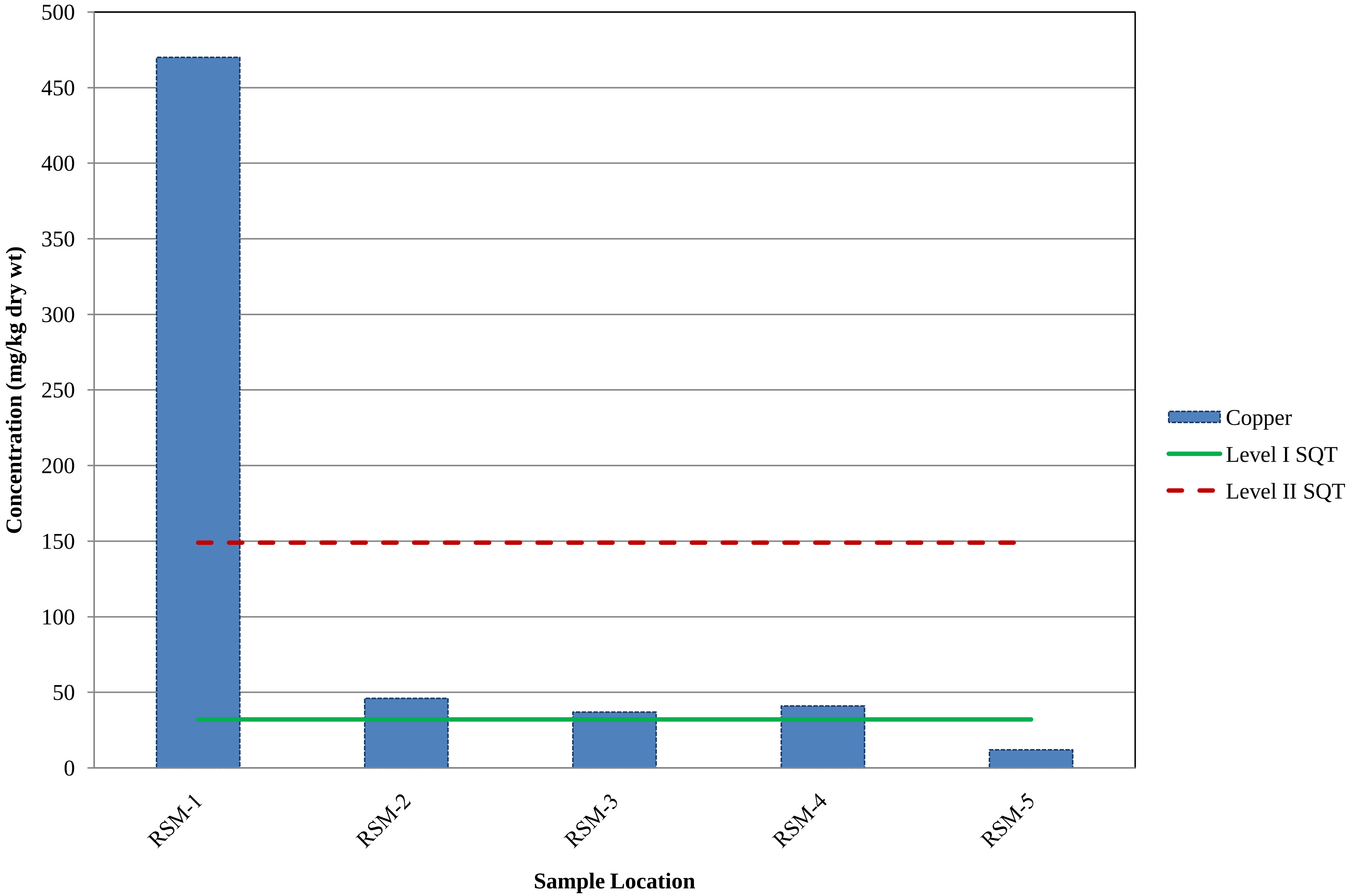


Figure 8.26-e
Riverside Marina (Top of Sediment, 0-0.5 ft) - Lead

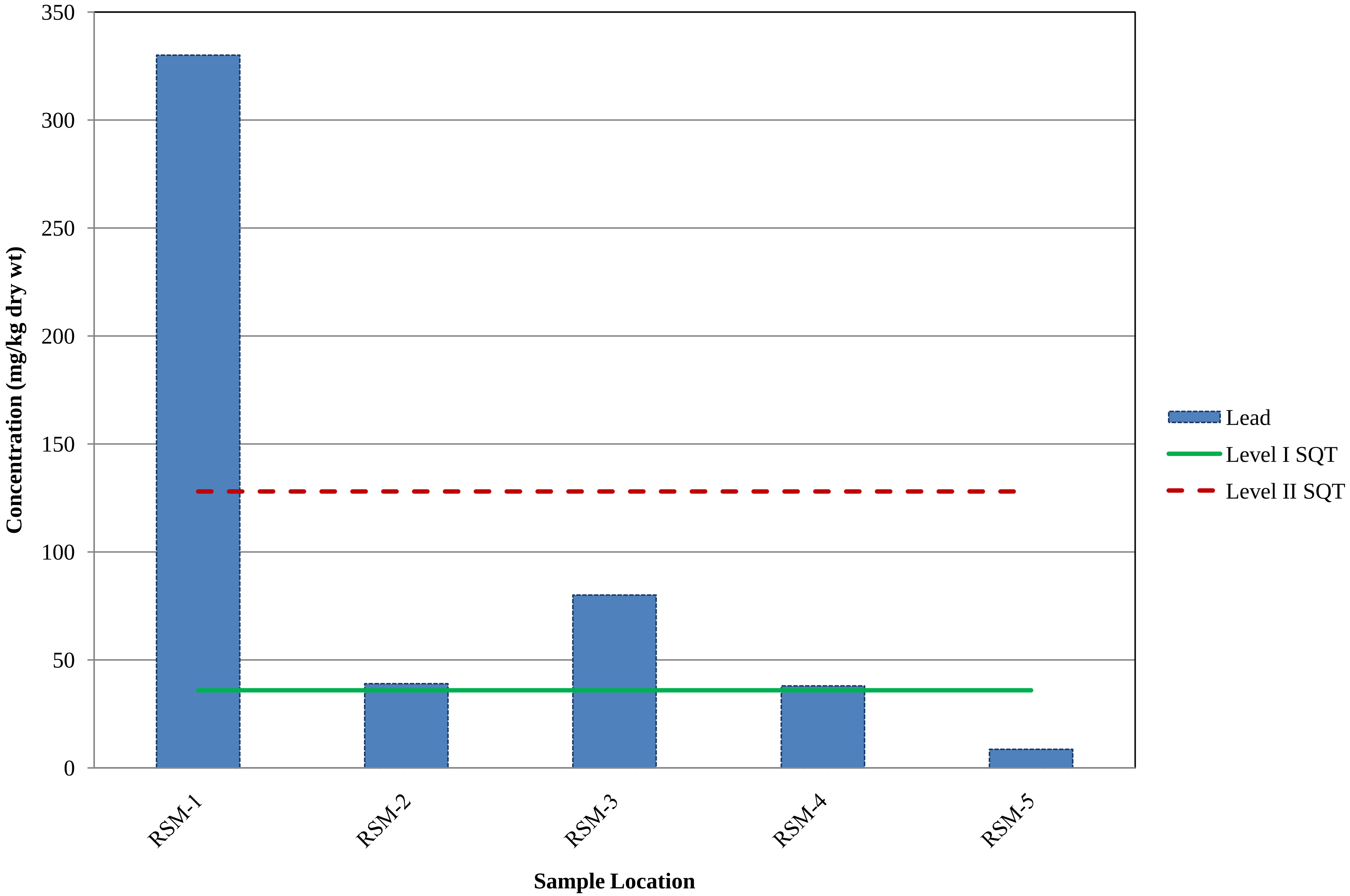
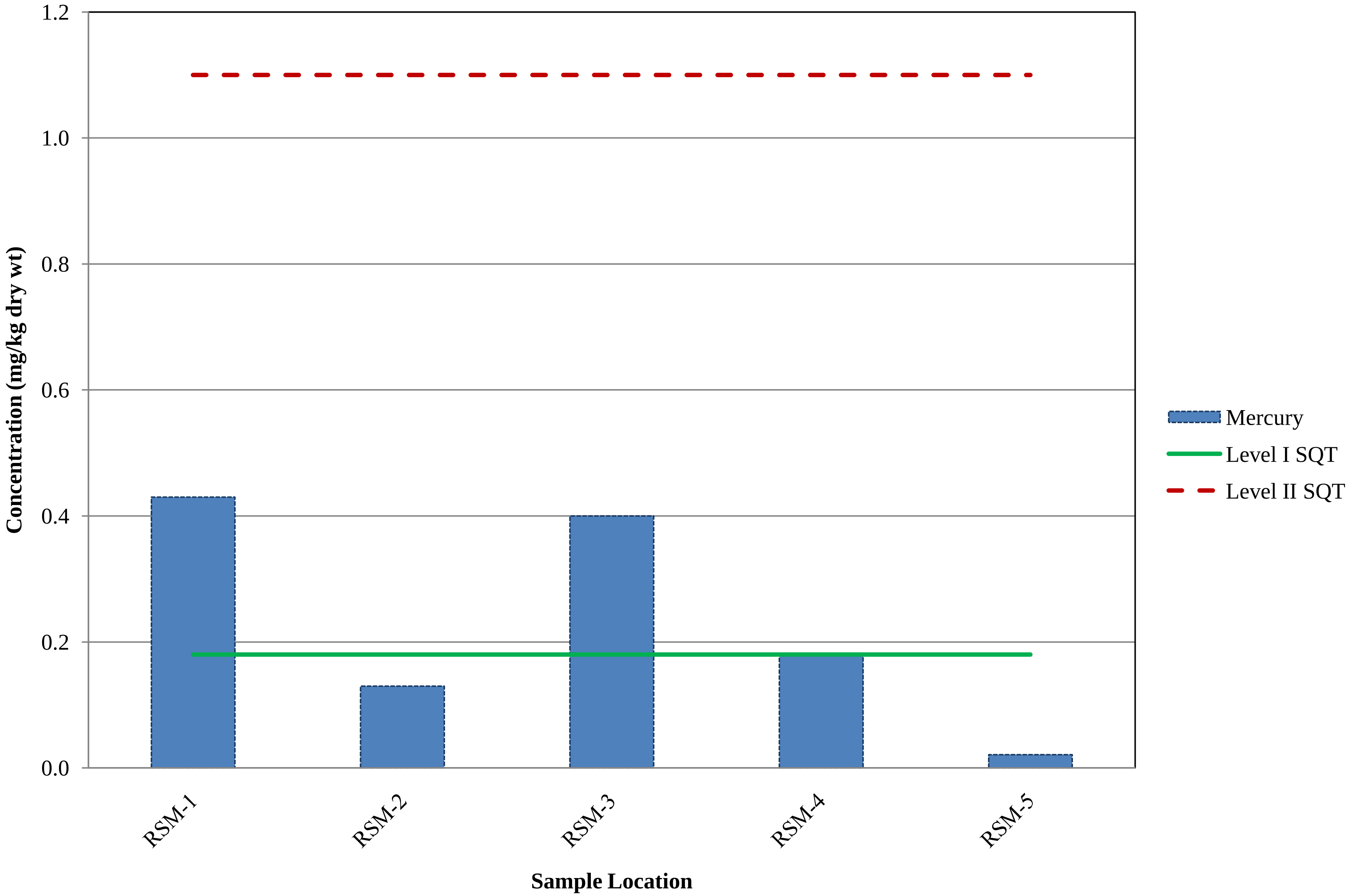


Figure 8.26-f
Riverside Marina (Top of Sediment, 0-0.5 ft) - Mercury



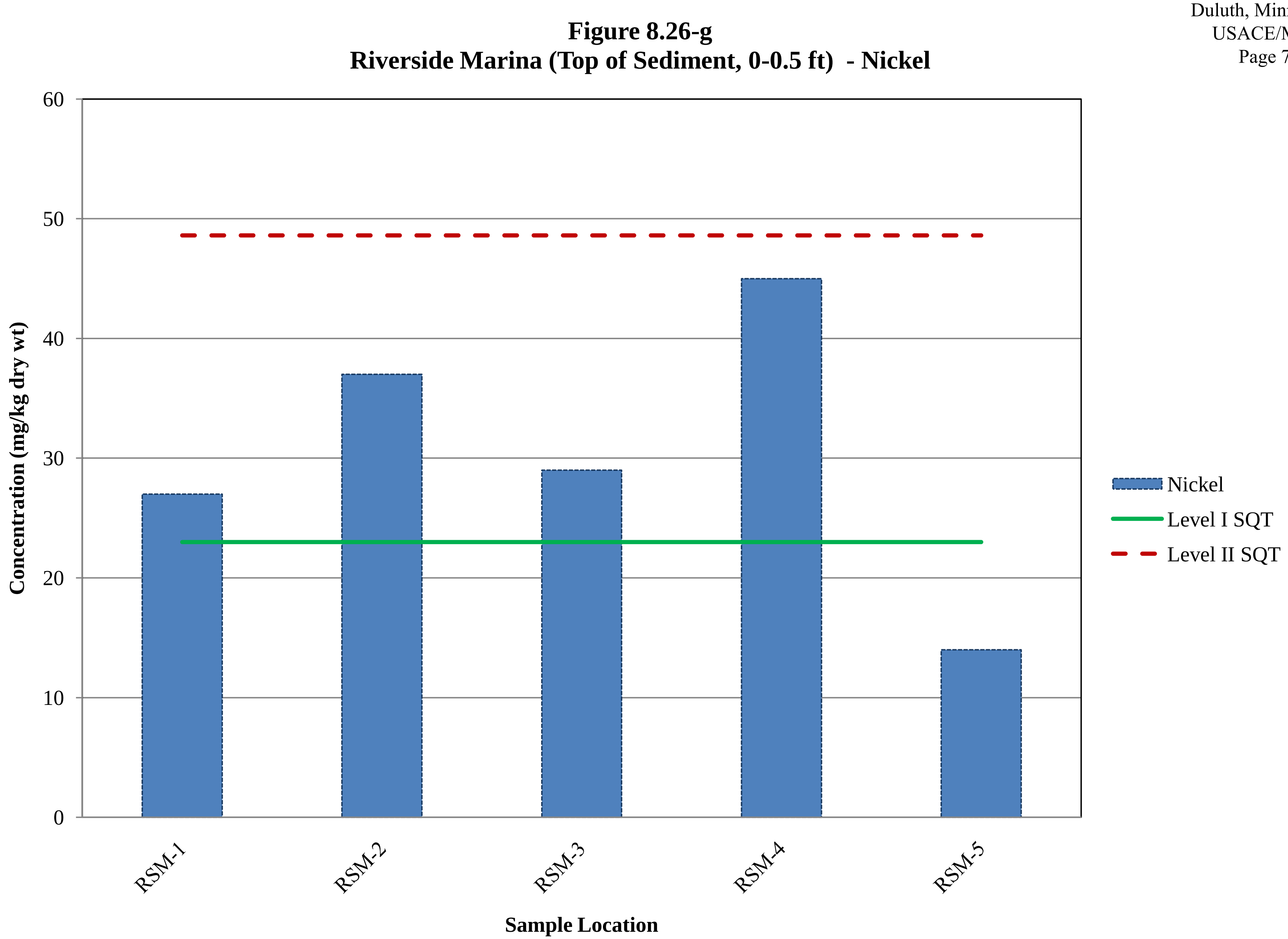


Figure 8.26-g
Riverside Marina (Top of Sediment, 0-0.5 ft) - Nickel
Concentration (mg/kg dry wt)
60
50
40
30
20
10
0
RSM-1
RSM-2
RSM-3
RSM-4
RSM-5
Sample Location
Nickel
Level I SQT
Level II SQT

