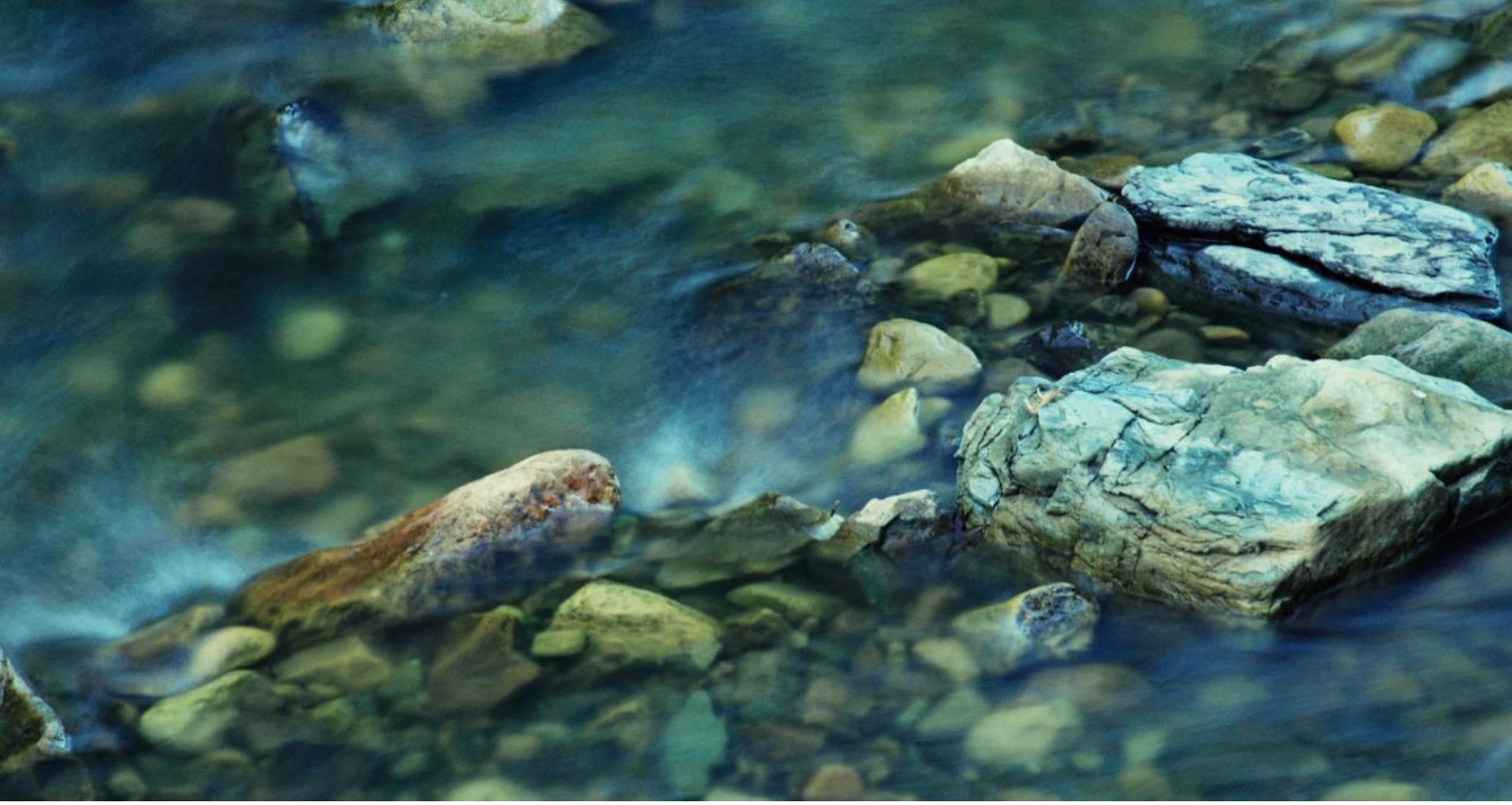


September 2021
Grand Lake Sedimentation Study

Initial Study Report

Prepared for

September 2021
Grand Lake Sedimentation Study

Initial Study Report

Prepared for
Grand River Dam Authority
P.O. Box 409
Vinita, Oklahoma 74301

Prepared by
Anchor QEA, LLC
30 West Mifflin Street
Suite 801
Madison, Wisconsin 53703

Simons & Associates
P.O. Box 607
Midway, Utah 84049

TABLE OF CONTENTS

1 Executive Summary 1

2 Introduction 3

2.1 Study Goals and Objectives 3

2.2 Study Area 3

3 Study Methods 4

3.1 Data Collection 4

3.1.1 Existing Data 4

3.1.2 Field Data Collection 12

3.1.3 Field Results 21

3.1.4 Discussion 43

4 Sediment Transport Model Development 52

4.1 Terrain Information 52

4.2 Streams 53

4.2.1 Neosho River 53

4.2.2 Spring River 53

4.2.3 Elk River 53

4.2.4 Tar Creek 53

4.3 Boundary Conditions 54

4.4 Quasi-Unsteady Modeling 54

4.5 Sediment Data 54

4.5.1 Upstream Sediment Supply 55

4.5.2 Bed Material 55

4.5.3 Sediment Transport Model Parameters 66

5 Sediment Transport Model Calibration 67

5.1 Hydraulic Calibration 67

5.1.1 Model Inputs 67

5.1.2 Roughness Parameters 68

5.1.3 Results 70

5.2 Sediment Calibration 79

6 Results **81**

7 References **82**

TABLES

Table 1 Summary of Datasets Used to Create the Three Primary Terrain Files Used in the Sediment Study 5

Table 2 USGS Gages Present in the Grand Lake Watershed and Periods of Record for Parameters Relevant to the Study 7

Table 3 Acoustic Doppler Current Profiler Data Available from USGS Measurements 9

Table 4 Surface Sediment Grab Sampling Locations by River and Reach 14

Table 5 Sampling Dates and Discharge Measurements, per USGS Gaging Station Records 19

Table 6 WSE Monitoring Site Visit Dates and Logger Retrieval Rates 22

Table 7 Physical Properties and Derived Critical Shear Stresses of SEDflume Sample NR-130 (Neosho River) 29

Table 8 Physical Properties and Derived Critical Shear Stresses of SEDflume Sample TC-DS (Tar Creek) 30

Table 9 Physical Properties and Derived Critical Shear Stresses of SEDflume Sample SR-100 (Spring River) 31

Table 10 Physical Properties and Derived Critical Shear Stresses of SEDflume Sample ER-680 (Elk River) 32

Table 11 Density Results from Top Layer Testing of SEDflume Samples 38

Table 12 Physical Properties of SEDflume Sample NR-130 (Neosho River) 39

Table 13 Physical Properties of SEDflume Sample SR-100 (Spring River) 39

Table 14 Physical Properties of SEDflume Sample TC-DS (Tar Creek) 40

Table 15 Physical Properties of SEDflume Sample ER-680 (Elk River) 41

Table 16 Regression Coefficients for the Suspended Sediment Transport Rating Curves 49

Table 17 Modeled Flow Events and Stream Discharges 68

Table 18 Typical Overland Manning's *n* Values by Land Cover 68

Table 19 Base Manning's *n* Roughness Parameters for Streams in the Sediment Transport Model 69

Table 20 Flow Roughness Parameters for Elk and Spring Rivers and Tar Creek in the Sediment Transport Model 69

Table 21 Flow Roughness Parameters for the Neosho River in the Sediment Transport Model 70

FIGURES

Figure 1 Survey Extents of Various Data Sources for Sediment Transport Model Development 6

Figure 2 Map of the Study Area Showing Locations of USGS Gaging Stations and Water Surface Elevation Monitoring Sites 8

Figure 3 Typical Sand and Gravel Material on a Point Bar Along the Left (North) Side of the Neosho River at Approximately River Mile 147 10

Figure 4 Suspended Sediment Concentration Samples and Stream Discharges During Sampling on the Neosho River Near Commerce (USGS Gage 07185000) 12

Figure 5 Photograph of HOBO Pressure Loggers and Mounting Chamber 13

Figure 6 Location of Sediment Grab Sampling Efforts within the Grand Lake Watershed 14

Figure 7 Ekman Dredge Used for In-Channel Sediment Sampling 15

Figure 8 Visual Comparison of Different Sediment Types 16

Figure 9 SEDflume Core Sampling 17

Figure 10 Locations of SEDflume Core Samples Collected During the Sediment Investigation 18

Figure 11 Sampling Equipment Used During SSC Sampling Efforts 20

Figure 12 Bedload Transport Measurements Collected Using the Helley-Smith Sampler 21

Figure 13 Sample Series 23

Figure 14 Particle Size Distributions within the Grand Lake Study Area 24

Figure 15 Sample Photographs Showing the Sediment in the Spring River, Tar Creek, Elk River, and Neosho River 25

Figure 16 Sediment Grab Samples Collected from the Reservoir Bed in Grand Lake 26

Figure 17 SEDflume Schematic Showing Top and Side Views 27

Figure 18 Photograph of SEDflume Test System 28

Figure 19 Photograph of Core NR-130 (Neosho River) Aligned with Applied Shear Stresses and Associated Erosion Rates 30

Figure 20 Photograph of Core TC-DS (Tar Creek) Aligned with Applied Shear Stresses and Associated Erosion Rates 31

Figure 21 Photograph of Core SR-100 (Spring River) Aligned with Applied Shear Stresses and Associated Erosion Rates 32

Figure 22 Photograph of Core ER-680 (Elk River) Aligned with Applied Shear Stresses and Associated Erosion Rates 33

Figure 23 Intracore Erosion Rate by Interval for Each SEDflume Core Sample 34

Figure 24 Example SEDflume Analysis Results 35

Figure 25 Sample Particle Size Analysis Output from SEDflume Analysis 36

Figure 26 Sample Particle Size Analysis Output from SEDflume Analysis Showing Cumulative Percent Finer Values for Core NR-130 (Neosho River) 37

Figure 27 Physical Properties of SEDflume Sample NR-130 (Neosho River) with Depth 39
Figure 28 Physical Properties of SEDflume Sample SR-100 (Spring River) with Depth 40
Figure 29 Physical Properties of SEDflume Sample TC-DS (Tar Creek) with Depth 41
Figure 30 Physical Properties of SEDflume Sample ER-680 (Elk River) with Depth 42
Figure 31 Suspended Sediment Transport Rates and Fluvial Discharge Measured on the Neosho River near Commerce, Oklahoma 45
Figure 32 Suspended Sediment Transport Rates and Fluvial Discharge Measured on Tar Creek near Commerce, Oklahoma 46
Figure 33 Suspended Sediment Transport Rates and Fluvial Discharge Measured on the Spring River near Quapaw, Oklahoma 47
Figure 34 Suspended Sediment Transport Rates and Fluvial Discharge Measured on the Elk River near Tiff City, Missouri 48
Figure 35 Fine Sediment as Fraction of Total Suspended Sediment Sampled on the Neosho River near Commerce, Oklahoma 49
Figure 36 Fine Sediment as Fraction of Total Suspended Sediment Sampled on Tar Creek near Commerce, Oklahoma 50
Figure 37 Fine Sediment as Fraction of Total Suspended Sediment Sampled on the Spring River near Quapaw, Oklahoma 50
Figure 38 Fine Sediment as Fraction of Total Suspended Sediment Sampled on the Elk River near Tiff City, Missouri 51
Figure 39 Example Bridge Replacement Using Modified Station-Elevation Terrain Data and a Cross Section Lid 53
Figure 40 Water Surface and Thalweg Profile of the Neosho River above Tar Creek 56
Figure 41 Neosho River Sediment Size Gradation Results Comparison 56
Figure 42 Neosho River Sediment Size Gradation Results Comparison 57
Figure 43 Water Surface and Thalweg Profile of Upper Grand Lake between Twin Bridges and the Elk River Confluence 57
Figure 44 Upper Grand Lake Sediment Size Gradation Results Comparison 58
Figure 45 Upper Grand Lake Sediment Size Gradation Results Comparison 58
Figure 46 Water Surface and Thalweg Profile of Tar Creek 59
Figure 47 Tar Creek Sediment Size Gradation Results Comparison 59
Figure 48 Water Surface and Thalweg Profile of the Spring River 60
Figure 49 Spring River Sediment Size Gradation Results Comparison 60
Figure 50 Spring River Sediment Size Gradation Results Comparison 61
Figure 51 Spring River Sediment Size Gradation Results Comparison 61
Figure 52 Water Surface and Thalweg Profile of the Elk River 62
Figure 53 Elk River Sediment Size Gradation Results Comparison 62
Figure 54 Elk River Sediment Size Gradation Results Comparison 63

Figure 55 Overprediction and Underprediction of Simulated WSE at USGS Gages 71
Figure 56 Comparison of STM WSE Results and Measured High Water Marks during the July 2007 Event 72
Figure 57 Comparison of STM WSE Results and Measured High Water Marks during the October 2009 Event 72
Figure 58 Comparison of STM WSE Results and Measured High Water Marks during the December 2015 Event 73
Figure 59 Locations of Anchor QEA Loggers 74
Figure 60 Comparison of STM WSE Results and Measured Values from Anchor QEA Loggers 75
Figure 61 Elk River Thalweg Comparison and WSE Measurement 76
Figure 62 Neosho River Thalweg Comparison 77
Figure 63 Upper Grand Lake Thalweg Comparison 78

APPENDICES

Appendix A Water Surface Elevation Monitoring
Appendix B Sediment Grab Sampling
Appendix C SEDflume Core Sampling
Appendix D Suspended Sediment Concentration Measurements

ABBREVIATIONS

1D	one-dimensional
2D	two-dimensional
ADCP	acoustic Doppler current profiler
BC	boundary condition
cfs	cubic feet per second
CHM	Comprehensive Hydraulic Model
cm	centimeter
cm/s	centimeters per second
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
ft/ft	vertical feet per horizontal foot
g/cm^3	gram per cubic centimeter
Grand Lake	Grand Lake o' the Cherokees
GRDA	Grand River Dam Authority
HEC-RAS	Hydrologic Engineering Center's River Analysis System
LiDAR	Light Detection and Ranging
mm	millimeter
NED	National Elevation Dataset
OWRB	Oklahoma Water Resources Board
Pa	pascal
pcf	pound per cubic foot
REAS	Real Estate Adequacy Study
RM	river mile
SSC	suspended sediment concentration
STM	sediment transport model
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UWSFL	University of Wisconsin Soil and Forage Laboratory
WSE	water surface elevation
WSLH	Wisconsin State Laboratory of Hygiene
µm	micrometer

1 Executive Summary

Anchor QEA, LLC (formerly FreshWater Engineering) and Simons & Associates were retained to support the Grand River Dam Authority (GRDA) as subconsultants to Mead & Hunt with Federal Energy Regulatory Commission (FERC) relicensing of the Pensacola Dam. Anchor QEA's and Simons & Associates' role, with Mead & Hunt's support, is to perform a sedimentation study to determine the rates and locations of sedimentation throughout the Grand Lake o' the Cherokees (Grand Lake) watershed and associated tributaries.