Figure 8.26-h
Riverside Marina (Top of Sediment, 0-0.5 ft) - Zinc

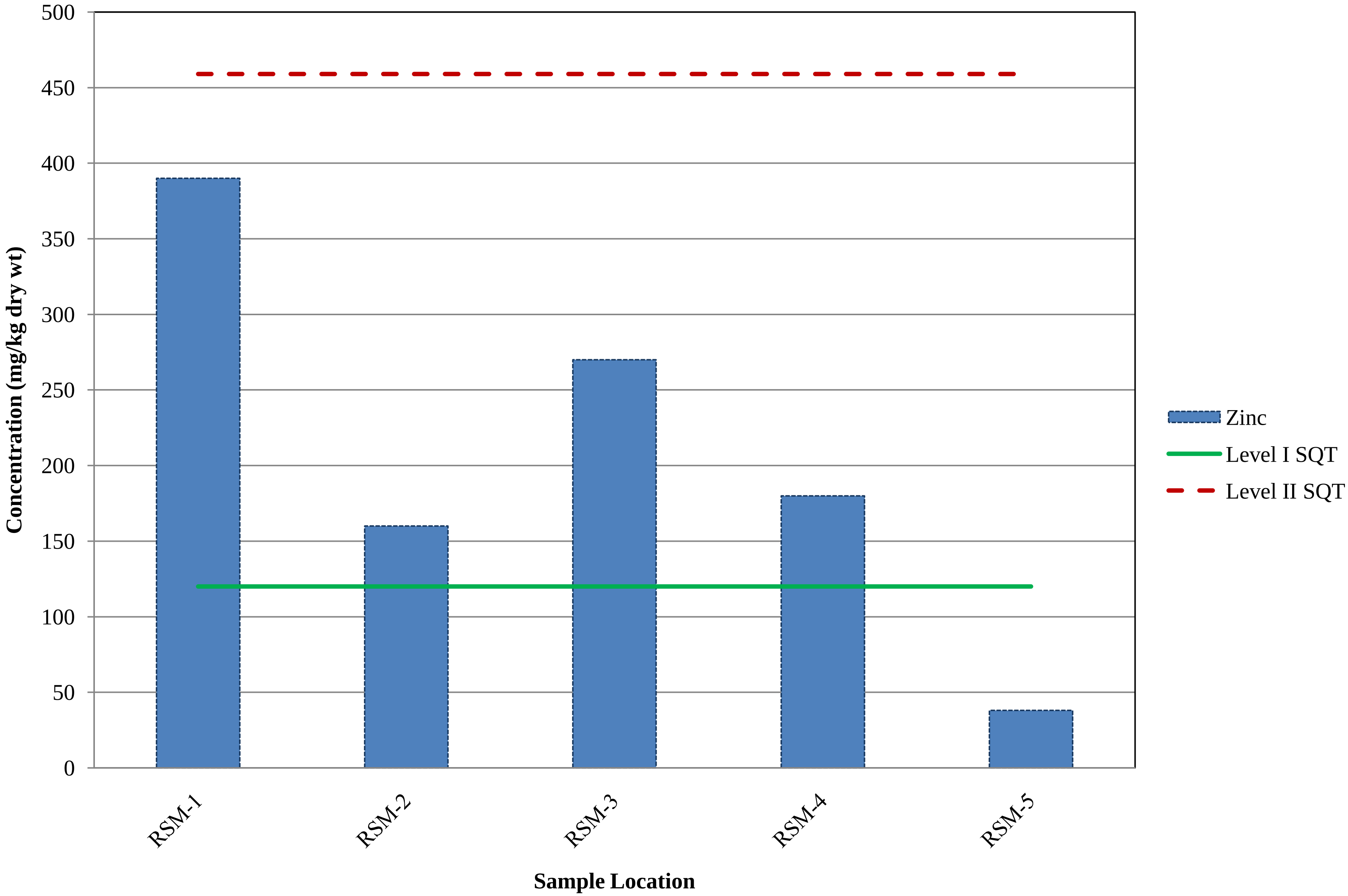


Figure 8.26-i
Riverside Marina (Top of Sediment, 0-0.5 ft) - PAHs

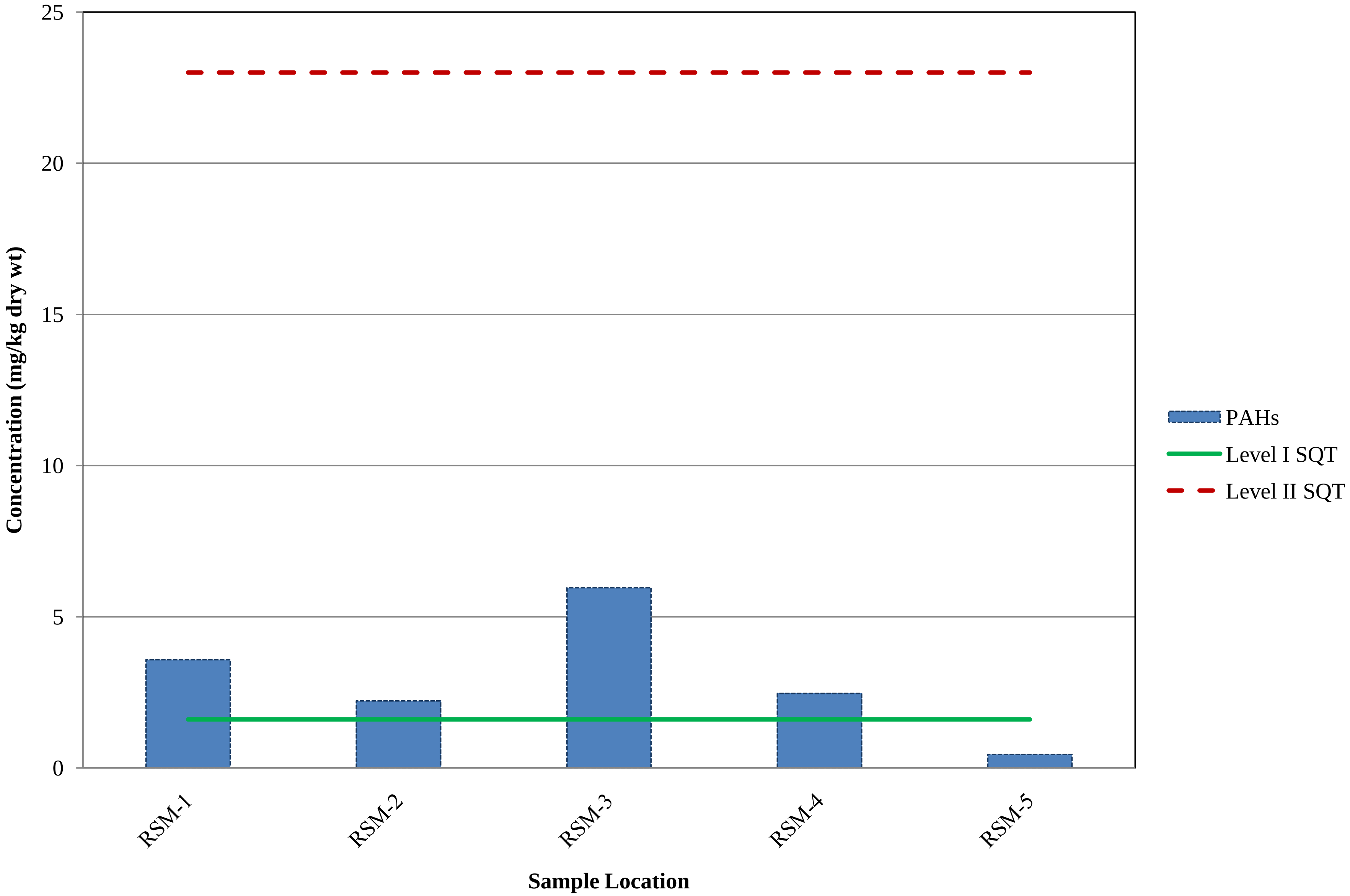


Figure 8.26-j
Riverside Marina (Top of Sediment, 0-0.5 ft) - Dioxins

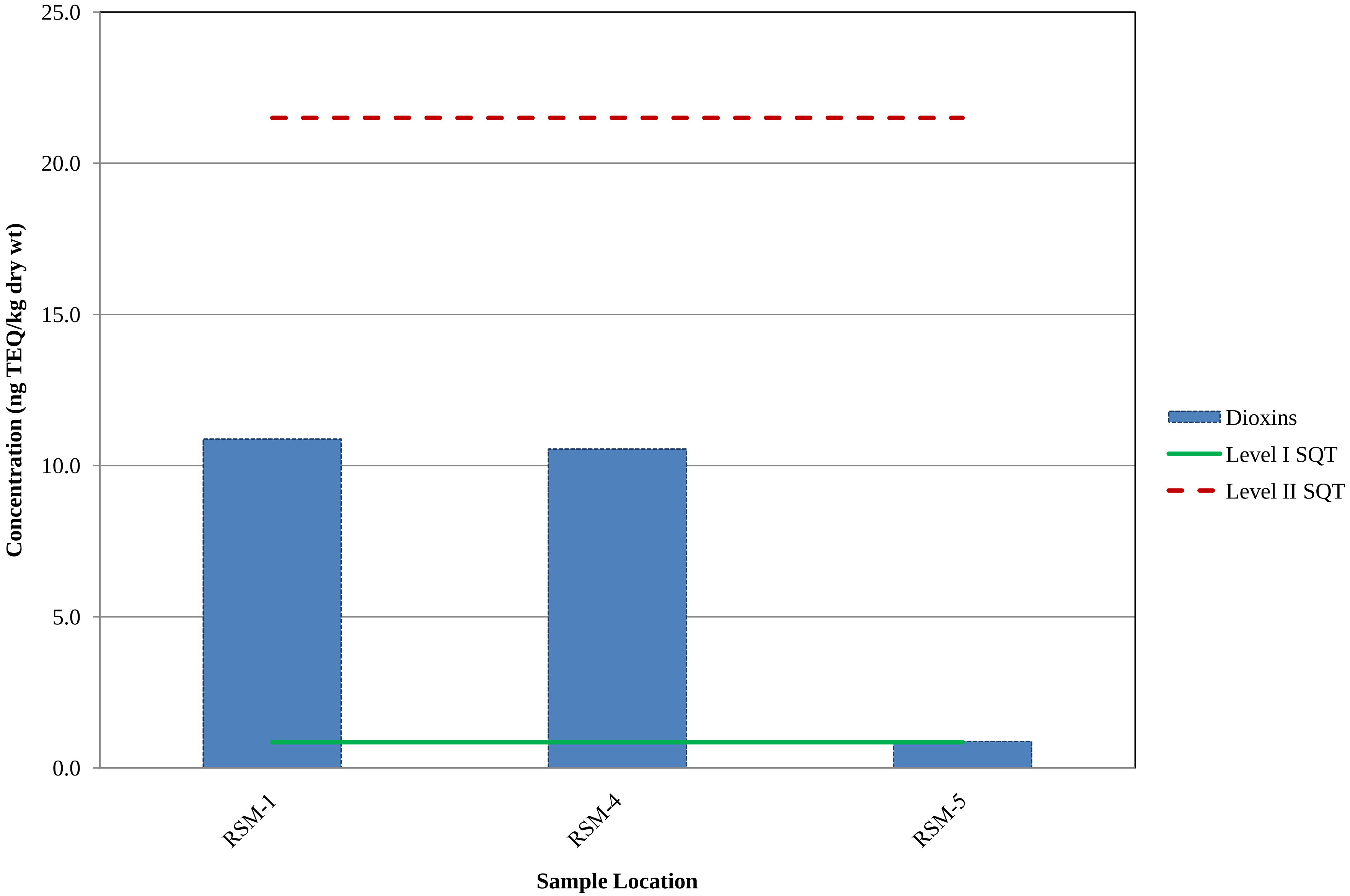


Figure 8.27-a
Spirit Lake (Top of Sediment, 0-0.5 ft) - Arsenic

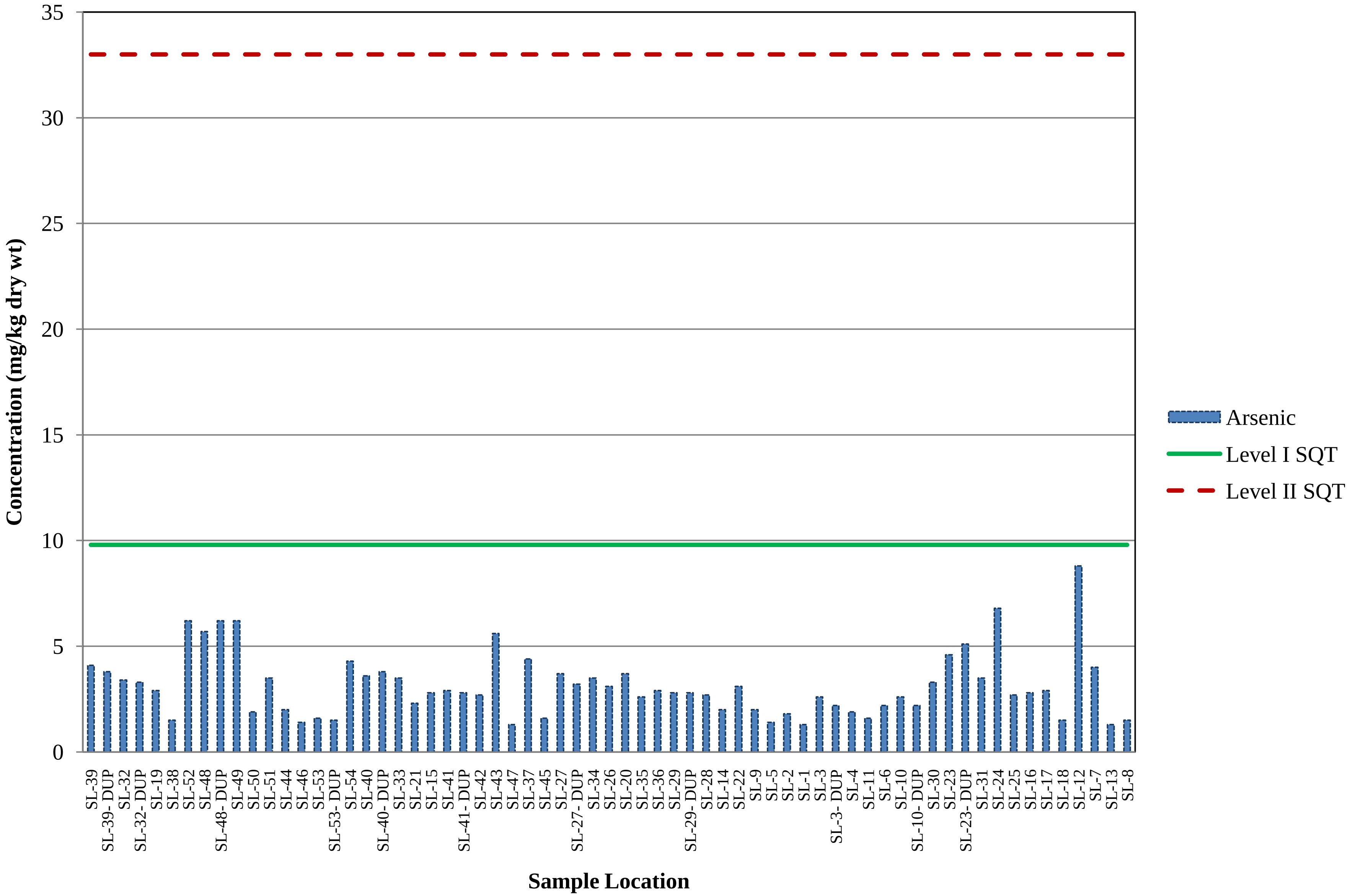


Figure 8.27-b
Spirit Lake (Top of Sediment, 0-0.5 ft) - Cadmium

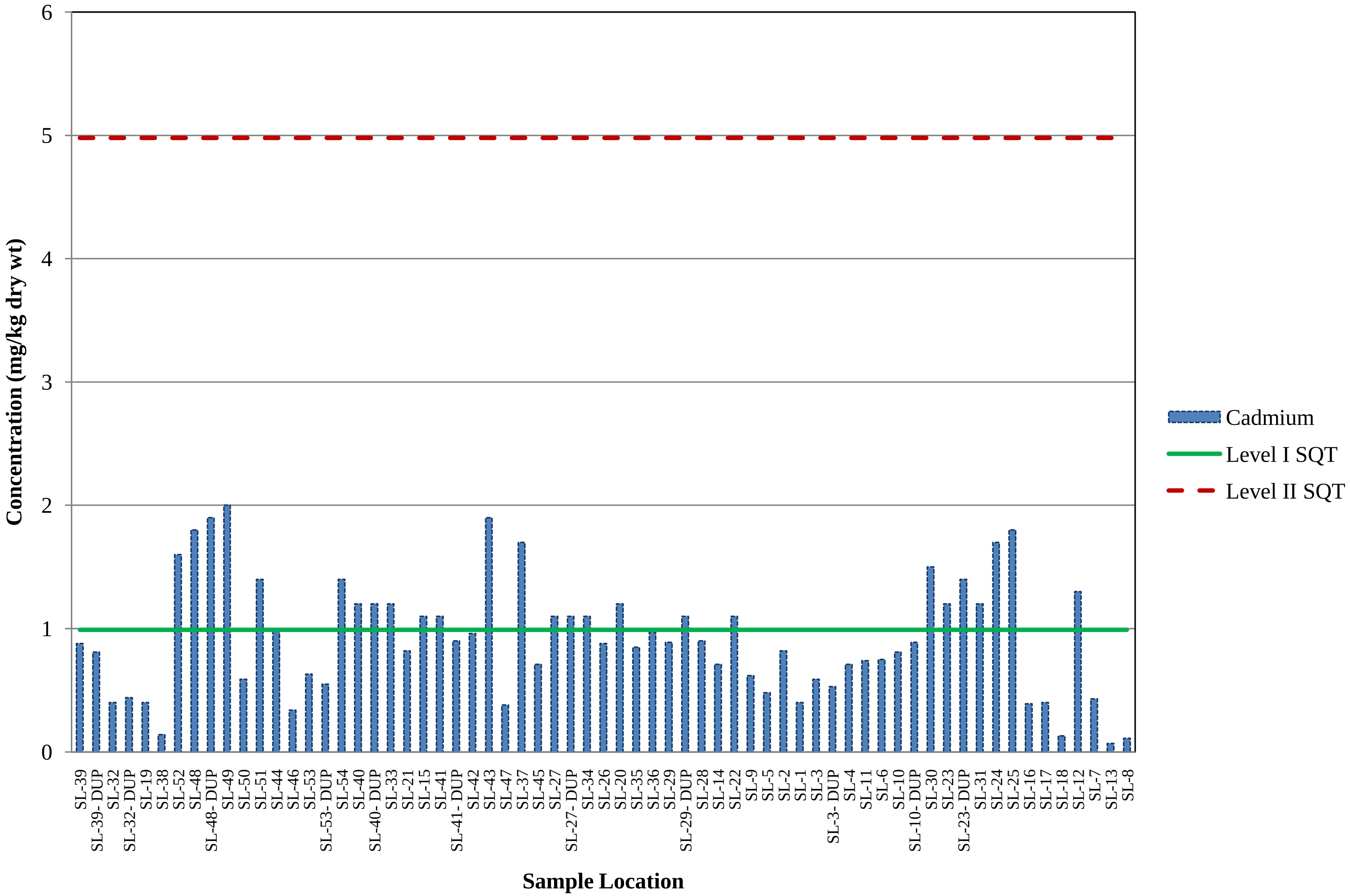


Figure 8.27-c
Spirit Lake (Top of Sediment, 0-0.5 ft) - Chromium

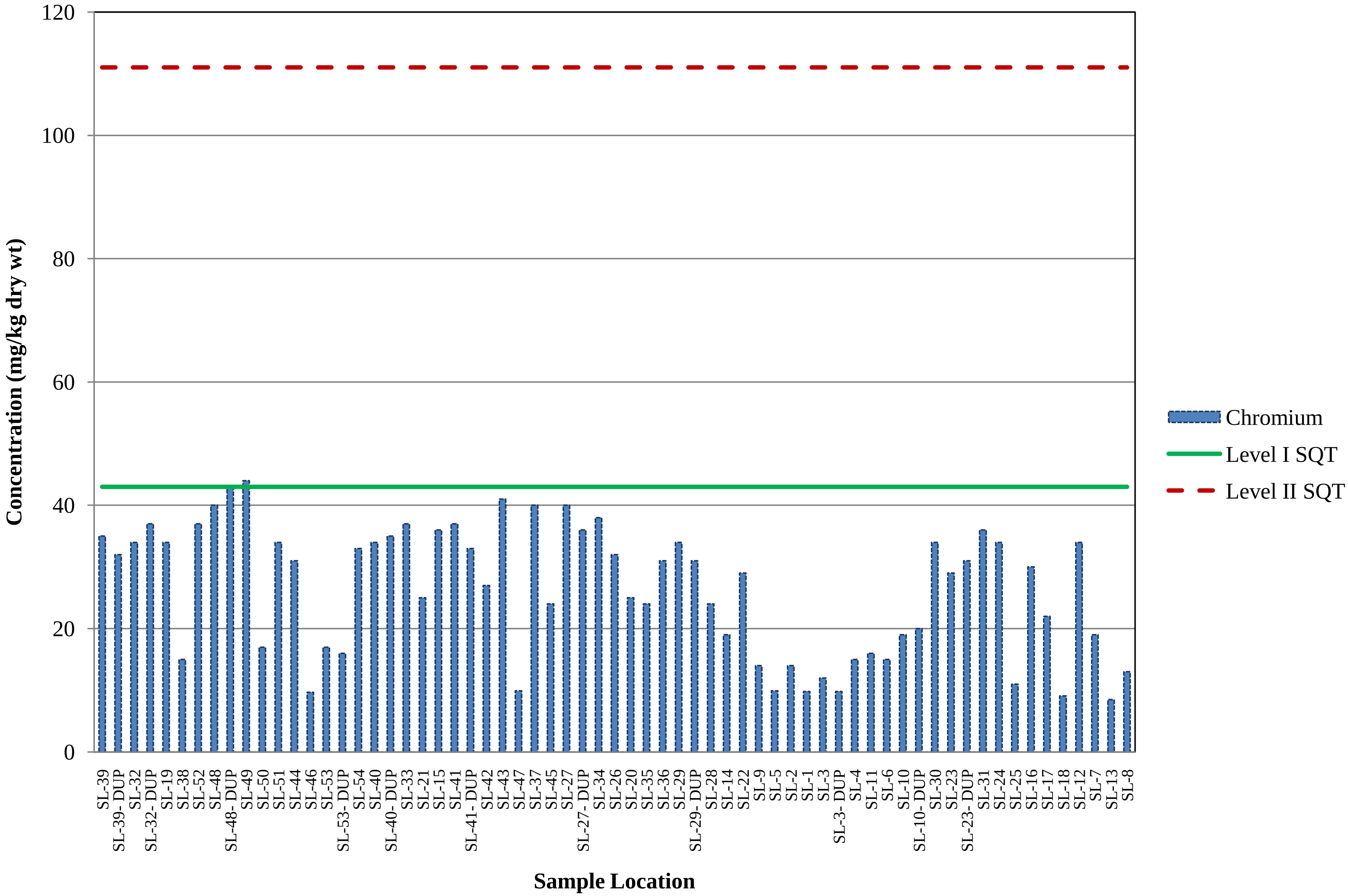


Figure 8.27-d
Spirit Lake (Top of Sediment, 0-0.5 ft) - Copper

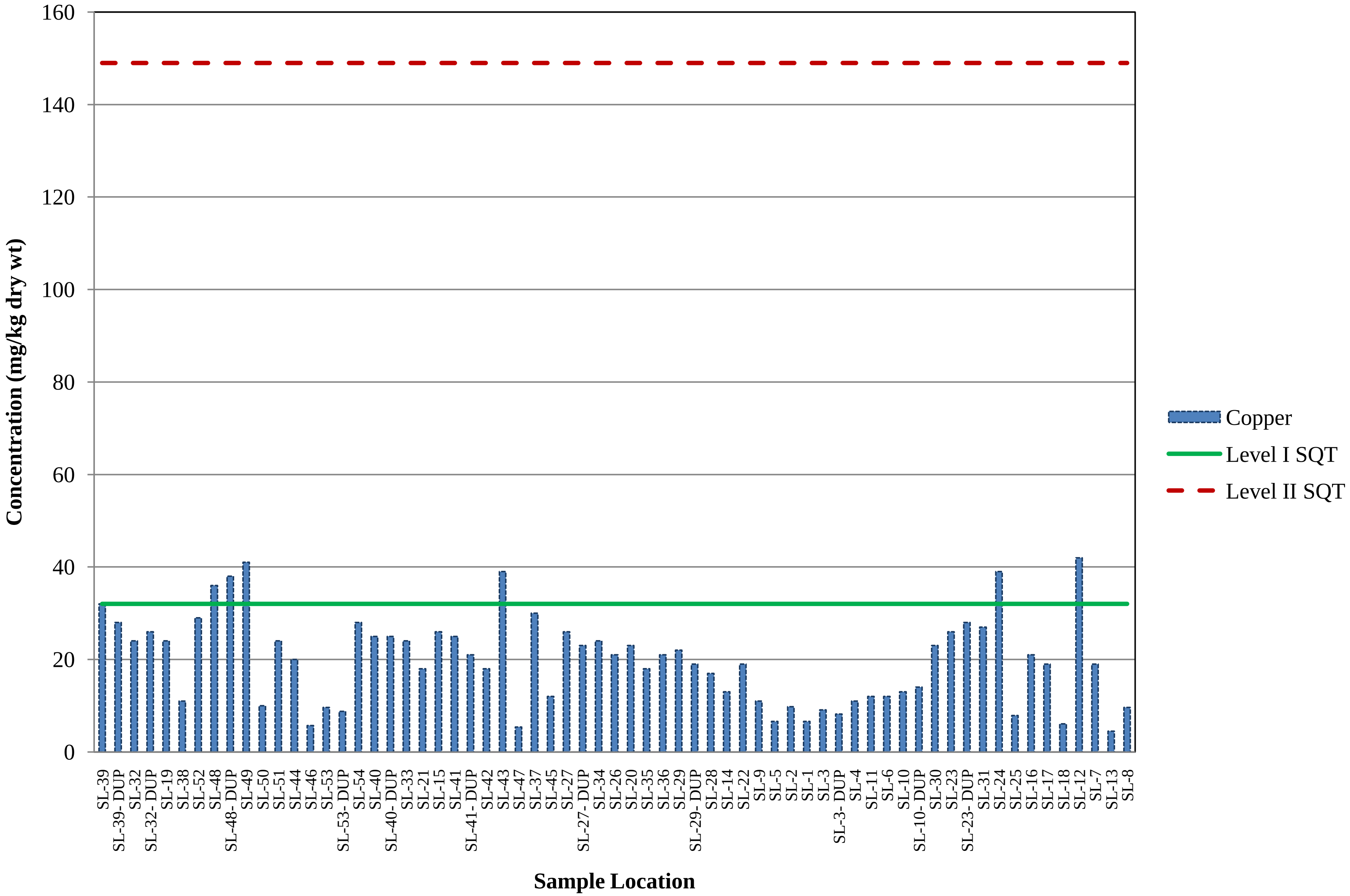


Figure 8.27-e
Spirit Lake (Top of Sediment, 0-0.5 ft) - Lead

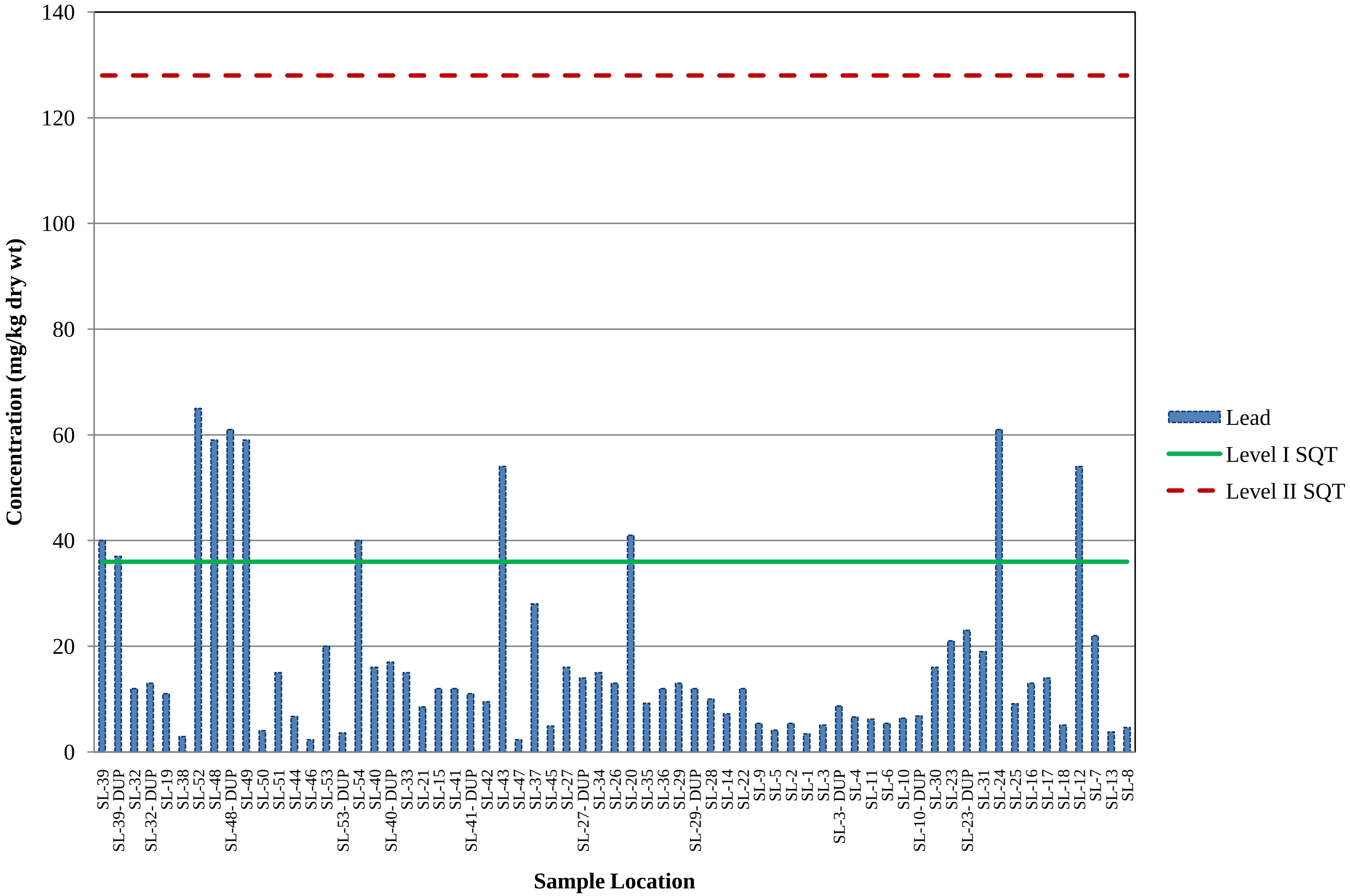


Figure 8.27-f
Spirit Lake (Top of Sediment, 0-0.5 ft) - Mercury

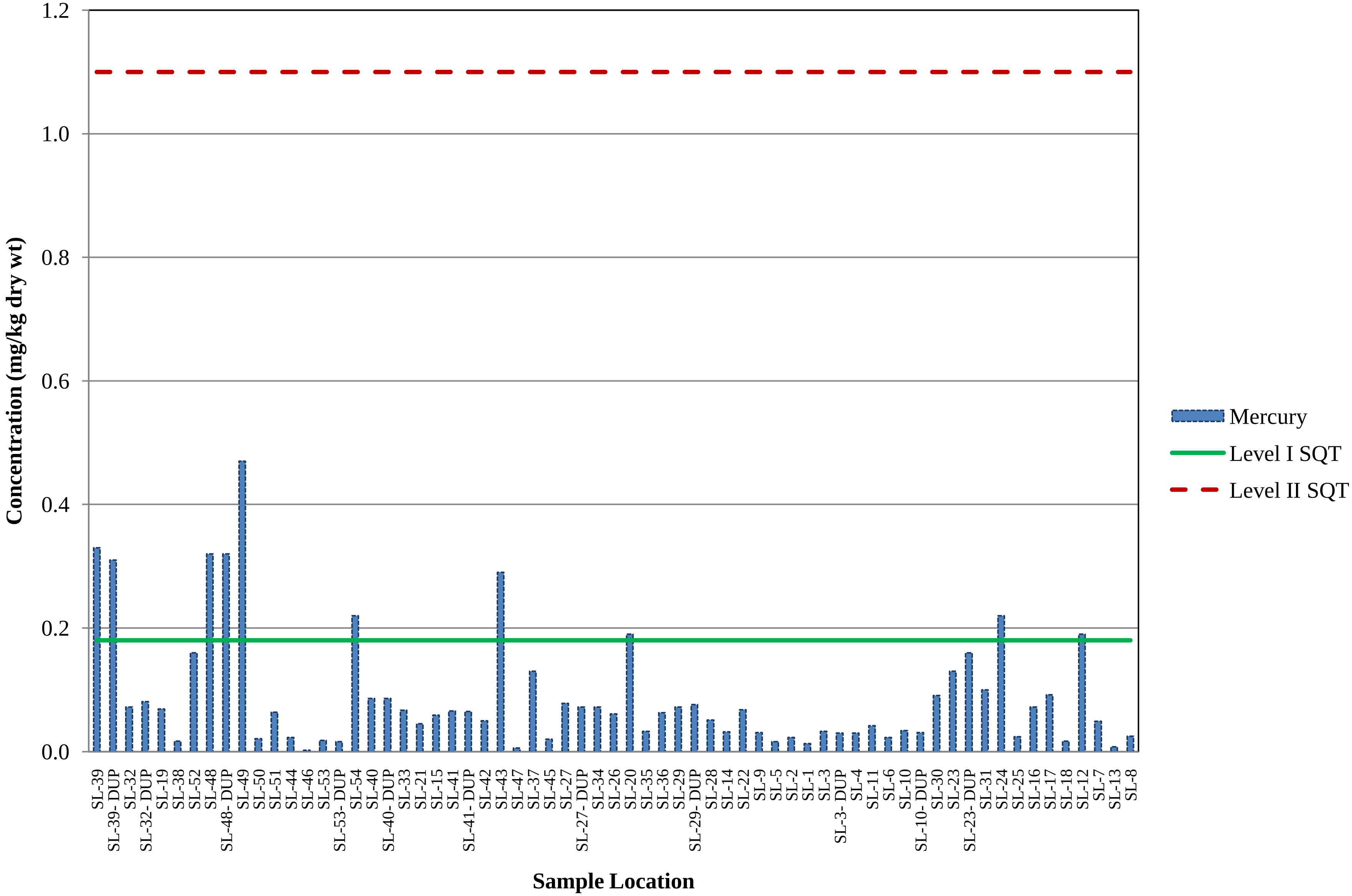


Figure 8.27-g
Spirit Lake (Top of Sediment, 0-0.5 ft) - Nickel

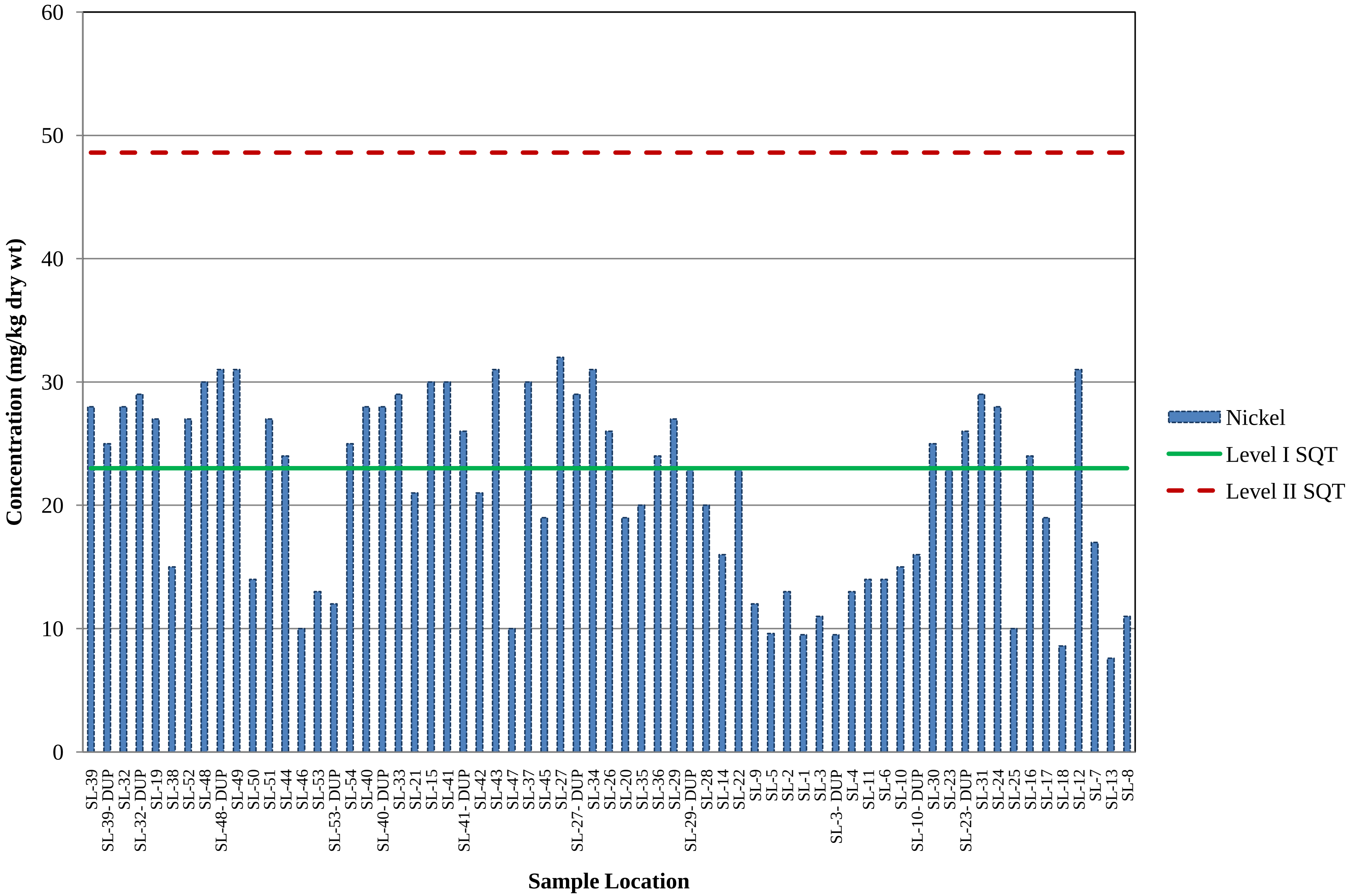


Figure 8.27-h
Spirit Lake (Top of Sediment, 0-0.5 ft) - Zinc

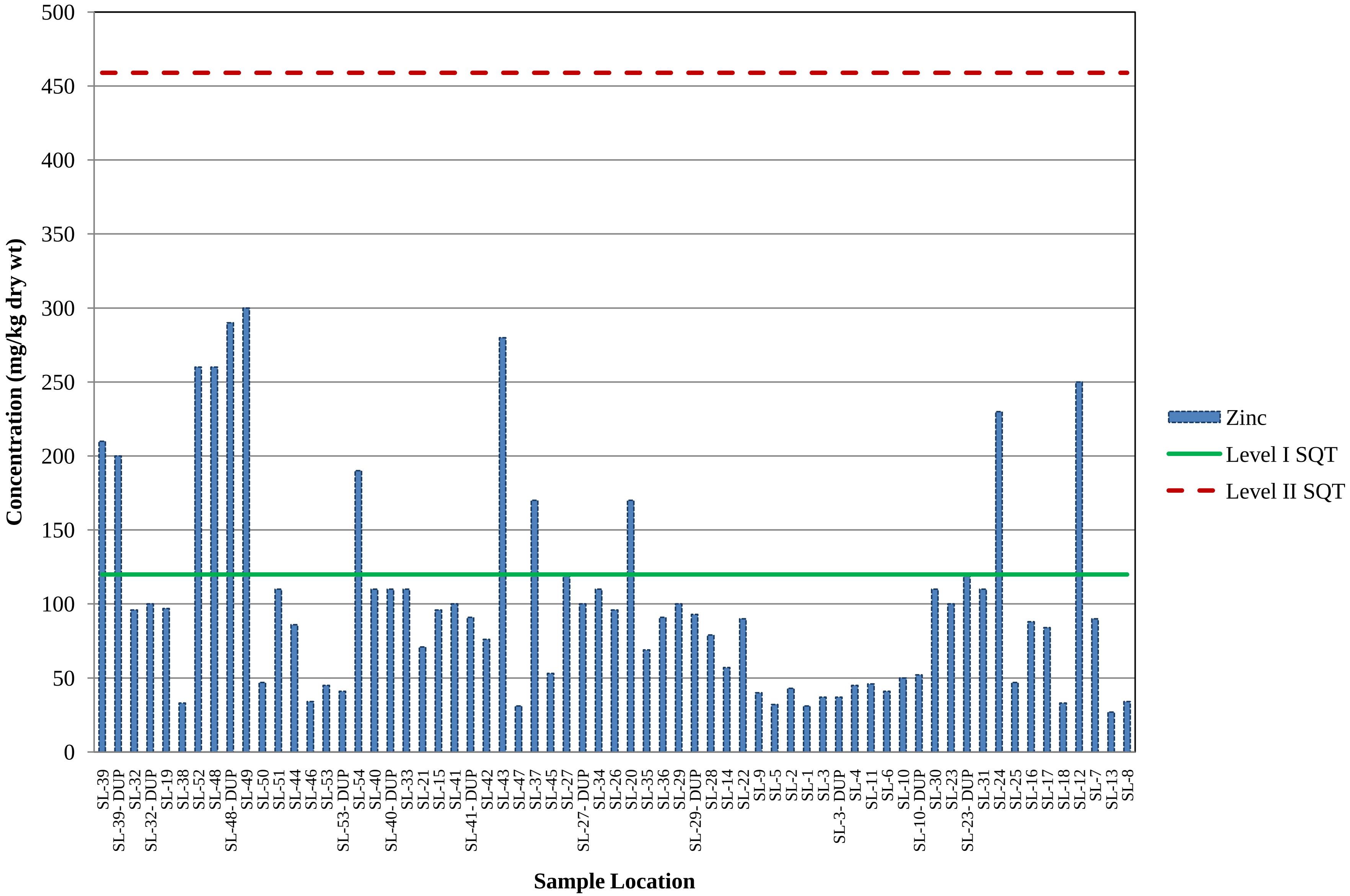


Figure 8.27-i
Spirit Lake (Top of Sediment, 0-0.5 ft) - PAHs

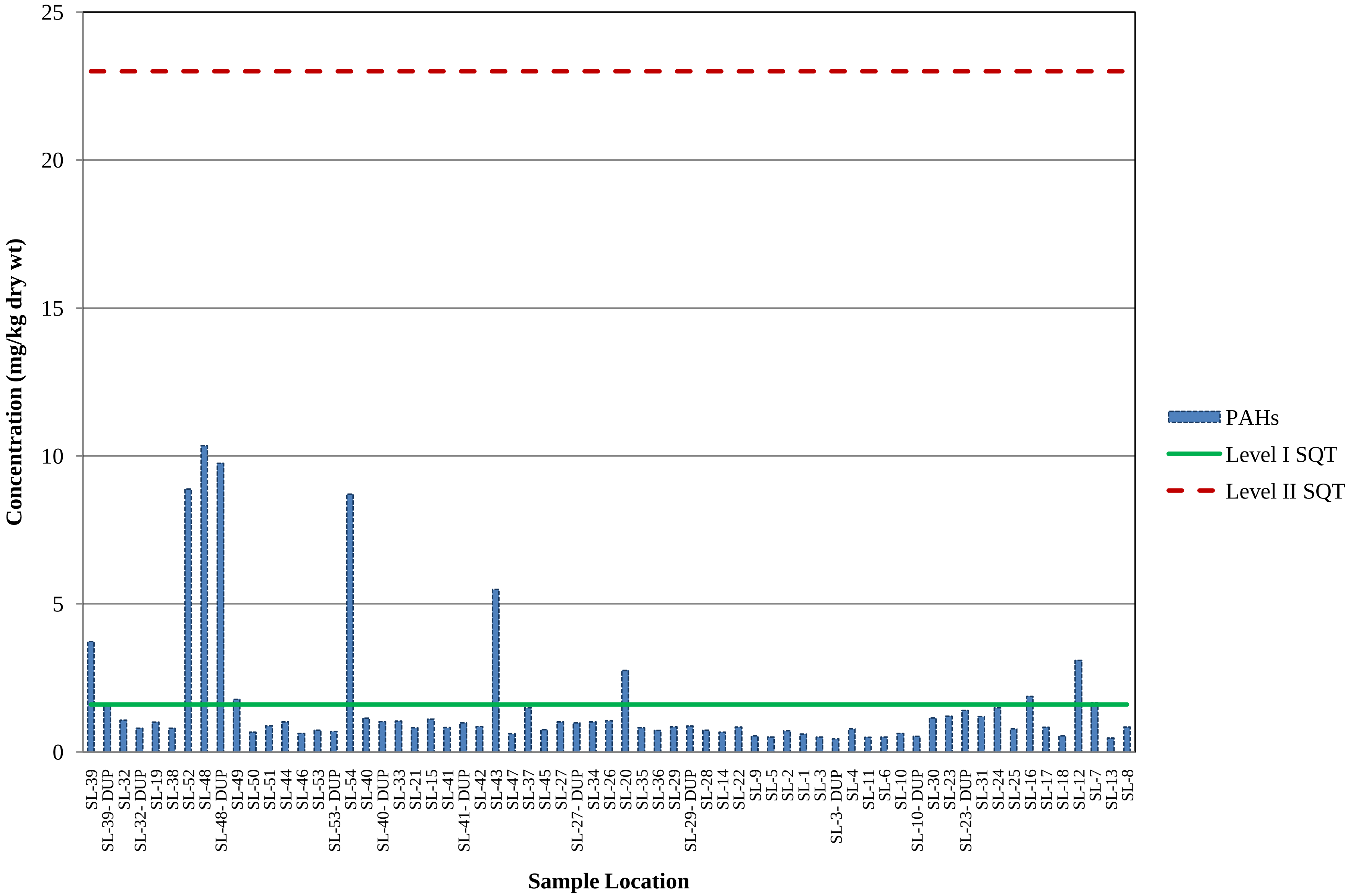


Figure 8.27-j
Spirit Lake (Top of Sediment, 0-0.5 ft) - Dioxins

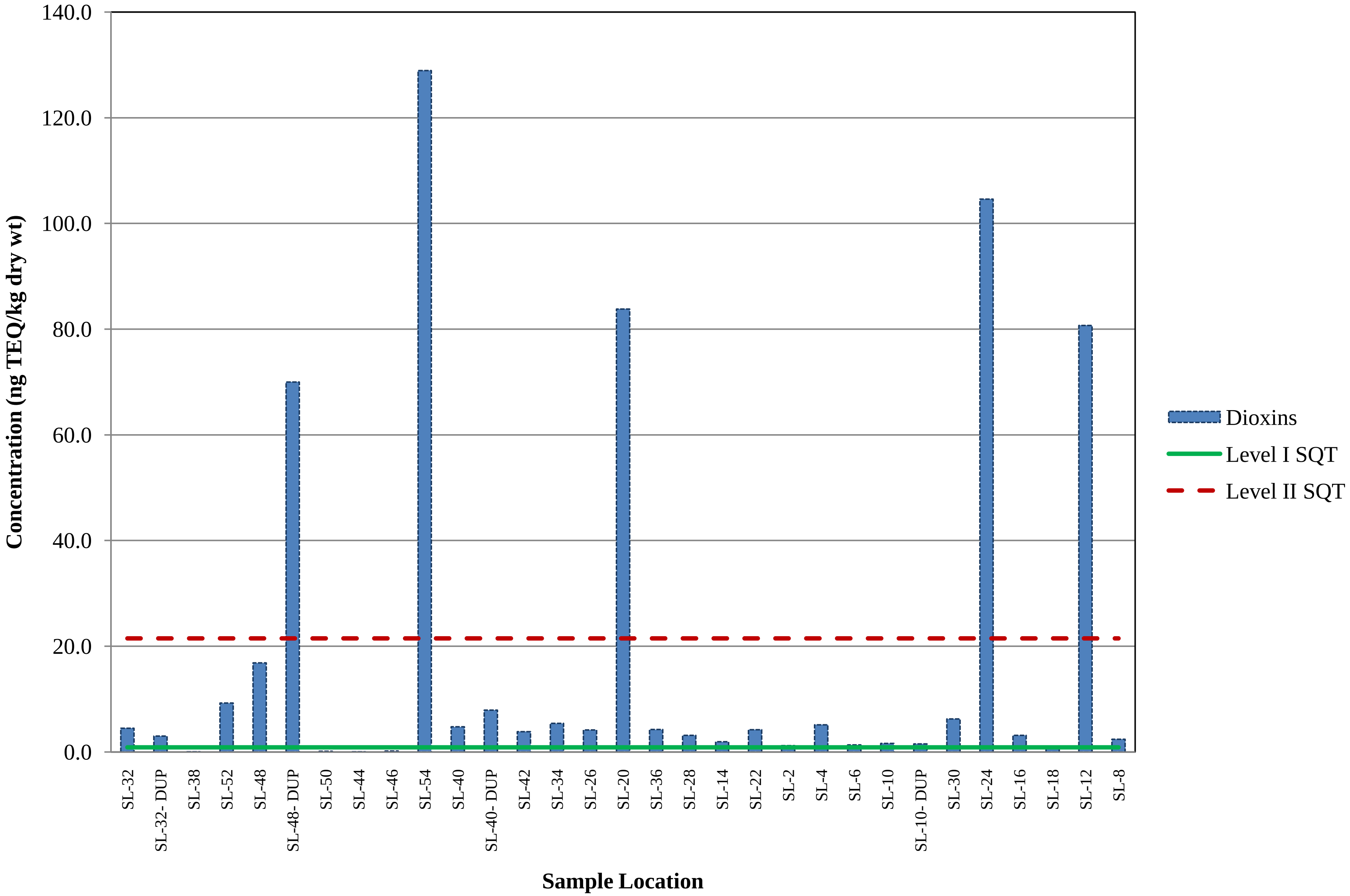


Figure 8.27-k
Spirit Lake (Top of Sediment, 0-0.5 ft) - PCBs

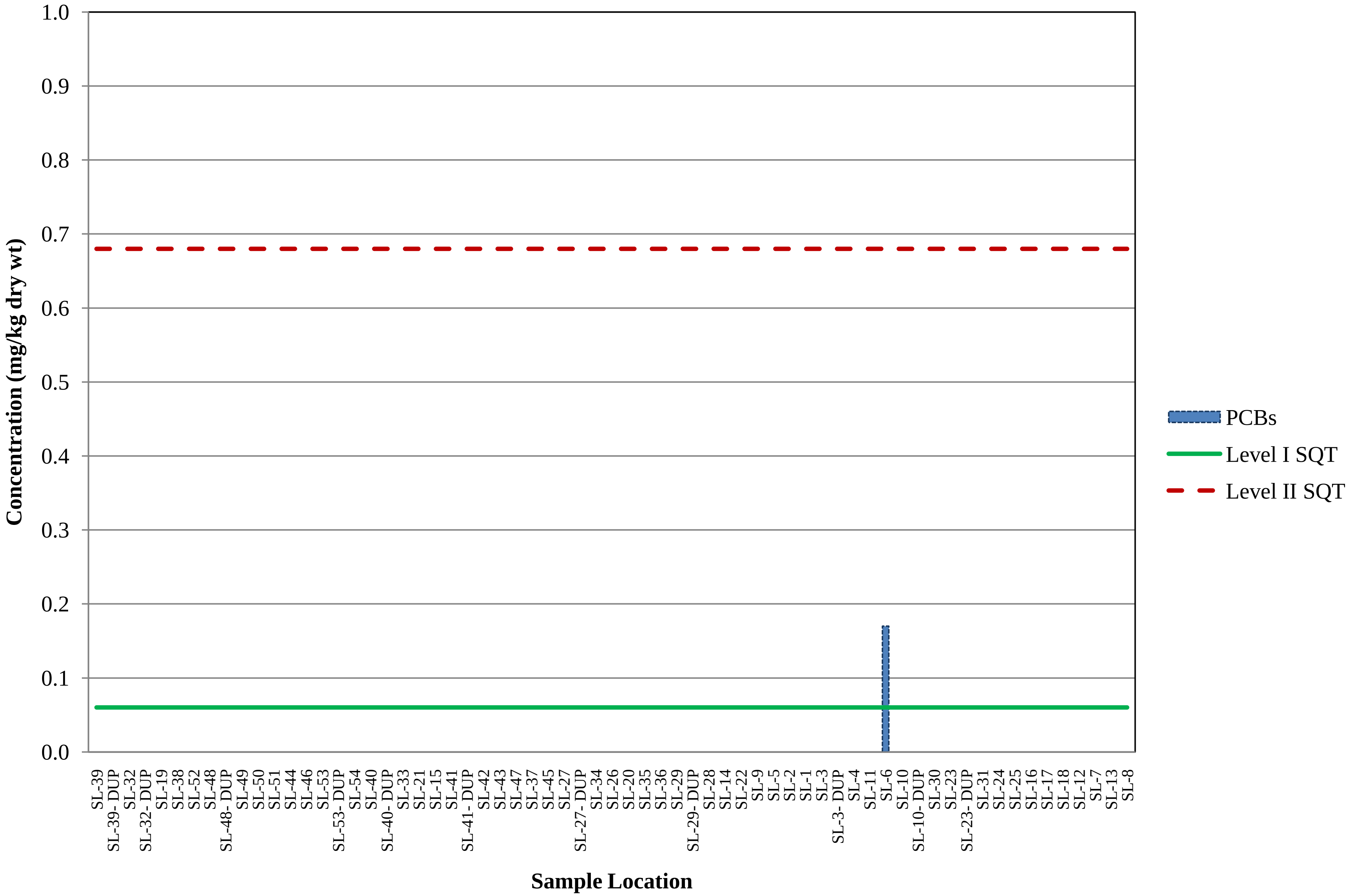


Figure 8.28-a
Steelton Bay (Top of Sediment, 0-0.5 ft) - Arsenic

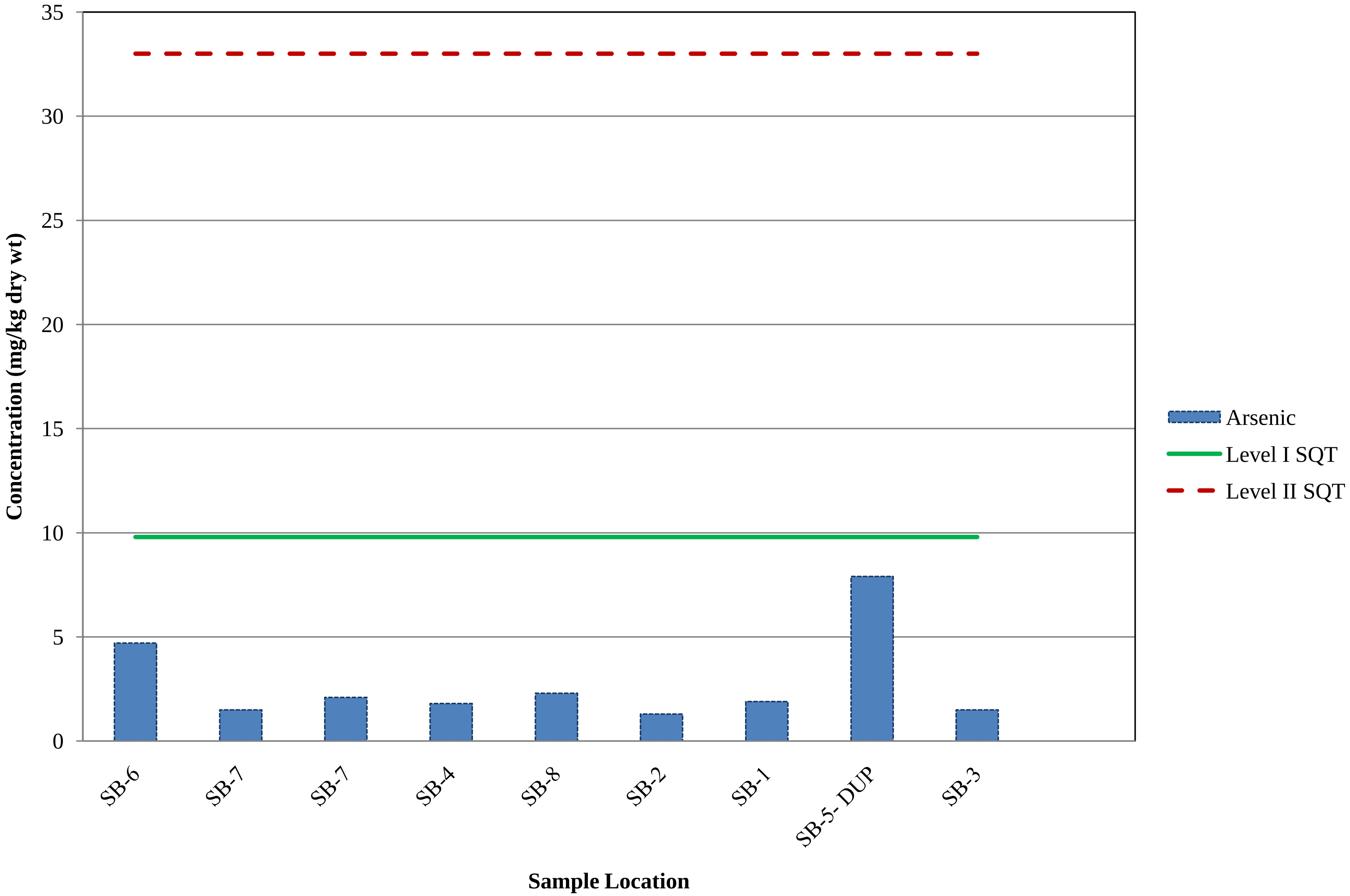


Figure 8.28-b
Steelton Bay (Top of Sediment, 0-0.5 ft) - Cadmium

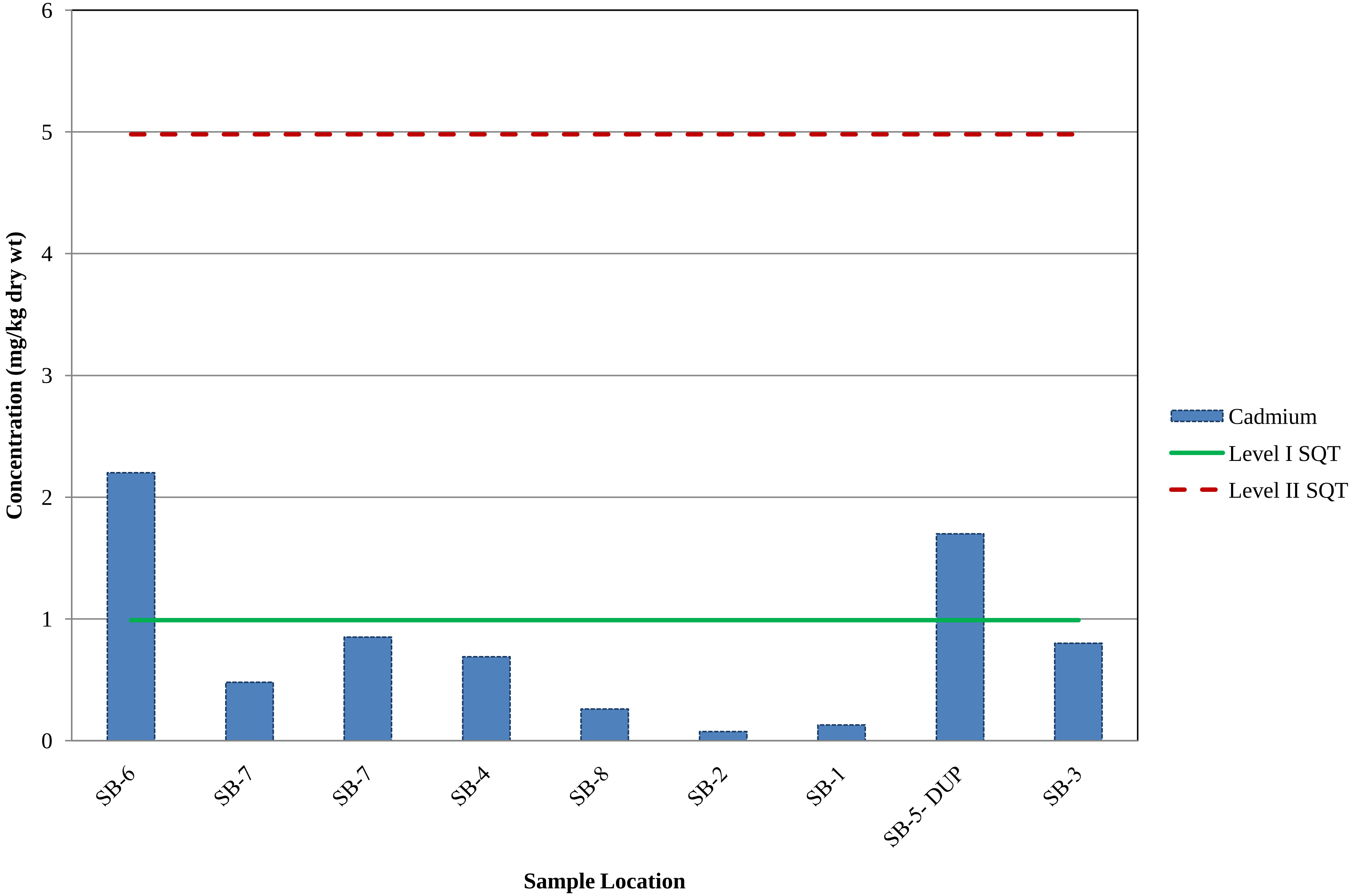


Figure 8.28-c
Steelton Bay (Top of Sediment, 0-0.5 ft) - Chromium

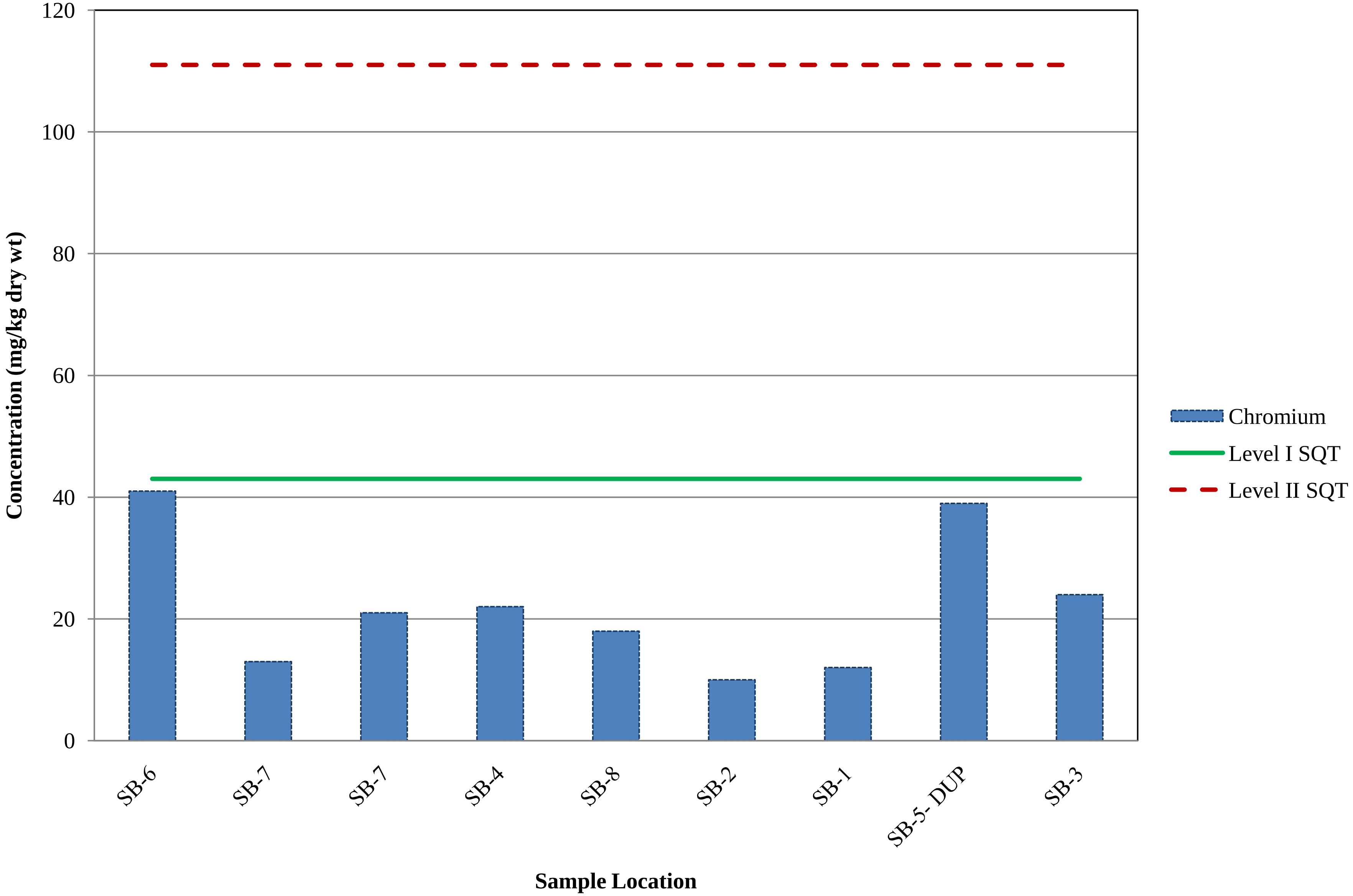


Figure 8.28-d
Steelton Bay (Top of Sediment, 0-0.5 ft) - Copper

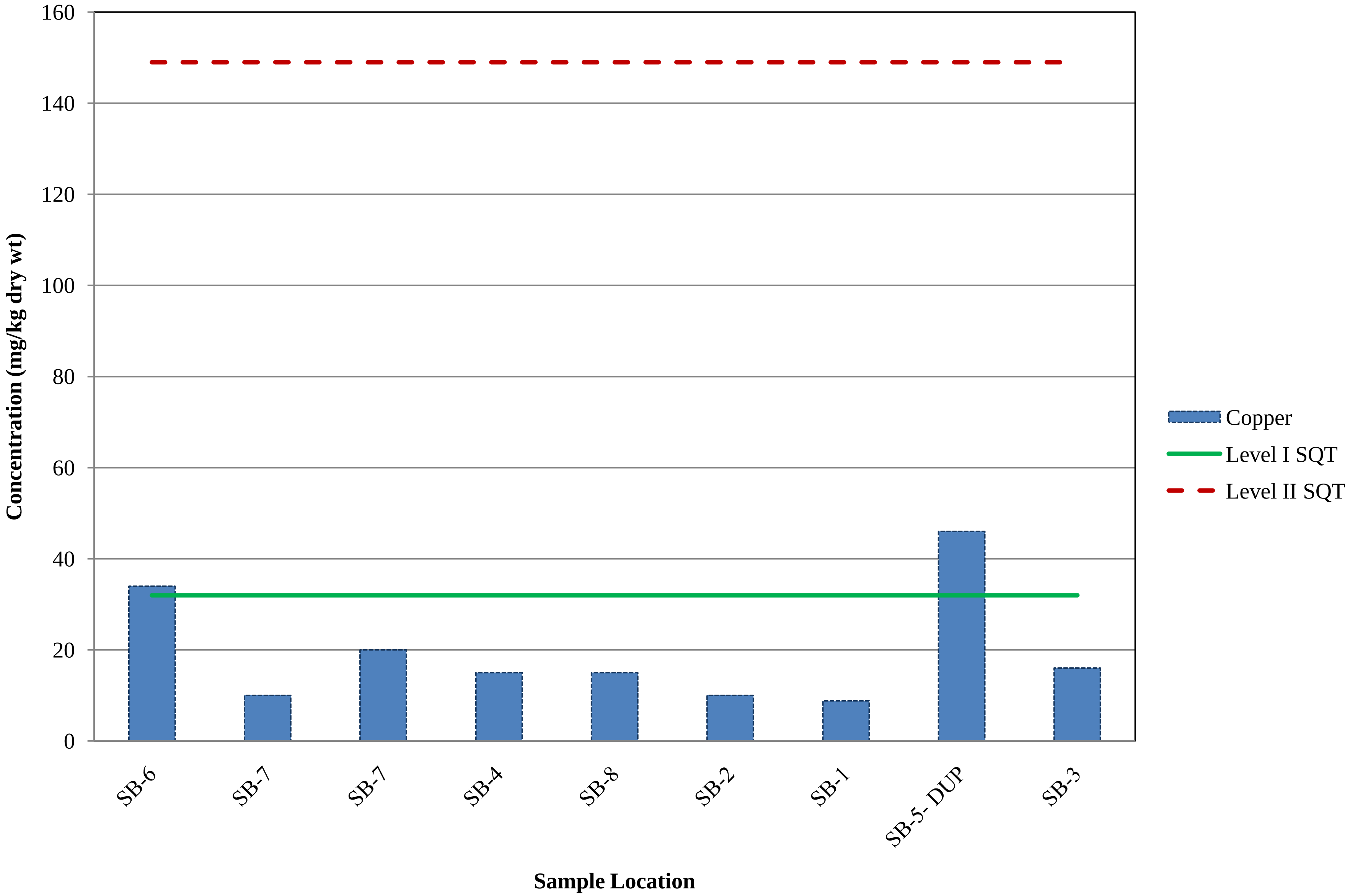


Figure 8.28-e
Steelton Bay (Top of Sediment, 0-0.5 ft) - Lead

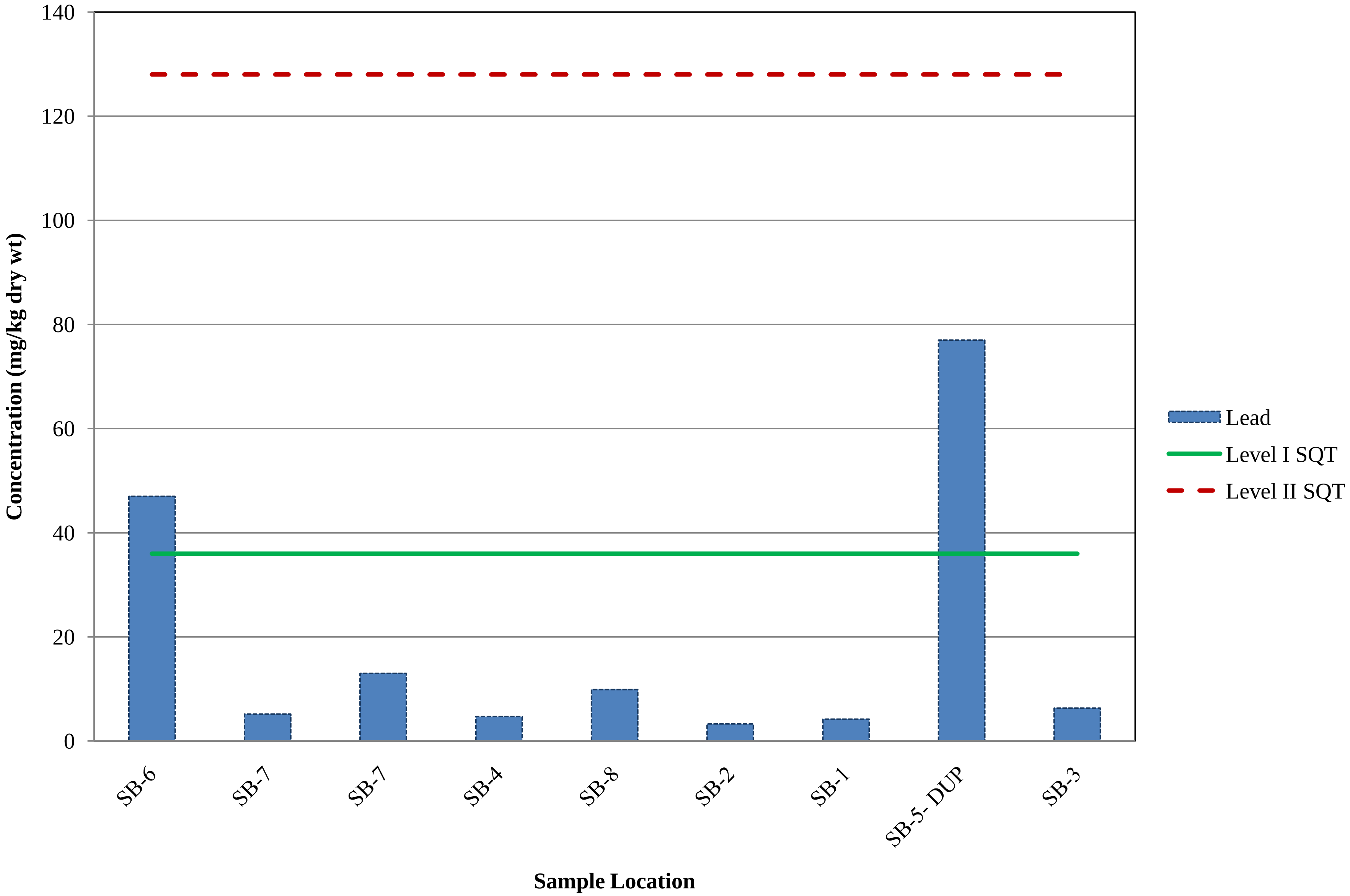


Figure 8.28-f
Steelton Bay (Top of Sediment, 0-0.5 ft) - Mercury

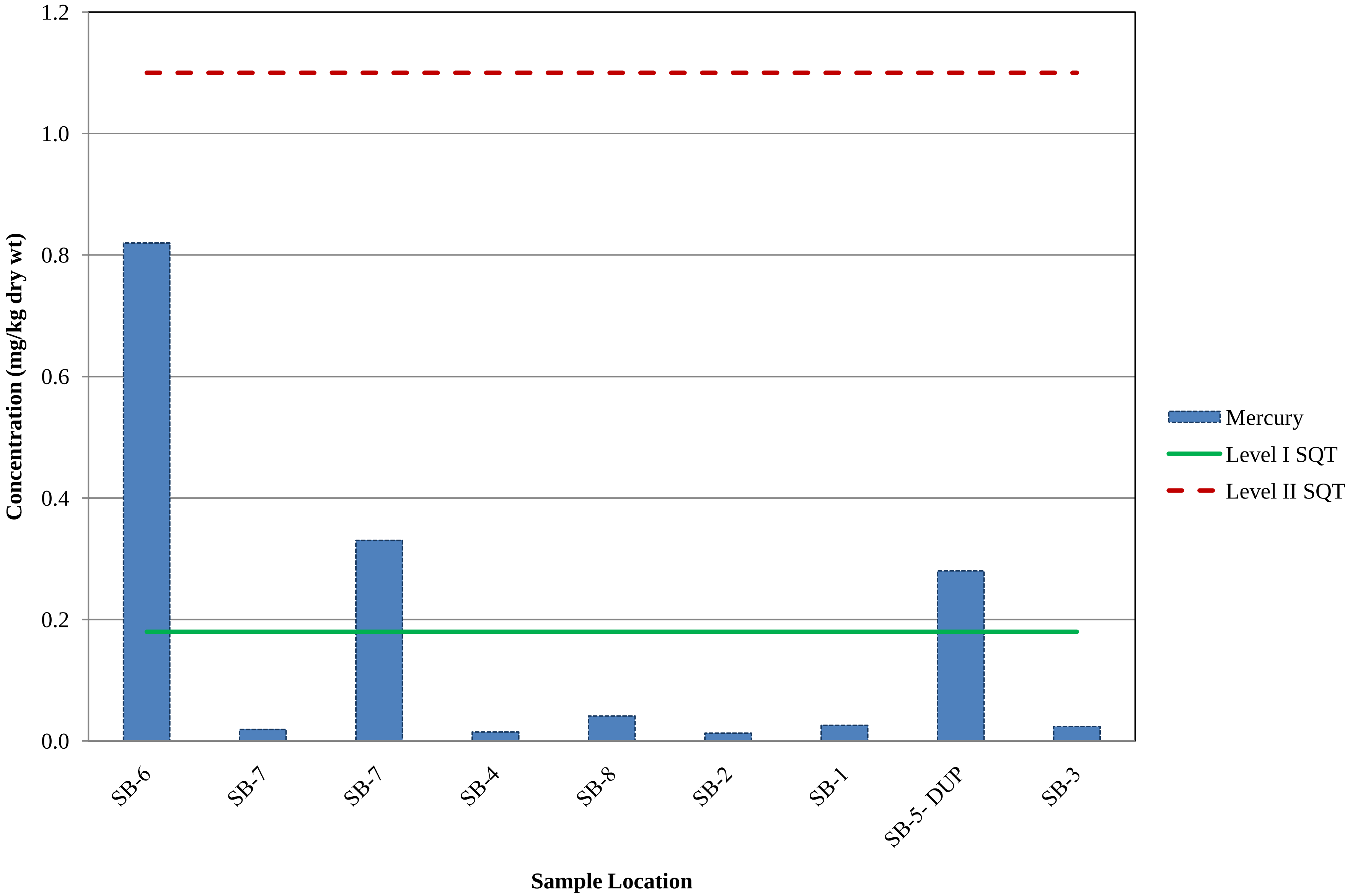


Figure 8.28-g
Steelton Bay (Top of Sediment, 0-0.5 ft) - Nickel

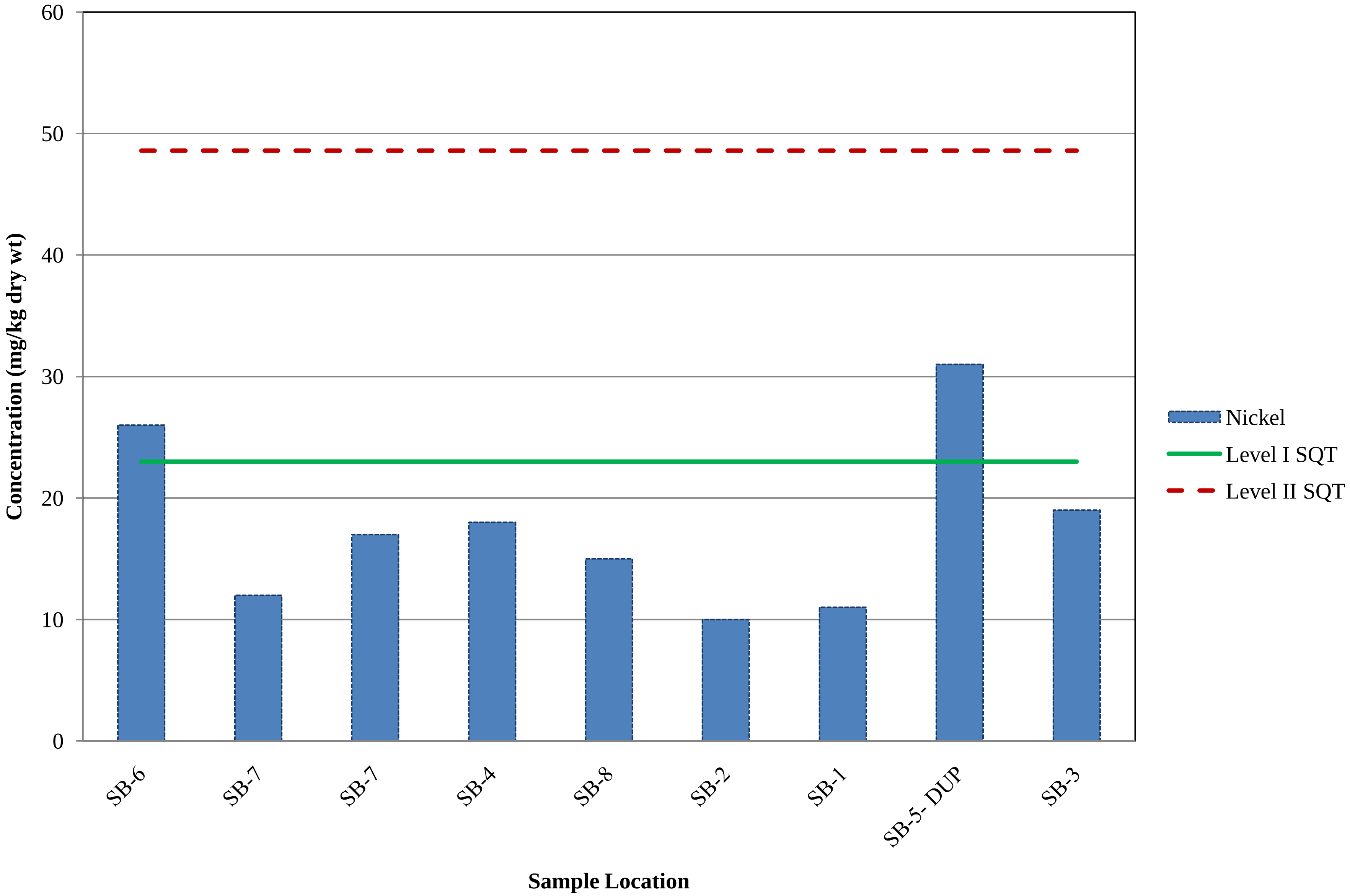


Figure 8.28-h
Steelton Bay (Top of Sediment, 0-0.5 ft) - Zinc

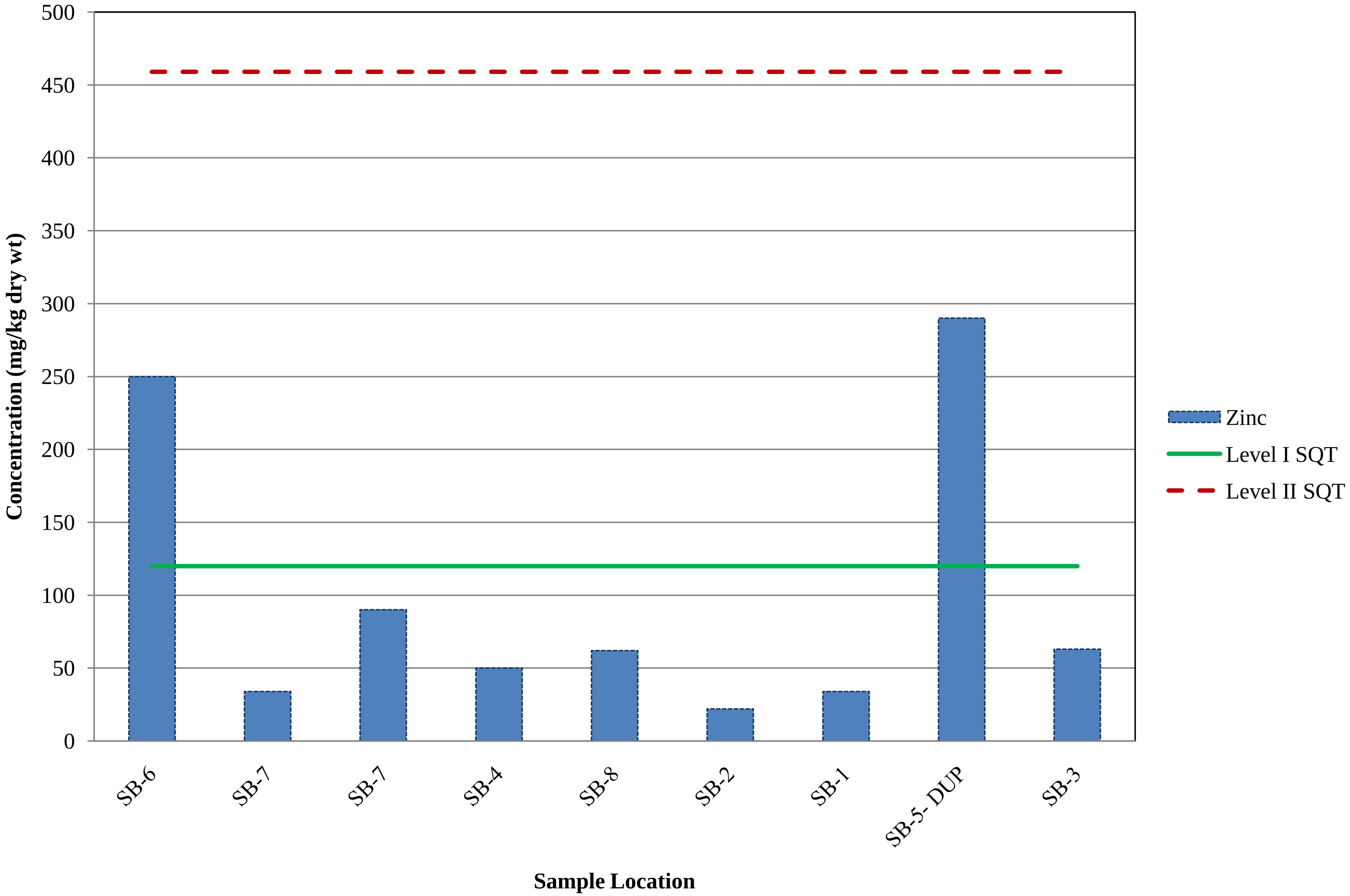


Figure 8.28-i
Steelton Bay (Top of Sediment, 0-0.5 ft) - PAHs

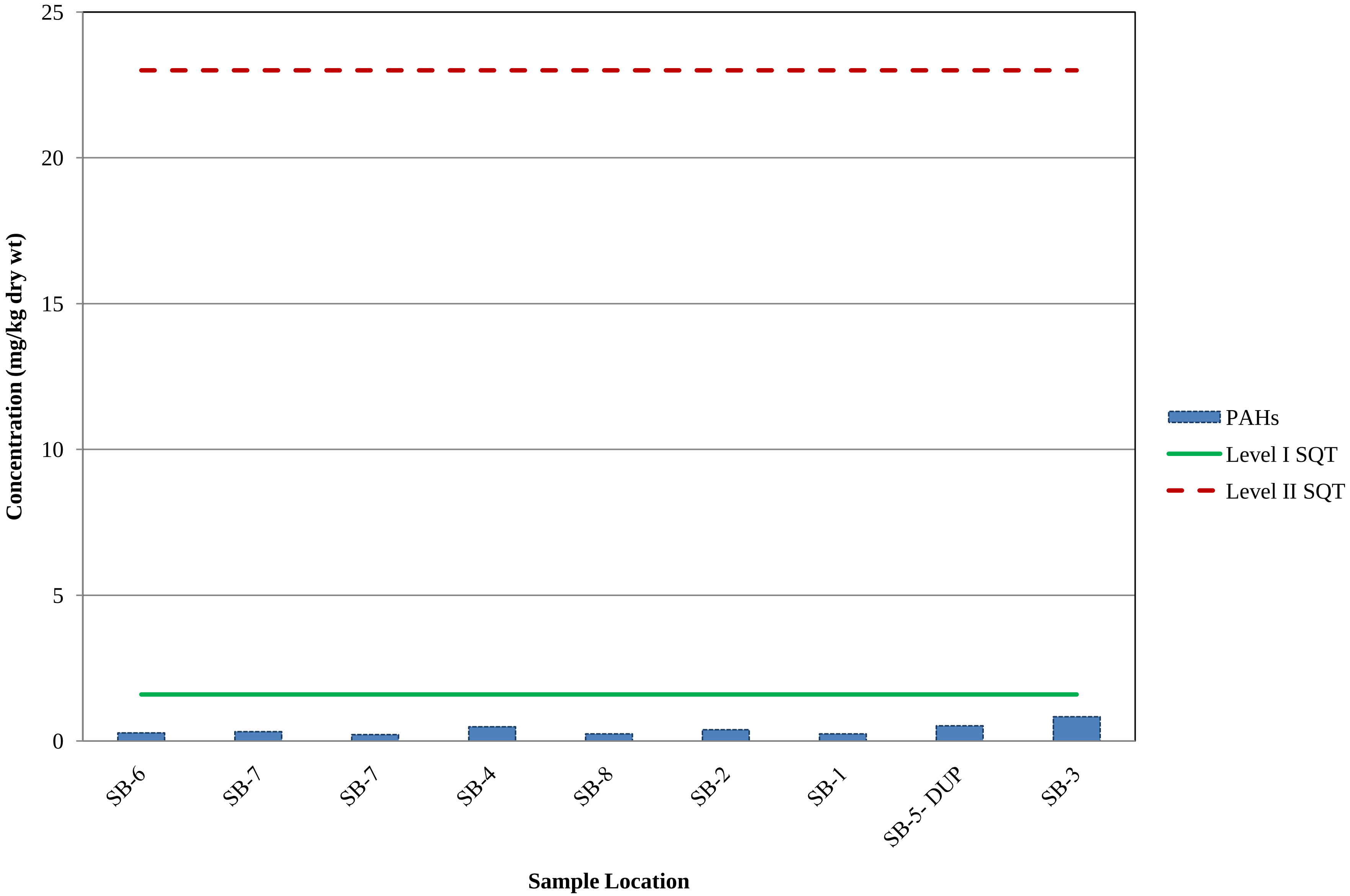


Figure 8.28-j
Steelton Bay (Top of Sediment, 0-0.5 ft) - Dioxins

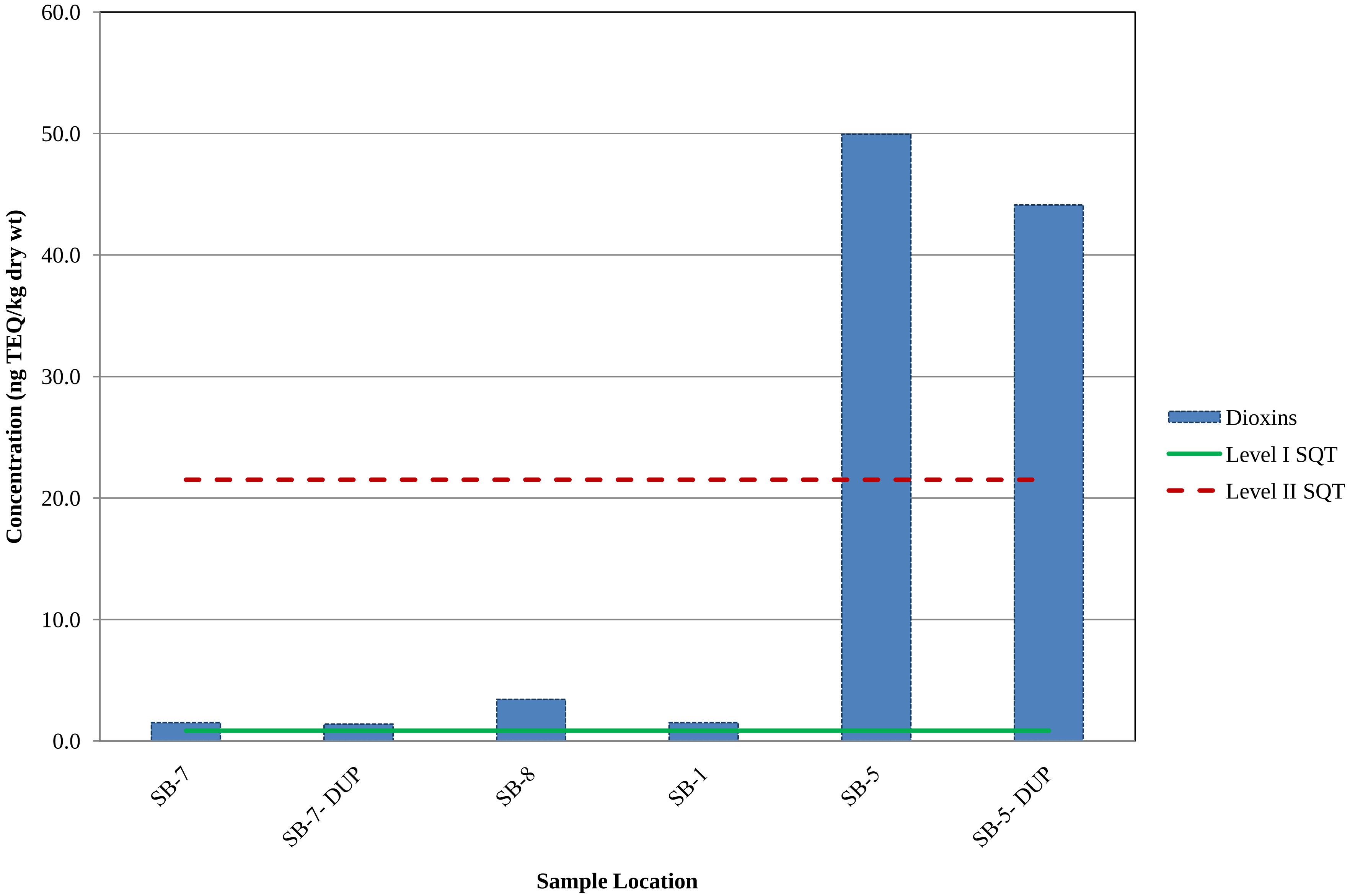


Figure 8.29-a
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Arsenic

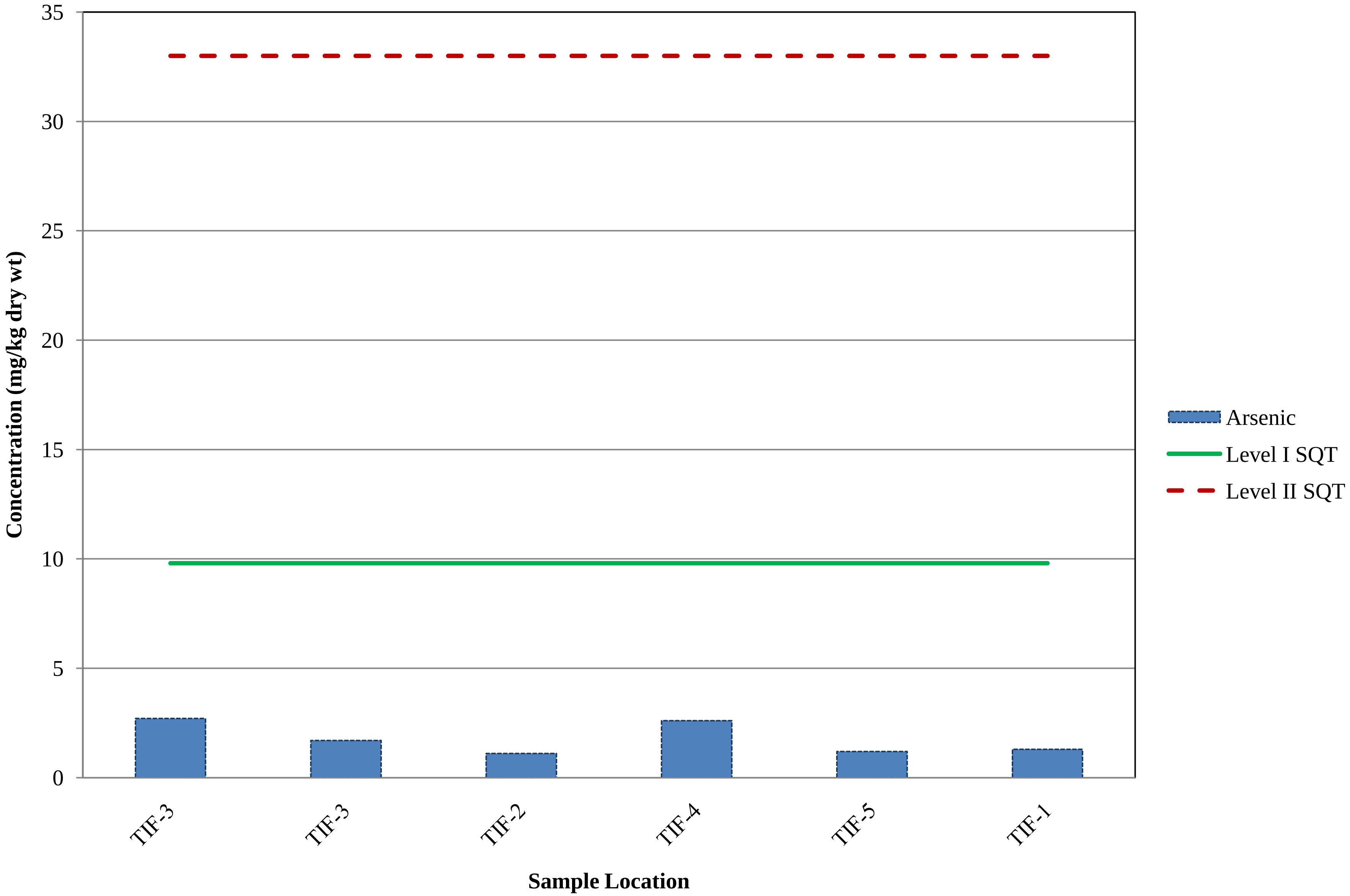


Figure 8.29-b
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Cadmium

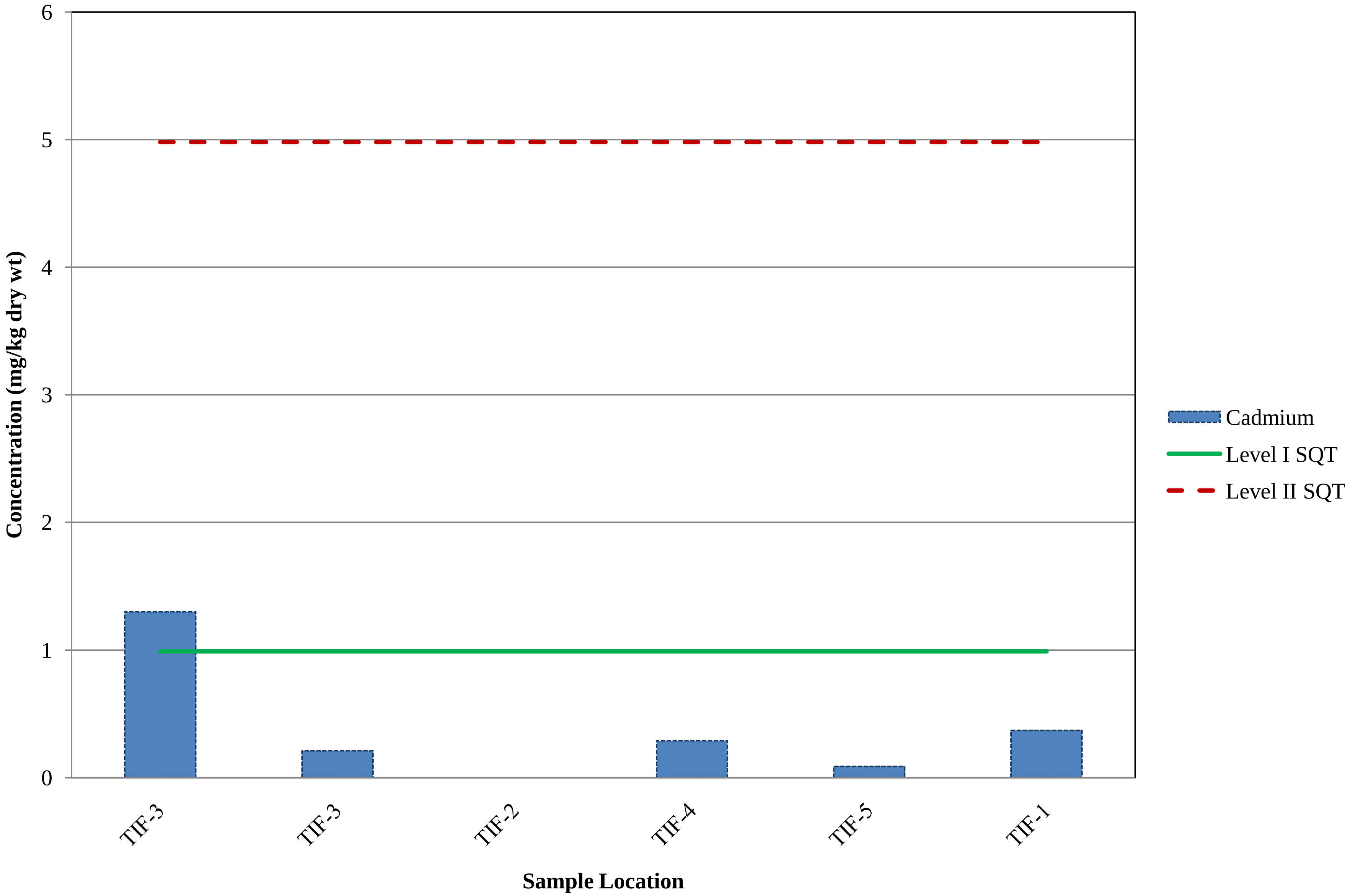


Figure 8.29-c
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Chromium

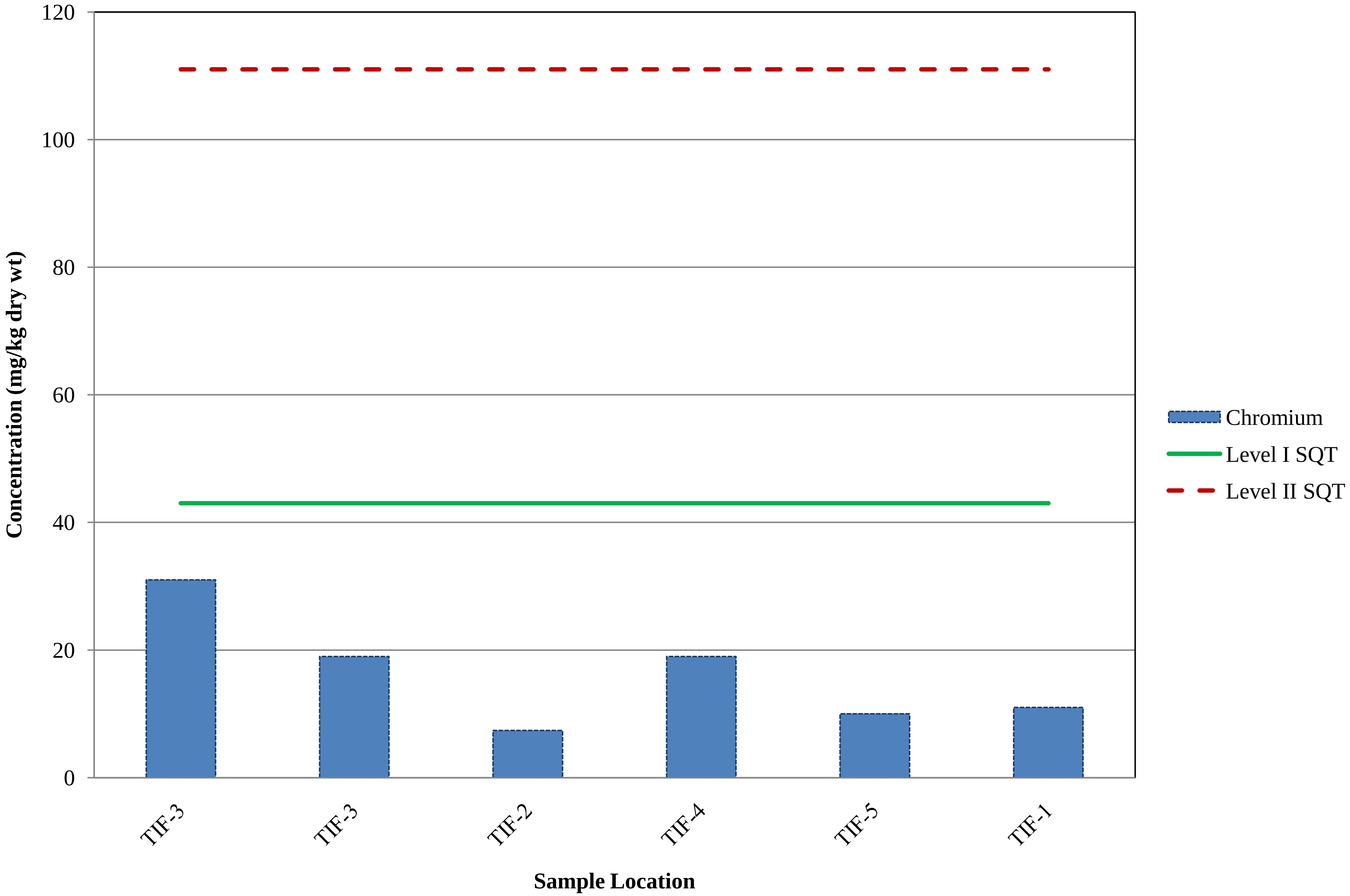


Figure 8.29-d
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Copper

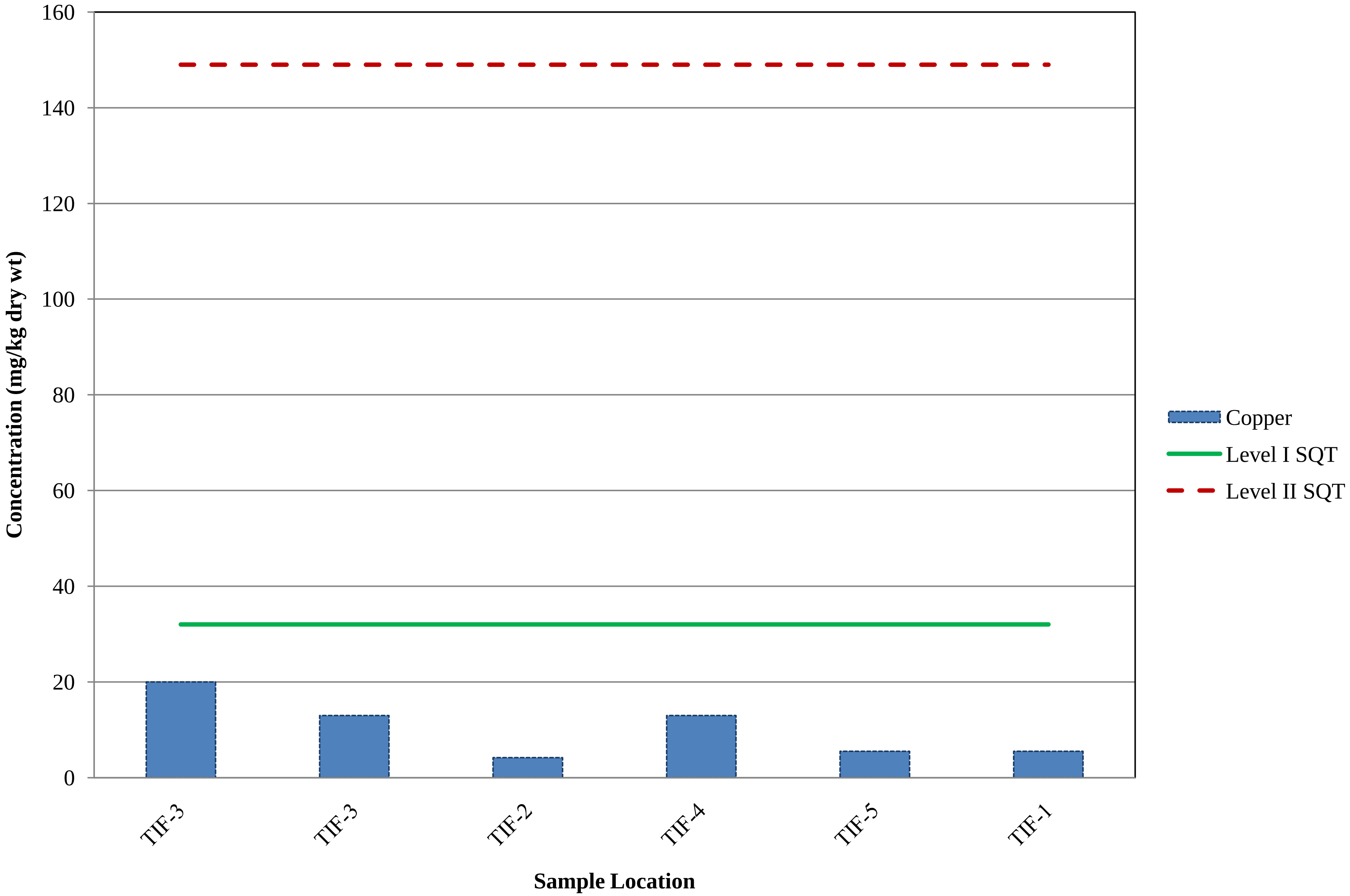


Figure 8.29-e
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Lead

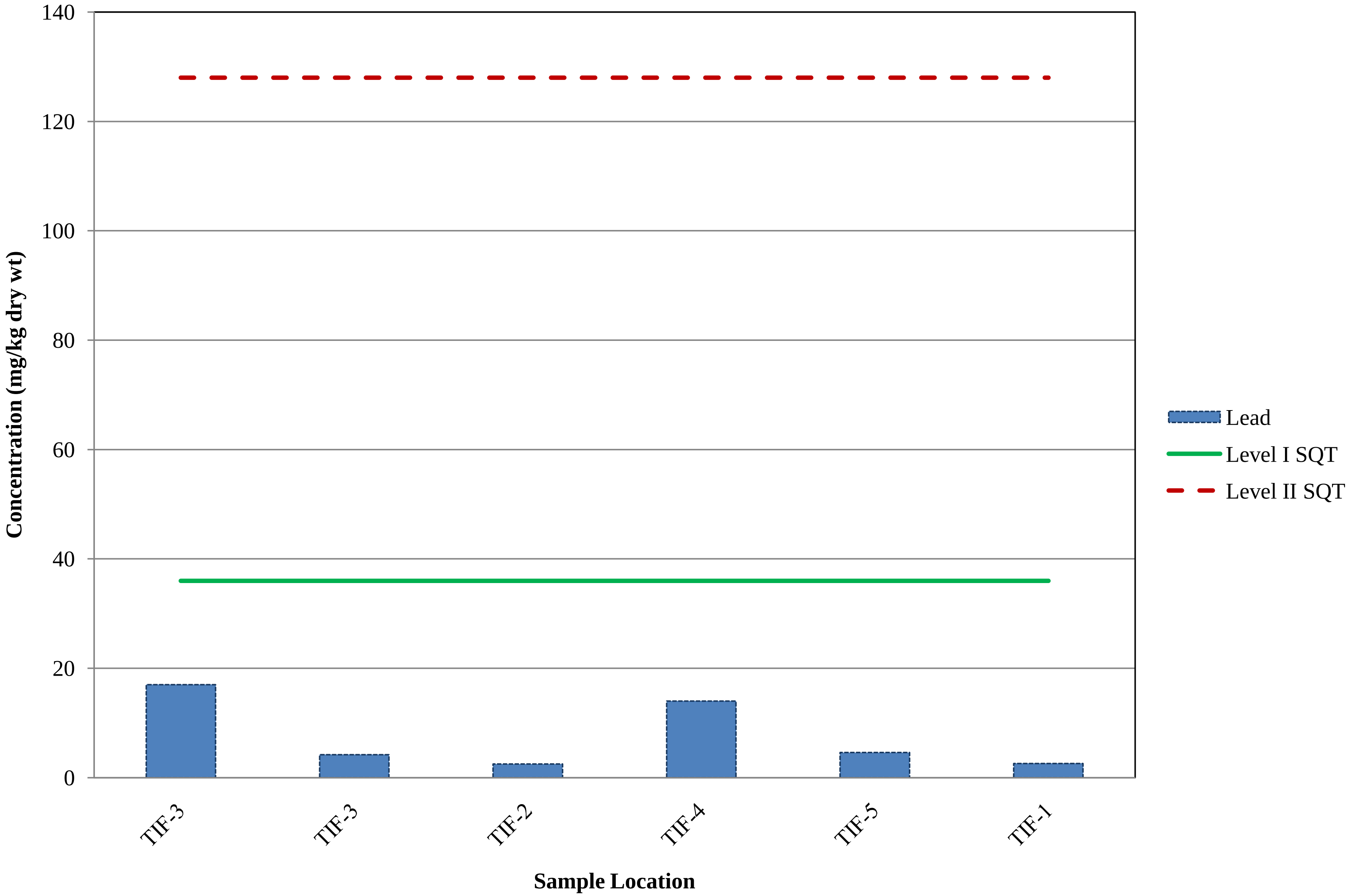


Figure 8.29-f
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Mercury

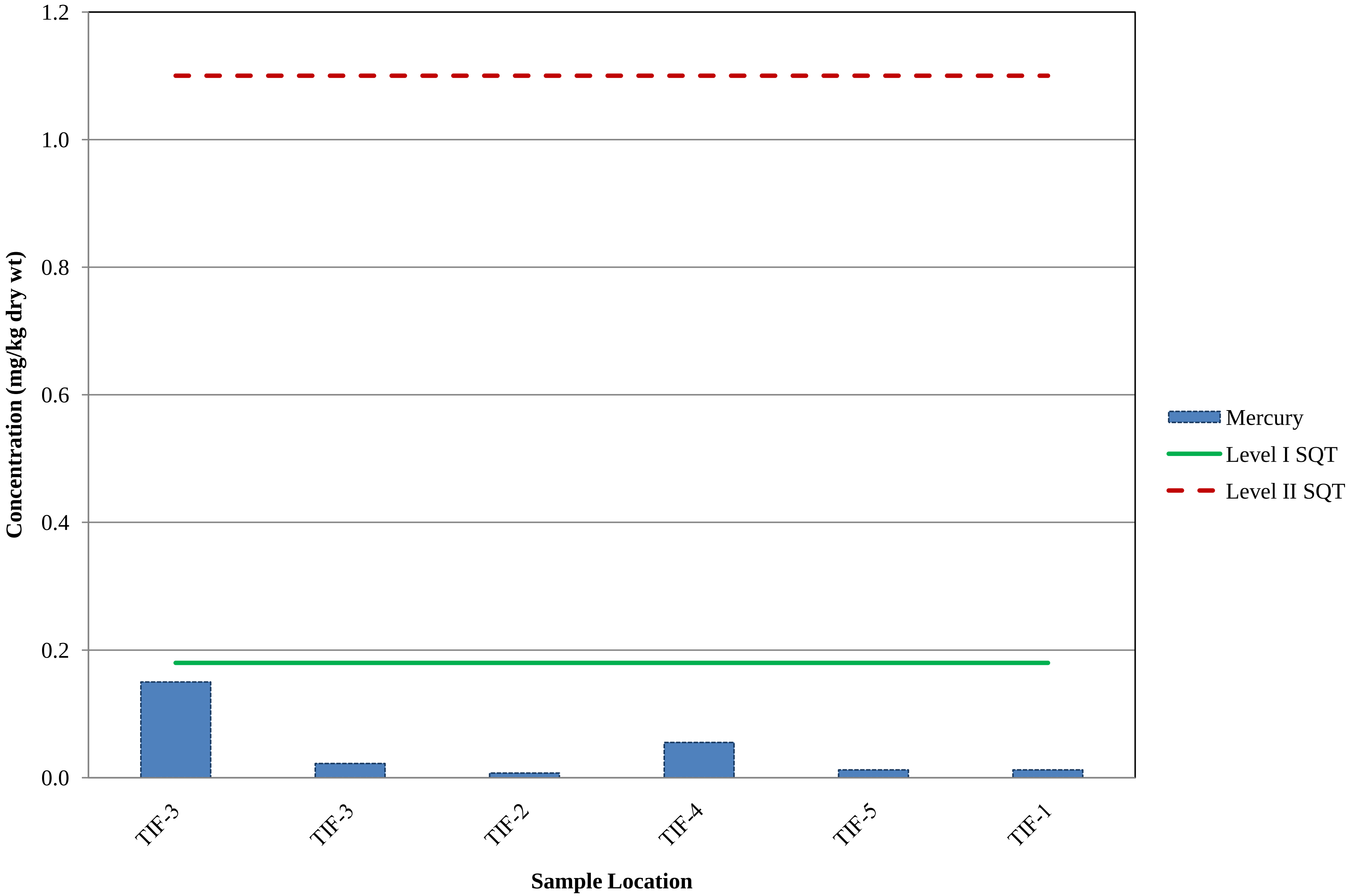


Figure 8.29-g
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Nickel

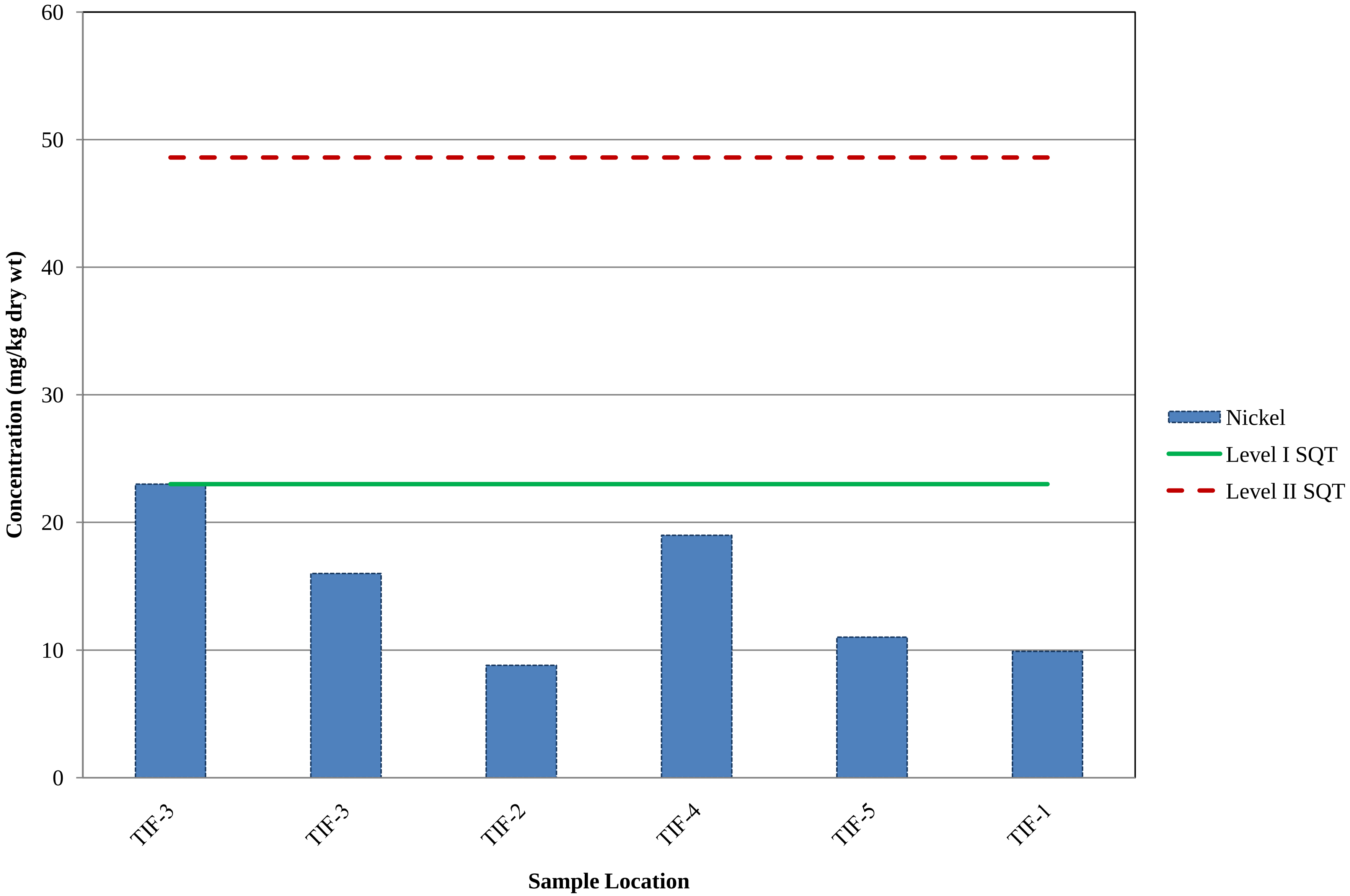


Figure 8.29-h
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Zinc

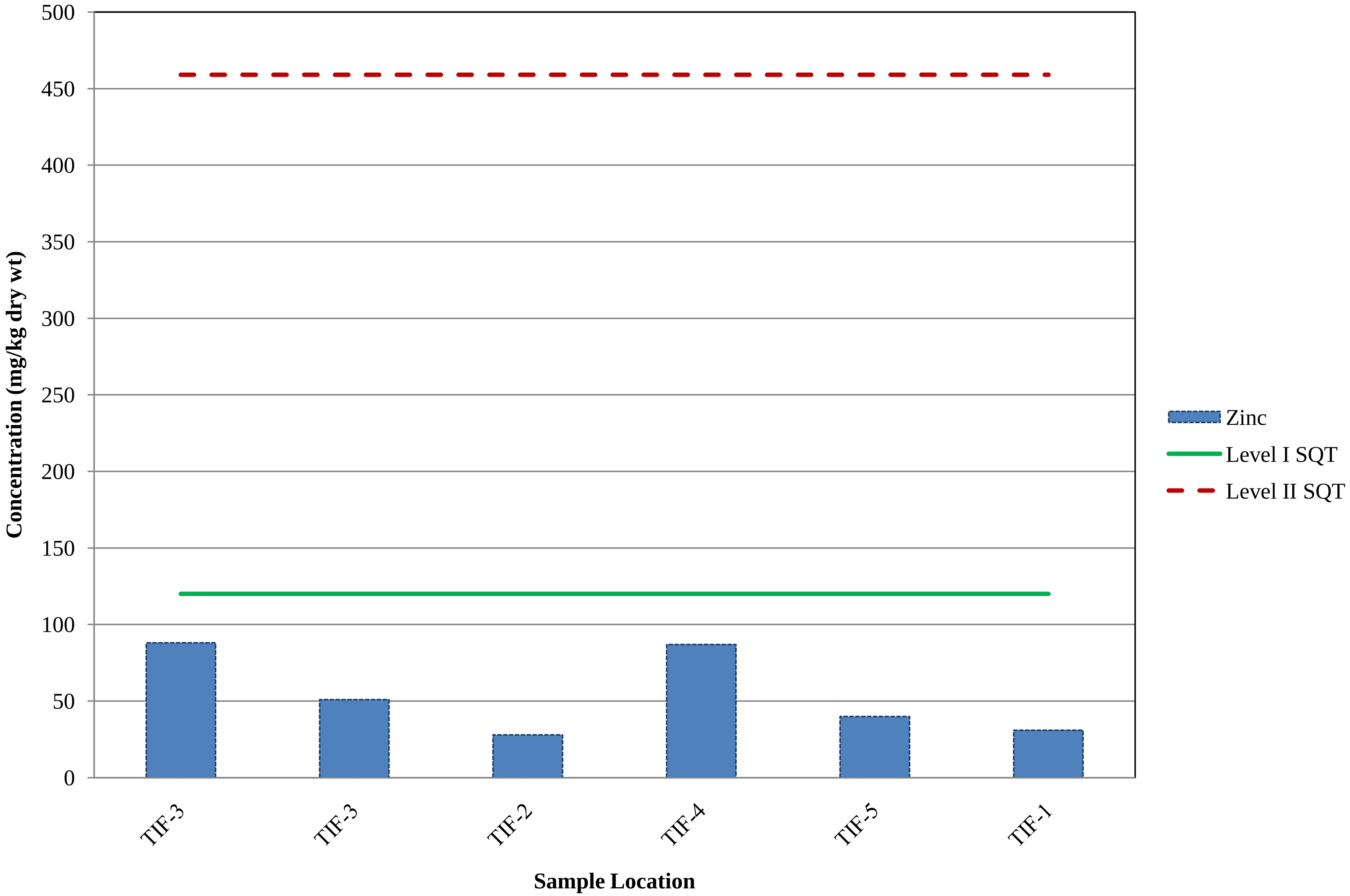


Figure 8.29-i
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - PAHs

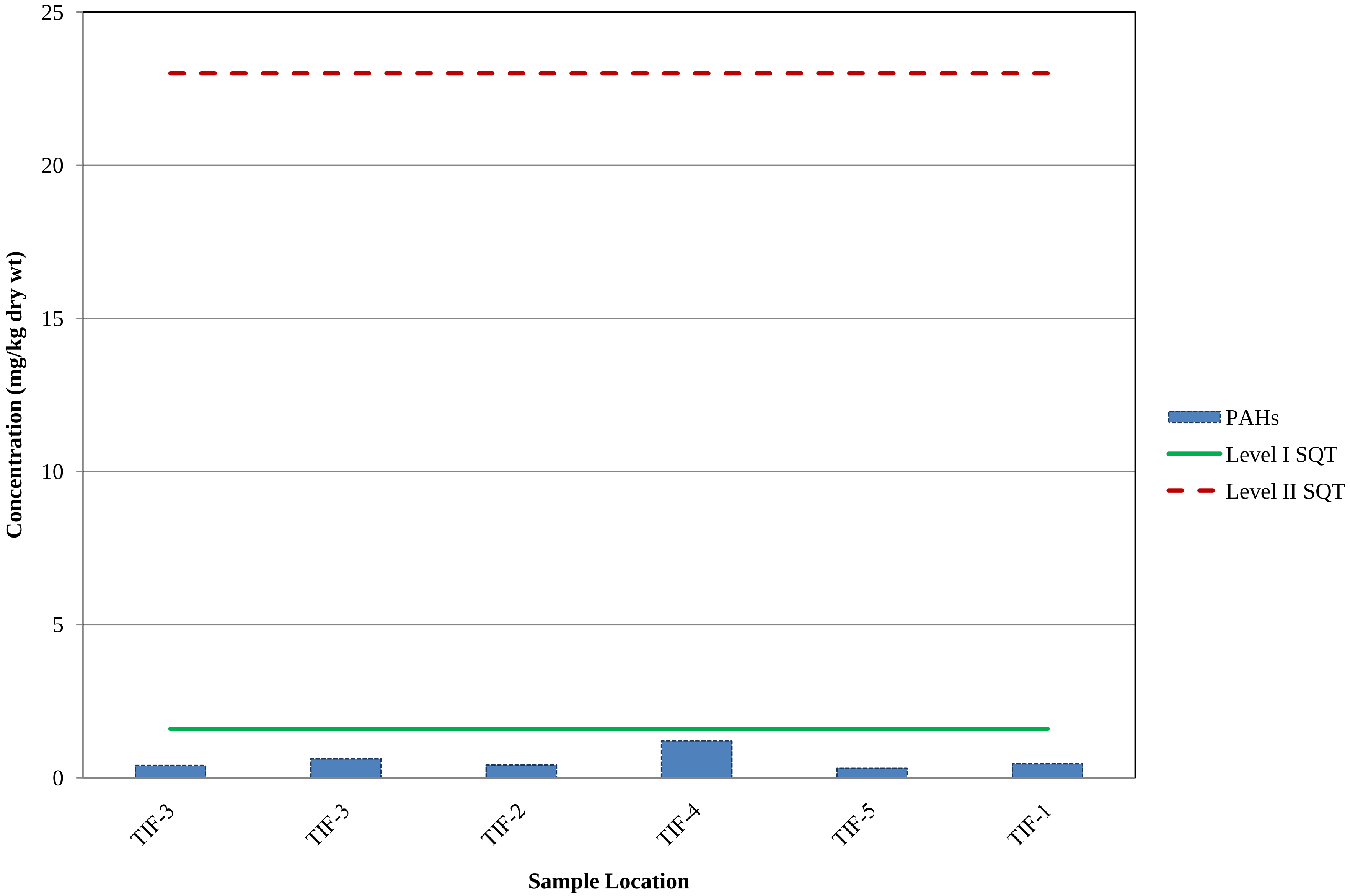
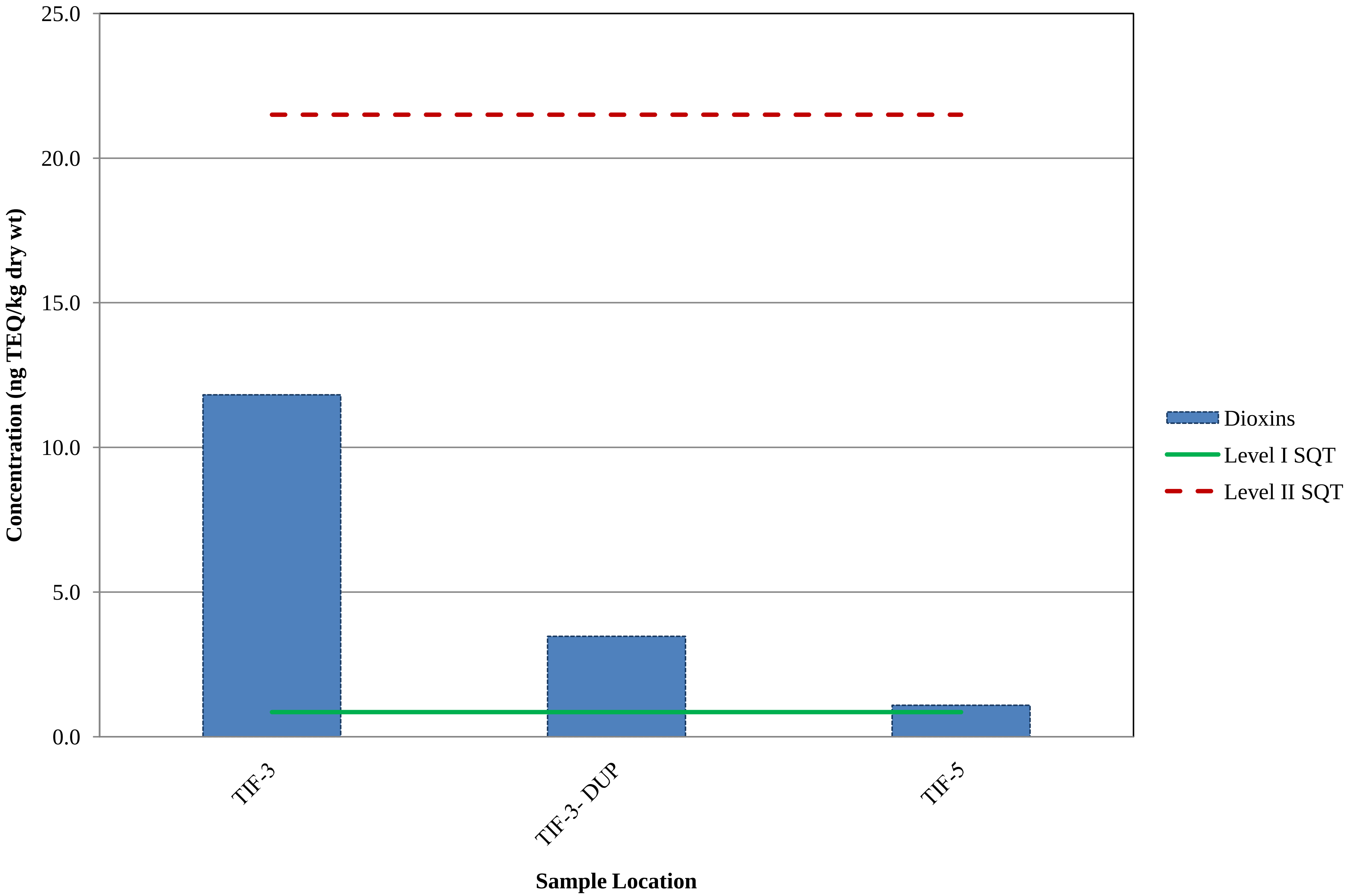


Figure 8.29-j
Tallas Island Flats (Top of Sediment, 0-0.5 ft) - Dioxins



LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Arsenic
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-a
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

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SQT Comparison: Cadmium
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-b
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Chromium
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-c
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Copper
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-d
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 | 800 | 1,600 | 3,200 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

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SQT Comparison: Lead
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-e
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Mercury
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-f
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Nickel
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-g
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Zinc
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-h
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Total PAHs
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-i
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Dioxins
Fond Du Lac Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/23/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.30-j
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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Detroit, Michigan 48226

SQT Comparison: Arsenic
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-a
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

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SQT Comparison: Cadmium
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-b
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt. (green)
- 43 - 111 mg/kg dry wt. (yellow)
- > 111 mg/kg dry wt. (red)

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Chromium
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 31-c
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Copper
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-d
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Lead
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-e
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Mercury
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-f
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Nickel
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 31-g
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

SQT Comparison: Zinc
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-h
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Total PAHs

0 - 1,600 µg/kg dry wt.