This task will culminate in the development of a sediment transport model (STM) using the Hydrologic Engineering Center's River Analysis System (HEC-RAS) fluvial modeling software. Data needed for model development ranges from topographic information to stream discharge volumes, water surface elevations, and sediment parameters both in the lake and streambeds and moving into the system through major tributaries. Anchor QEA evaluated publicly available data sources to compile parameters necessary for model development and to determine where additional field work was required to fill data gaps.

Topographic and bathymetric data are available from a range of sources. Grand Lake itself was surveyed as part of the 1998 Real Estate Adequacy Study (REAS), then again by the Oklahoma Water Resources Board (OWRB) in 2009, and once more by the U.S. Geological Survey (USGS) in 2019. Upstream surveys of the Neosho River, Spring River, and Elk River were performed as part of the 1998 REAS, and USGS surveyed those reaches again in 2017. Topographic information was available from surveys performed in support of the 1998 REAS and Light Detection and Ranging (LiDAR) flights conducted in 2011. Other topographic information was obtained from the USGS National Elevation Dataset (NED) one-third arc-second datasets where LiDAR information was unavailable. Additionally, stage-storage curves were available from 1940 U.S. Army Corps of Engineers (USACE) as-built drawings as well as the more recent Grand Lake bathymetry surveys.

Other data are available from USGS gaging stations located throughout the Grand Lake watershed. Water surface elevation (WSE) data and stream discharge information are available along the Neosho, Spring, and Elk rivers, as well as on Tar Creek. These stations also provide sediment transport data in the form of suspended sediment concentration (SSC) measurements taken throughout the period of record at each gage.

Data gaps exist within the period of record for the USGS gaging stations within the Grand Lake watershed and the gaging network lacks in spatial density. As a result, the study team developed a field monitoring system to track WSE throughout the study area and fill data gaps. A set of 16 monitoring locations were selected, and HOBO pressure loggers were installed at each site in December 2016. Over the last 4.5 years, pressure and temperature have been recorded at 30-minute

intervals. The record provides a detailed dataset of water levels that can be used for model development and calibration.

Other data gaps identified were related to sediment properties. Sediment conditions within the basin were evaluated using grab samples to evaluate grain size distributions. In general, the streambeds consist of gravel with limited sand; the lake is primarily silt and clay. Due to the presence of cohesive material (silt and clay) in the lake, Anchor QEA also collected core samples for SEDflume erosion analysis. The erosion analysis was used to determine parameters for sediment movement as part of model development.

Sediment transport rates were the final missing parameters. The aforementioned SSC measurements occur only occasionally, and samples taken during large flow events are limited. Researchers were also unable to find bedload sediment transport measurements at any location in the watershed. Anchor QEA field work included trips to gather additional SSC measurements to help close data gaps in the record. Technicians also sampled bedload sediment transport and found that even under large flows, the bulk of sediment transport occurs in suspension rather than along the bed.

Hydraulic calibration of the model consisted of tuning roughness parameters to match measured peak WSEs for a range of flow events. Events that occurred between July 2007 and April 2017 were used for hydraulic calibration. Model tuning relied on adjusting hydraulic roughness coefficients and flow roughness factors. Calibration datasets included the USGS gages throughout the model domain, high water marks, and the Anchor QEA monitoring stations. Model results showed good agreement with the gaged locations.

Once developed, discussion of STM sediment calibration will be added here. Results will be included in the final study report. It is currently estimated that sediment transport calibration procedures will be finalized by the end of 2021. At that time, the sedimentation model inputs and outputs will be made available to relicensing participants for download from a protected cloud-based server.

2 Introduction

2.1 Study Goals and Objectives

The primary goal of the Sedimentation Study is to determine the potential effect of Project operations on sediment transport, erosion, and deposition in the lower reaches of tributaries to Grand Lake upstream of Pensacola Dam. Additionally, the Sedimentation Study is designed to provide an understanding of the sediment transport processes and patterns upstream of Grand Lake on the Neosho, Spring, and Elk rivers, as well as on Tar Creek. An STM will provide estimates of overall sedimentation trends and impacts of sedimentation in the project Boundary.

2.2 Study Area

The Pensacola Dam is located near Langley, Oklahoma. It impounds the Neosho River, forming the Grand Lake reservoir (often referred to as Grand Lake o' the Cherokees). The Grand Lake reservoir is split between four counties, including Craig, Ottawa, Delaware, and Mayes in northeastern Oklahoma. The main tributaries that flow into the reservoir are the Neosho, Spring, and Elk rivers. Honey, Drowning, Duck, and Horse Creeks also flow into the lake. Additional minor tributaries include Sycamore and Tar creeks.

3 Study Methods

The sedimentation study has been divided into three main stages—Data Collection, Model Development, and Sedimentation Predictions. During the initial stage, the study team collected data that was publicly available, analyzed data gaps, and created and executed plans to gather additional information. Model Development used the field data to develop and calibrate the STM. Sedimentation Predictions will use the calibrated model to estimate the future deposition and erosion patterns within the study area to help evaluate future flood risks in the basin.

3.1 Data Collection

3.1.1 Existing Data

A significant amount of the necessary data was available to the study team at the beginning of the project. Sources included USACE, the USGS, past studies in Grand Lake, and surveys performed by the OWRB.

3.1.1.1 Terrain Information

Terrain data had been collected by several sources throughout the history of Pensacola Dam. For the purposes of this report, "terrain" refers to the combination of bathymetric and topographic data that are used for model development. Surveys to develop terrain files included reservoir storage volume studies (bathymetric survey of Grand Lake), bathymetric surveys on the tributaries, and topographic measures of the surrounding topography.

The more recent surveys provided geometry information that was used for model development. Namely, the 1998 REAS; (USACE 1998), 2009 OWRB, and 2019 USGS (Hunter et al. 2020) surveys provided Grand Lake bathymetric information for the three primary terrain datasets used in development of the STM. The terrain files are referred to by the years associated with the Grand Lake surveys—1998, 2009, and 2019, respectively.

3.1.1.1.1 Upstream Bathymetry Surveys

Upstream of the reservoir, the tributaries were surveyed at different times. The upper reaches of the Neosho, Spring, and Elk rivers, as well as Tar Creek were mapped during the 1998 REAS efforts.

The REAS project included detailed investigation of upstream areas, but the other Grand Lake surveys ended considerably lower in the watershed. The 2009 OWRB survey ended at Connors Bridge (South 590 Road) over the Neosho River, approximately 4.5 miles upstream of Twin Bridges. The survey of the Spring River ended approximately 3.5 miles upstream of Twin Bridges near East 130 Road. Along the Elk River, the survey reached 5 miles upstream of the Highway 10 bridge. The upstream extents of the 2019 USGS Grand Lake survey were Twin Bridges on the Neosho and Spring rivers and Cayuga, 2 miles upstream of Highway 10, on the Elk River.

In 2017, USGS performed a bathymetric survey of the upper tributaries (Smith et al. 2017). This survey reached the Oklahoma and Kansas border on the Neosho River and stopped approximately at the border on the Spring River. The Elk River survey reached across the Oklahoma and Missouri border to river mile (RM) 16.4, approximately 2.5 miles upstream of the Highway 43 bridge.

The 2017 survey did not include Tar Creek bathymetry. To represent Tar Creek, Federal Emergency Management Agency (FEMA) cross-section data was used (FEMA 2019).

3.1.1.1.2 Topographic Surveys

Two primary data sources exist for overbank analyses. The first is topographic survey information gathered during the 1998 REAS (USACE 1998). The extents of this survey reach the Oklahoma and Kansas border along both the Neosho and Spring River and approximately 5 miles upstream of the Highway 43 bridge on the Elk River. The second major overbank data source is LiDAR data from a mission flown in 2011 (Dewberry 2011). Where additional data was needed for overbank areas, it was obtained from the USGS NED one-third arc-second dataset (USGS 2017). These combined datasets covered the entire overbank portion of the study area.

3.1.1.1.3 Terrain Datasets

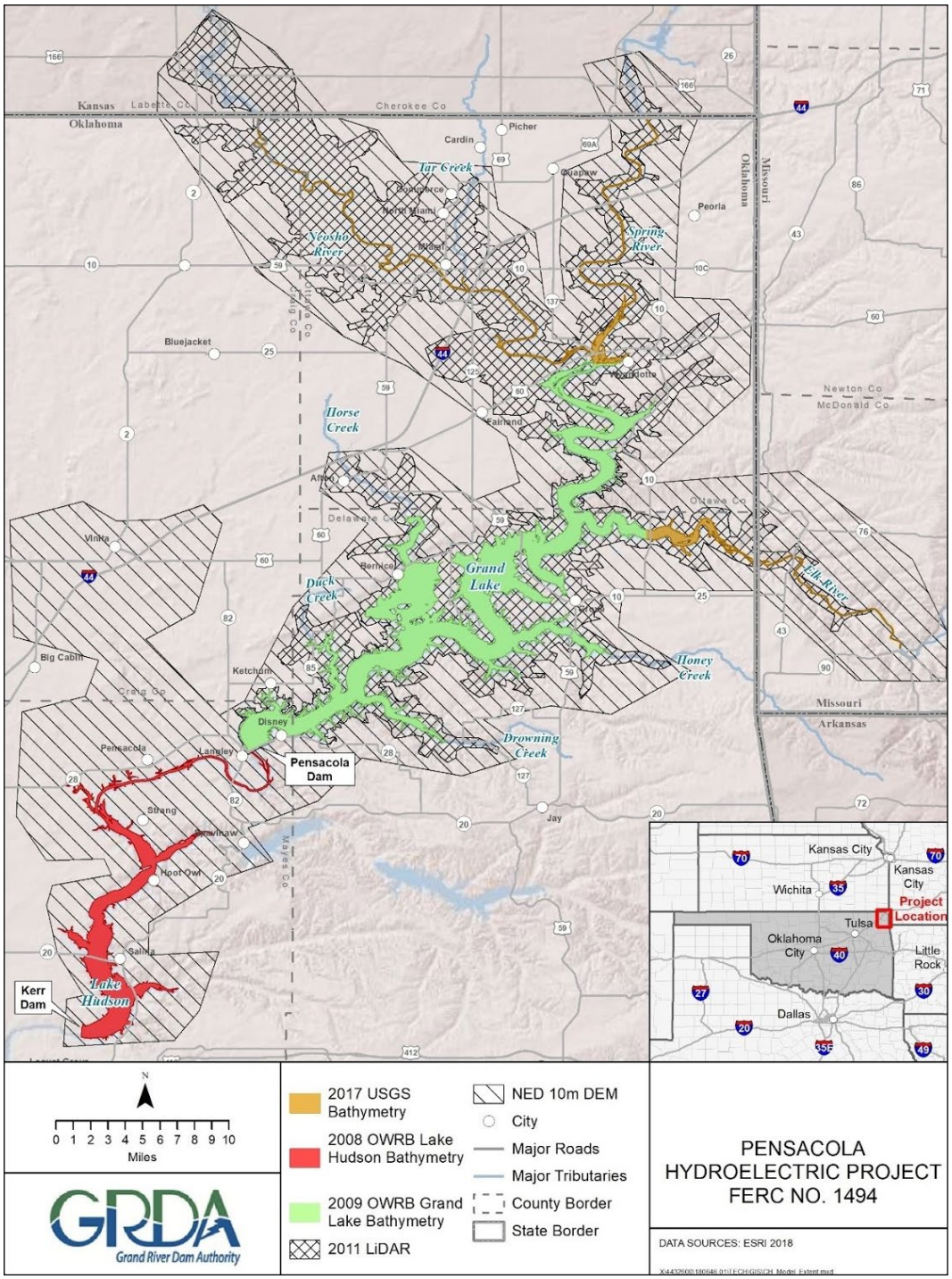
The information gathered from the above sources was compiled to make three terrain datasets. The datasets served as the basis for all STM geometry development. While data for each was created from a patchwork of sources measured at different times, for simplicity of naming them, they will be referred to in this report by the year of the relevant Grand Lake survey. Terrain files contain both bathymetric and topographic information. Table 1 details the terrain names and relevant source materials.

Table 1
Summary of Datasets Used to Create the Three Primary Terrain Files Used in the Sediment Study

Terrain Name	Grand Lake Survey	Upstream Survey	Overbank Survey
1998 Terrain	1998 REAS	1998 REAS	1998 REAS/2011 LiDAR/2017 NED
2009 Terrain	2009 OWRB	2017 USGS	2011 LiDAR/2017 NED
2019 Terrain	2019 USGS	2017 USGS	2011 LiDAR/2017 NED

Figure 1 shows the survey areas for each of the above-referenced surveys, with the exception of the 2019 USGS bathymetric survey of Grand Lake. The extents of the 2019 Grand Lake survey are approximately the same as those of the 2009 OWRB survey.

Figure 1
Survey Extents of Various Data Sources for Sediment Transport Model Development



3.1.1.1.4 Stage-Storage Curves

Grand Lake stage-storage curves were available dating back to 1940. USACE created a capacity curve from as-built dimensions and surveys at that time. The 1998 REAS produced an additional Grand Lake dataset. An OWRB survey of Grand Lake completed in 2009 and a USGS survey of the lake in 2019 provide additional data points. These were used to estimate the annual volume of sediment deposition within the Grand Lake reservoir as a ground truthing measure.