1,600 - 23,000 µg/kg dry wt.

> 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

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SQT Comparison: Total PAHs
Indian Point Water Front
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.31-i
SCALE: AS SHOWN	

SOMAT Engineering, Inc. 660 Woodward Ave., Suite 2430, Detroit, Michigan 48226	**SQT Comparison: Dioxins** **Indian Point Water Front** Lower St. Louis River, Duluth, MN Sediment Investigation USACE/MPCA	PROJECT NO: E08112D	DATE: 4/25/2012
		DWN BY: CCR	REV. NO: 1
		CHK'D BY:	FIGURE: 8.31-j
		SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Arsenic
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-a
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Cadmium
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 32-b
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

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SQT Comparison: Chromium
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-c
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

0 500 1,000 2,000 Feet

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Detroit, Michigan 48226

SQT Comparison: Copper
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-d
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Lead
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-e
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

0 500 1,000 2,000 Feet

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SQT Comparison: Mercury
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-f
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Nickel
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-g
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Zinc
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-h
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Total PAHs
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 32-i
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Dioxins

0 - 0.85 ng TEQ/kg dry wt.

0.85 - 21.5 ng TEQ/kg dry wt

> 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Dioxins
Kingsbury Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO:	DATE:
E08112D	4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.32-j
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Arsenic
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 833-a
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Cadmium

0 - 0.99 mg/kg dry wt.

0.99 - 4.98 mg/kg dry wt.

> 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Cadmium
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-b
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Chormium
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-c
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Copper
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-d
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

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SQT Comparison: Lead
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-e
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Mercury
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-f
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 | 800 | 1,600 | 3,200 Feet

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SQT Comparison: Nickel
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-g
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Zinc
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-h
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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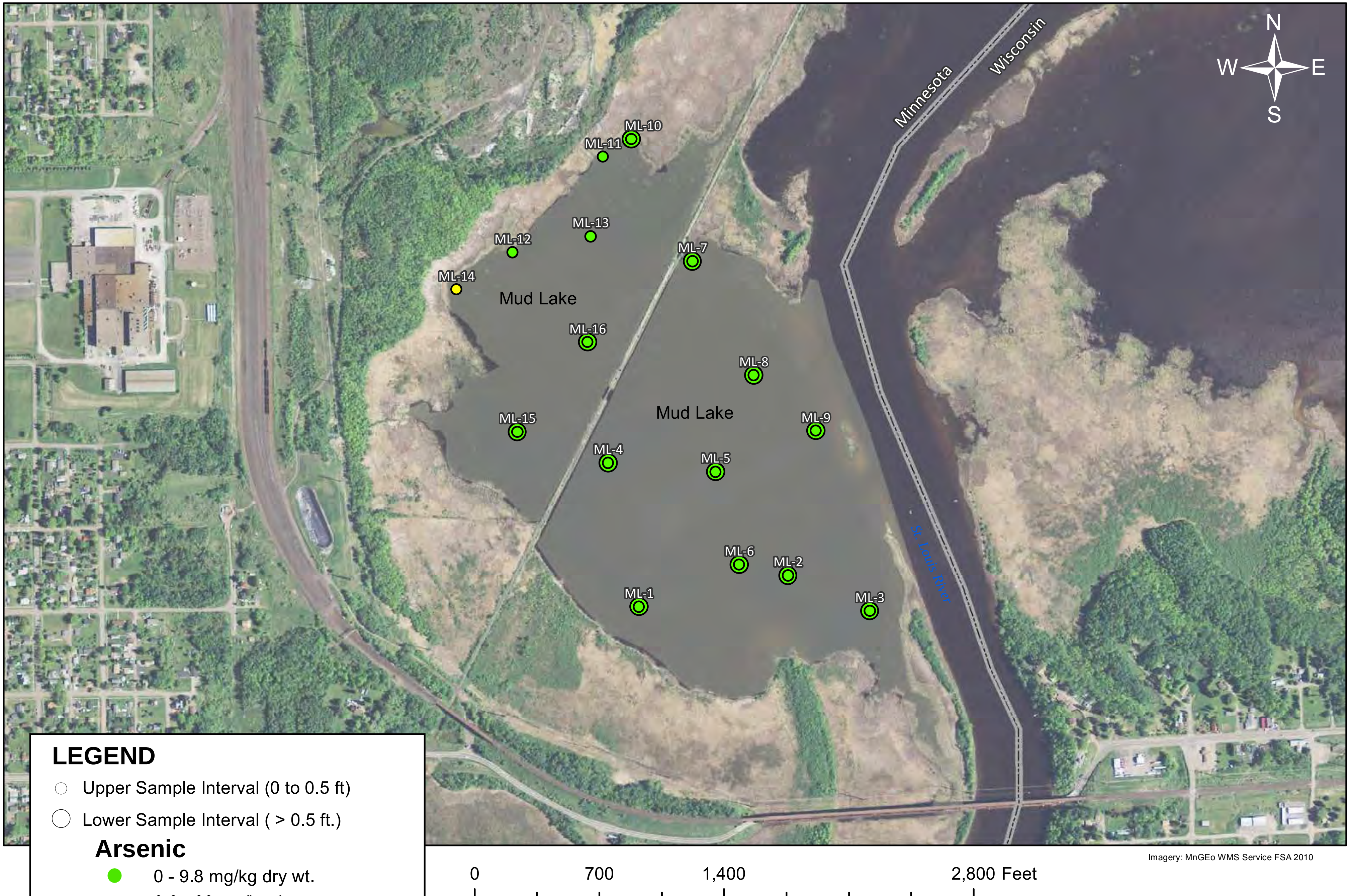
SQT Comparison: Total PAHs
Minnesota Channel
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.33-i
SCALE: AS SHOWN	



LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

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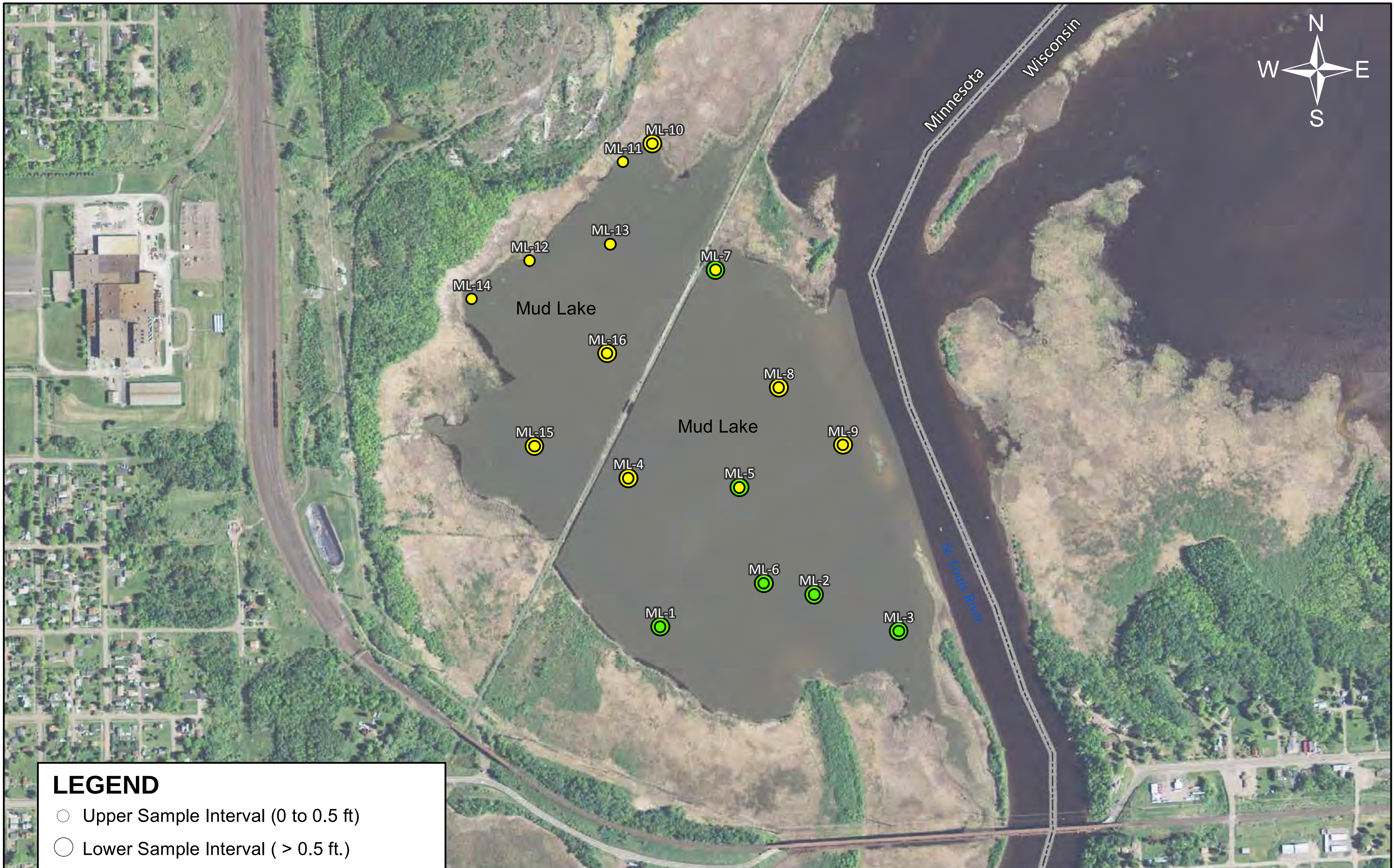
SQT Comparison: Arsenic
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-a
SCALE: AS SHOWN	



LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 700 1,400 2,800 Feet

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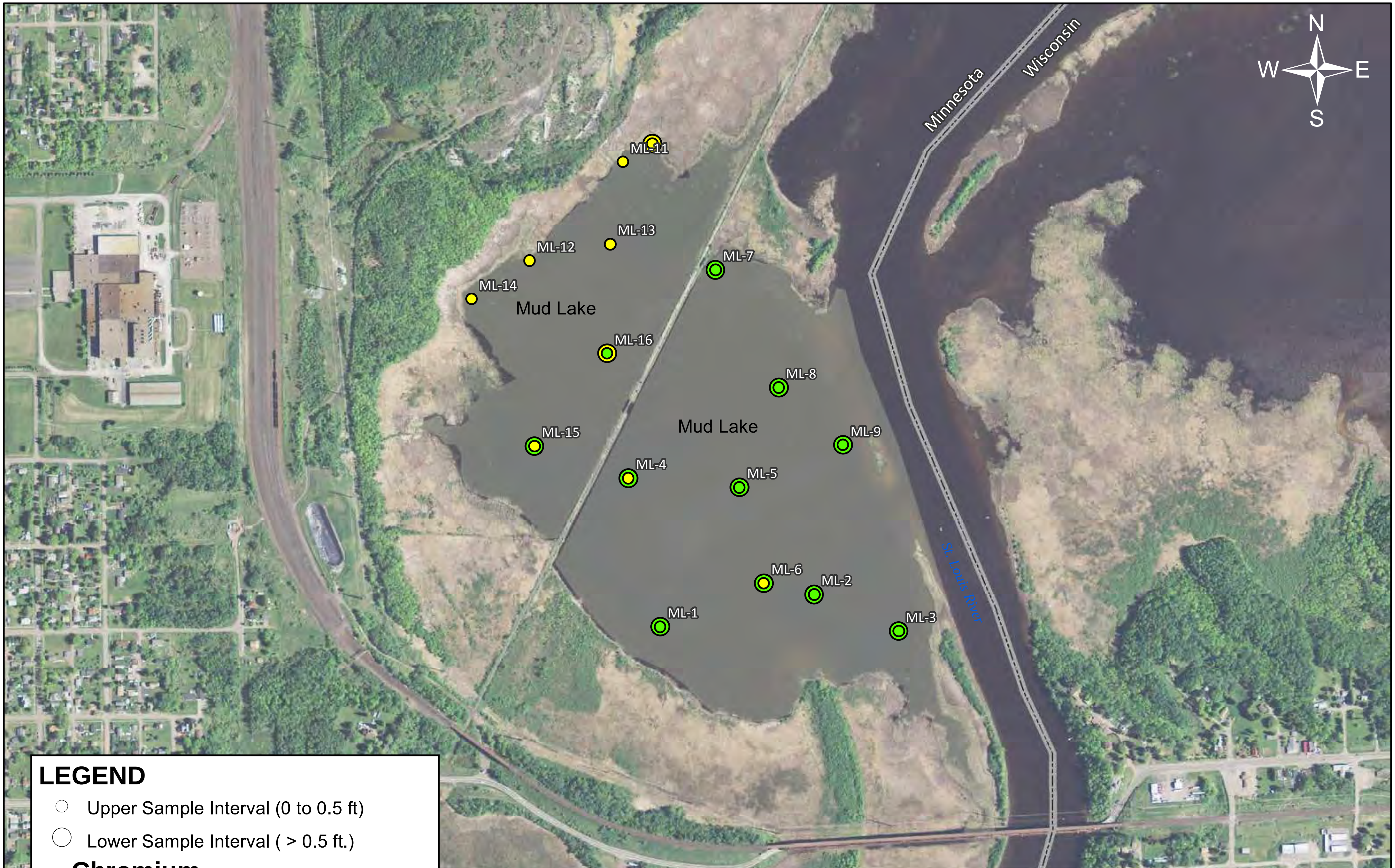
SQT Comparison: Cadmium
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-b
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

◯ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 700 1,400 2,800 Feet

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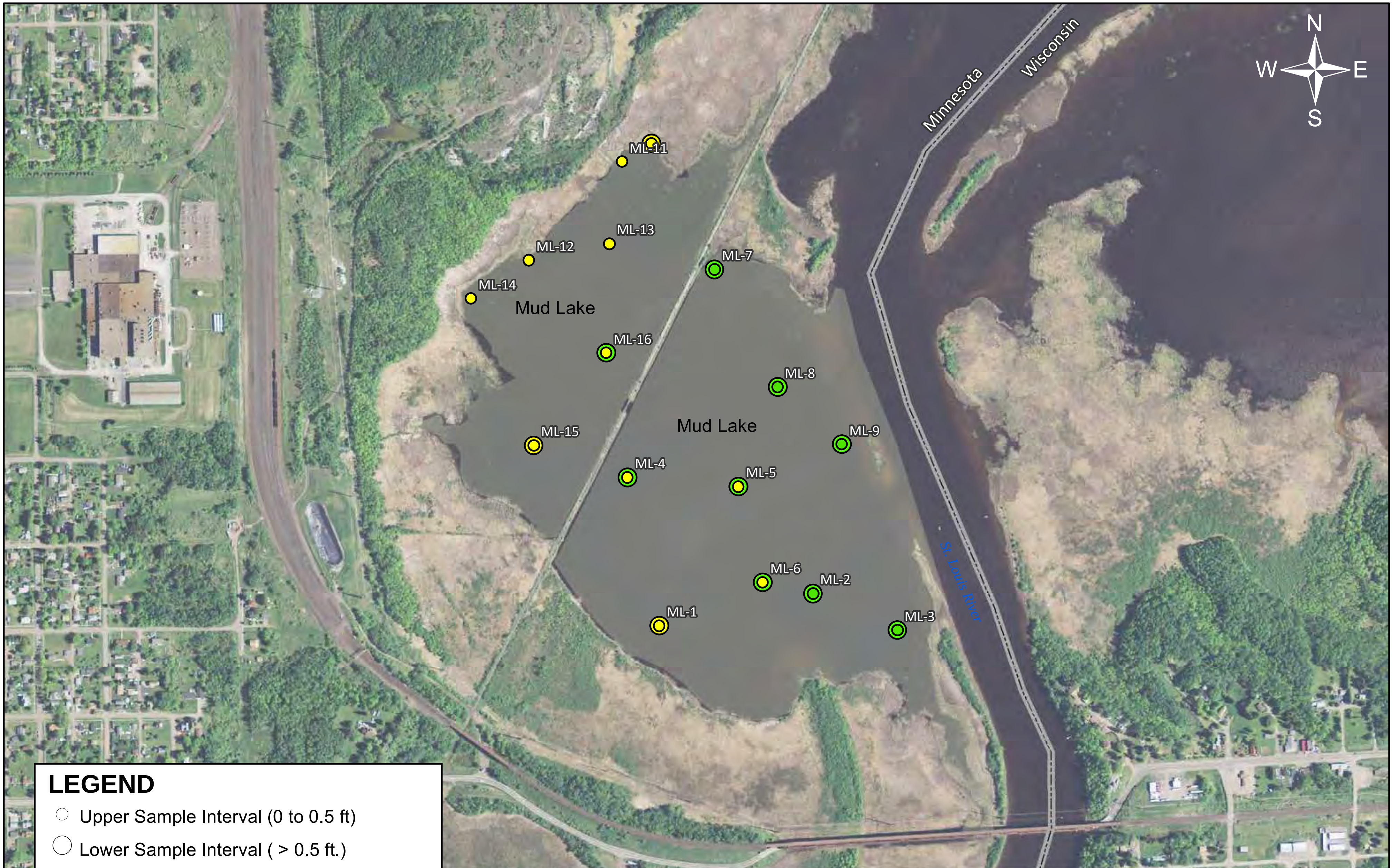
SQT Comparison: Chromium
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-c
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 700 1,400 2,800 Feet

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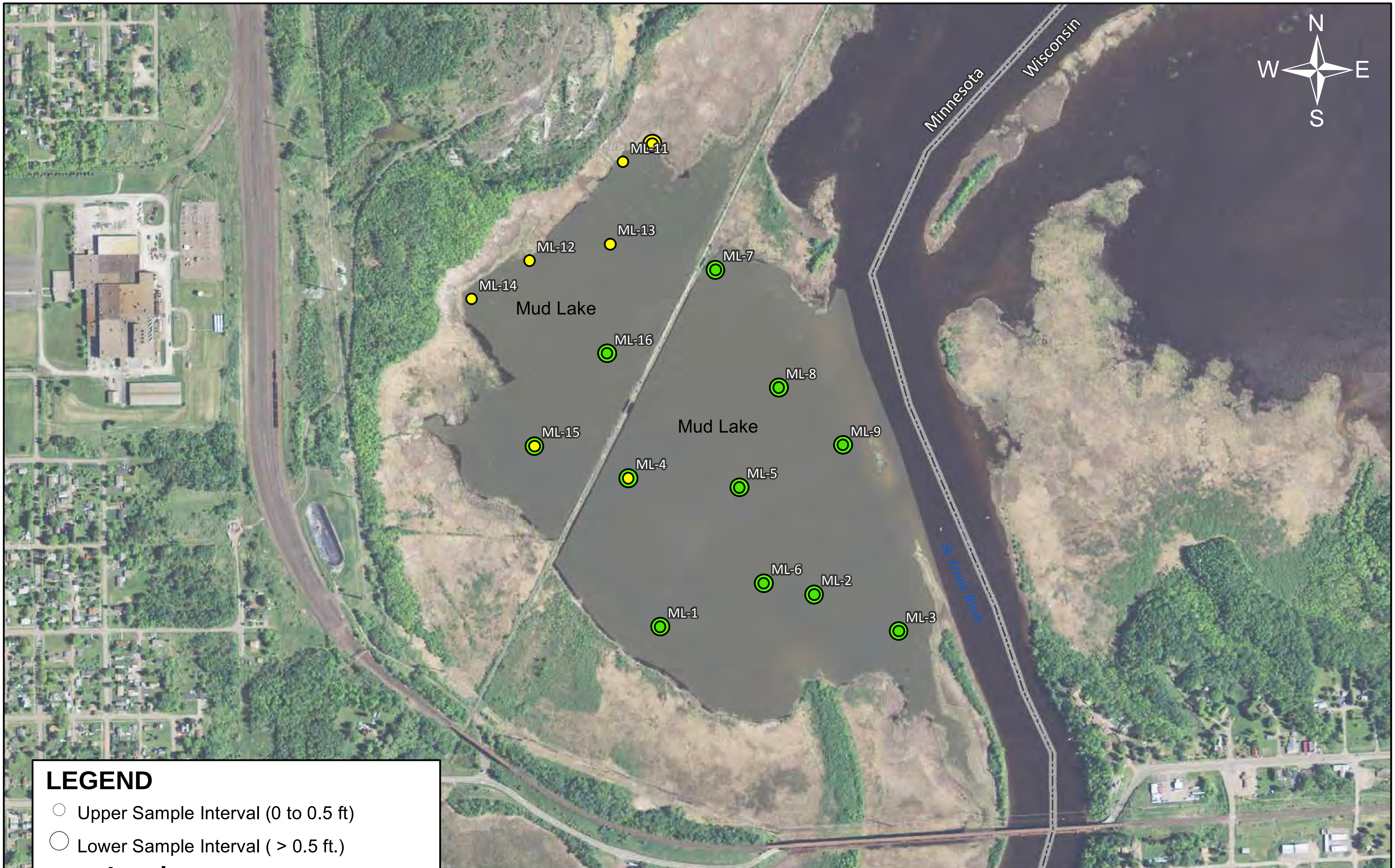
SQT Comparison: Copper
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-d
SCALE: AS SHOWN	



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Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

0 700 1,400 2,800 Feet

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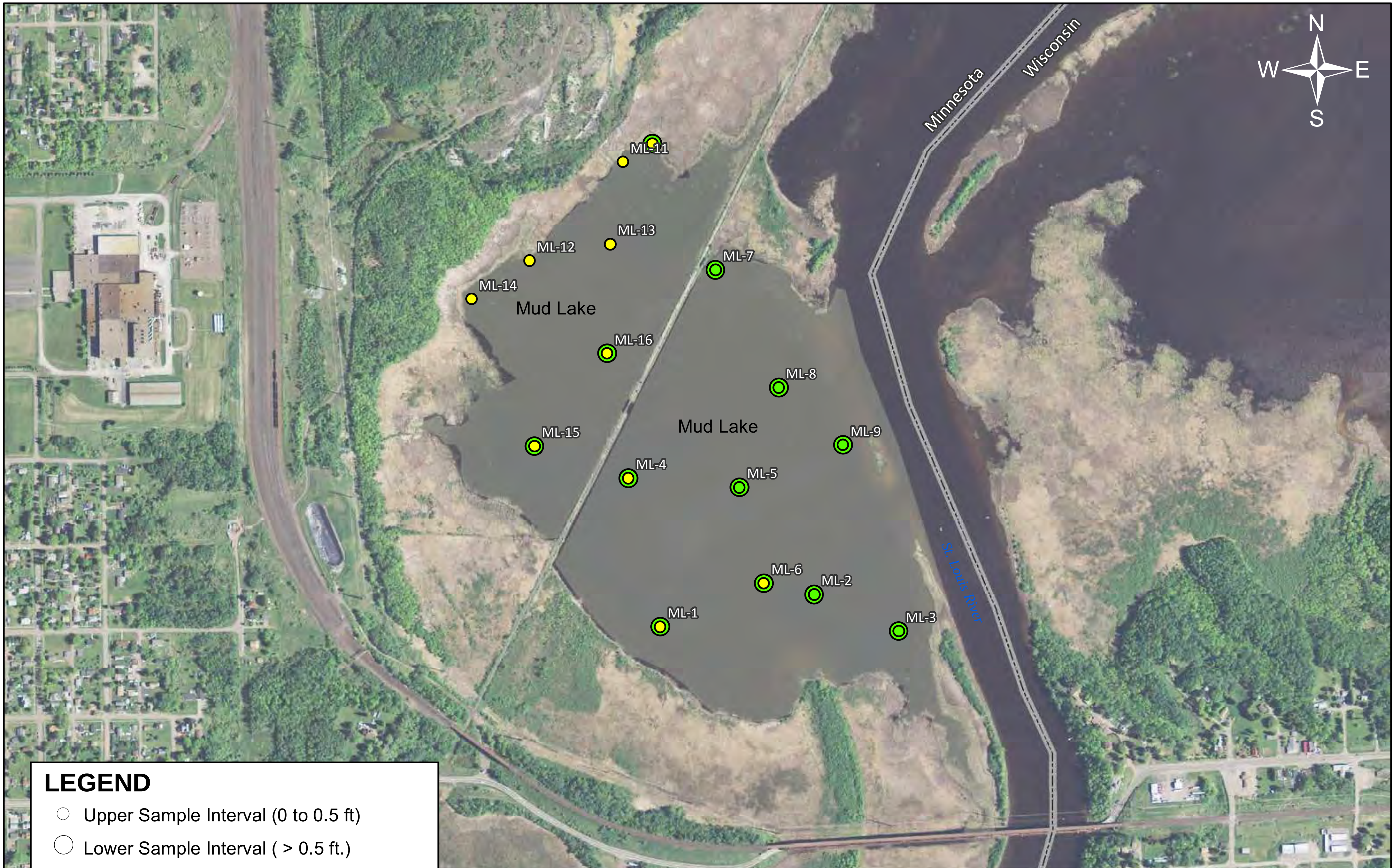
SQT Comparison: Lead
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-e
SCALE: AS SHOWN	



LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 700 1,400 2,800 Feet

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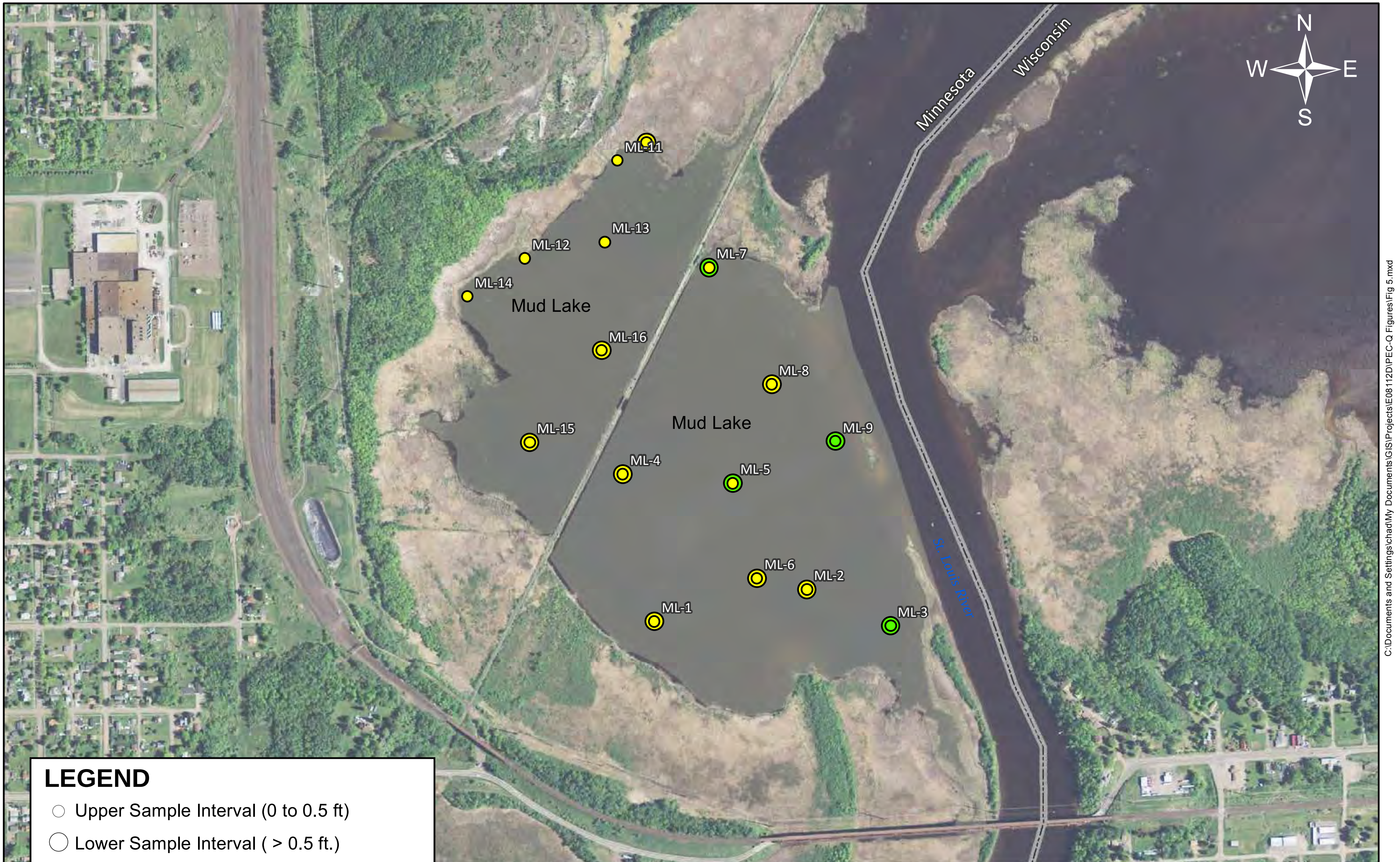
SQT Comparison: Mercury
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-f
SCALE: AS SHOWN	



LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 | 700 | 1,400 | 2,800 Feet

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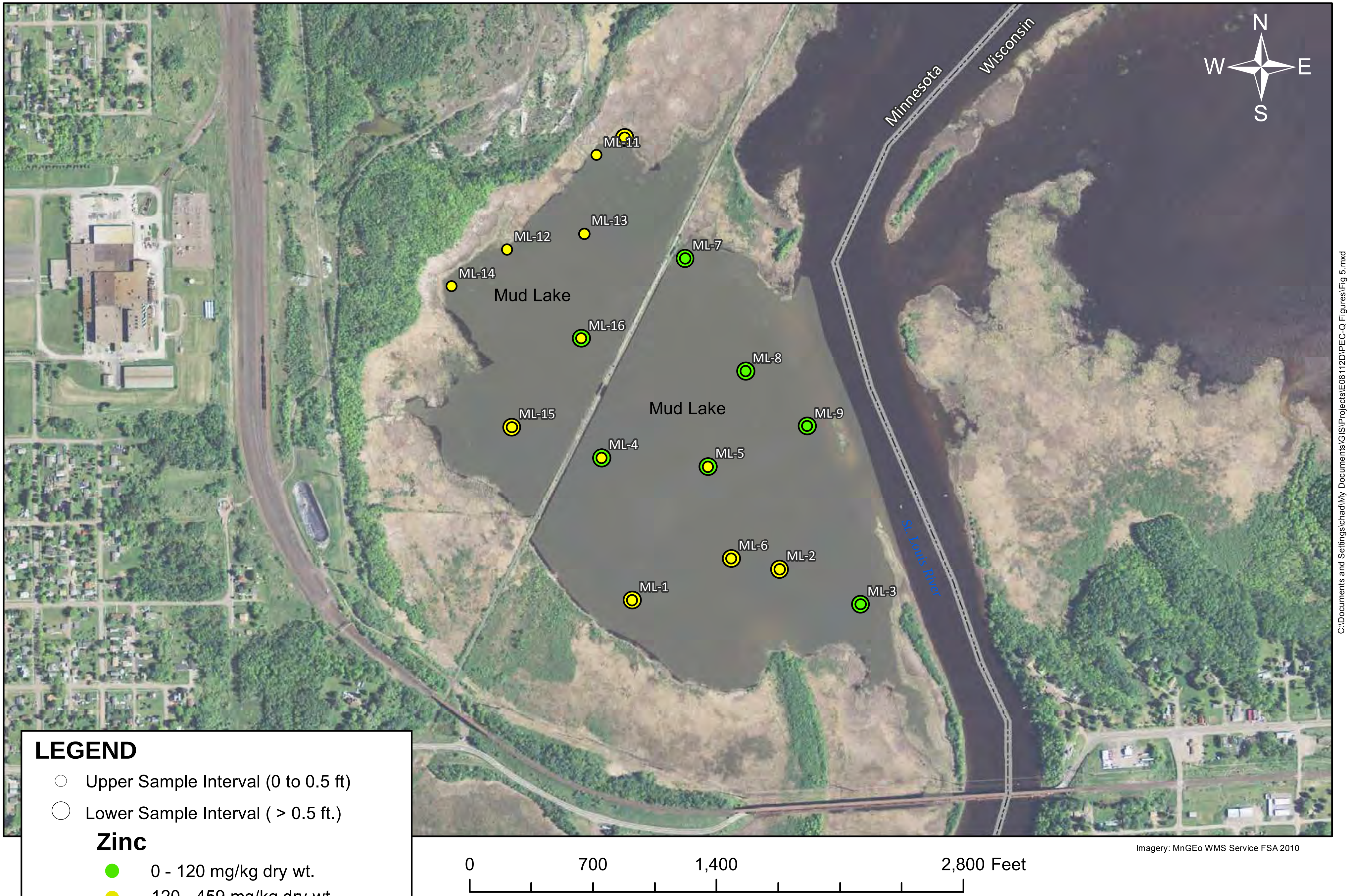
SQT Comparison: Nickel
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-g
SCALE: AS SHOWN	



LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

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SQT Comparison: Zinc
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-h
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 700 1,400 2,800 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

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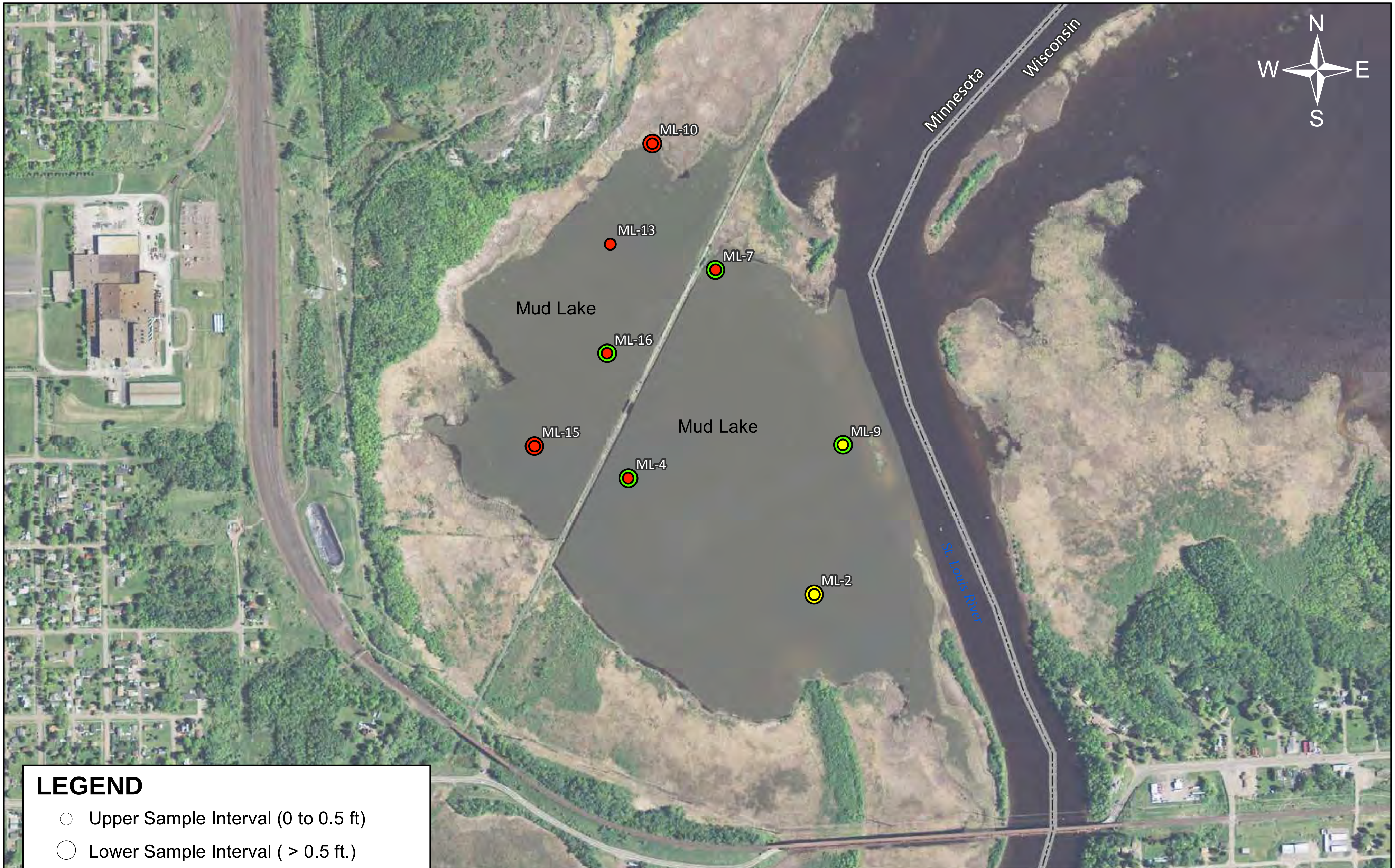
SQT Comparison: Total PAHs
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 34-i
SCALE: AS SHOWN	



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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

0 | 700 | 1,400 | 2,800 Feet

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SQT Comparison: Dioxins
Mud Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.34-j
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

0 625 1,250 2,500 Feet

SOMAT Engineering, Inc. 660 Woodward Ave., Suite 2430, Detroit, Michigan 48226	**SQT Comparison: Arsenic** **Munger Landing** Lower St. Louis River, Duluth, MN Sediment Investigation USACE/MPCA	PROJECT NO: E08112D	DATE: 4/25/2012
		DWN BY: CCR	REV. NO: 1
		CHK'D BY:	FIGURE: 8.35-a
		SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

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SQT Comparison: Cadmium
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-b
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

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SQT Comparison: Chromium
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-c
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

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SQT Comparison: Copper
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-d
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

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SQT Comparison: Lead
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 35-e
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

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SQT Comparison: Mercury
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-f
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

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SQT Comparison: Nickel
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-g
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

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SQT Comparison: Zinc
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 35-h
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

0 625 1,250 2,500 Feet

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SQT Comparison: Total PAHs
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-i
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

0 625 1,250 2,500 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

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SQT Comparison: Dioxins
Munger Landing
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.35-j
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

◯ Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

0 1,125 2,250 4,500 Feet

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SQT Comparison: Arsenic
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 36-a
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 1,125 2,250 4,500 Feet

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

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SQT Comparison: Cadmium
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.36-b
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Chromium

0 - 43 mg/kg dry wt.