3.1.1.2 Water Surface Elevation, Discharge, and Flow Velocity

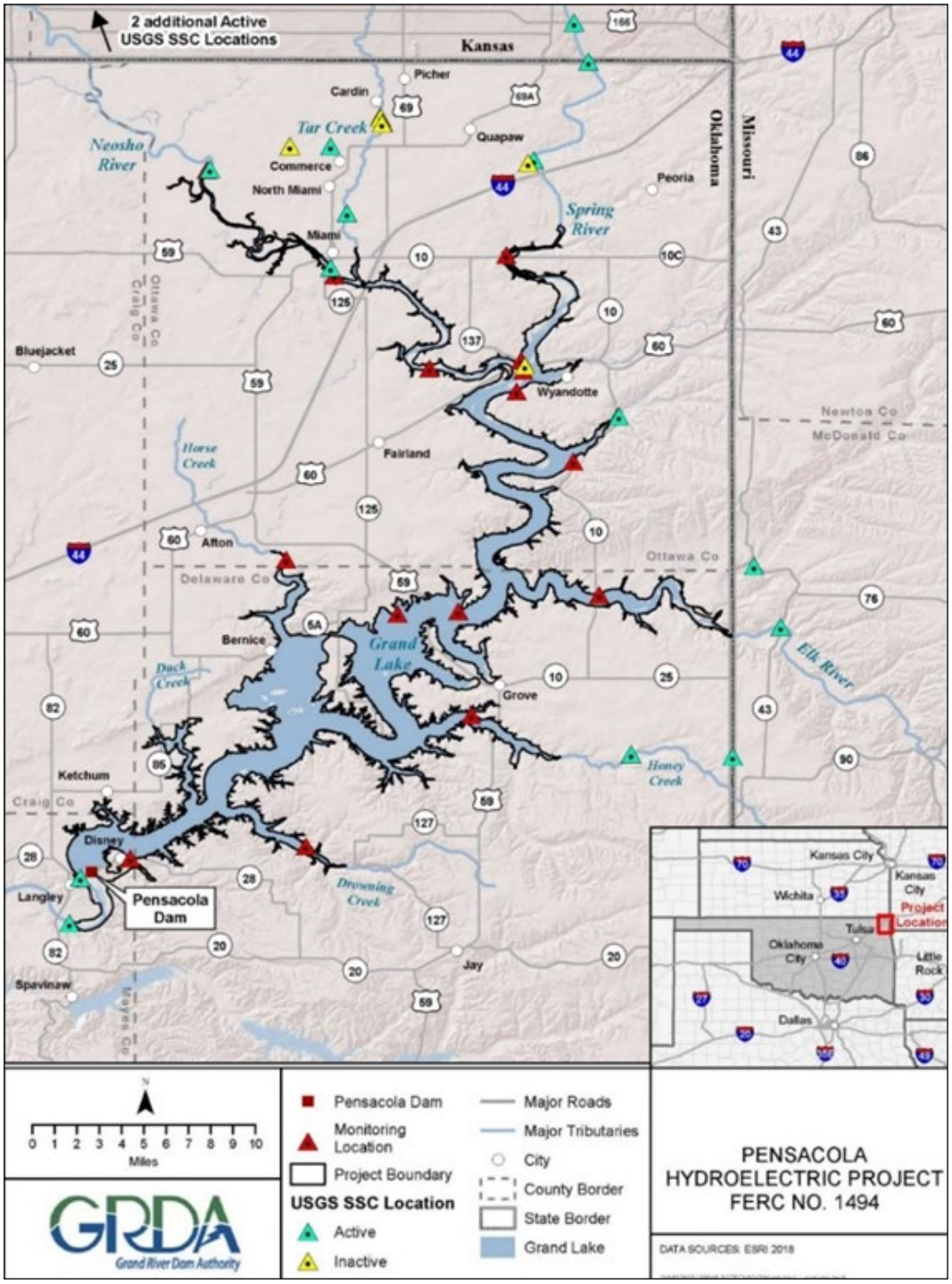
USGS provides monitoring gages in several locations within the study watershed. These locations are shown in Figure 2, and station information is provided in Table 2. Each station provides WSE information at regular intervals; most also list discharge volumes. These gage readings are available to the public through USGS websites (USGS 2021a, 2021b, 2021c, 2021d, 2021e, 2021f).

Table 2
USGS Gages Present in the Grand Lake Watershed and Periods of Record for Parameters Relevant to the Study

USGS Station ID	Site Name	Period of Record		
		Discharge (Continuous Record)	WSE (Continuous Record)	SSC (Intermittent Record)
07185000	Neosho River near Commerce, Oklahoma	1990–Present	2007–Present	1944–2016
07185080	Neosho River at Miami, Oklahoma	N/A	2007–Present	N/A
07185090	Tar Creek near Commerce, Oklahoma	2007–Present	2007–Present	2004–2016
07185095	Tar Creek at 22nd Street Bridge at Miami, Oklahoma	1989–Present	2007–Present	1988–2006
07188000	Spring River near Quapaw, Oklahoma	1989–Present	2007–Present	1944–Present
07189000	Elk River near Tiff City, Missouri	1990–Present	2007–Present	1993–2009
07190000	Lake O' the Cherokees at Langley, Oklahoma	N/A	2007–Present	N/A

Note:
N/A indicates that the specific data type was not recorded at these locations.

Figure 2
Map of the Study Area Showing Locations of USGS Gaging Stations and Water Surface Elevation Monitoring Sites



USGS also performs periodic discharge profile measurements at the gage stations. These typically use an acoustic Doppler current profiler (ADCP), and data are available upon request. Table 3 provides a summary of the available ADCP data.

Table 3
Acoustic Doppler Current Profiler Data Available from USGS Measurements

USGS Station ID	Site Name	Period of Record	Range of Flows (cfs)
07185000	Neosho River near Commerce, Oklahoma	2006–Present	931–129,000
07185080	Neosho River at Miami, Oklahoma	2013–2017	172–57,100
07185090	Tar Creek near Commerce, Oklahoma	2008–2017	402–4,930
07185095	Tar Creek at 22nd Street Bridge at Miami, Oklahoma	2012–2016	398–2,400
07188000	Spring River near Quapaw, Oklahoma	2004–Present	639–62,600
07189000	Elk River near Tiff City, Missouri	2008–2017	2,340–24,800

3.1.1.3 Sediment Information

There are two primary components of sediment information needed for this study. The first is analysis of the bed sediments in the rivers and lake; the second is evaluation of sediment volumes moving into the study area from upstream sources.

3.1.1.3.1 Bed Sediments

Understanding and analysis of sediment transport through the rivers flowing into Grand Lake requires knowledge of the sediment forming the bed of these streams. Only limited information was available regarding bed material of these streams. Several studies investigated sediment in the channel and upland areas within Grand Lake (e.g., Pope 2005; Andrews et al. 2009; Ingersoll et al. 2009; Juracek and Becker 2009; Smith 2016). While the studies have produced a great deal of sediment analysis, they do not contain information that can be used to determine properties necessary for the proposed study such as critical shear stress or detailed grain size distributions.

Mussetter, in a 1998 report entitled *Evaluation of the Roughness Characteristics of the Neosho River in the Vicinity of Miami, Oklahoma*, photographically documented characteristics of the bed material forming the Neosho River and describing the sediment as sand and gravel.

Mussetter (1998) observed the following regarding the bed material of the Neosho River:

> Based on field observations and sediment samples taken from bank-attached bars and from the bed of the river, the bed material in the reach upstream from approximately the I-44 Bridge (RM 142) is composed primarily of gravel and sand. Downstream from I-44, the surface bed material at the time of the sampling in late 1996, which was performed when the discharge in the river was relatively low, was primarily silt and clay (Mussetter 1997). There are no obvious factors other than reduced flow velocities caused by backwater from Pensacola Dam that would cause the observed change in character of the river bed in the reach downstream from Miami. Prior to construction of the dam, the bed of the river downstream from Miami was most likely gravel and sand, similar to that found upstream. (Figure 3)

Figure 3
Typical Sand and Gravel Material on a Point Bar Along the Left (North) Side of the Neosho River at Approximately River Mile 147

Note: Mussetter 1998

In the conclusions of his report, Mussetter continues his observations and speculation regarding the bed of the Neosho River:

> The bed of the Neosho River through and upstream from Miami consists of a mixture of sand and gravel. In contrast, the bed is composed of finer-grained material in the reaches downstream from Miami due to the effects of backwater from Grand Lake. Samples taken from the bed surface at low flow in late 1996 consisted primarily of silt- and clay-sized material. Based on the characteristics of the upstream bed material, it is probable that the silt and clay is entrained and carried farther downstream into the reservoir during higher flows, and that the bed is composed primarily of sand. (Mussetter 1998)

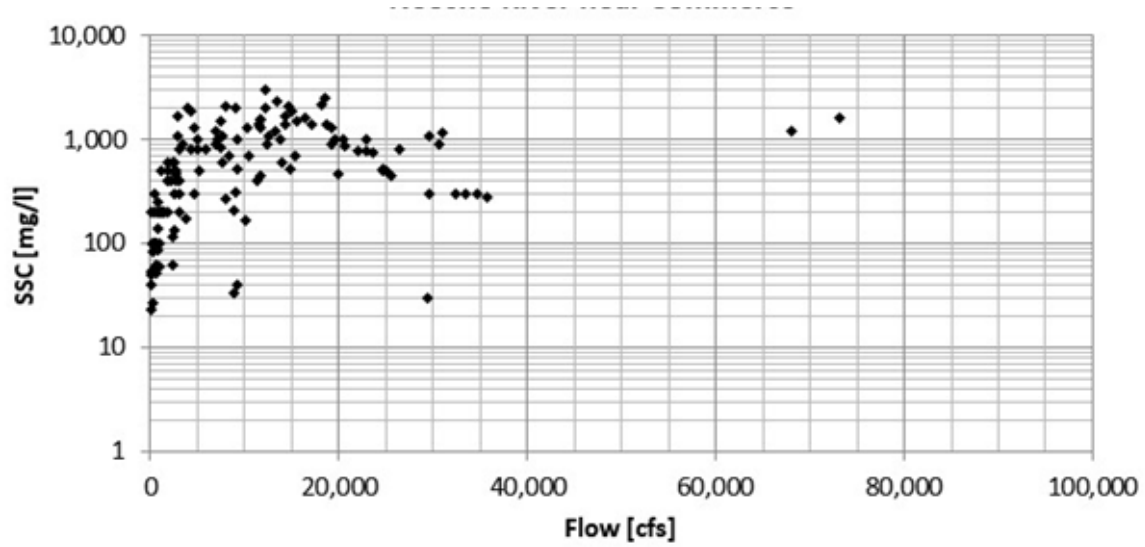
The concept that the bed consists primarily of sand was apparently reinforced by the analysis of resistance to flow. In discussing the Manning's *n* values, which quantify resistance to flow in hydraulic modeling, Mussetter states the following:

> These values are consistent with observed values in other sand bed streams having dune bedforms. This result indicates that dunes, and therefore relatively high Manning's n values, must be present in the reach downstream from Miami during high flows under with-reservoir conditions. (Mussetter 1998)

3.1.1.3.2 Sediment Transport

The second sediment analysis required is measurement of sediment volumes flowing into the system. Approximate sediment transport rates can be determined from USGS measurements of SSCs (Figure 4). SSC provides a measurement of sediment loading, typically in milligrams per liter, of streamflow. That information can then be multiplied by discharge volumes to determine transport rates within the water column. Table 2 provides a summary of the available period of record for SSC information. However, the datasets are small with samples collected on rare occasions; they do not represent continuous records like the discharge and WSE measurements.

Figure 4
Suspended Sediment Concentration Samples and Stream Discharges During Sampling on the Neosho River Near Commerce (USGS Gage 07185000)



Note: Only two samples were collected at discharges above 40,000 cfs.

SSC measurements focus only on fine materials suspended in the water column. This typically includes silts and clays, with limited sand possible depending on turbulence at the sampling site. It does not, however, measure transport rates along the streambed. Bedload transport is generally dominated by sands, gravels, and cobbles. This information is critical to understand the full sediment transport regimes of a watershed. Recorded sediment transport rates are limited to SSC calculations as bedload transport has not been reported within the Grand Lake watershed.

3.1.1.3.3 Contaminated Sediment

City of Miami, Miami Tribe, Eastern Shawnee Tribe, Ottawa Tribe, Seneca Cayuga Nation, Wyandotte Nation, and N. Larry Bork (counsel for the City of Miami citizens) provided a list of existing information to be used in their requested contaminated sediment transport study. The toxicity of the sediments is not within the scope of this study. However, existing data and information available from studies conducted of the Superfund site within the Tar Creek watershed were reviewed and incorporated in the study as appropriate.

3.1.2 Field Data Collection

Due to information gaps relevant to the study, field data collection was deemed necessary. This consisted primarily of WSE monitoring and sediment and water sampling to provide calibration information for eventual model development.

3.1.2.1 Water Surface Elevation Monitoring

Anchor QEA collected WSE data throughout the project site (Figure 2). Sixteen monitoring locations were selected, and HOBO pressure loggers (Figure 5) were installed at each site in December 2016. The loggers record raw pressures and water temperatures at 30-minute intervals to provide a continuous WSE record throughout the basin. Data are stored in onboard memory; with 30-minute recording intervals, the memory capacity is approximately 1.2 years.

Figure 5
Photograph of HOBO Pressure Loggers and Mounting Chamber

Loggers were placed in a mounting chamber and attached to rebar driven into the bed at each location shown in Figure 2. The mounting chamber was constructed of PVC with threaded caps painted black to limit visibility and deter theft or vandalism. Rebar was driven into the bed to a sufficient depth to prevent the loggers from washing away during high flow events.

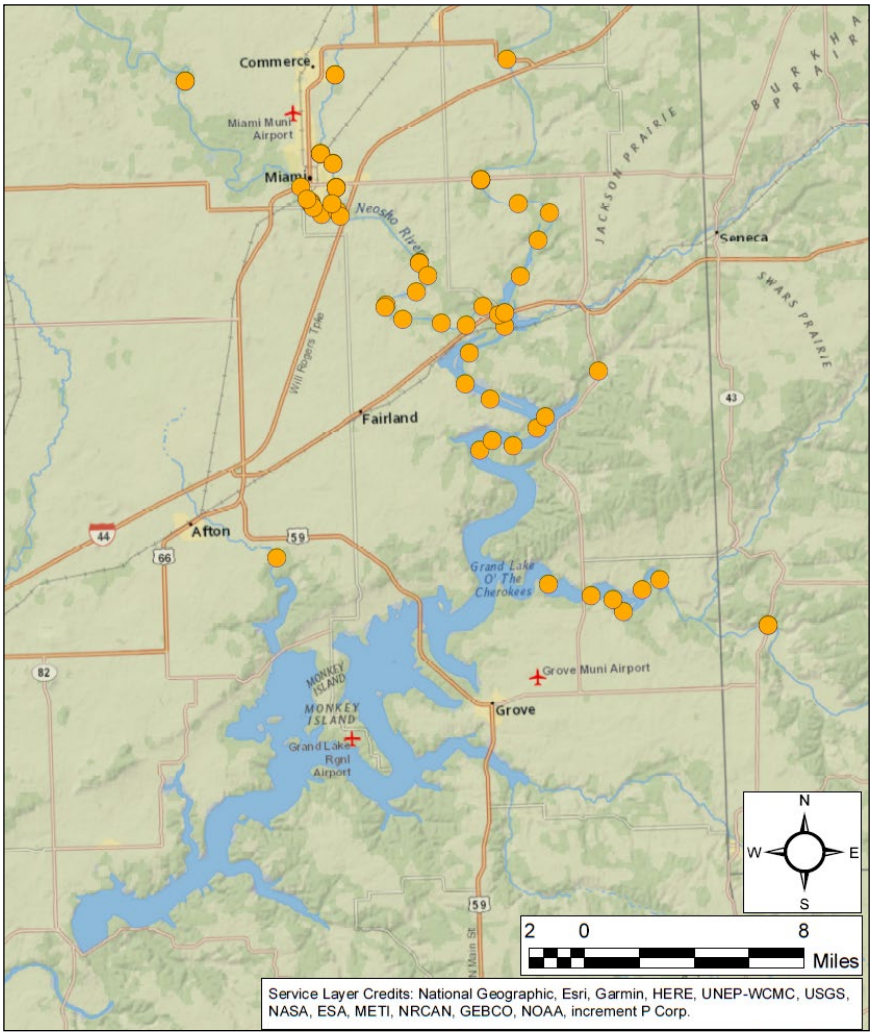
3.1.2.2 Sediment Grab Samples

The study team first collected surface samples of stream sediment throughout the watershed. A total of 62 samples were collected during a visit in December 2019 (Table 4). Figure 6 shows the locations of the sediment samples.

Table 4
Surface Sediment Grab Sampling Locations by River and Reach

Stream	Samples Collected
Neosho River North of Spring River	20
Neosho River South of Spring River	9
Tar Creek	13
Spring River	10
Elk River	8
Sycamore Creek	1
Horse Creek	1

Figure 6
Location of Sediment Grab Sampling Efforts within the Grand Lake Watershed



Samples were collected both in the overbank and in-channel areas. Overbank samples were gathered with shovels while in-channel samples were taken with either a PVC push-core sampler, a shovel, or an Ekman dredge (Figure 7). Once collected, the samples were placed into containers for analysis at the University of Wisconsin Soil and Forage Laboratory (UWSFL) in Marshfield, Wisconsin.

Figure 7
Ekman Dredge Used for In-Channel Sediment Sampling

3.1.2.3 SEDflume Core Sampling

Cohesive sediment cores were collected during the study for erosion testing using SEDflume. Despite initial reports indicating the Grand Lake watershed sediment was dominated by sands (Tetra Tech 2018), field information showed that cohesive sediments were prevalent throughout the basin. As a result, plans were adapted to account for the presence of silts and clays, which are not eroded or transported in the same way as non-cohesive sediments such as sand and gravel.

Sediment transport is generally dictated by bed shear stress. Bed shear is a function of bed slope and water depth. It is essentially a measure of frictional drag on the streambed. At low shear stress, sediment is held in place by gravitational forces. At the point of incipient motion, shear and gravitational forces are essentially balanced; the shear stress in this condition is known as the critical shear stress. Above critical shear, the bed sediment becomes mobile and can be transported. Below critical shear, sediment does not move and may settle out of the water column. Depending on sediment properties, critical shear stress can vary widely, with boulders having high critical shear values and fine sand exhibiting low critical shear stresses.

Non-cohesive sediments such as sand, gravel, and cobbles (Figure 8, top) tend to have easily predictable critical shear stress. It is typically proportional to sediment density and grain size and is relatively constant through the entire sediment layer. Generally, grains move relatively independently of each other. As a result, these sediments are comparatively simple to evaluate and model.

Figure 8
Visual Comparison of Different Sediment Types

Note: Top—non-cohesive sand, gravel, and cobbles; bottom—cohesive silt and clay.

Modeling cohesive sediments is far more complex. Critical shear stress is determined primarily by the cohesive forces between silt and clay particles rather than individual grain sizes. This is complicated by the process of consolidation; as sediment is deposited in an area, it applies force to the underlying layers, compressing them and increasing the cohesion, making them less susceptible to erosion. The amount of time spent on the bed also affects consolidation and critical shear stress. Furthermore, erosion typically occurs as clumps break free of the surrounding sediment. Due to the changing resistance to erosion based on depth and the nature of cohesive sediment transport, it is considerably more difficult to accurately model and requires additional information.

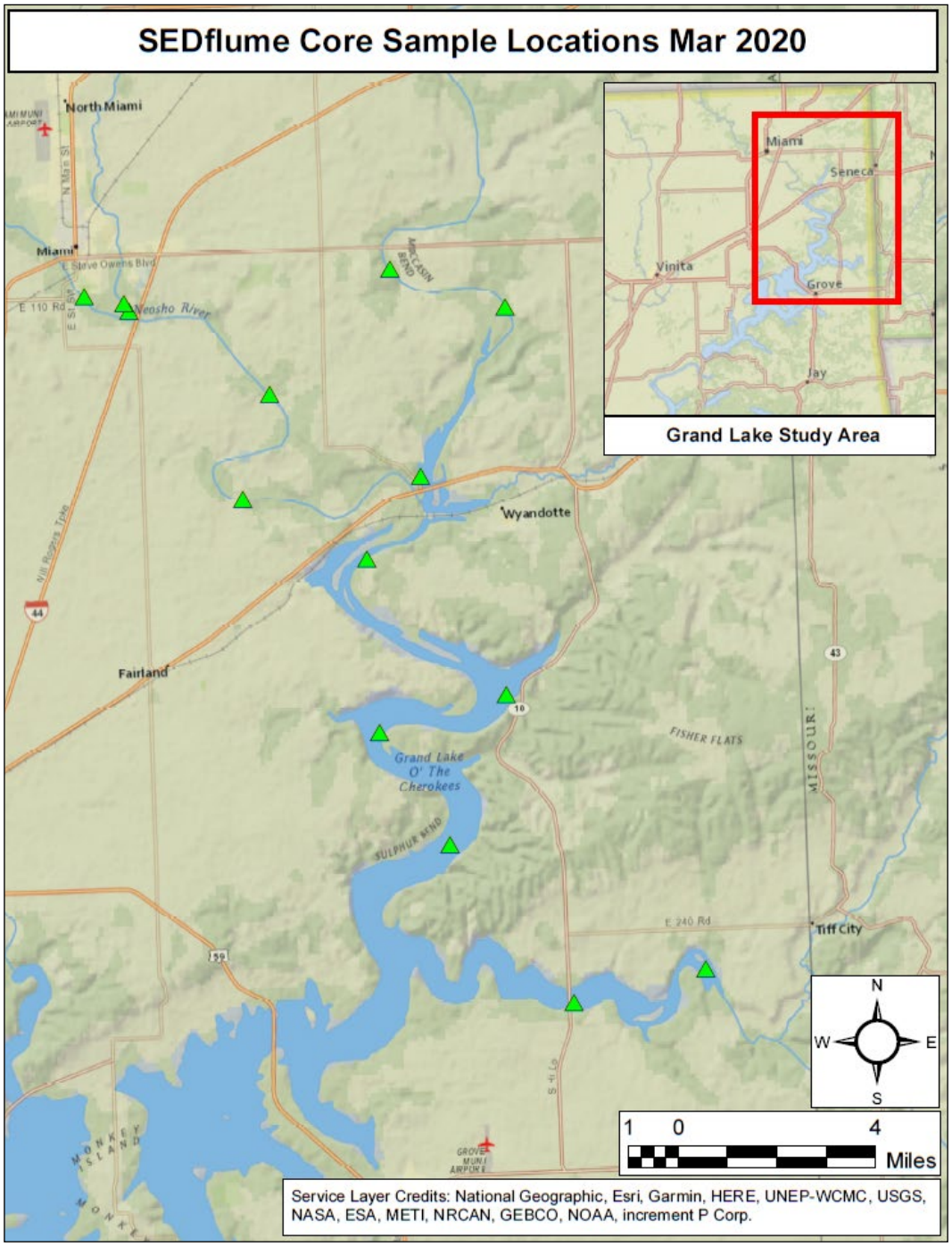
Accurate collection of sediment information can be accomplished through erosion testing on SEDflume (Borrowman et al. 2006; McNeil et al. 1996). The SEDflume testing facility consists of an enclosed flume with a hole in the bed. An undisturbed sediment core sample is placed under the hole, and the surface of the core is raised to be flush with the flume bed. Water is pumped across the sample surface at a known shear stress; as the core erodes, a jack lifts it to keep the surface flush with the flume bed. The rate of erosion is the distance the jack moved per unit time of the test. Bed shear stress can then be increased to evaluate rates at a range of shear values. This test provides information about critical shear stress throughout the sediment core, allowing engineers to evaluate critical shear as a function of depth.

The study team collected core samples for SEDflume analysis in March 2020 (Figure 9). A total of 14 core samples were collected using a box push-core system (Figure 10). The box core was a clear plastic sleeve, which was pressed into the sediment bed. A pressure relief valve at the top of the core allowed air and water to escape as the core sank into the streambed. The resulting suction pressure kept the sample inside the sleeve as it was raised back to the water surface. The sample was then measured, sealed, and transported to the test laboratory for analysis.

Figure 9
SEDflume Core Sampling

Note: Left—technician pulling box core rig out of the bed; center—box core showing sediment fill and measuring depth of sample; right—several collected samples before shipment to the test facility.

Figure 10
Locations of SEDflume Core Samples Collected During the Sediment Investigation



SEDflume analysis also provided particle size analysis. During testing, Integral Consulting used a Beckman Coulter LS particle size analyzer over a range of depths below the surface of the core for each sample.

3.1.2.4 Sediment Transport Measurements

Sediment transport measurements were also included in the sediment study. These consisted primarily of two forms of data: SSC and bedload transport quantification. Bedload samples were collected immediately following SSC sampling at each site. Dates of sampling efforts and discharges are provided in Table 5.

Table 5
Sampling Dates and Discharge Measurements, per USGS Gaging Station Records

Date	Discharge (cfs)			
	USGS 07185000 Neosho River at E 60 Rd	**USGS 07185090 Tar Creek at Hwy 69**	**USGS 07188000 Spring River at E 57 Rd**	**USGS 07189000 Elk River at Hwy 43**
August 2019	15,500	10.0	1,240	537
May 2020	37,500	*	8,040	4,940
July 2020	2,930	5.29	3,480	*
April 2021	2,330	*	2,250	*
May 2021	18,900	750	16,500 23,400**	*

Notes:
*Samples not taken at this location
**Spring River was sampled twice during the May 2021 site visit

3.1.2.4.1 Suspended Sediment Concentration

A D-74 depth-integrating water sampler was used to collect SSC samples (Figure 11). This sampler features a finned body with a nozzle pointing upstream and a vent pointing downstream. As it is lowered into the water, flow is allowed through the nozzle and into a sampling bottle. The sampler is lowered into the stream until it reaches the bed, then is raised; this is all done at a constant speed. Based on flow conditions at the site, researchers have an array of nozzle sizes and travel speeds to choose to ensure valid data (USGS 2006).

Figure 11
Sampling Equipment Used During SSC Sampling Efforts

Notes: The D-74 Water Sampler is attached to the crane, and the SonTek M9 ADCP used to measure stream flows is in the lower right. Samples are placed in the carrier at left after collection.

Anchor QEA followed standard USGS protocols for equal width interval water sampling (USGS 2006). The field technicians used a SonTek M9 ADCP to measure current profiles at each site before sampling began. Based on flow velocities and patterns, they selected appropriate nozzle sizes and descent and ascent velocities for the D-74 sampler following USGS standard procedures (USGS 2006). Following nozzle installation, a calibrated winch lowered the sampler to the stream and raised it at the specified rates. Samples were then capped and sent to the Wisconsin State Laboratory of Hygiene (WSLH) for SSC analysis.

3.1.2.4.2 Bedload Transport

Anchor QEA used a Helley-Smith bedload sampler (Figure 12) to collect bedload transportation measurements. Sampling sites were the same as those used for SSC measurements to ensure capture of all sediment (SSC and bedload) moving through the system under given flow conditions. The Helley-Smith sampler sits on the streambed with a rectangular opening pointed upstream. Saltating, sliding, and rolling sediment is transported at the bed surface into the opening and trapped in a

mesh bag. USGS documentation provides guidelines for the use of this equipment; Anchor QEA followed USGS procedures (Edwards and Glysson 1999) to collect bedload sediment during site visits (Table 5).

Figure 12
Bedload Transport Measurements Collected Using the Helley-Smith Sampler

3.1.3 Field Results

3.1.3.1 Water Surface Records

Anchor QEA has visited the site several times to collect and redeploy pressure loggers. Trips to collect WSE monitoring data were performed according to Table 6.