43 - 111 mg/kg dry wt.

> 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 | 1,125 | 2,250 | 4,500 Feet

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SQT Comparison: Chromium
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 36-c
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

0 1,125 2,250 4,500 Feet

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SQT Comparison: Copper
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 36-d
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 1,125 2,250 4,500 Feet

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Lead

0 - 36 mg/kg dry wt.

36 - 128 mg/kg dry wt.

> 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

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SQT Comparison: Lead
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.36-e
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 | 1,125 | 2,250 | 4,500 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

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SQT Comparison: Mercury
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.36-f
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,125 2,250 4,500 Feet

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SQT Comparison: Nickel
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.36-g
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

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SQT Comparison: Zinc
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 36-h
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

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SQT Comparison: Total PAHs
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.36-i
SCALE: AS SHOWN	

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LEGEND

- ○ Upper Sample Interval (0 to 0.5 ft)
- ◯ Lower Sample Interval (> 0.5 ft.)

Dioxins

- ● (green) 0 - 0.85 ng TEQ/kg dry wt.
- ● (yellow) 0.85 - 21.5 ng TEQ/kg dry wt
- ● (red) > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

Imagery: MnGEo WMS Service FSA 2010

0 1,125 2,250 4,500 Feet

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SQT Comparison: Dioxins
New Duluth Stretch
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.36-j
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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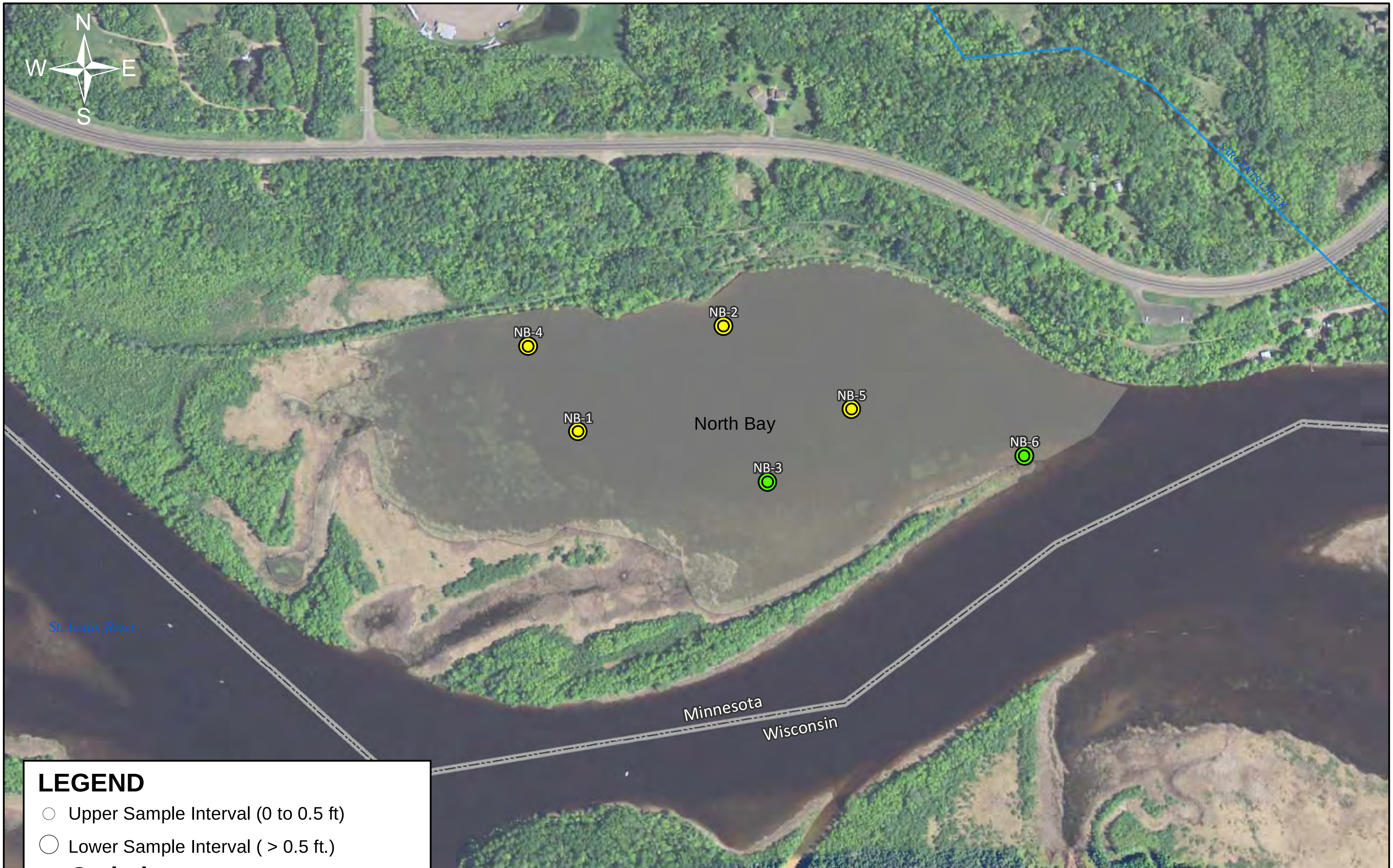
SQT Comparison: Arsenic
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 37-a
SCALE: AS SHOWN	



LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Cadmium
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.37-b
SCALE: AS SHOWN	

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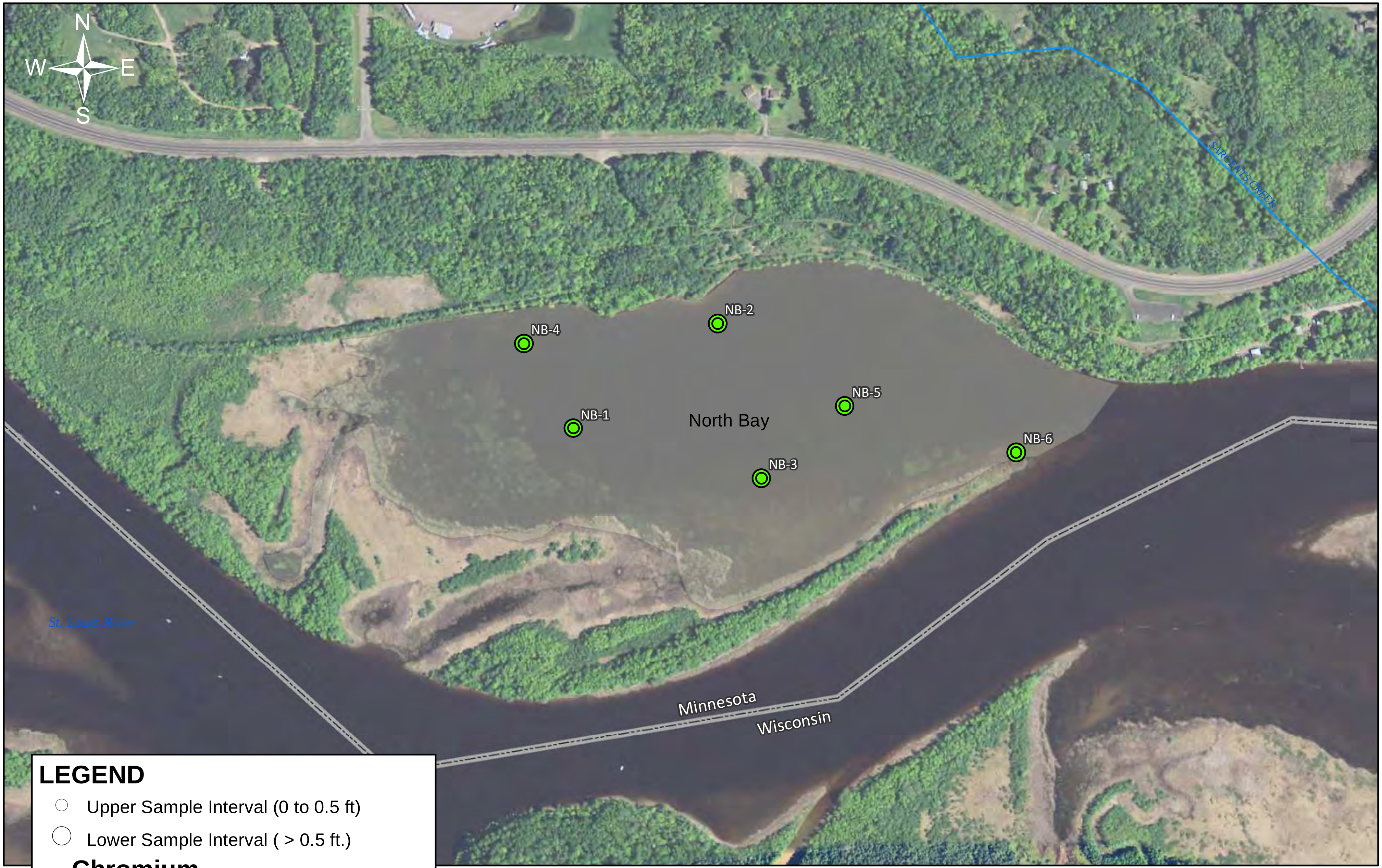

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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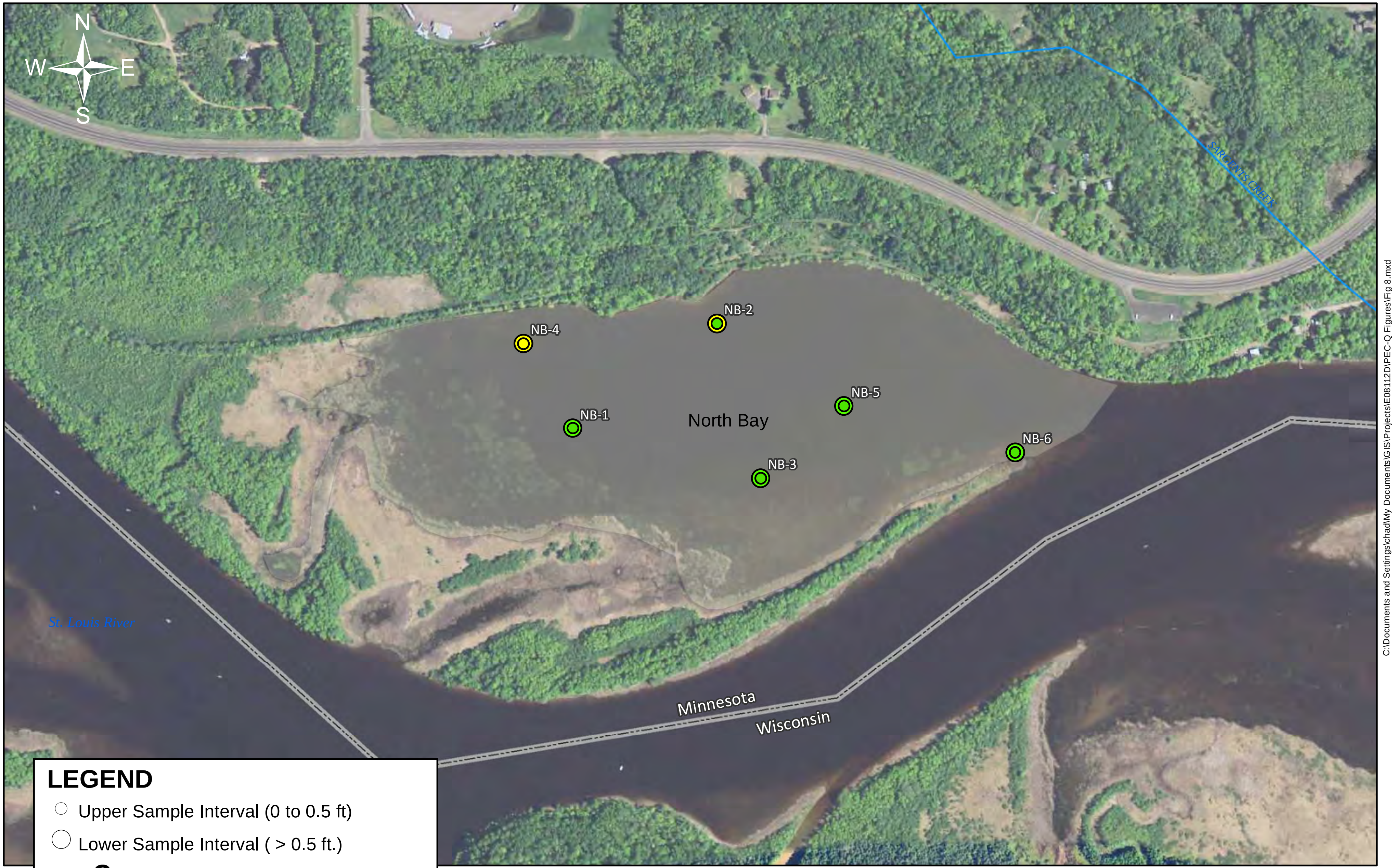
Detroit, Michigan 48226

SQT Comparison: Chromium
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.37-c
SCALE: AS SHOWN	



LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

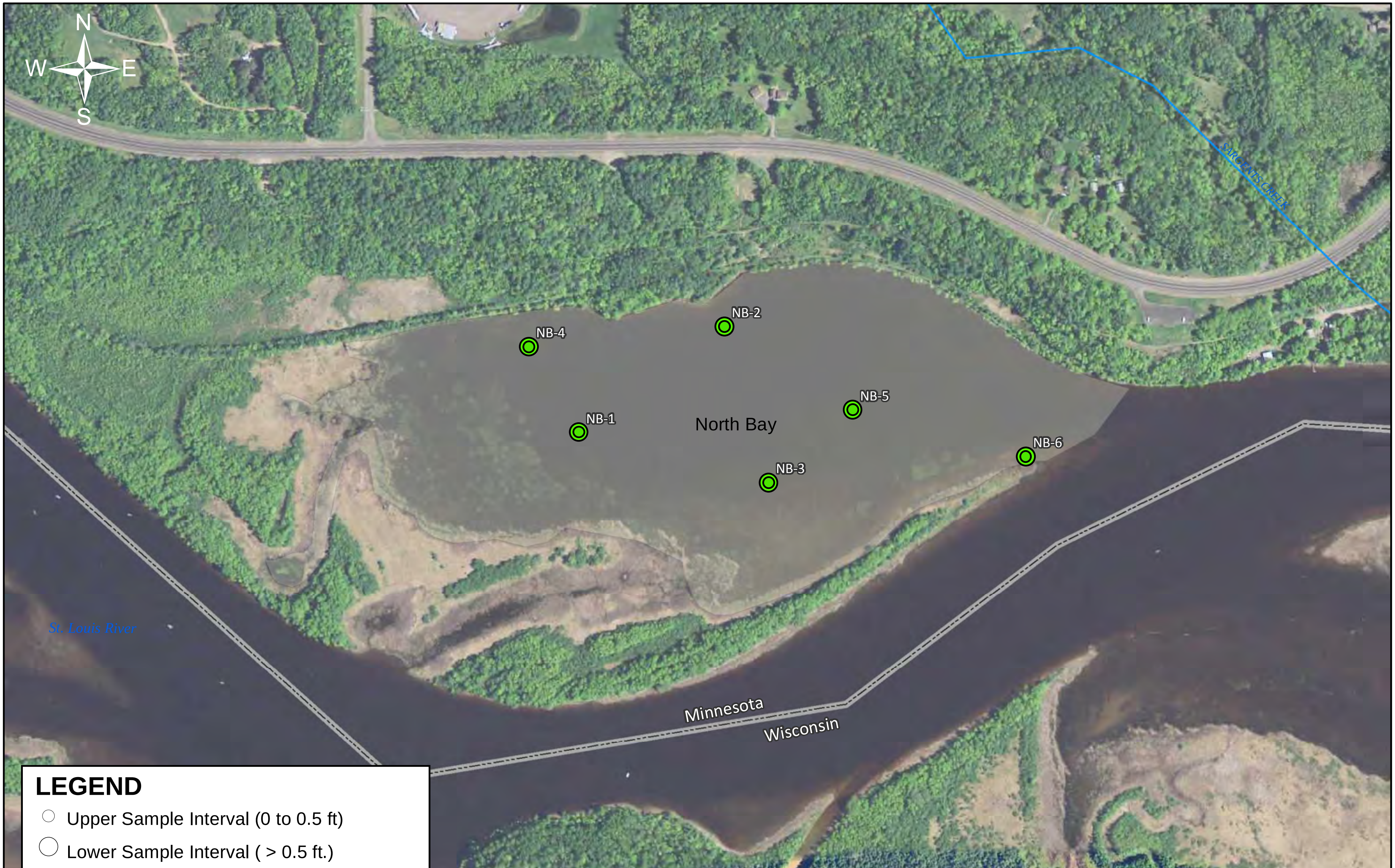
Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

SQT Comparison: Copper
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 37-d
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

SOMAT Engineering, Inc.
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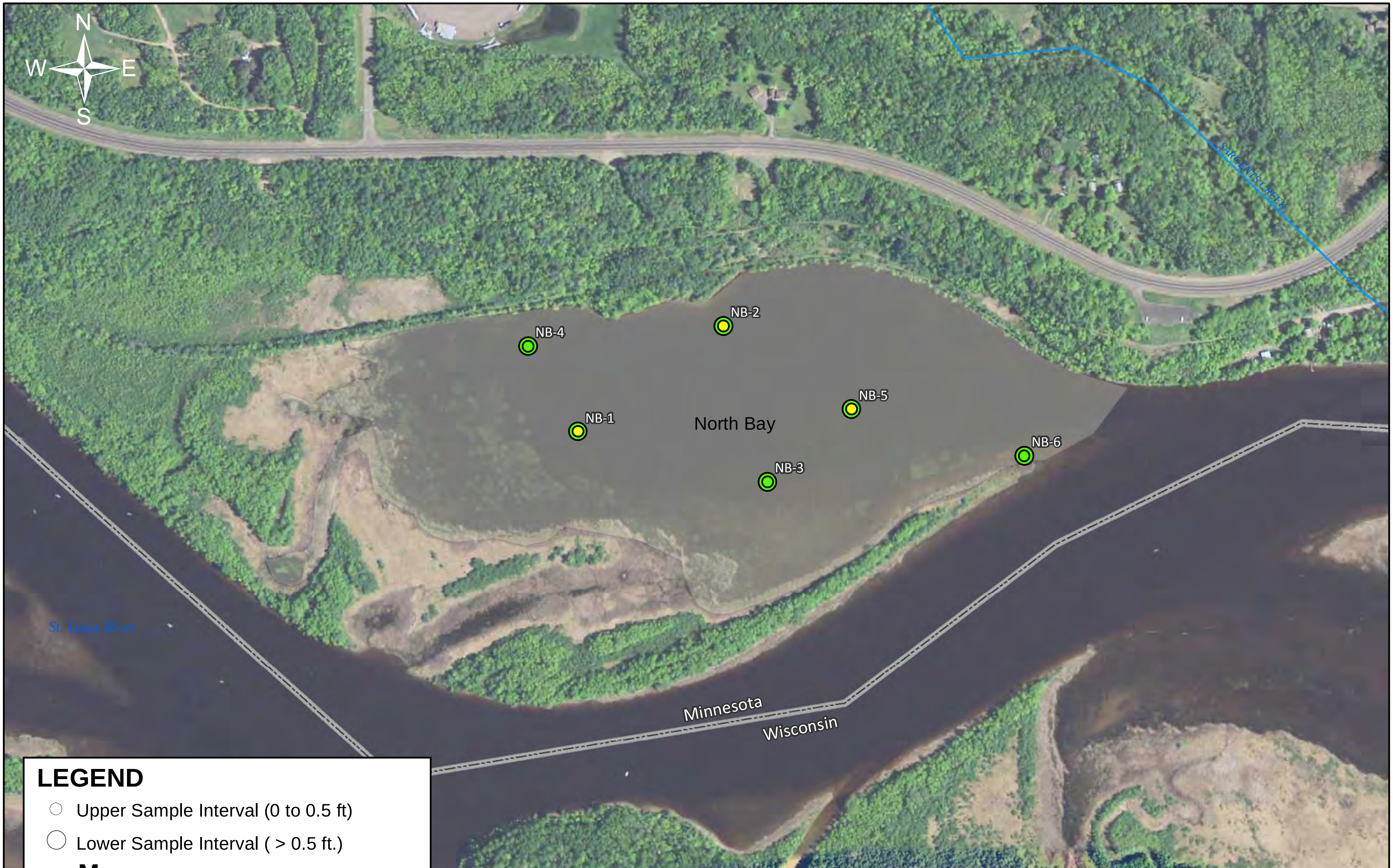
Detroit, Michigan 48226

SQT Comparison: Lead
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.37-e
SCALE: AS SHOWN	



LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

SOMAT Engineering, Inc.
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SQT Comparison: Mercury
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 37-f
SCALE: AS SHOWN	

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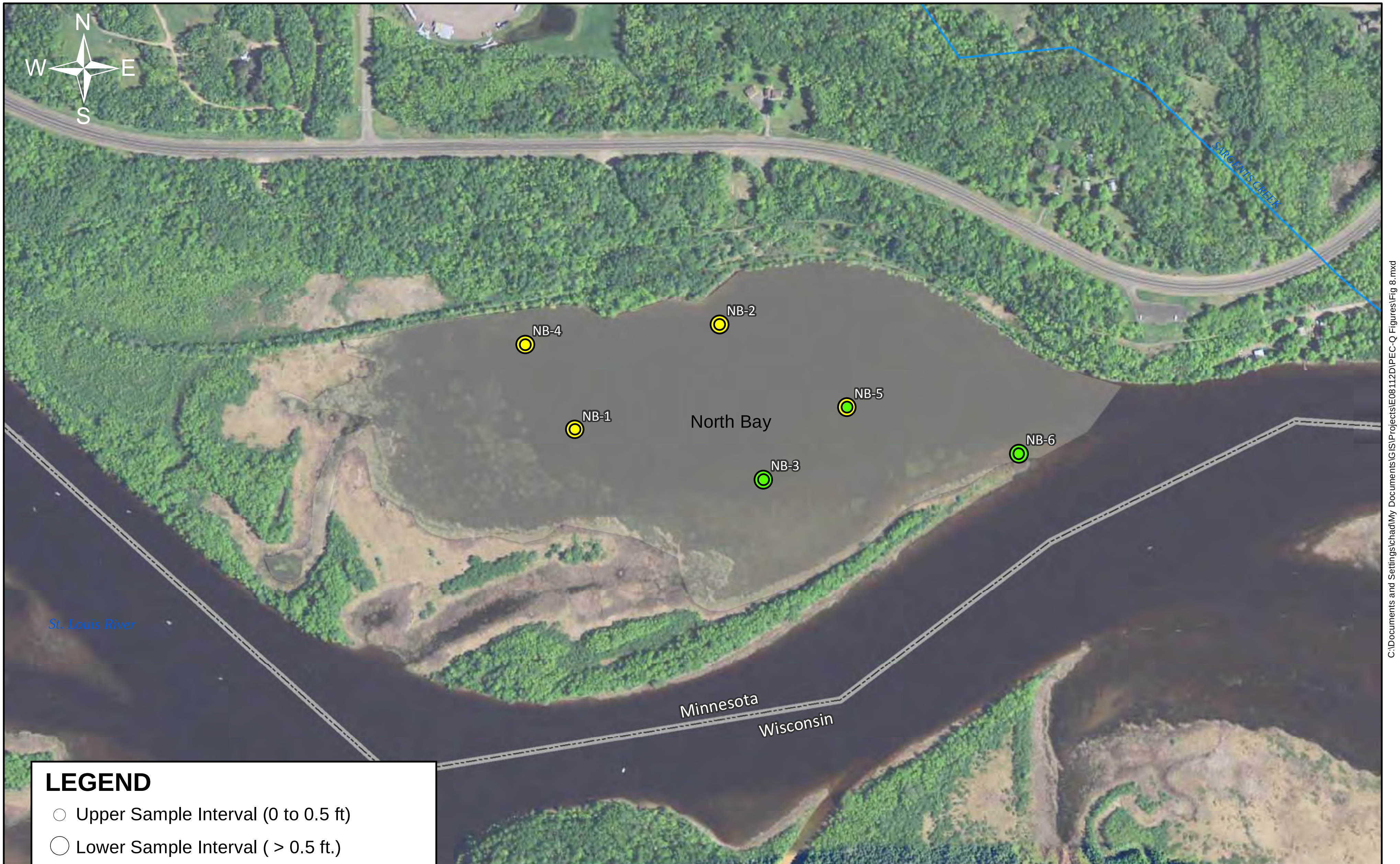

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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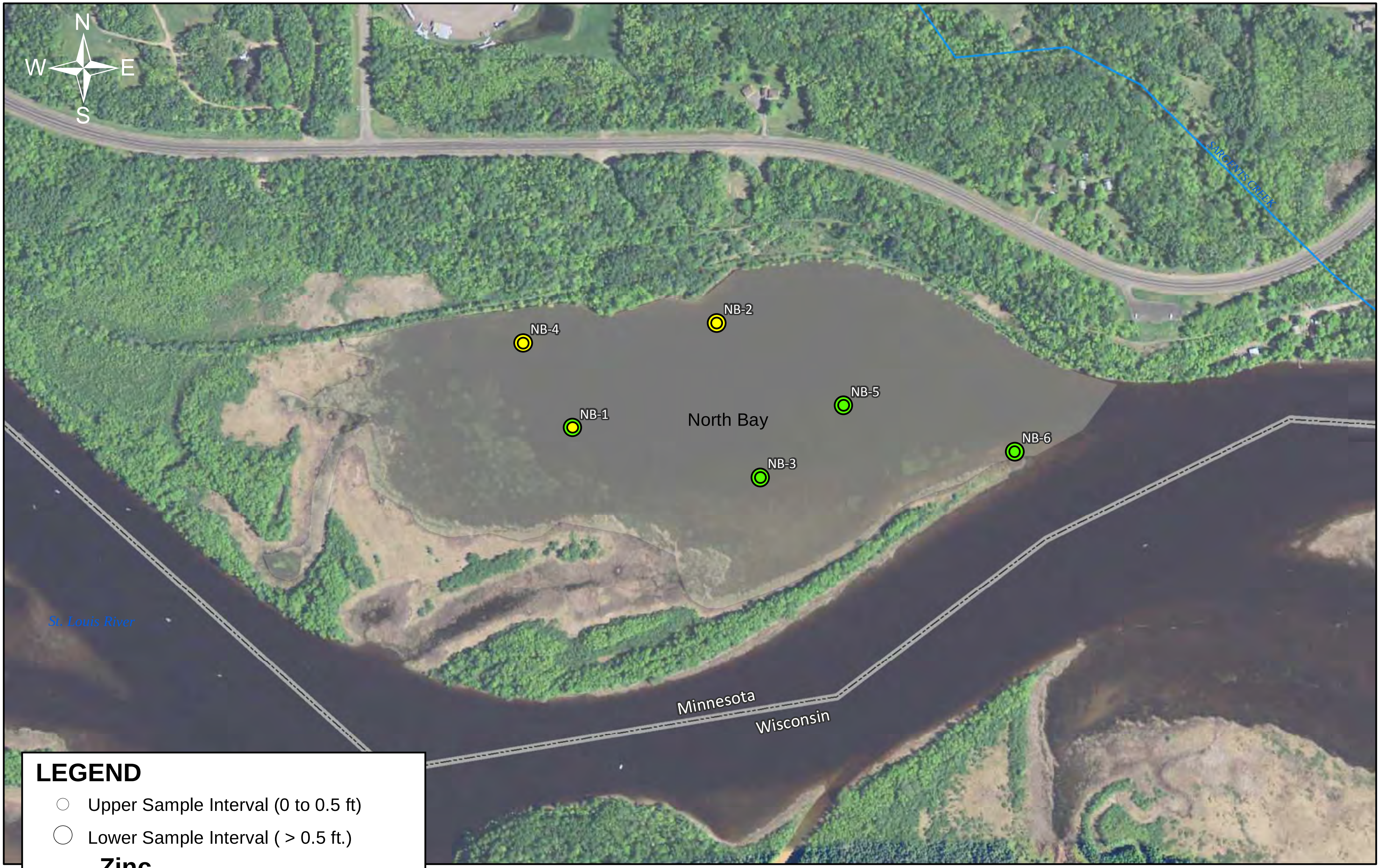
SQT Comparison: Nickel
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.37-g
SCALE: AS SHOWN	



LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

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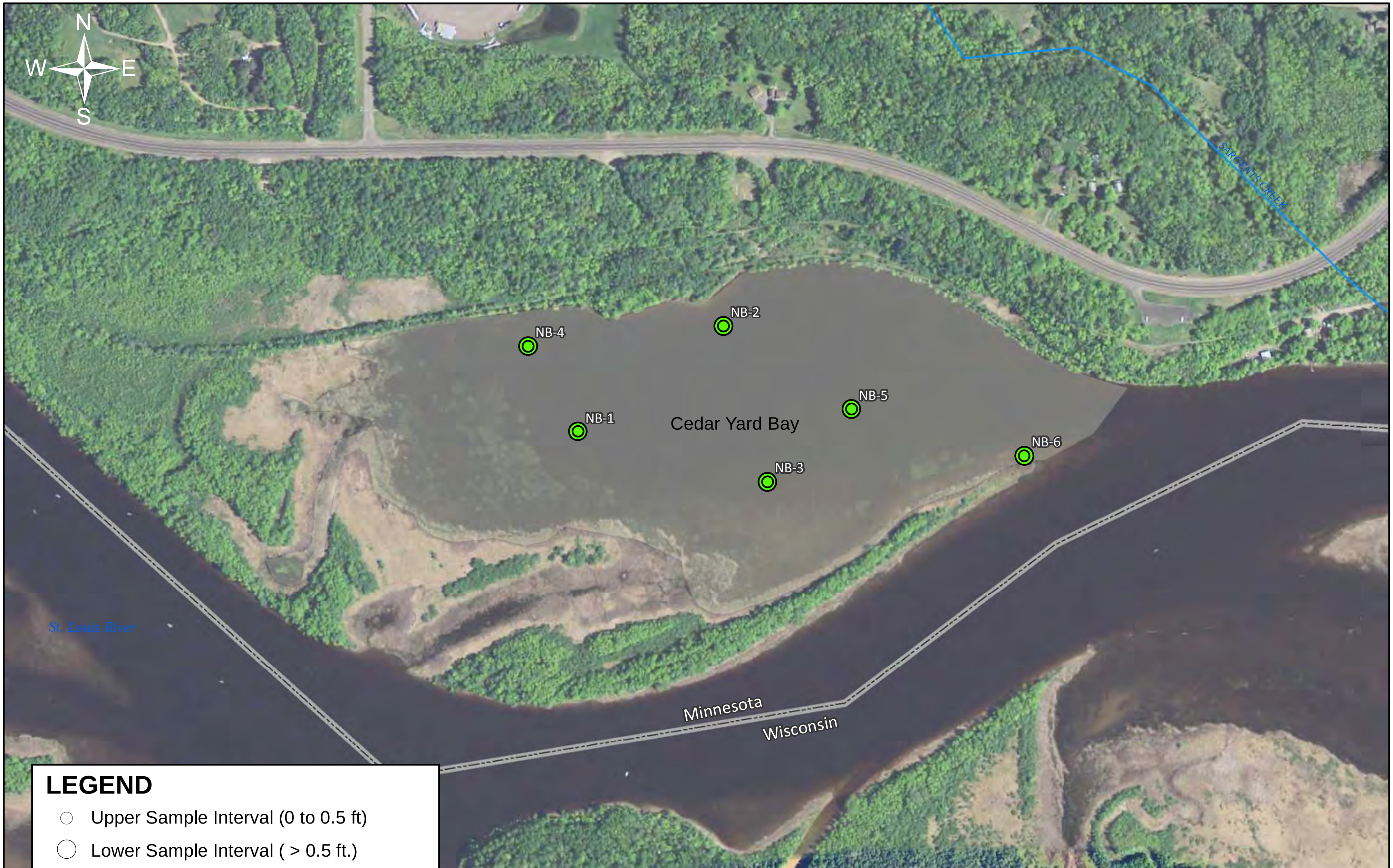
SQT Comparison: Zinc
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 37-h
SCALE: AS SHOWN	



LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Total PAHs
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 37-i
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

◯ Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

SOMAT Engineering, Inc.
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Detroit, Michigan 48226

SQT Comparison: Total PAHs
North Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.37-j
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

SOMAT Engineering, Inc.
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Detroit, Michigan 48226

SQT Comparison: Arsenic
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 38-a
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

SOMAT Engineering, Inc.
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SQT Comparison: Arsenic
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.38-a
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Chromium
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.38-c
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

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SQT Comparison: Copper
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.38-d
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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Detroit, Michigan 48226

SQT Comparison: Lead
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.38-e
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Mercury
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 38-f
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Nickel
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.38-g
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Zinc
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.38-h
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Total PAHs
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 38-i
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

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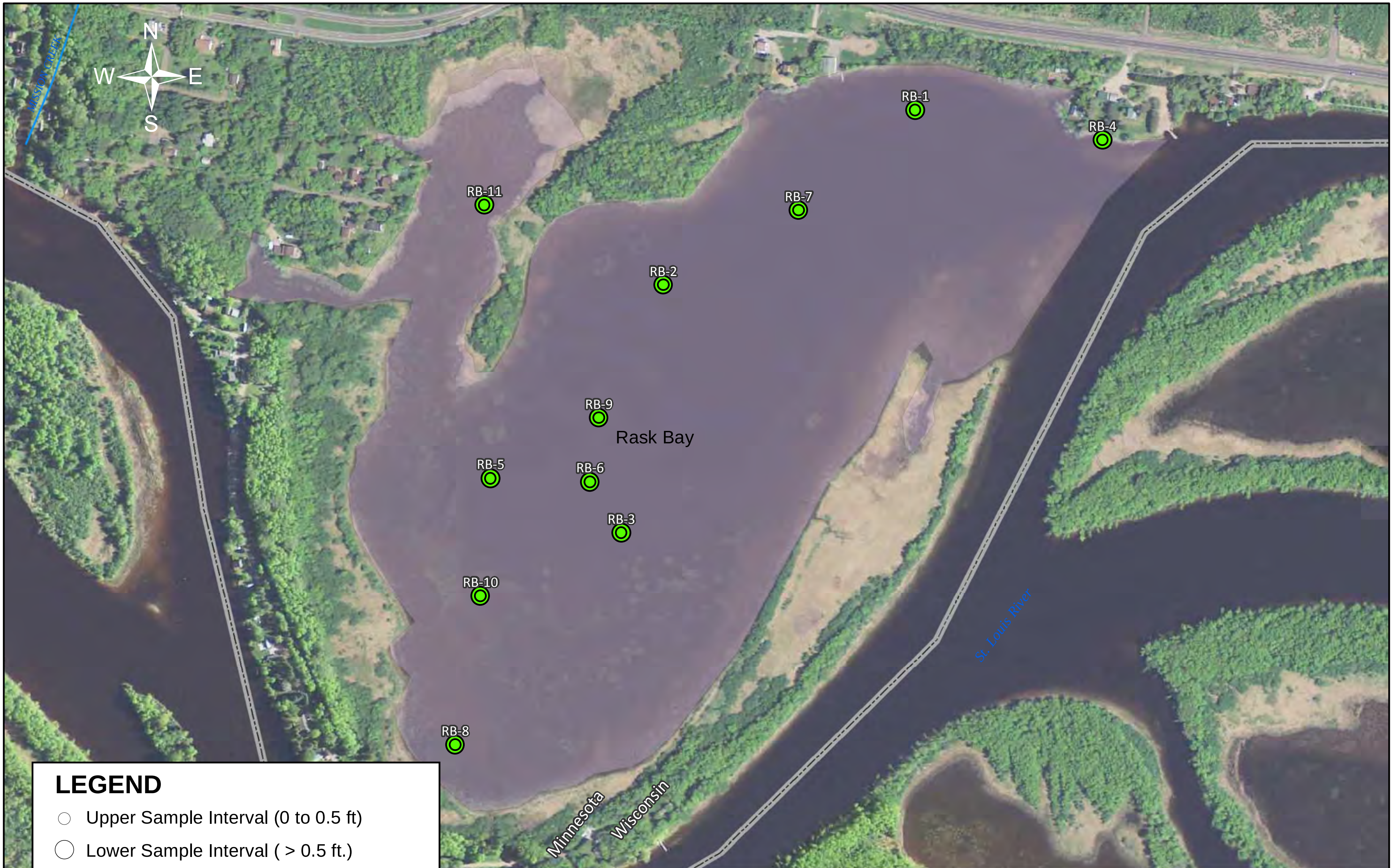
SQT Comparison: Total PAHs
Perch Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 38-j
SCALE: AS SHOWN	



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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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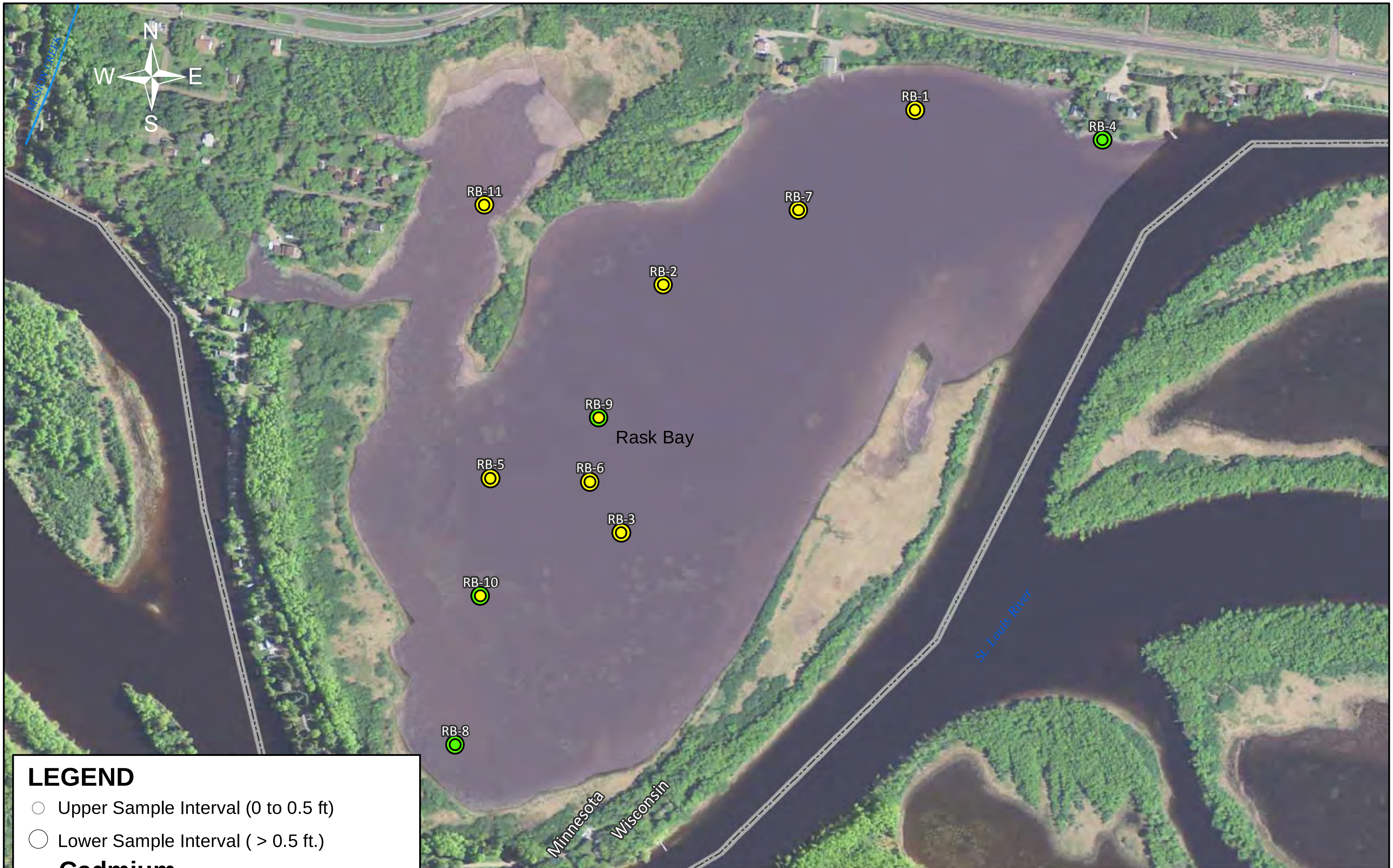
SQT Comparison: Arsenic
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 39-a
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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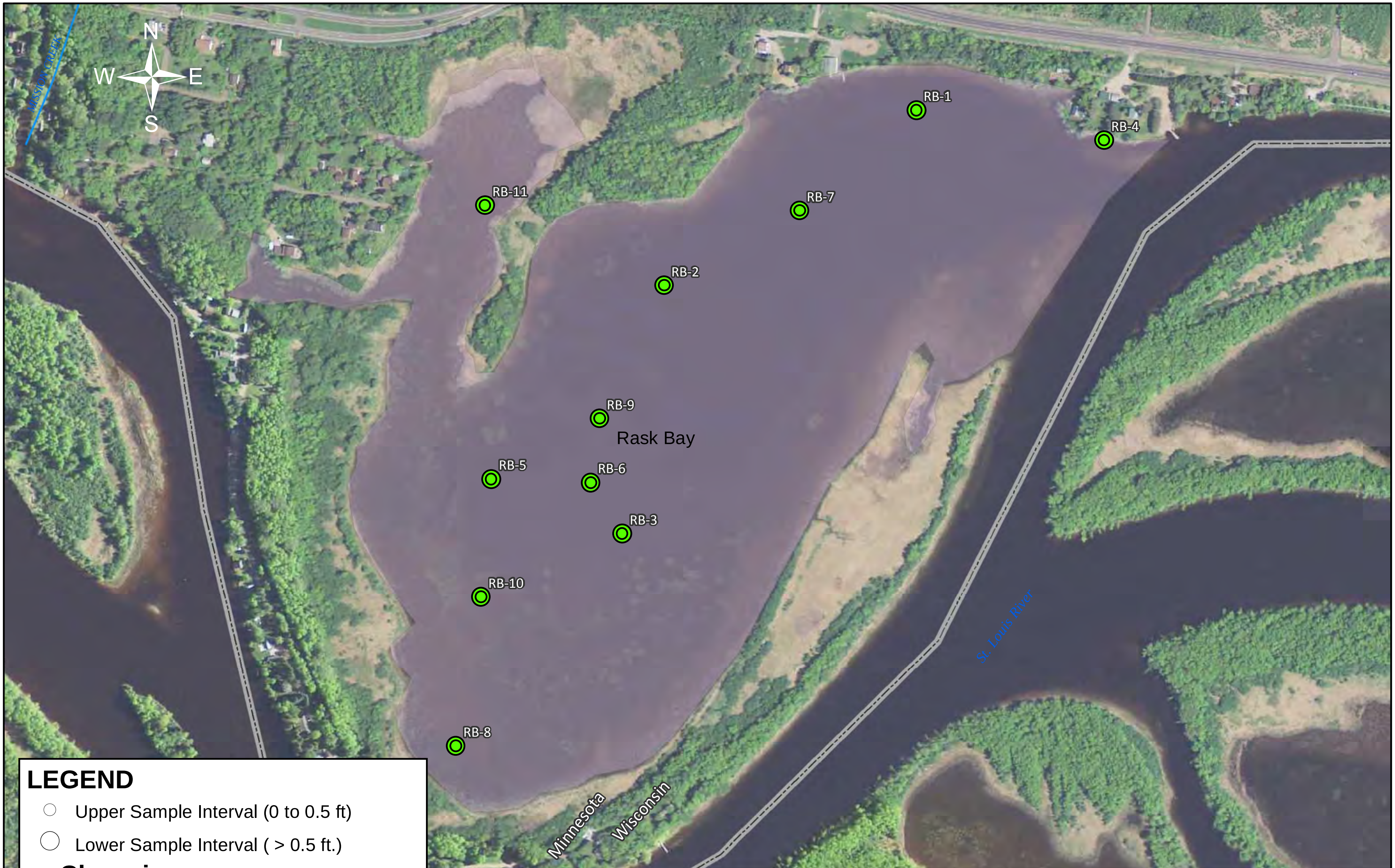
SQT Comparison: Cadmium
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 39-b
SCALE: AS SHOWN	



LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Chromium
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 39-c
SCALE: AS SHOWN	

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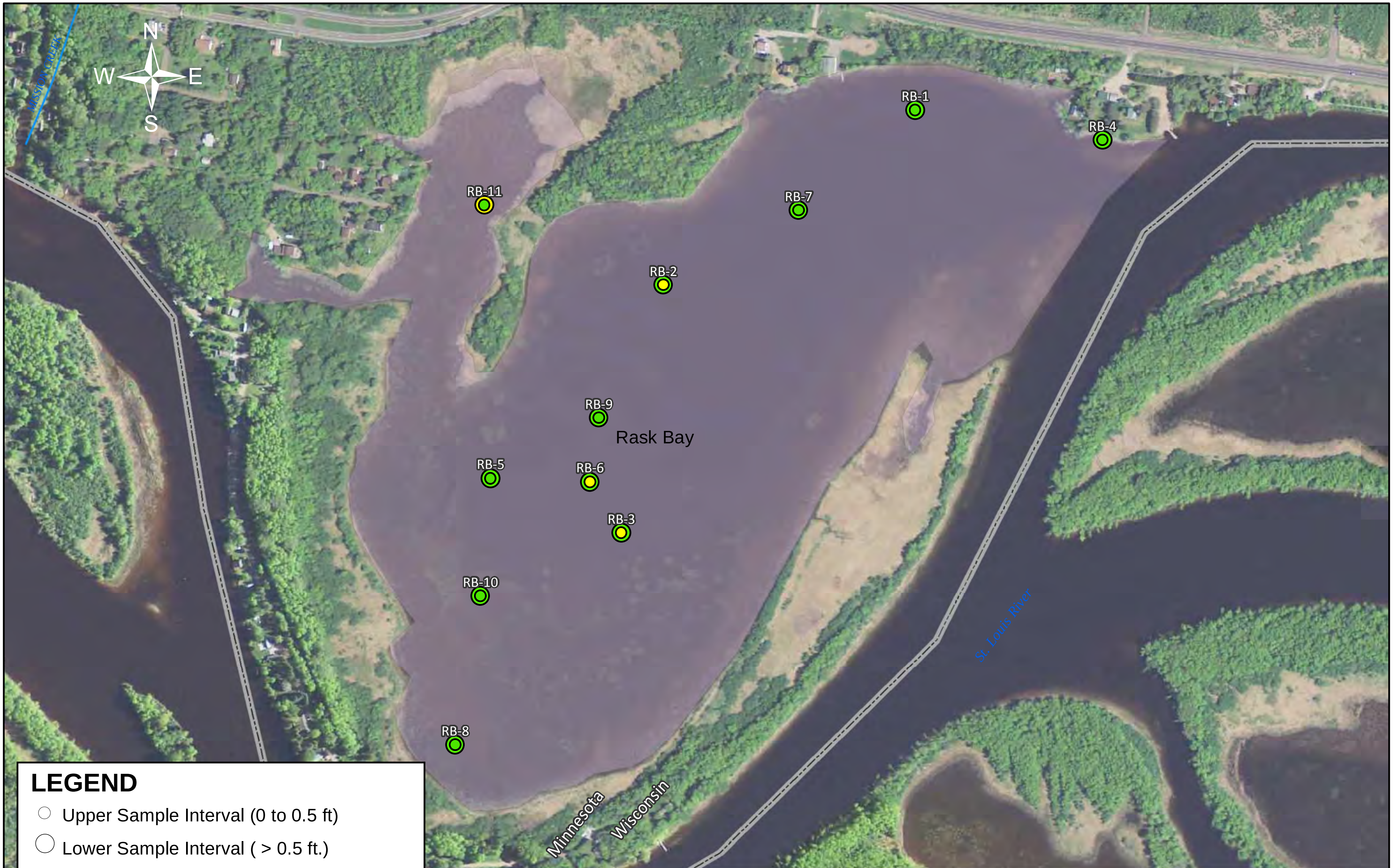

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

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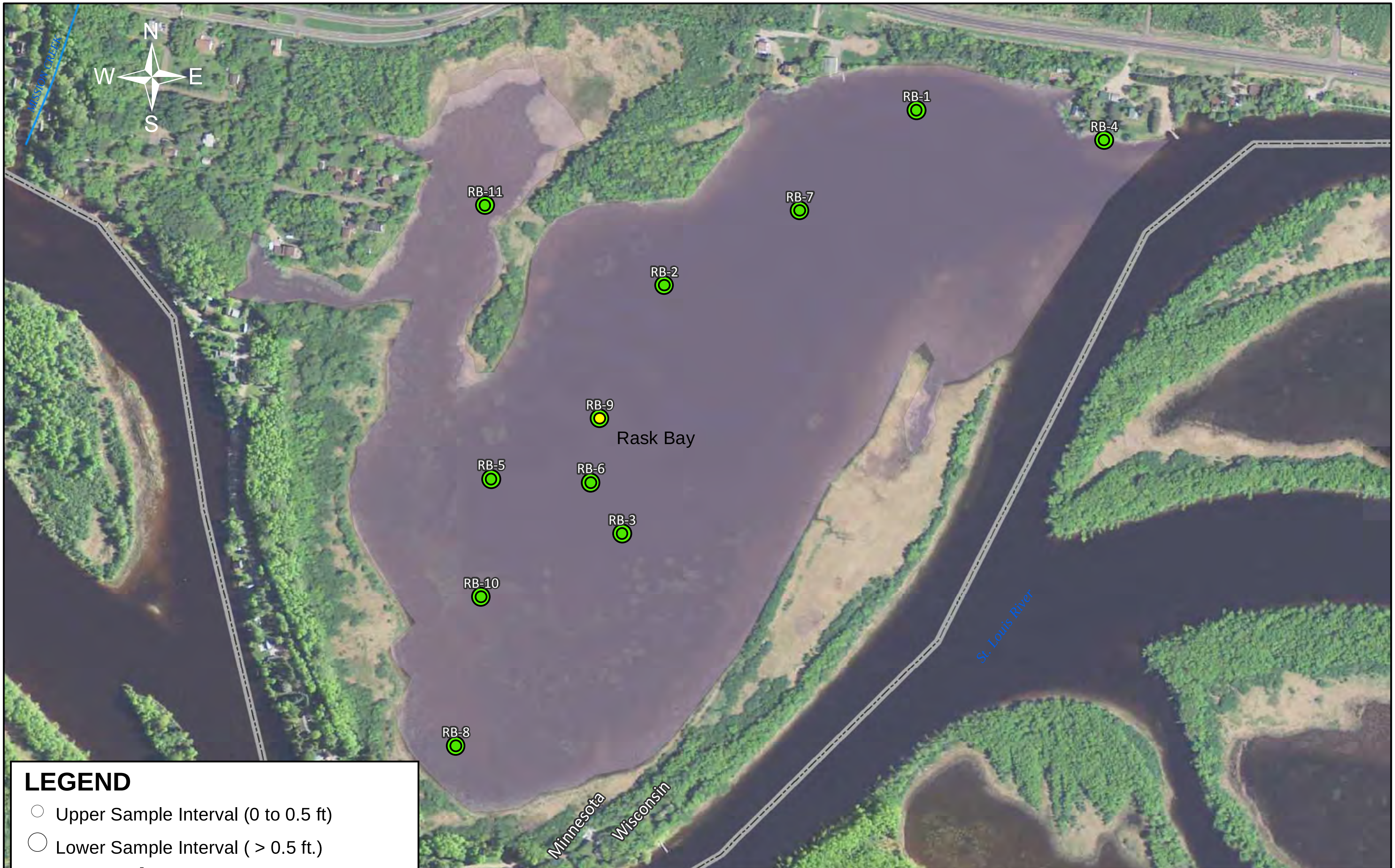
SQT Comparison: Copper
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.39-d
SCALE: AS SHOWN	



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Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

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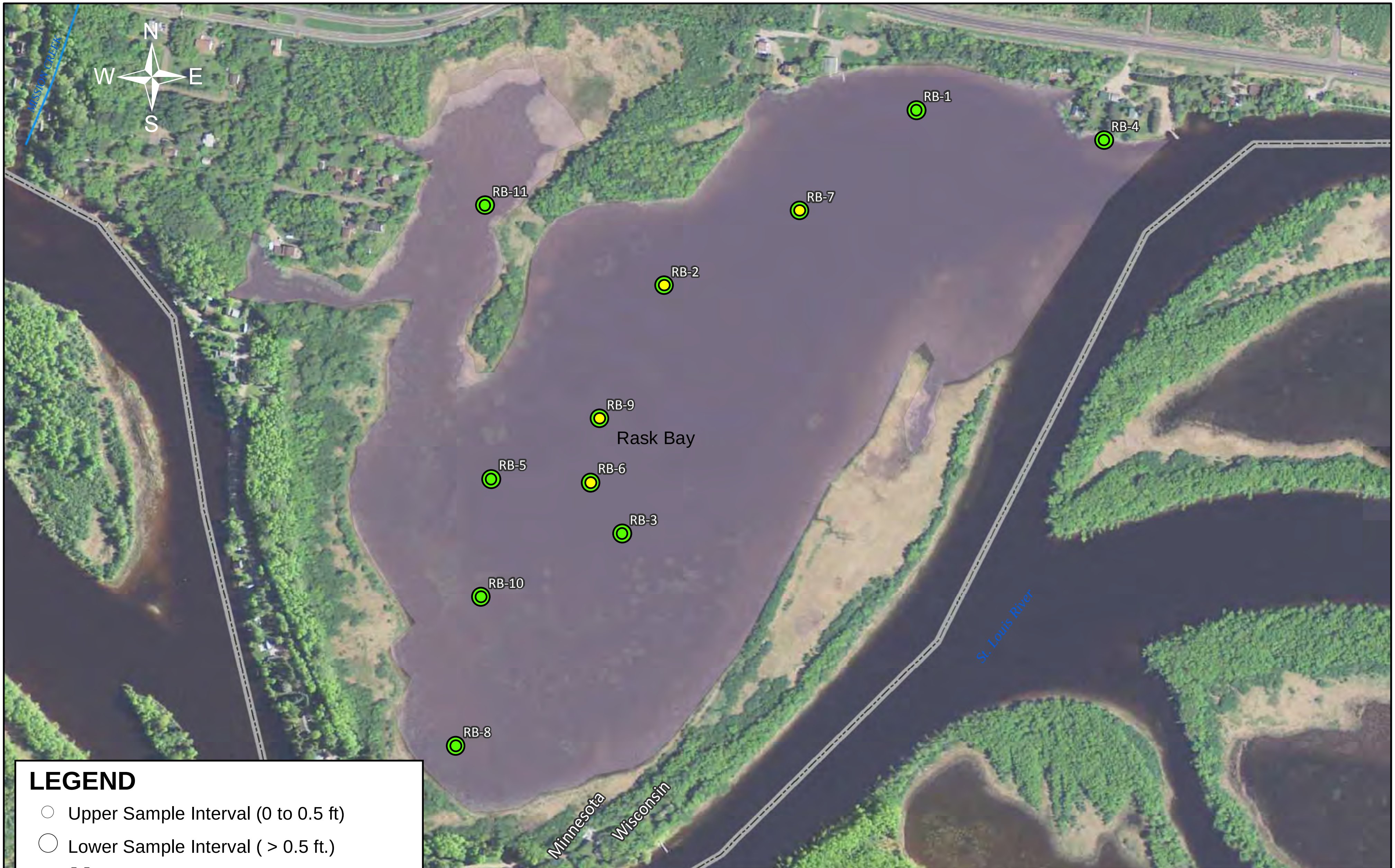
SQT Comparison: Lead
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.39-e
SCALE: AS SHOWN	



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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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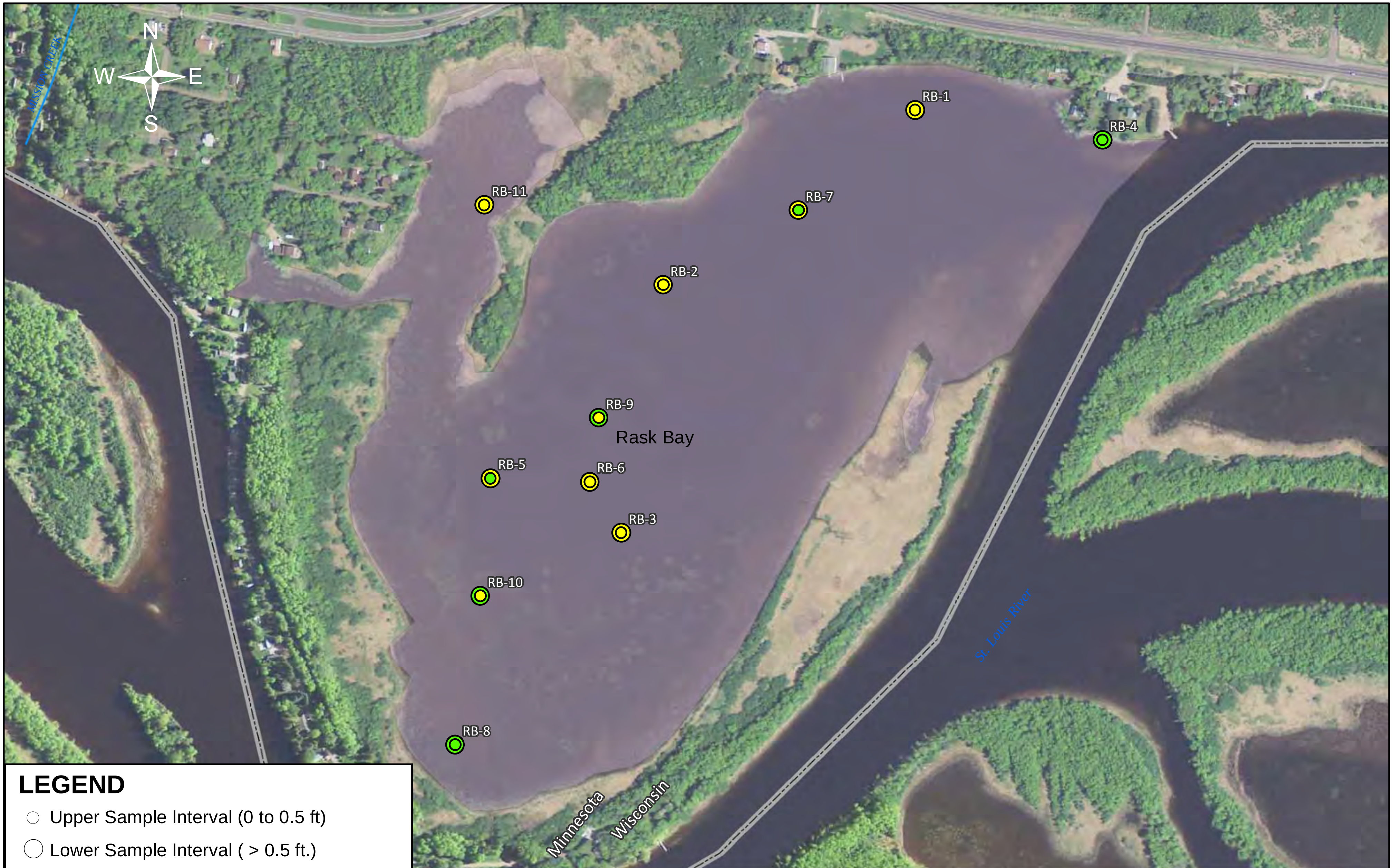
SQT Comparison: Mercury
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 39-f
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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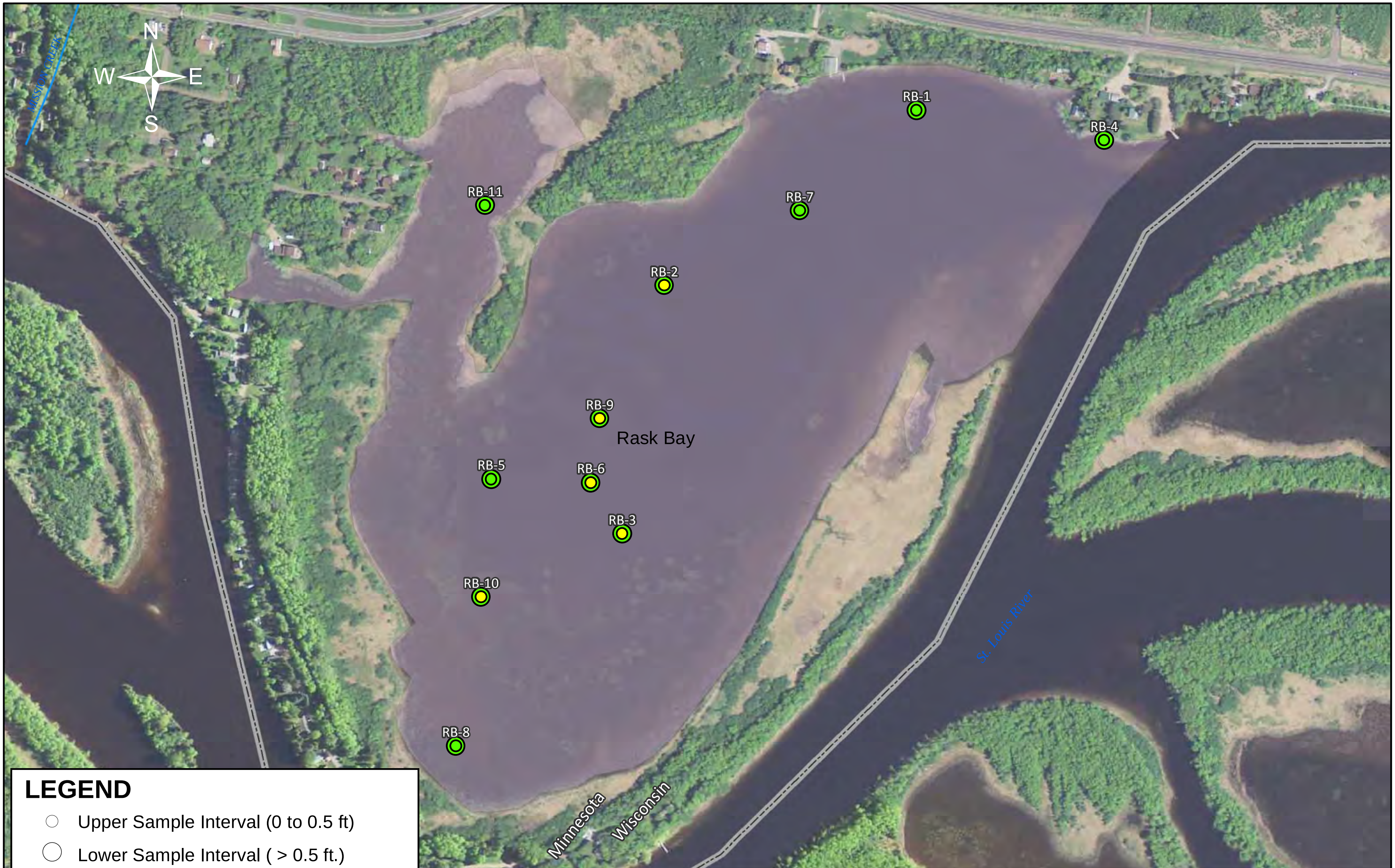
Detroit, Michigan 48226

SQT Comparison: Nickel
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.39-g
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

SOMAT Engineering, Inc.
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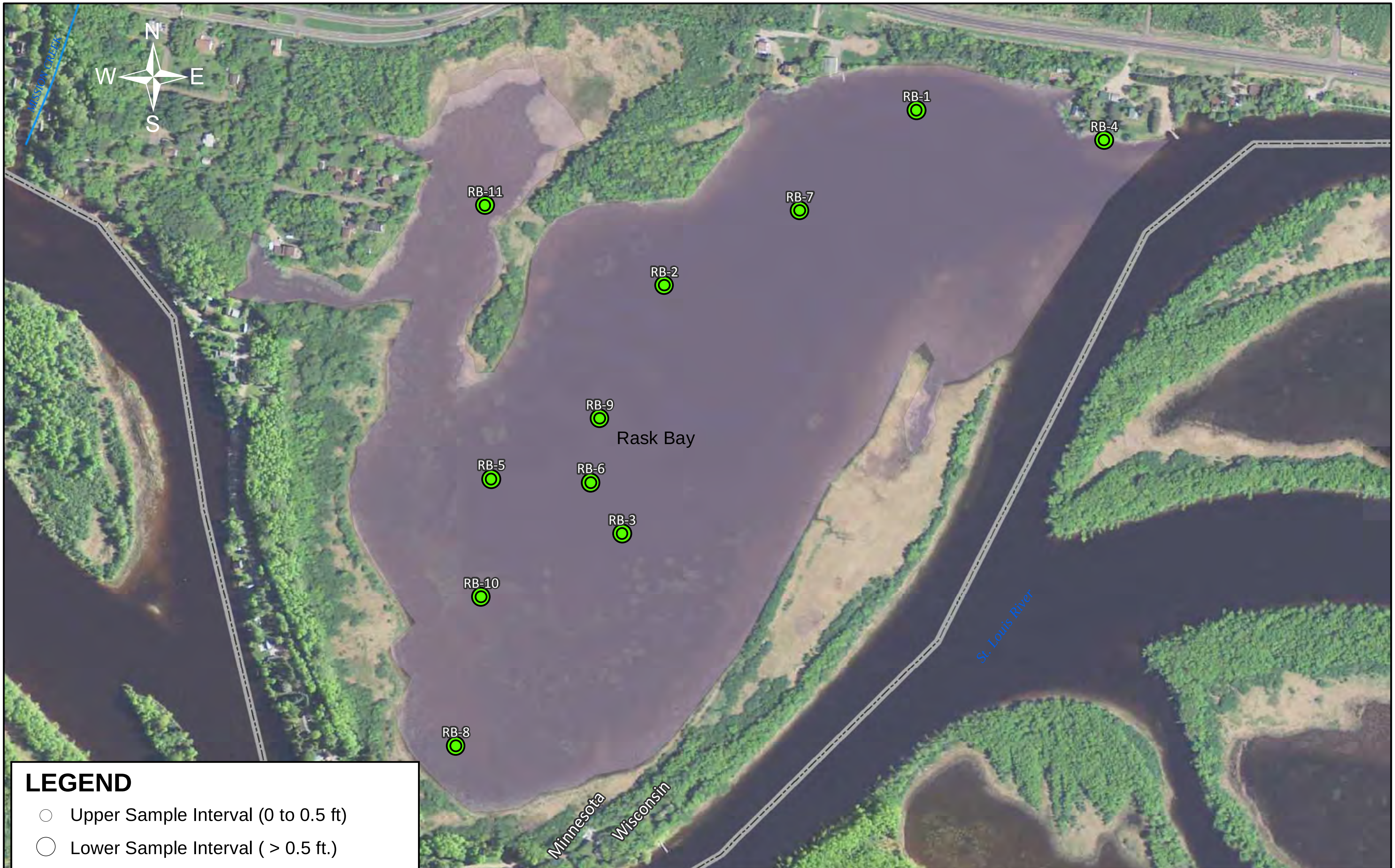
SQT Comparison: Zinc
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.39-h
SCALE: AS SHOWN	



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Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

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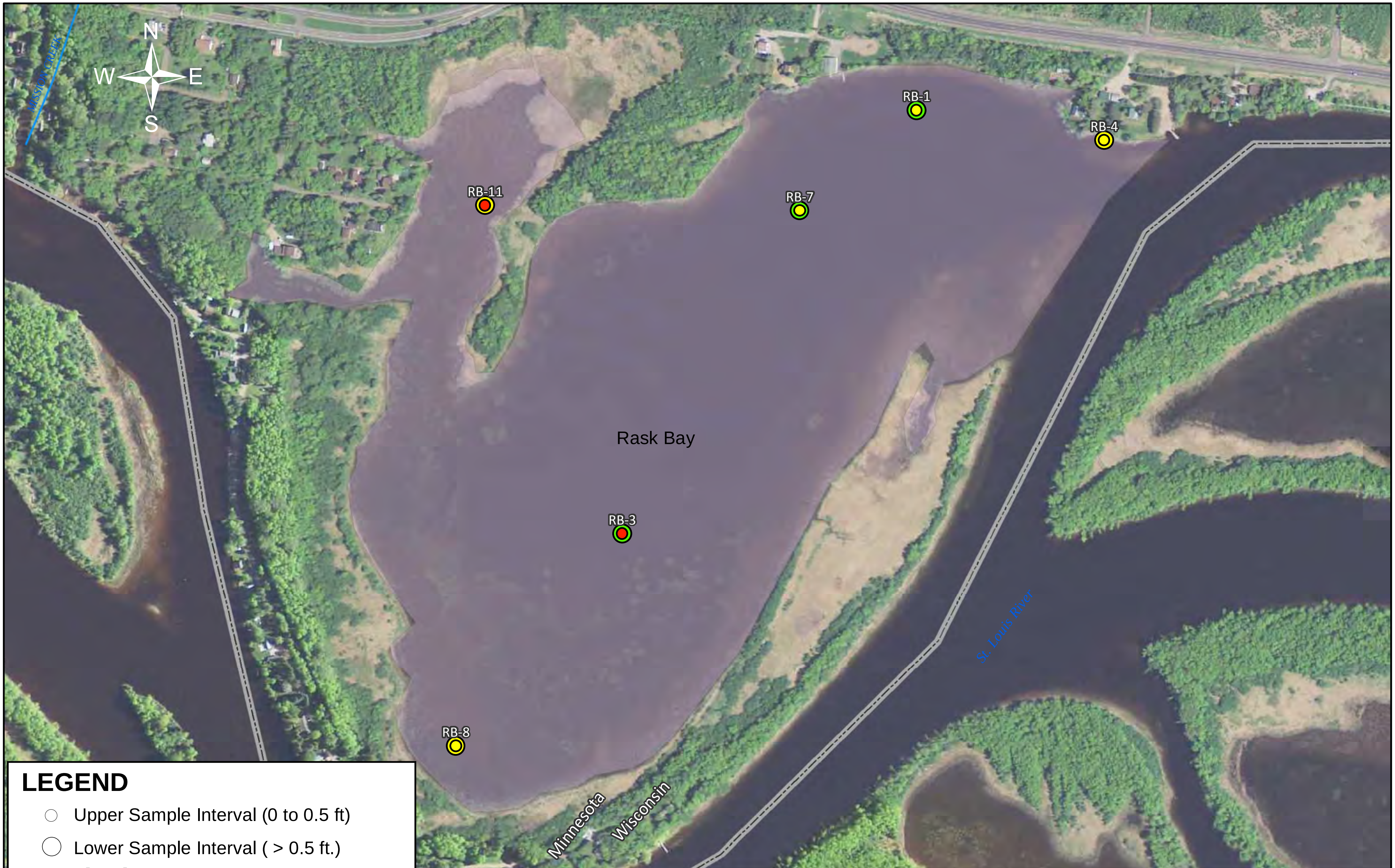
Detroit, Michigan 48226

SQT Comparison: Total PAHs
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 39-i
SCALE: AS SHOWN	



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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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Detroit, Michigan 48226

SQT Comparison: Dioxins
Rask Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 39-j
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Arsenic
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 40-a
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Cadmium
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.40-b
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Chromium
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 40-c
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

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SQT Comparison: Copper
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.40-d
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Lead
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 40-e
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

◯ Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Mercury
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 40-f
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

0 250 500 1,000 Feet

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SQT Comparison: Nickel
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.40-g
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Zinc

0 - 120 mg/kg dry wt.

120 - 459 mg/kg dry wt.