Table 6
WSE Monitoring Site Visit Dates and Logger Retrieval Rates

Date	Loggers Recovered
December 2016	16 Deployed
August 2017	13 of 16
March 2018	2 of 16
April 2019	12 of 16
December 2020	13 of 16

Anchor QEA retrieved the loggers on an approximately annual basis. Upon arrival at each monitoring station, Anchor QEA staff collected Real-Time Kinematic Global Positioning System measurements of the WSE and surveyed any nearby benchmarks. The loggers were collected, and data were read from them using an optic USB interface. They were then relaunched and placed back in the field; staff measured depth to the loggers and depth to bed before leaving the site. After all loggers were retrieved, the data was processed to produce WSE readings from the pressure data.

The loggers recorded raw pressure measurements that had to be converted to water depths and then WSE. Because pressure readings include both water pressure and atmospheric pressure, it was first necessary to subtract ambient air pressure from the measurements. Records from the Grove Municipal Airport provided atmospheric pressure readings for processing. Computer scripts were used to subtract the raw readings to water pressure measurements; water density was then used to estimate the depth of the sensors according to the following equation:

Equation 1

$$h = \frac{P}{\rho g}$$

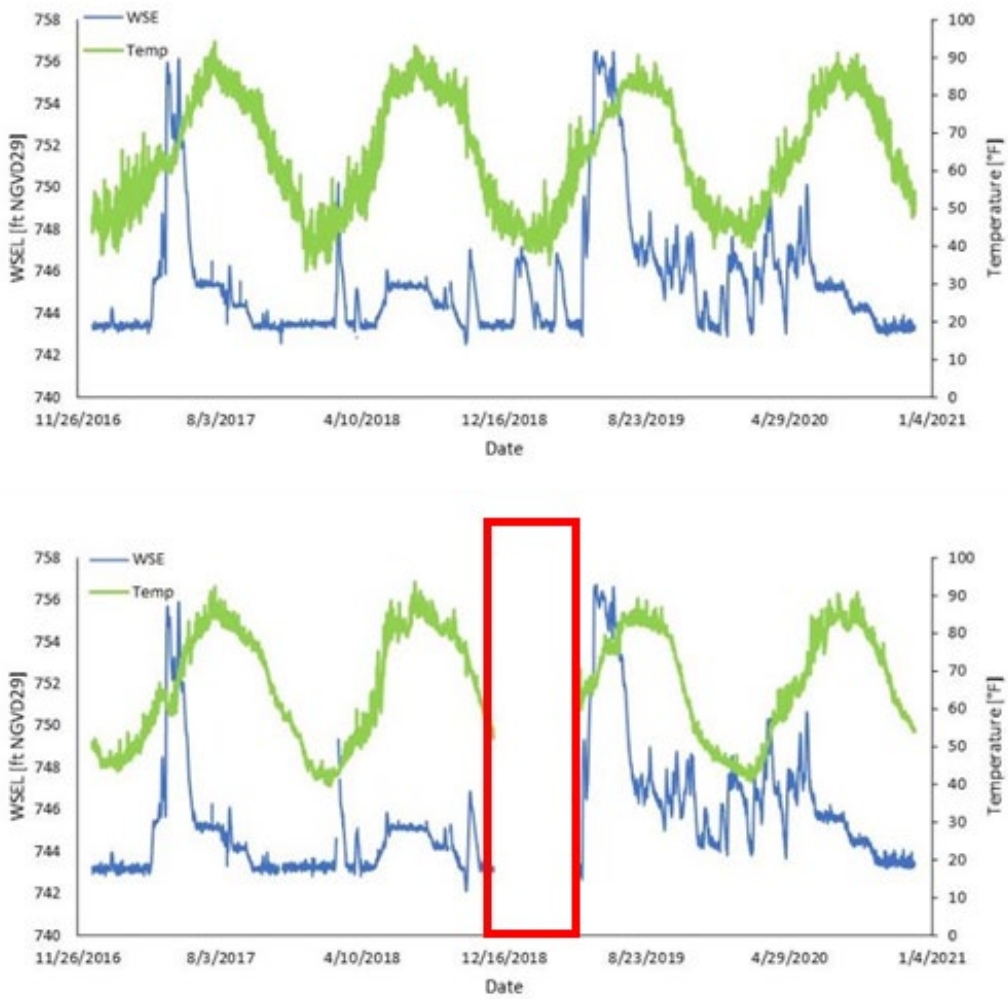
where:

h	=	water depth
P	=	pressure
ρ	=	water density
g	=	acceleration due to gravity

Once water depths were established at the time of retrieval, logger elevation was set based on the measured WSE and recorded depth; data throughout the period of record were thus converted from the raw pressure recordings to WSE measurements (Figure 13).

Several loggers had data gaps in the record. At various sites, the loggers were washed away or vandalized, which prevented recovery. One additional data gap was due to an unforeseen high water event that prevented recovery until after internal storage had been filled. Full datasets are available in Appendix A.

Figure 13
Sample Series



Note: Top: complete dataset; bottom: gap in record.

3.1.3.2 Sediment Grain Size Analysis

Following the December 2019 sediment grab sample collection, Anchor QEA sent 62 sediment samples to the UWSFL for grain size analysis. The results of the analysis indicated a bi-modal size distribution, with a majority of streambed sediments consisting of gravels and coarse sediments and

a majority of lakebed sediments composed of silt and clay. The results showed limited volumes of sand in either stream or lake sediments with most of the lakebed being finer than sand and most of the riverbed being coarser than sand (Figure 14).

Figure 14
Particle Size Distributions within the Grand Lake Study Area

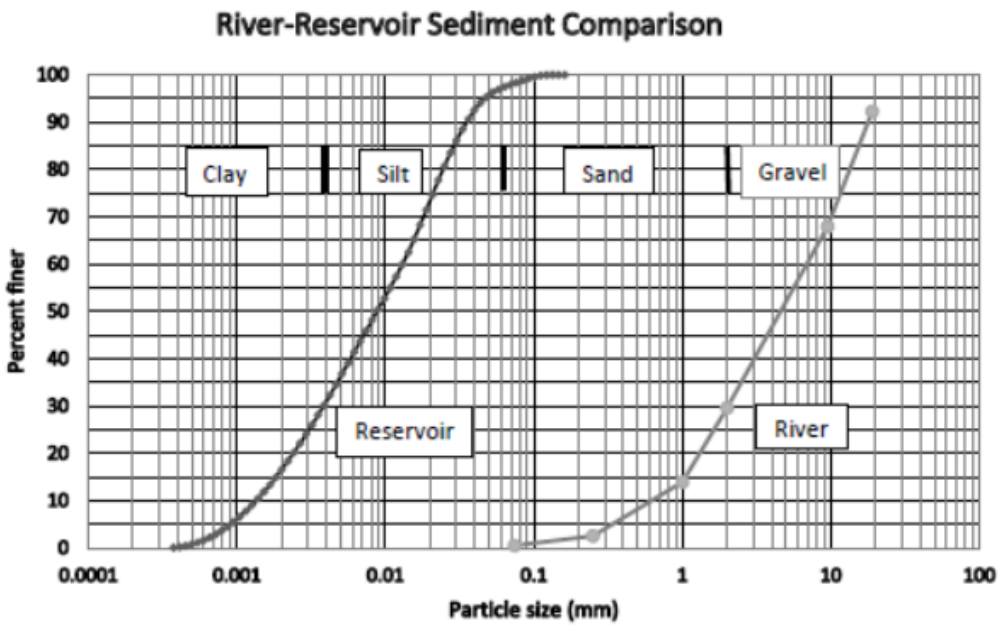


Figure 15
Sample Photographs Showing the Sediment in the Spring River, Tar Creek, Elk River, and Neosho River

Note: Clockwise from top left, the Spring River, Tar Creek, Elk River, and Neosho River.

As shown in Figure 15, the beds of these streams consist primarily of gravel, with some sand. The surface of the streambeds appears to be armored by gravel and (in the case of areas of Tar Creek), larger particles. Hydraulic and sediment transport analyses, based on particle size distributions, will determine the extent to which these particles may be transported downstream into the reservoir.

Farther downstream, as the tributaries transition into lacustrine conditions, the character of the bed material changes dramatically. Samples collected from the reservoir bed appear to consist primarily of silt and clay (Figure 16).

Figure 16
Sediment Grab Samples Collected from the Reservoir Bed in Grand Lake

Full results for each sample are presented in Appendix B. These results show the significant variability in particle size distributions from reach to reach within streams and even significant differences between samples taken in close proximity.

3.1.3.3 SEDflume Test Results

SEDflume samples were tested by Integral Consulting at their Santa Cruz, California laboratory. Testing was performed according to the procedures described by McNeil et al. (1996) and Borrowman et al. (2006). The laboratory analysis of the samples included evaluation of erosion parameters, grain size distributions, and bulk density of the samples.

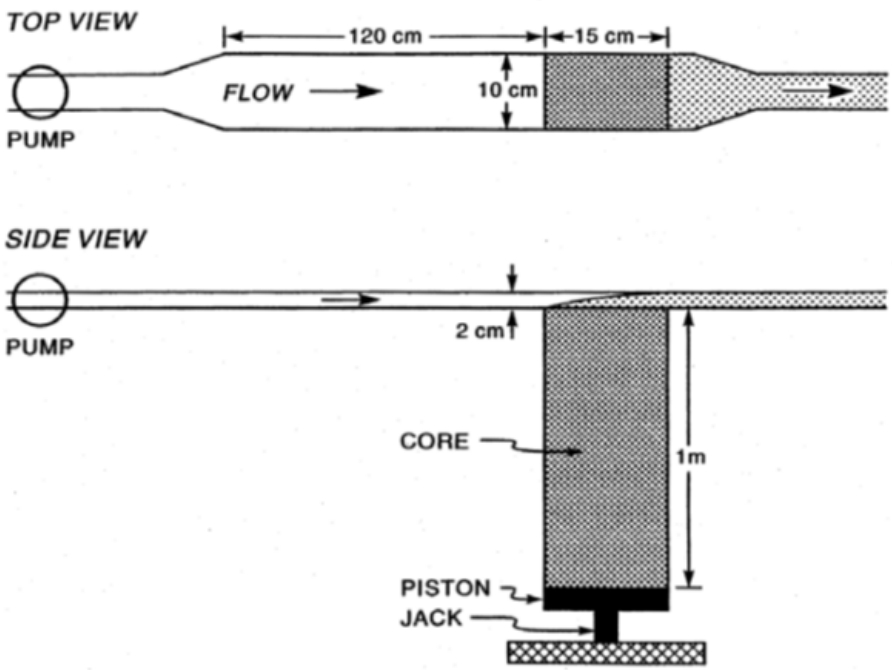
3.1.3.3.1 Erosion Parameter Analysis

Erosion of cohesive sediment is quantified by two key parameters: critical shear stress at which erosion begins, and the rate of erosion as a function of increasing shear stress greater than critical shear. A standard technology, SEDflume, has been developed to measure these parameters. The SEDflume is described as follows:

> A SEDflume is essentially a straight flume with an open bottom section through which a rectangular, cross-sectional core barrel containing sediment can be inserted (Figure [17]). The main components of the flume are the water tank, pump, inlet flow converter (which establishes uniform, fully developed, turbulent flow), the main duct, test section, hydraulic jack, and the core barrel containing sediment (Figure [18]). The core barrel, test section,

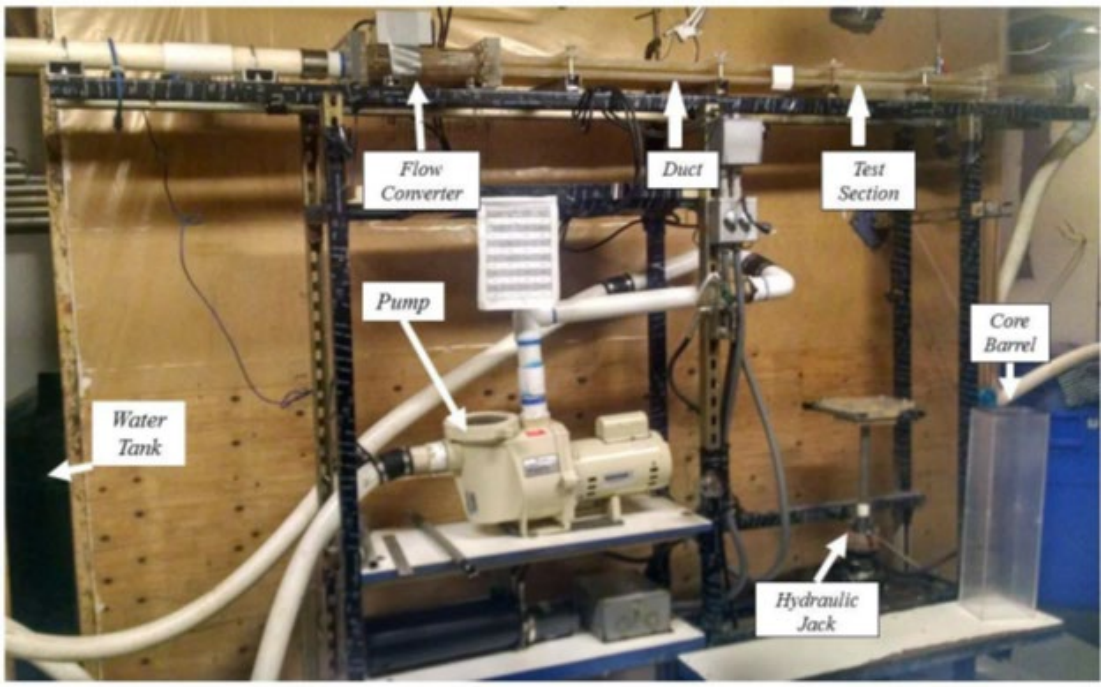
flow inlet section, and flow exit section are made of transparent acrylic so that the sediment–water interactions can be observed visually. The core barrel has a rectangular cross section, 10 by 15 cm, and a length of 60 cm. (Integral Consulting 2020)

Figure 17
SEDflume Schematic Showing Top and Side Views



Source: Integral Consulting 2020

Figure 18
Photograph of SEDflume Test System



Source: Integral Consulting 2020

In their report, Integral Consulting describes the process of conducting the laboratory testing with SEDflume.

> At the start of each test, a core barrel and the sediment it contains are inserted into the bottom of the test section. The sediment surface is aligned with the bottom of the SEDflume channel. When fully enclosed, water is forced through the duct and test section over the surface of the sediment. The shear stress produced by the flow and imparted on the particles causes sediment erosion. As the sediment on the surface of the core erodes, the remaining sediment in the core barrel is slowly moved upward so that the sediment–water interface remains level with the bottom of the flume. (Integral Consulting 2020)

They then describe the process of taking measurements to develop critical shear and erosion rate data.

> At the start of each core analysis, an initial reference measurement is made of the starting core length. The flume is then operated at a specific flow rate corresponding to a particular shear stress, and sediment is eroded (McNeil et

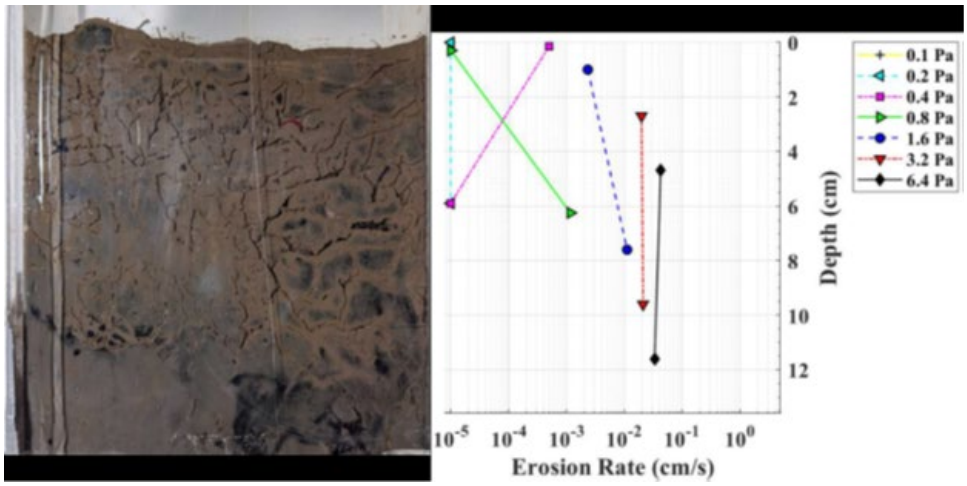
al. 1996; Jepsen et al. 1997). As erosion proceeds, the core is raised if needed to keep the core's surface level with the bottom of the flume. This process is continued until either 10 minutes has elapsed or the core has been raised roughly 2 cm. (Integral Consulting 2020)

As the flow rate is increased through the flume and as sediment begins to erode from the surface of the core, this determines the critical shear value above which erosion occurs and below which no erosion occurs. Once the critical shear value is determined for that layer of sediment, the flow rate through the flume is increased and erosion measured over a range of flow or shear stresses. This process is repeated at different levels of the core sample below the surface to develop the critical shear and erosion rates through the depth of the sample. Tabulated results for each of the streams showing the critical shear erosion parameters determined using SEDflume can be seen in Tables 7 through 10, whereas Figures 19 through 22 show the erosion rates at the various applied shear stresses over the depth of the core sample for the associated streams.

Table 7
Physical Properties and Derived Critical Shear Stresses of SEDflume Sample NR-130 (Neosho River)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	τ_{no} (Pa)	τ_1 (Pa)	τ_c Linear (Pa)	τ_c Power (Pa)	Final Critical Shear (Pa)
0.0	8.34	1.49	0.84	3.7	0.2	0.4	0.84	0.33	0.33
5.9	5.20	1.56	1.01	6.8	0.4	0.8	0.44	0.29	0.40
8.6	7.01	1.64	1.10	5.0	---	---	---	---	---
Mean	6.85	1.56	0.98	5.2	0.3	0.6	0.64	0.31	0.37

Figure 19
Photograph of Core NR-130 (Neosho River) Aligned with Applied Shear Stresses and Associated Erosion Rates

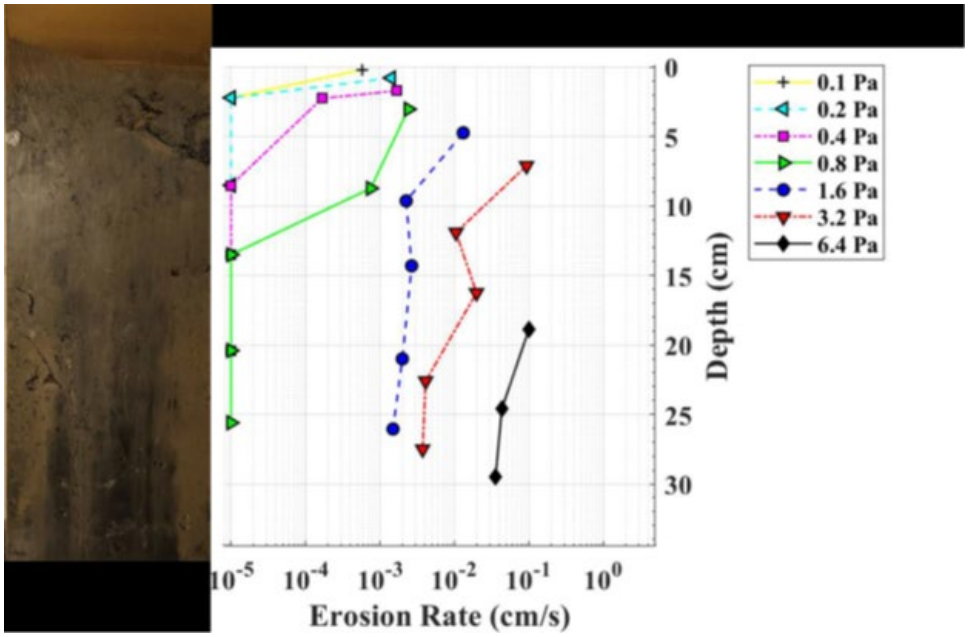


Source: Integral Consulting 2020

Table 8
Physical Properties and Derived Critical Shear Stresses of SEDflume Sample TC-DS (Tar Creek)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	τ_{no} (Pa)	τ_1 (Pa)	τ_c Linear (Pa)	τ_c Power (Pa)	Final Critical Shear (Pa)
0.0	7.99	1.15	0.34	8.0	0.05	0.1	0.06	0.04	0.05
2.2	9.76	1.27	0.53	7.7	0.2	0.4	0.32	0.32	0.32
8.5	8.72	1.20	0.43	8.7	0.4	0.8	0.46	0.40	0.40
13.5	10.64	1.40	0.72	5.8	0.8	1.6	0.83	0.71	0.80
20.4	9.37	1.41	0.74	5.8	0.8	1.6	0.84	0.73	0.80
25.6	7.91	1.47	0.84	5.3	0.8	1.6	0.86	0.76	0.80
Mean	9.07	1.32	0.60	6.9	0.5	1.0	0.56	0.49	0.53

Figure 20
Photograph of Core TC-DS (Tar Creek) Aligned with Applied Shear Stresses and Associated Erosion Rates

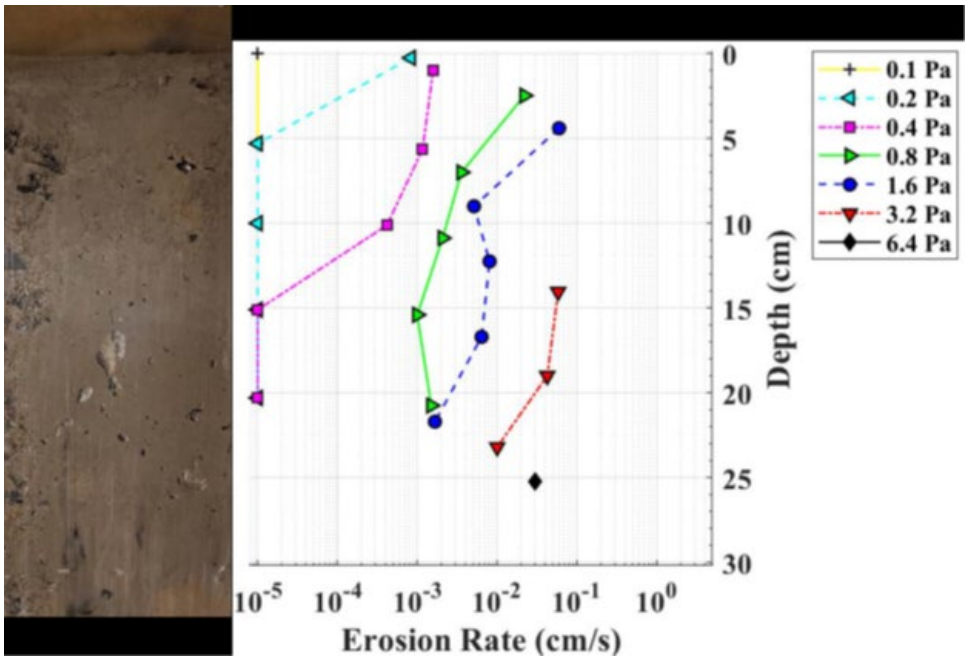


Source: Integral Consulting 2020

Table 9
Physical Properties and Derived Critical Shear Stresses of SEDflume Sample SR-100 (Spring River)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	τ_{no} (Pa)	τ_1 (Pa)	τ_c Linear (Pa)	τ_c Power (Pa)	Final Critical Shear (Pa)
0.0	13.20	1.13	0.34	11.6	0.1	0.2	0.12	0.11	0.11
5.3	112.80	1.26	0.57	12.1	0.2	0.4	0.22	0.16	0.20
10	6.22	1.38	0.70	6.8	0.2	0.4	0.25	0.24	0.24
15.1	13.00	1.34	0.65	8.1	0.4	0.8	0.45	0.41	0.41
20.3	9.37	1.35	0.68	8.2	0.4	0.8	0.43	0.32	0.40
Mean	30.92	1.29	0.59	9.4	0.3	0.5	0.29	0.25	0.27

Figure 21
Photograph of Core SR-100 (Spring River) Aligned with Applied Shear Stresses and Associated Erosion Rates

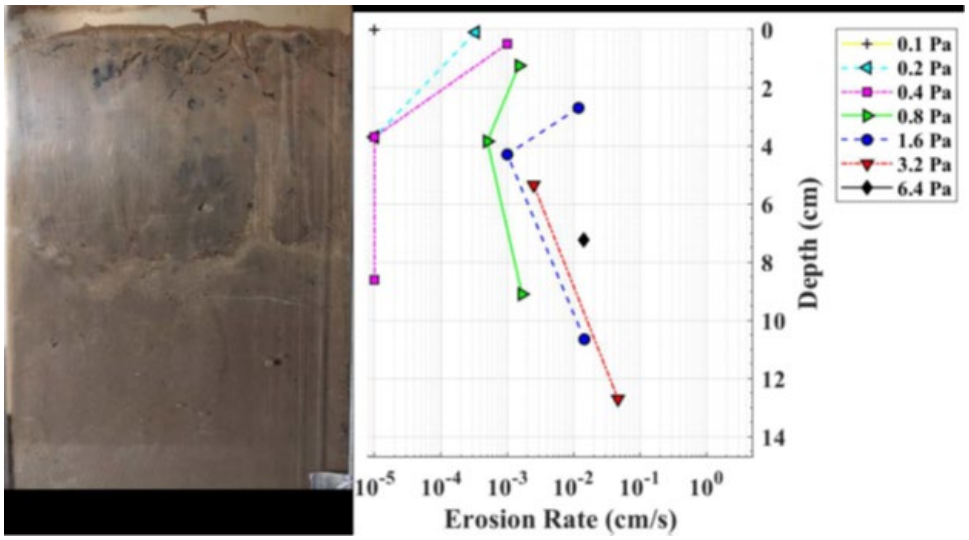


Source: Integral Consulting 2020

Table 10
Physical Properties and Derived Critical Shear Stresses of SEDflume Sample ER-680 (Elk River)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	τ_{no} (Pa)	τ_1 (Pa)	τ_c Linear (Pa)	τ_c Power (Pa)	Final Critical Shear (Pa)
0.0	18.95	1.39	0.68	3.4	0.1	0.2	0.13	0.12	0.12
3.7	32.96	1.70	1.16	2.9	0.4	0.8	0.48	0.42	0.42
8.6	16.32	1.66	1.11	3.0	0.4	0.8	0.43	0.37	0.40
13.7	23.18	1.54	0.94	4.2	---	---	---	---	---
Mean	22.85	1.57	0.97	3.4	0.3	0.6	0.35	0.30	0.31

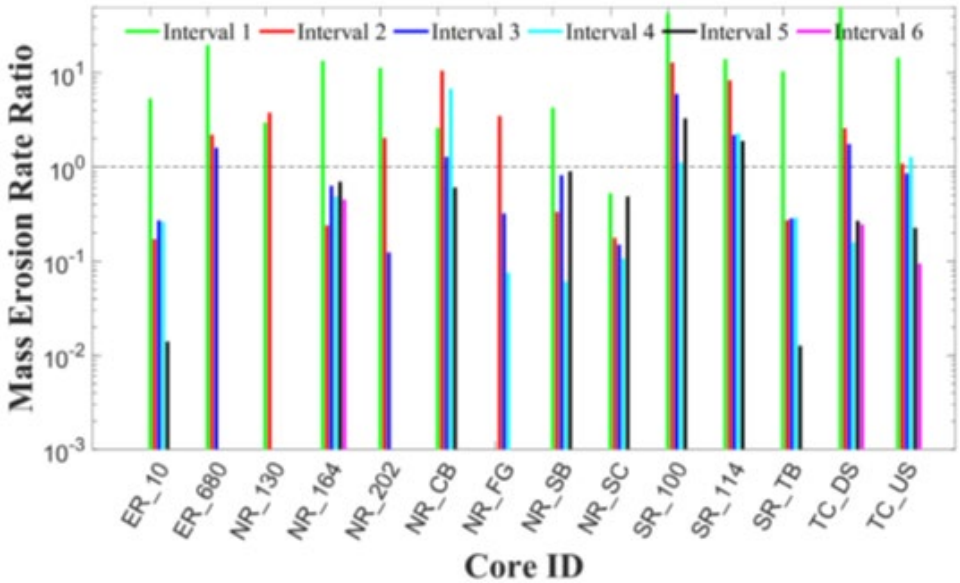
Figure 22
Photograph of Core ER-680 (Elk River) Aligned with Applied Shear Stresses and Associated Erosion Rates



Source: Integral Consulting 2020

A summary of erosion rates ratios developed by Integral Consulting (Figure 23) shows that erosion rates generally are significantly lower at deeper locations in the sediment columns than at the surface. Interval 1 refers to the top layer of the sediment cores, with each subsequent interval representing a deeper layer of material. Exact interval thicknesses vary, though most are 5 centimeters (cm) or less.