> 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Zinc
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.40-h
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 250 500 1,000 Feet

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SQT Comparison: Total PAHs
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 40-i
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

0 250 500 1,000 Feet

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SQT Comparison: Dioxins
Riverside Marina
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 40-i
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

0 1,250 2,500 5,000 Feet

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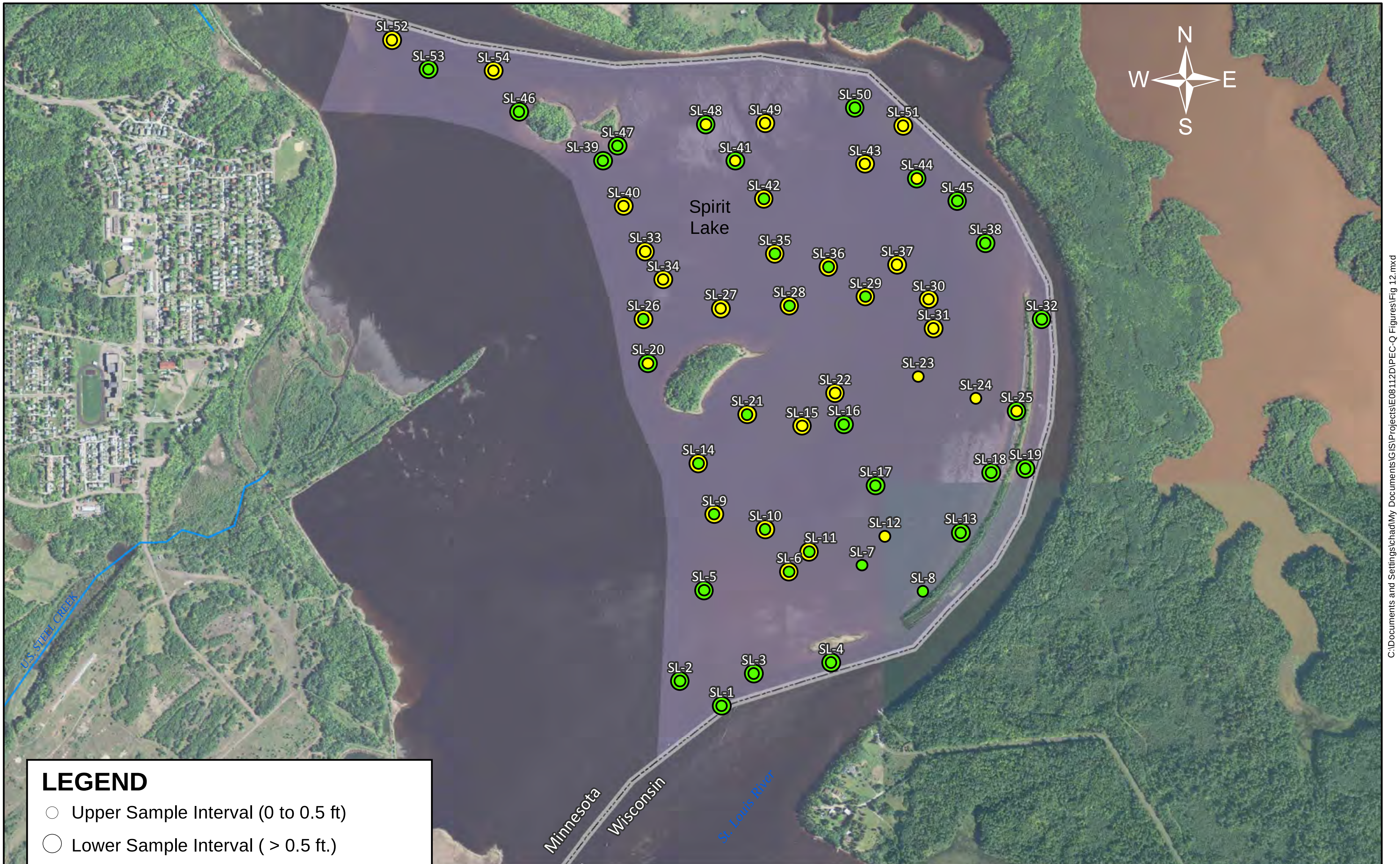
SQT Comparison: Arsenic
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-a
SCALE: AS SHOWN	



Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

0 1,250 2,500 5,000 Feet

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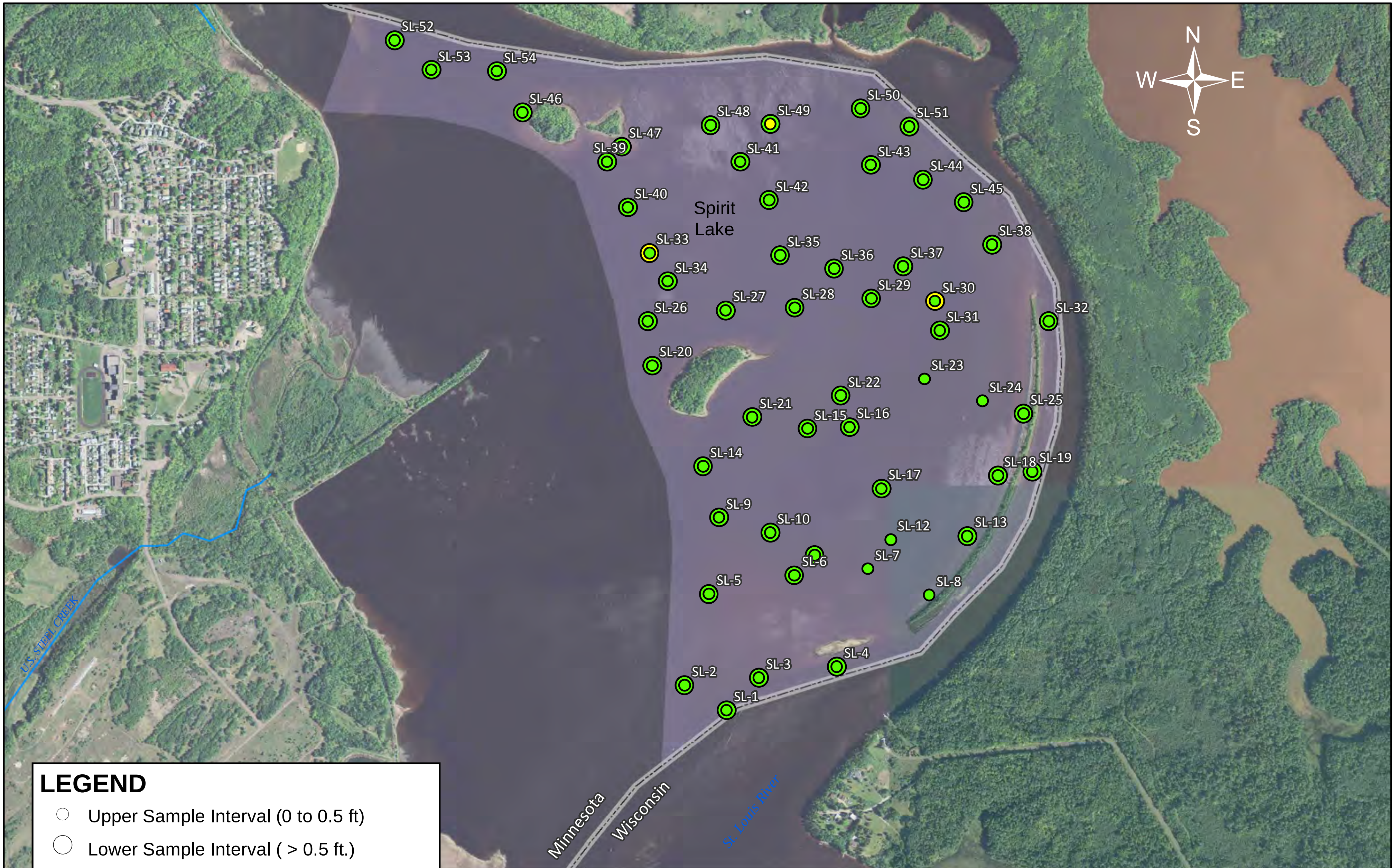
SQT Comparison: Cadmium
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-b
SCALE: AS SHOWN	



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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

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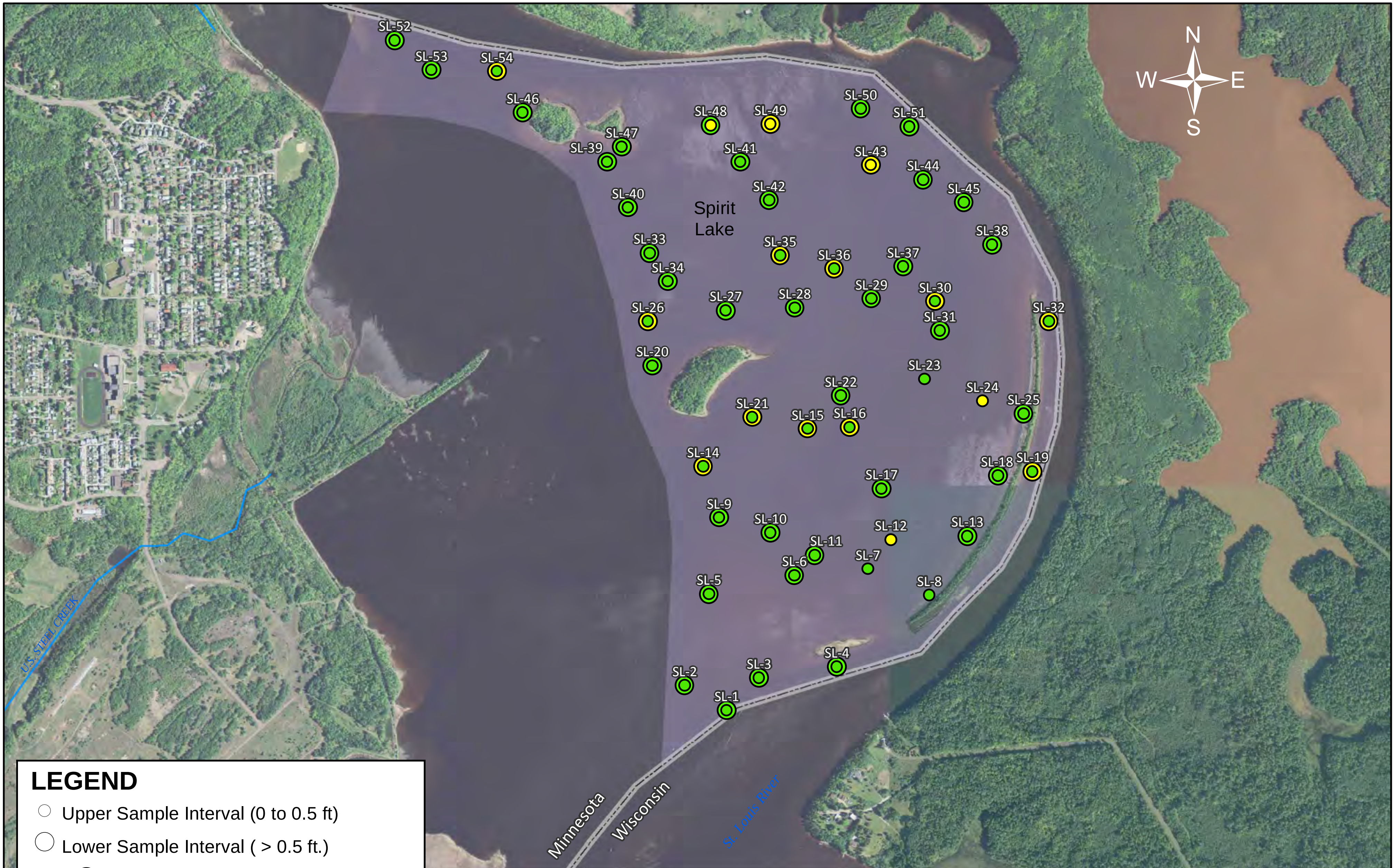
Detroit, Michigan 48226

SQT Comparison: Chromium
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-c
SCALE: AS SHOWN	



LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

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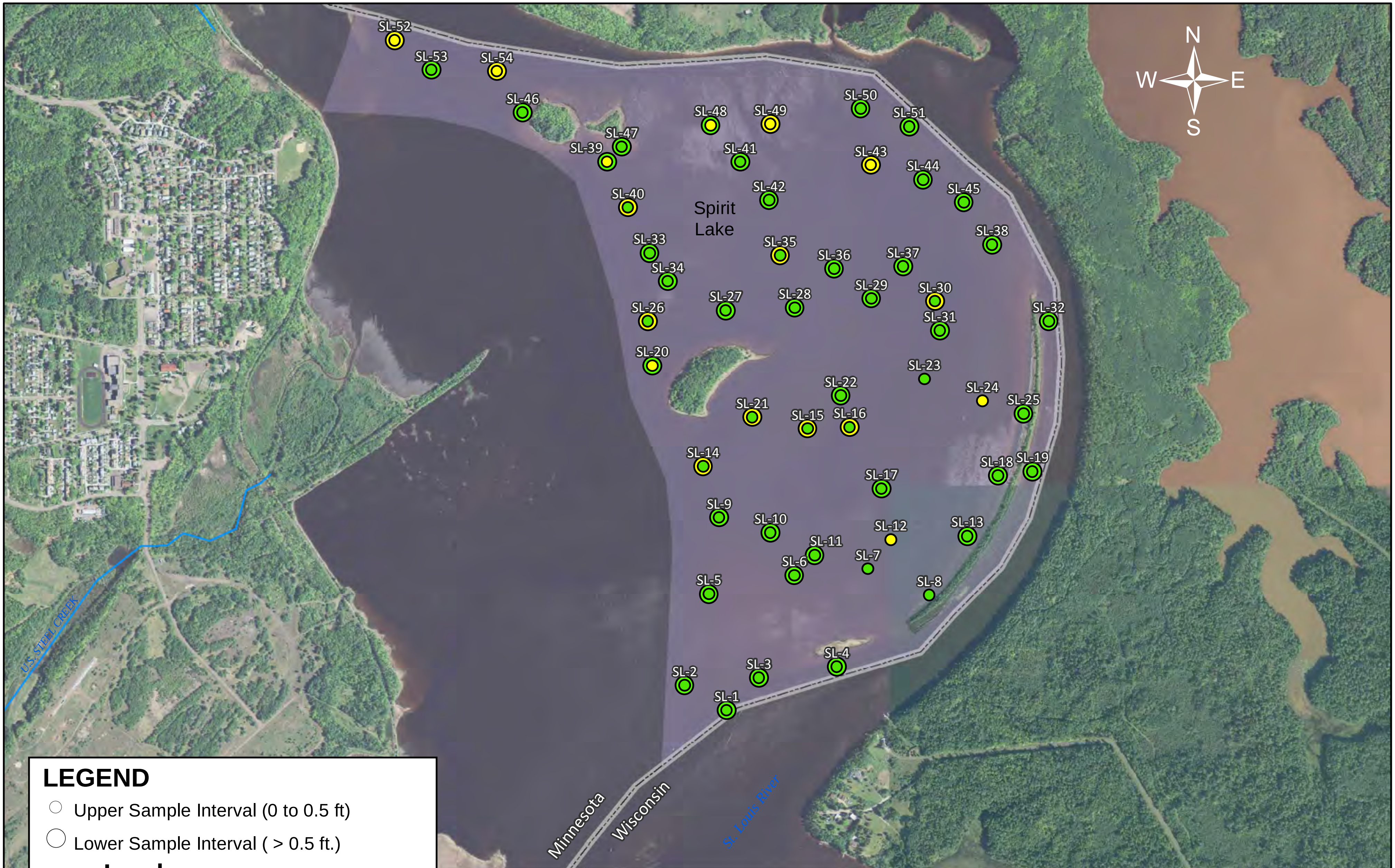
SQT Comparison: Copper
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-d
SCALE: AS SHOWN	



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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Lead

0 - 36 mg/kg dry wt.

36 - 128 mg/kg dry wt.

> 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

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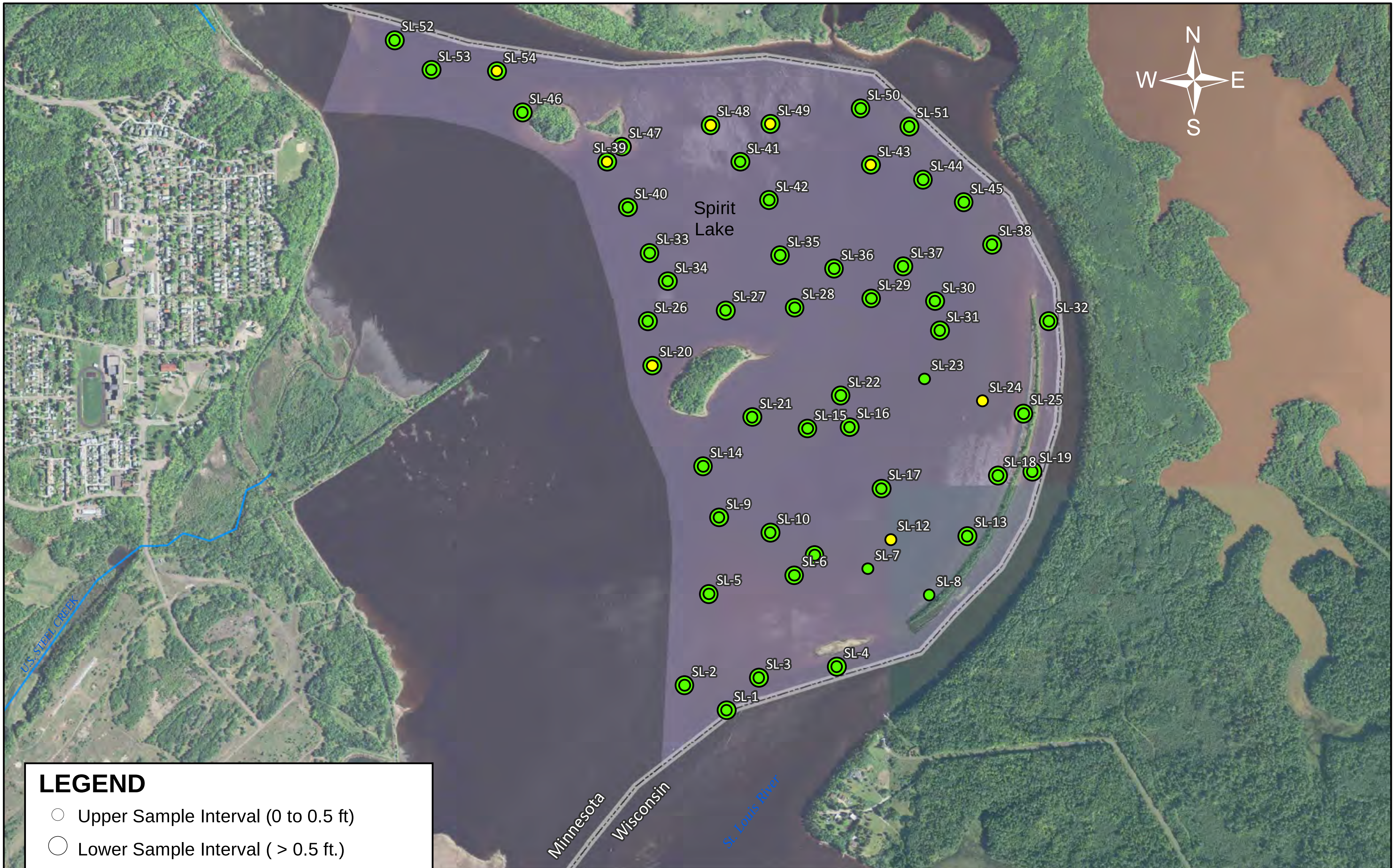
Detroit, Michigan 48226

SQT Comparison: Lead
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 41-e
SCALE: AS SHOWN	



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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

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SQT Comparison: Mercury
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-f
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

0 1,250 2,500 5,000 Feet

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SQT Comparison: Nickel
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 41-g
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

◯ Lower Sample Interval (> 0.5 ft.)

Zinc

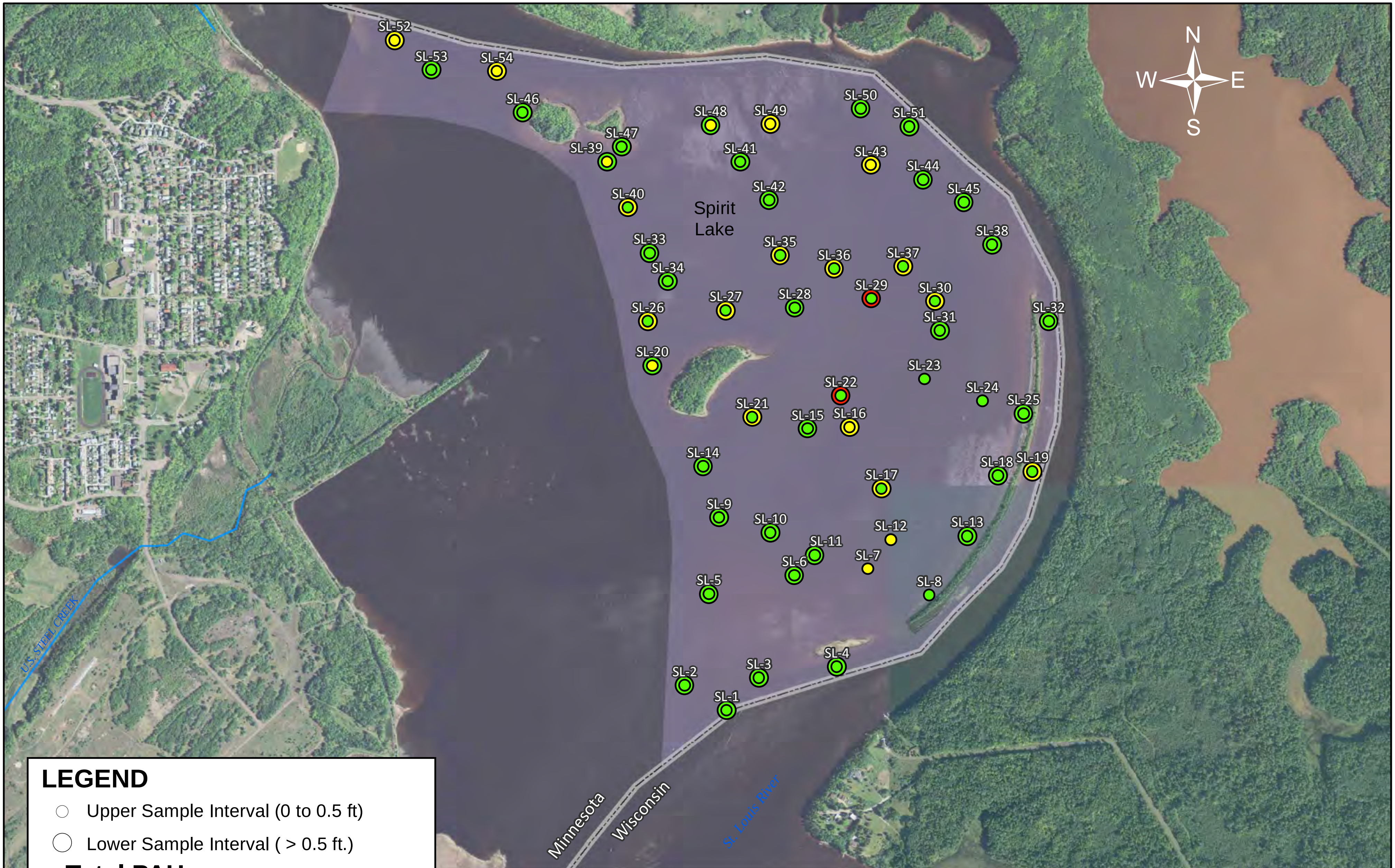
- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

SOMAT Engineering, Inc. 660 Woodward Ave., Suite 2430, Detroit, Michigan 48226	**SQT Comparison: Zinc** **Spirit Lake** Lower St. Louis River, Duluth, MN Sediment Investigation USACE/MPCA	PROJECT NO: E08112D	DATE: 4/25/2012
		DWN BY: CCR	REV. NO: 1
		CHK'D BY:	FIGURE: 8.41-h
		SCALE: AS SHOWN	



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Imagery: MnGEo WMS Service FSA 2010

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

0 1,250 2,500 5,000 Feet

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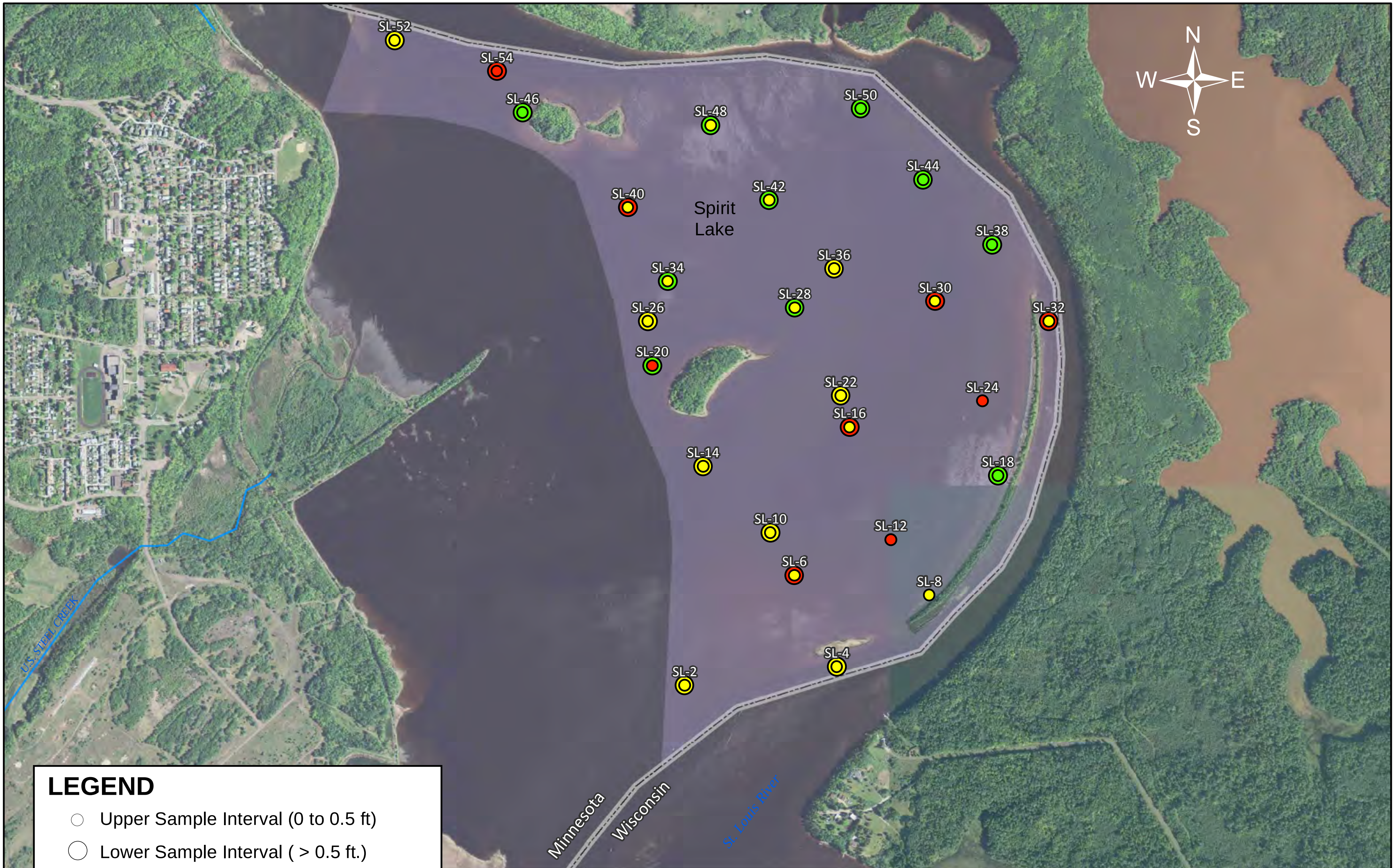
SQT Comparison: Total PAHs
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-i
SCALE: AS SHOWN	



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Imagery: MnGEo WMS Service FSA 2010

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Dioxins

0 - 0.85 ng TEQ/kg dry wt.

0.85 - 21.5 ng TEQ/kg dry wt

> 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

0 1,250 2,500 5,000 Feet

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Detroit, Michigan 48226

SQT Comparison: Dioxins
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 41-j
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PCBs

- 0 - 60 µg/kg dry wt.
- 60 - 680 µg/kg dry wt.
- > 680 µg/kg dry wt.

SQT Level I = 60 µg/kg dry wt.
SQT Level II = 680 µg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 1,250 2,500 5,000 Feet

SOMAT Engineering, Inc.
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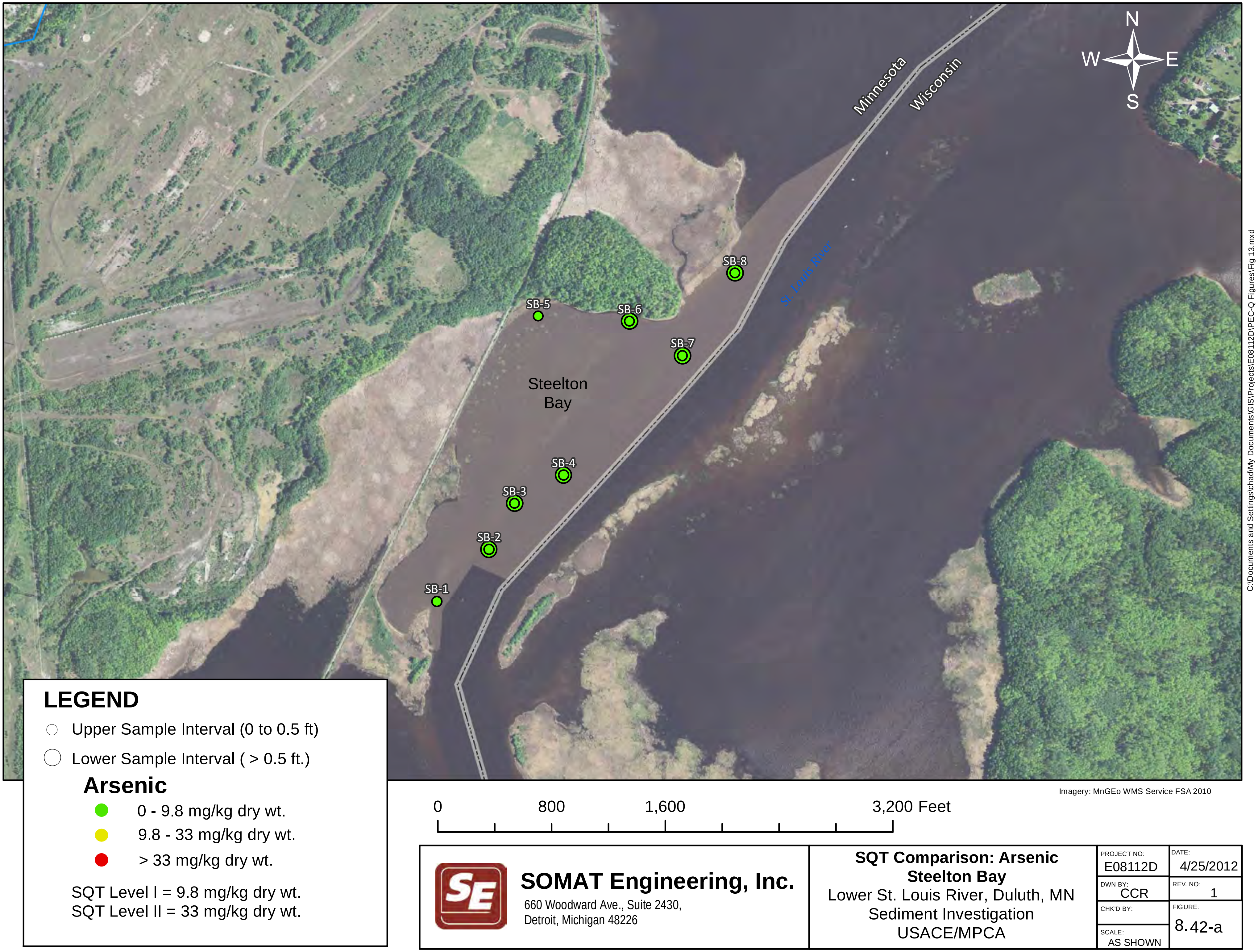
Detroit, Michigan 48226

SQT Comparison: Total PCBs
Spirit Lake
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.41-k
SCALE: AS SHOWN	



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SQT Comparison: Arsenic
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-a
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

SQT Comparison: Cadmium
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-b
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

SQT Comparison: Chromium
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-c
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

SQT Comparison: Copper
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-d
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

0 800 1,600 3,200 Feet

SOMAT Engineering, Inc.
660 Woodward Ave., Suite 2430,
Detroit, Michigan 48226

SQT Comparison: Lead
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-e
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SQT Comparison: Mercury
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-f
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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Detroit, Michigan 48226

SQT Comparison: Nickel
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.42-g
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 800 1,600 3,200 Feet

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SOMAT Engineering, Inc.
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Detroit, Michigan 48226

SQT Comparison: Zinc
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 42-h
SCALE: AS SHOWN	

LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

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SQT Comparison: Total PAHs
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 42-i
SCALE: AS SHOWN	

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LEGEND

Upper Sample Interval (0 to 0.5 ft)

Lower Sample Interval (> 0.5 ft.)

Dioxins

0 - 0.85 ng TEQ/kg dry wt.

0.85 - 21.5 ng TEQ/kg dry wt

> 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

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SQT Comparison: Dioxins
Steelton Bay
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 42-j
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Arsenic

- 0 - 9.8 mg/kg dry wt.
- 9.8 - 33 mg/kg dry wt.
- > 33 mg/kg dry wt.

SQT Level I = 9.8 mg/kg dry wt.
SQT Level II = 33 mg/kg dry wt.

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SQT Comparison: Arsenic
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-a
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Cadmium

- 0 - 0.99 mg/kg dry wt.
- 0.99 - 4.98 mg/kg dry wt.
- > 4.98 mg/kg dry wt.

SQT Level I = 0.99 mg/kg dry wt.
SQT Level II = 4.98 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 | 500 | 1,000 | 2,000 Feet

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Detroit, Michigan 48226

SQT Comparison: Cadmium
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-b
SCALE: AS SHOWN	

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Chromium

- 0 - 43 mg/kg dry wt.
- 43 - 111 mg/kg dry wt.
- > 111 mg/kg dry wt.

SQT Level I = 43 mg/kg dry wt.
SQT Level II = 111 mg/kg dry wt.

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SQT Comparison: Chromium
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-c
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Copper

- 0 - 32 mg/kg dry wt.
- 32 - 149 mg/kg dry wt.
- > 149 mg/kg dry wt.

SQT Level I = 32 mg/kg dry wt.
SQT Level II = 149 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Copper
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-d
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Lead

- 0 - 36 mg/kg dry wt.
- 36 - 128 mg/kg dry wt.
- > 128 mg/kg dry wt.

SQT Level I = 36 mg/kg dry wt.
SQT Level II = 128 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Lead
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-e
SCALE: AS SHOWN	

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LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

○ Lower Sample Interval (> 0.5 ft.)

Mercury

- 0 - 0.18 mg/kg dry wt.
- 0.18 - 1.1 mg/kg dry wt.
- > 1.1 mg/kg dry wt.

SQT Level I = 0.18 mg/kg dry wt.
SQT Level II = 1.1 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Mercury
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8.43-f
SCALE: AS SHOWN	

LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Nickel

- 0 - 23 mg/kg dry wt.
- 23 - 48.6 mg/kg dry wt.
- > 48.6 mg/kg dry wt.

SQT Level I = 23 mg/kg dry wt.
SQT Level II = 48.6 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Nickel
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-g
SCALE: AS SHOWN	

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Zinc

- 0 - 120 mg/kg dry wt.
- 120 - 459 mg/kg dry wt.
- > 459 mg/kg dry wt.

SQT Level I = 120 mg/kg dry wt.
SQT Level II = 459 mg/kg dry wt.

Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

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SQT Comparison: Zinc
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-h
SCALE: AS SHOWN	

Imagery: MnGEo WMS Service FSA 2010

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LEGEND

- Upper Sample Interval (0 to 0.5 ft)
- Lower Sample Interval (> 0.5 ft.)

Total PAHs

- 0 - 1,600 µg/kg dry wt.
- 1,600 - 23,000 µg/kg dry wt.
- > 23,000 µg/kg dry wt.

SQT Level I = 1,600 µg/kg dry wt.
SQT Level II = 23,000 µg/kg dry wt.

0 500 1,000 2,000 Feet

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SQT Comparison: Total PAHs
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-i
SCALE: AS SHOWN	

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Imagery: MnGEo WMS Service FSA 2010

0 500 1,000 2,000 Feet

LEGEND

○ Upper Sample Interval (0 to 0.5 ft)

◯ Lower Sample Interval (> 0.5 ft.)

Dioxins

- 0 - 0.85 ng TEQ/kg dry wt.
- 0.85 - 21.5 ng TEQ/kg dry wt
- > 21.5 ng TEQ/kg dry wt

SQT Level I = 0.85 ng TEQ/kg dry wt
SQT Level II = 21.5 ng TEQ/kg dry wt

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SQT Comparison: Dioxins
Tallas Island Flats
Lower St. Louis River, Duluth, MN
Sediment Investigation
USACE/MPCA

PROJECT NO: E08112D	DATE: 4/25/2012
DWN BY: CCR	REV. NO: 1
CHK'D BY:	FIGURE: 8. 43-j
SCALE: AS SHOWN	

APPENDIX A

SEDIMENT CORE LOGS WITH PHOTOGRAPHS

APPENDIX B

ANALYTICAL DATA REPORTS

AND

CHAIN OF CUSTODY FORMS

APPENDIX C

DATA VALIDATION MEMORANDA

APPENDIX D

ANALYTICAL DATABASE

APPENDIX E

PROJECT PLANS:

WORK PLAN

SAMPLE ANALYSIS PLAN (SAP)

QUALITY ASSURANCE AND PROJECT PLAN (QAPP)

SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)