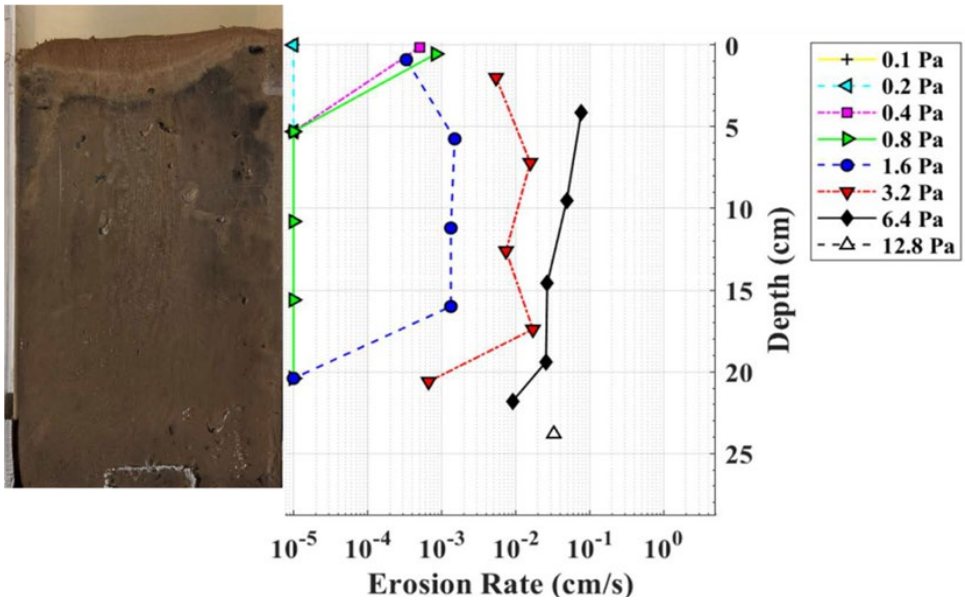
Figure 23
Intracore Erosion Rate by Interval for Each SEDflume Core Sample



The results of the tests showed expected critical shear patterns. Sediment near the top of the column is more recently deposited and therefore has had less time to consolidate; in general, it is more easily eroded. Lower in the sediment column, the particles have consolidated over time and under higher pressures due to the overlying material; critical shear stress is generally higher as one moves deeper into the core sample.

It is important to understand the high degree of variability of erosion rates as a function of depth below the sediment surface by looking at an example. A sample of the data are shown in Figure 24. The photograph on the left allows visual inspection of the core sample before erosion; the chart on the right provides erosion rate as a function of depth and applied shear stress. It indicates more resistance to erosion at deeper levels of the soil column. For example, at 0.4 pascal (Pa) of shear stress, the surface material eroded at a rate of approximately 4×10^{-3} centimeters per second (cm/s), but at 5 cm of depth, erosion was significantly lower (approximately 10^{-5} cm/s) for the same shear stress.

Figure 24
Example SEDflume Analysis Results



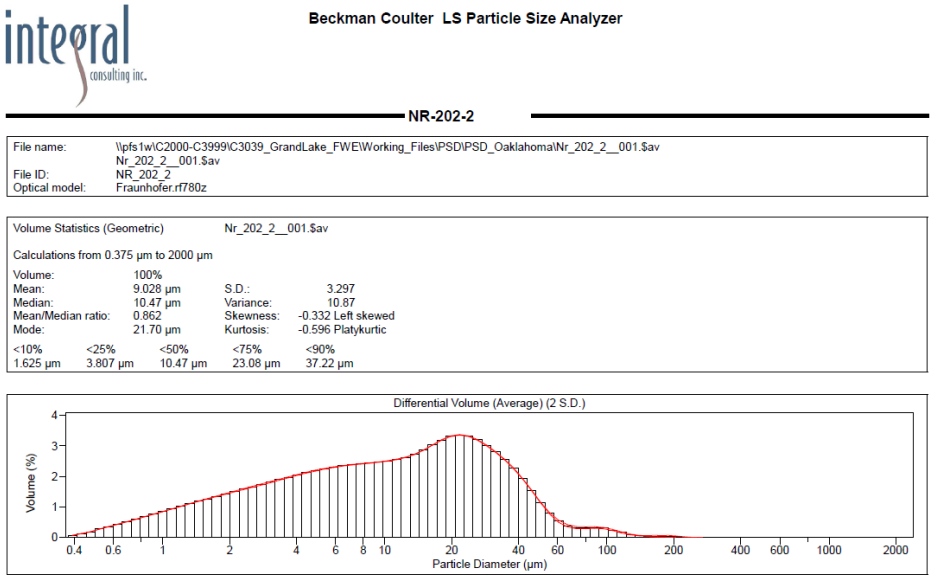
Note: Left: image of sediment core before erosion testing; right: graphical dataset showing erosion rates as a function of bed shear stress and depth in sediment column.
Source: Integral Consulting 2020

This example and the previous summary of intracore erosion rates show a variation of several orders of magnitude over the depth of samples. This extreme variability affects the development of reasonable erosion parameters to be used in the STM.

3.1.3.3.2 Sediment Particle Size Analysis

During erosion of the samples, the testing facility used a Beckman Coulter LS particle size analysis system to collect sediment grain size information (Integral Consulting 2020). An example of the output is provided in Figure 25.

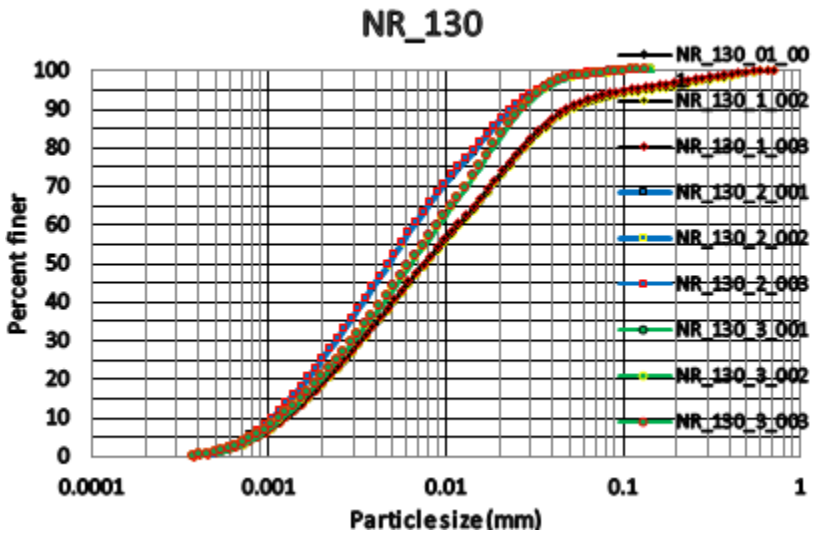
Figure 25
Sample Particle Size Analysis Output from SEDflume Analysis



Source: Integral Consulting 2020

The particle count analysis shows that most of these samples consist of silt- and clay-sized particles. These data were developed into particle size distribution curves relating sediment size to the percentage of the sample finer than the individual sizes to cover the entire range of sediment sizes in the sample. Figure 26 presents an example of this type of graph. A complete set of particle size distribution graphs for the samples is found in Appendix C.

Figure 26
Sample Particle Size Analysis Output from SEDflume Analysis Showing Cumulative Percent Finer Values for Core NR-130 (Neosho River)



3.1.3.3.3 Sediment Deposit Bulk Density Analysis

A key factor in understanding silt and clay deposits is the density of sediment and how it varies vertically in the sediment column. Density, along with erodibility and the particle size distribution, are critical parameters for evaluating fluvial transport of this type of sediment.

While density of sand and gravel deposits fits into a relatively narrow band and does not vary significantly over time, sediment deposits of silt and clay generally settle out of the water column at a low density and then gradually increase in density over time as water is compressed out of the sediment column. As more sediment deposits over the original layers, density of lower layers increases; the consolidation process continues over time until a maximum value is reached. In some situations, this can result in the formation of sedimentary rock such as claystone or shale.

As discussed above, this process also affects the strength or erodibility of sediment. The deeper, more consolidated layers tend to exhibit higher critical shear stress values than the more recently deposited layers near the bed surface.

Density is also the link between sediment transport and deposition. Incoming sediment load is quantified in weight (i.e., tons per day as the unit of sediment transport), while sediment deposition as measured by survey is defined in terms of volume. In the case of reservoir sediment deposits, the deposited volume can vary considerably over time and with the depth of the sediment layer.

Sediment density of the upper layer of the sediment deposit was determined in the analysis of sediment cores. Table 11 summarizes the range of sediment density values for the core samples.

Table 11
Density Results from Top Layer Testing of SEDflume Samples

Sediment Core	Min Dry Density		Max Dry Density		Mean Dry Density (pcf)
	pcf	% of Mean	pcf	% of Mean	
SED-ER-10	28.7	66.7	48.7	113.0	43.1
SED-ER-680	42.5	70.1	72.4	119.6	60.6
SED-NR-130	52.4	85.7	68.7	112.2	61.2
SED-NR-164	76.2	81.9	103.0	110.7	93.0
SED-NR-202	27.5	63.8	53.1	123.2	43.1
SED-NR-CB	37.5	74.1	64.9	128.4	50.6
SED-NR-FG	73.0	90.0	85.5	105.4	81.2
SED-NR-SB	30.6	62.8	62.4	128.2	48.7
SED-NR-SC	48.7	88.6	61.2	111.4	54.9
SED-SR-100	21.2	57.6	43.7	118.6	36.8
SED-SR-114	32.5	69.3	54.9	117.3	46.8
SED-SR-TB	29.3	73.4	46.2	115.6	40.0
SED-TC-DS	21.2	56.7	52.4	140.0	37.5
SED-TC-US	30.0	75.0	46.2	115.6	40.0
Minimum	21.2	56.7	43.7	105.4	36.8
Mean	39.4	72.6	61.7	118.5	52.7
Maximum	76.2	90.0	103.0	140.0	93.0

The summary table shows a significant degree of variability for the dry density values for the sediment cores. For example, the minimum dry density ranges from 21.2 to 76.2 pounds per cubic foot (pcf), and the maximum dry density ranges from 43.7 to 103 pcf. For reference, the bulk density of water is 62.4 pcf and solid rock at a specific gravity of 2.65 is 165.4 pcf. Laboratory results for each individual sample analysis are found in Appendix C. Preliminary assessment of the data does not reveal any readily apparent spatial trends in sediment density.

Sediment density may be correlated with depth below the surface of the sediment deposit due to the consolidation process as fine sediment deposits generally compress over time. Tables 12 through 15 display the sediment density from the SEDflume samples in relation to sample depth for each of the streams. Corresponding graphs (Figures 27 through 30) of sediment density with depth below the sediment surface for each stream show this general trend (noting that 1 gram per cubic centimeter [g/cm^3] is equivalent to 62.4 pcf—the density of water). Also shown on the graphs are D_{10}, D_{50}, and D_{90} (the sediment grain diameters that are larger than 10%, 50%, and 90% of the total sample, respectively) to give some perspective on sediment sizes found in the samples.

Table 12
Physical Properties of SEDflume Sample NR-130 (Neosho River)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)
0.0	8.34	1.49	0.84	3.7
5.9	5.20	1.56	1.01	6.8
8.6	7.01	1.64	1.10	5.0
Mean	6.85	1.56	0.98	5.2

Figure 27
Physical Properties of SEDflume Sample NR-130 (Neosho River) with Depth

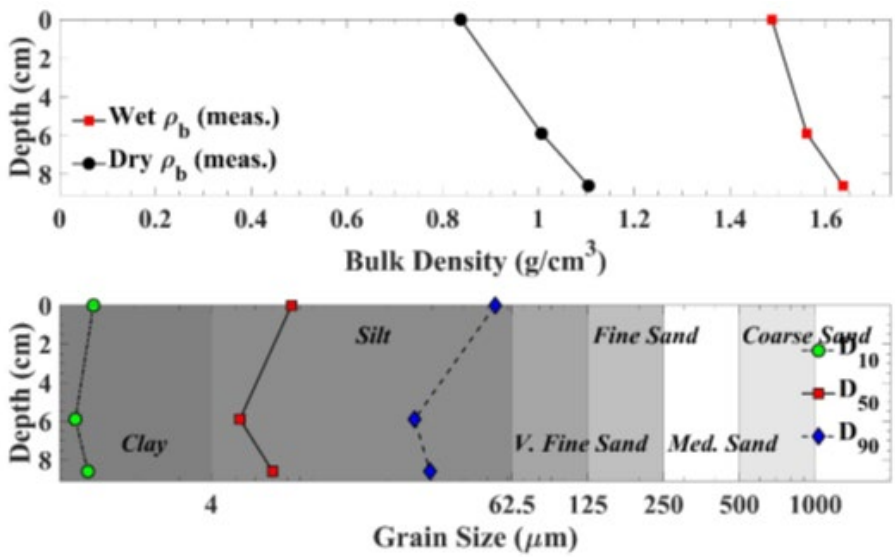


Table 13
Physical Properties of SEDflume Sample SR-100 (Spring River)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)
0.0	13.20	1.13	0.34	11.6
5.3	112.80	1.26	0.57	12.1
10.0	6.22	1.38	0.70	6.8
15.1	13.00	1.34	0.65	8.1
20.3	9.37	1.35	0.68	8.2
Mean	30.92	1.29	0.59	9.4

Figure 28
Physical Properties of SEDflume Sample SR-100 (Spring River) with Depth

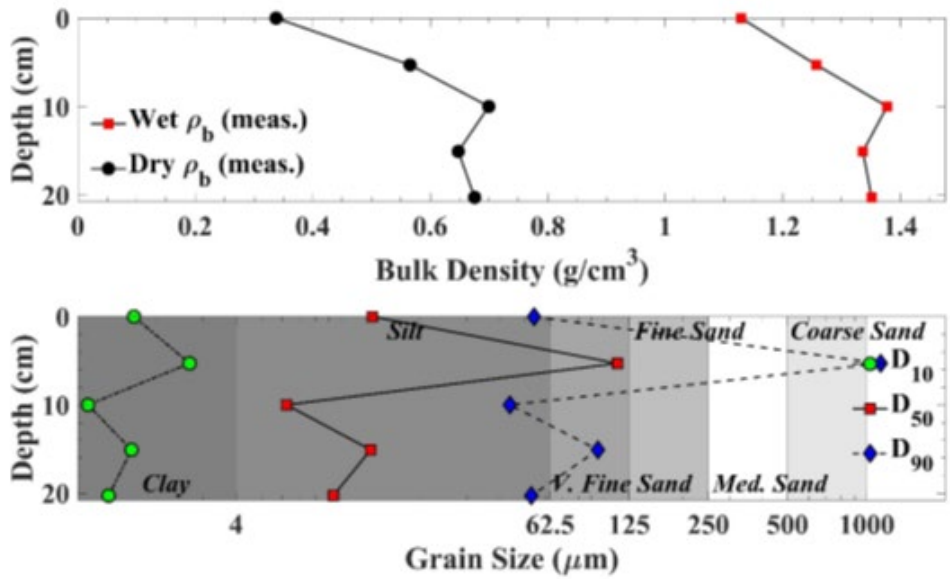


Table 14
Physical Properties of SEDflume Sample TC-DS (Tar Creek)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)
0.0	7.99	1.15	0.34	8.0
2.2	9.76	1.27	0.53	7.7
8.5	8.72	1.20	0.43	8.7
13.5	10.64	1.40	0.72	5.8
20.4	9.37	1.41	0.74	5.8
25.6	7.91	1.47	0.84	5.3
Mean	9.07	1.32	0.60	6.9

Figure 29
Physical Properties of SEDflume Sample TC-DS (Tar Creek) with Depth

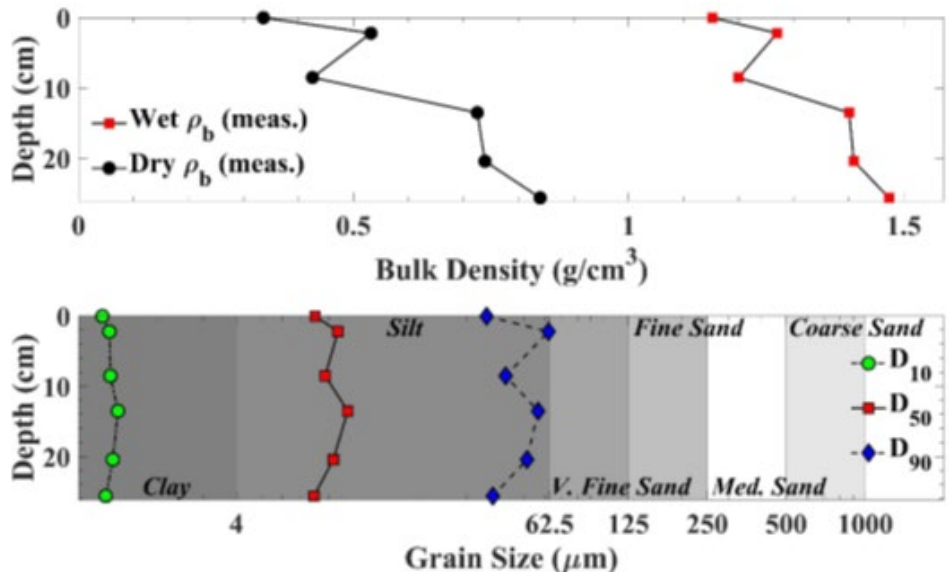
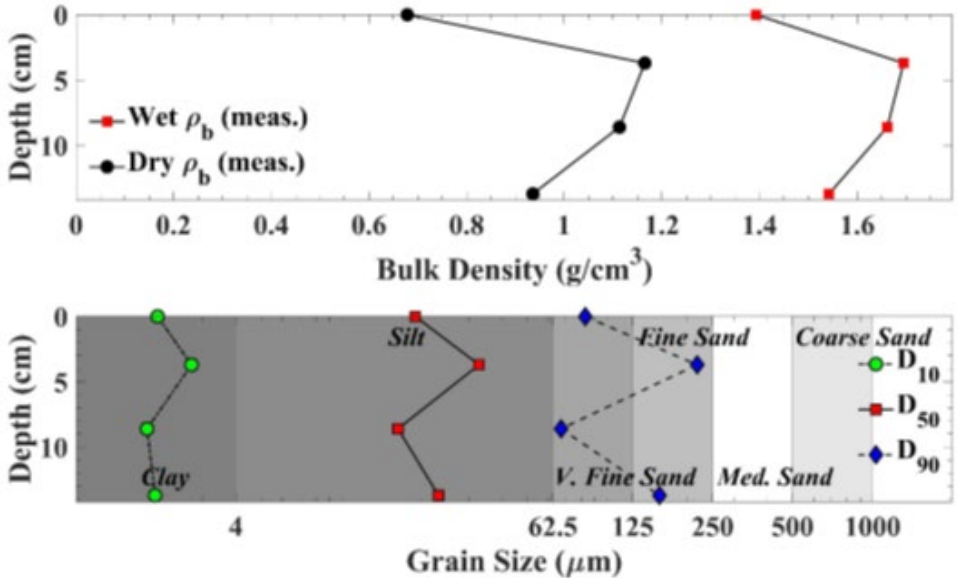


Table 15
Physical Properties of SEDflume Sample ER-680 (Elk River)

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)
0.0	18.95	1.39	0.68	3.4
3.7	32.96	1.70	1.16	2.9
8.6	16.32	1.66	1.11	3.0
13.7	23.18	1.54	0.94	4.2
Mean	22.85	1.57	0.97	3.4

Figure 30
Physical Properties of SEDflume Sample ER-680 (Elk River) with Depth



3.1.3.4 Sediment Transport Measurements

Sediment transport samples were collected during several site visits and delivered to appropriate laboratories for analysis.

3.1.3.4.1 Suspended Transport Results

SSC samples were processed by the WSLH. Sample analysis evaluated both total sediment concentration as well as concentration of sediment with grain sizes less than 63 micrometer (µm; upper limit of silt-sized particles) to assess the percentage of cohesive sediments moving through the system in suspension.

Several samples produced erroneous results due to laboratory processing errors, with cohesive sediment concentrations higher than total sediment concentrations. These results were discarded. Across all samples, particles smaller than 63 µm accounted for 82% of all suspended sediment.

Full reports of SSC sample analysis can be found in Appendix D.

3.1.3.4.2 Bedload Transport Results

During each SSC sampling trip, Anchor QEA collected bedload transportation measurements as well. At no point did the Helley-Smith sampler bag collect any sediment particles. Flow rates during sampling efforts are shown in Table 5. Data collected to date indicate that for the vast majority of flow conditions experienced on these rivers, very little bedload transport occurs. Bed material particle size distributions, coupled with shear stress calculations over a wider range of flows and standard STM parameters for non-cohesive sediment sizes will be used in the model to develop a more

complete understanding of the relative contribution of bedload transport. Initial indications are that bedload transport does not represent a significant contribution to the overall sediment transport into Grand Lake.

3.1.4 Discussion

The field campaign provided valuable insights for the sediment study. Initial understanding of the reservoir indicated the system was dominated by sand and gravel sediments (Mussetter 1998; Tetra Tech 2018). While that appears to be the case in the riverine components of the overall system, field work results have found cohesive silts and clays play a far more important role than initially anticipated.

The relative dearth of bedload sediment transport and comparatively high concentrations of fines moving in suspension through the watershed have indicated a need to focus extra resources on silt- and clay-sized sediment modeling. Because silt and clay deposits typically exhibit cohesive characteristics along with several other complicating factors, increases the complexity of the overall sediment study and associated modeling tasks. *Modeling Sediment Movement in Reservoirs* prepared by the United States Society on Dams Committee on Hydraulics of Dams, Subcommittee on Reservoir Sedimentation (USSD 2015), presents a discussion of the issues associated with cohesive sediments. Some of the challenges are related to changing density over time through the process of consolidation; others are related to the fact that cohesive sediment particle motion is determined primarily by electrochemical surface forces rather than gravity forces which dominate sand and gravel motion. Further complicating the development of appropriate input data and parameters is the fact that the data show a wide degree of variability from sample to sample and location to location.

To develop the necessary information additional efforts for sediment core sampling were required beyond what was originally planned in the Sediment Study Plan. The study team selected locations for and performed sampling of the reservoir bed. The material was then subjected to erosion testing for model parameterization. SEDflume testing provided multiple valuable data points for sediment within the Grand Lake reservoir.

Critical shear stress is perhaps the most important of the SEDflume outputs. The gradual consolidation of fine, cohesive material and its effect on erosion resistance as a function of depth within the sediment column are crucial for accurately modeling sediment transport and deposition within the basin. Its use in developing the STM will allow HEC-RAS to determine whether sediment will erode from the bed or remain in place during a variety of flow conditions, and particle size and density parameters will allow the model to determine whether deposition will occur.

3.1.4.1 Sediment Transport

3.1.4.1.1 Suspended Sediment Transport

Sediment transport data, in the form of suspended sediment sampling, were collected at various USGS stations on the primary rivers of interest flowing into Grand Lake. In addition to the USGS data, additional suspended sediment samples were collected by Anchor QEA at these same stations. At each station, regression analyses were conducted to develop a numerical relationship between suspended sediment transport (in tons per day) and flow that forms a rating curve between sediment transport and flow. The data used for the development of the suspended sediment transport rating curves include all available data from the USGS through July 8, 2021, and the Anchor QEA data collected through July 1, 2021.

Preliminary assessment of the two sets of data reveal that they both lie within the bounds of variability typically seen in sets of suspended sediment data. The Anchor QEA data, however, generally lies in the mid- to lower end of the range of the available data. It is possible because these data were collected in recent years and the USGS data covers the entire period of record, which dates several decades back in time; there may be a trend towards lower sediment transport from these rivers over time.

Sediment transport data are only collected occasionally so no continuous, or even daily record of sediment transport exists. With a sediment transport rating curve, the regression equation can be applied to the daily flow data to develop an estimate of the long-term historic quantity of sediment flowing past given stations on these rivers and hence sediment transport into the reservoir.
Figures 31 through 34 present the available suspended sediment transport data along with the best fit regression curves.

Figure 31
Suspended Sediment Transport Rates and Fluvial Discharge Measured on the Neosho River near Commerce, Oklahoma

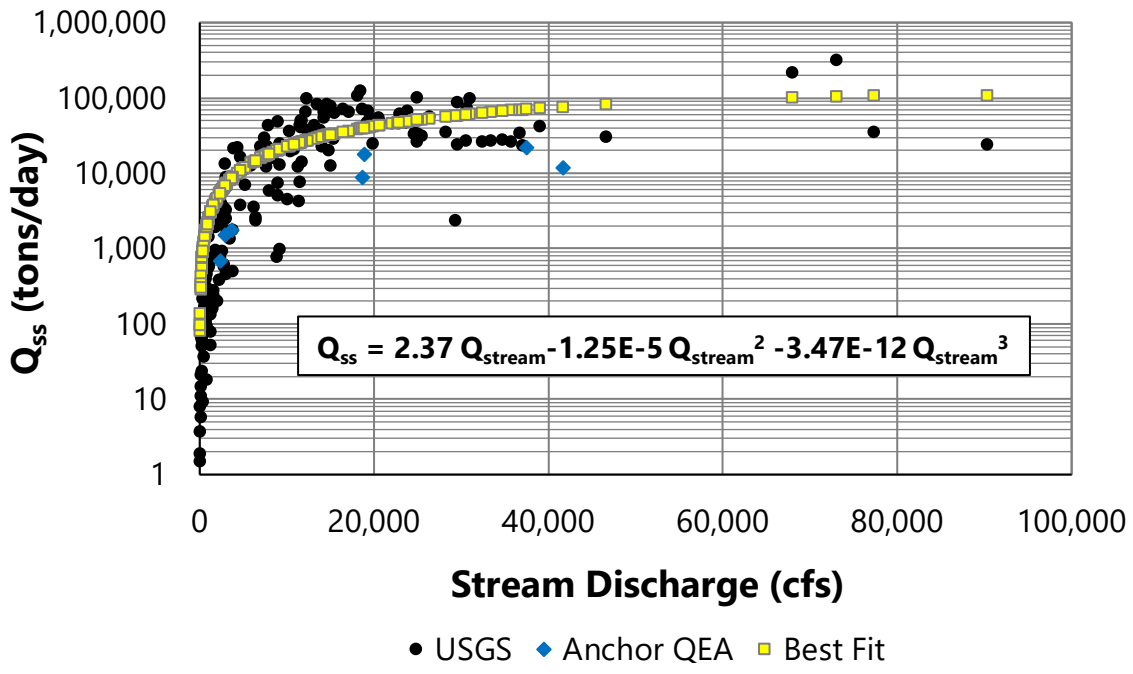


Figure 32
Suspended Sediment Transport Rates and Fluvial Discharge Measured on Tar Creek near Commerce, Oklahoma

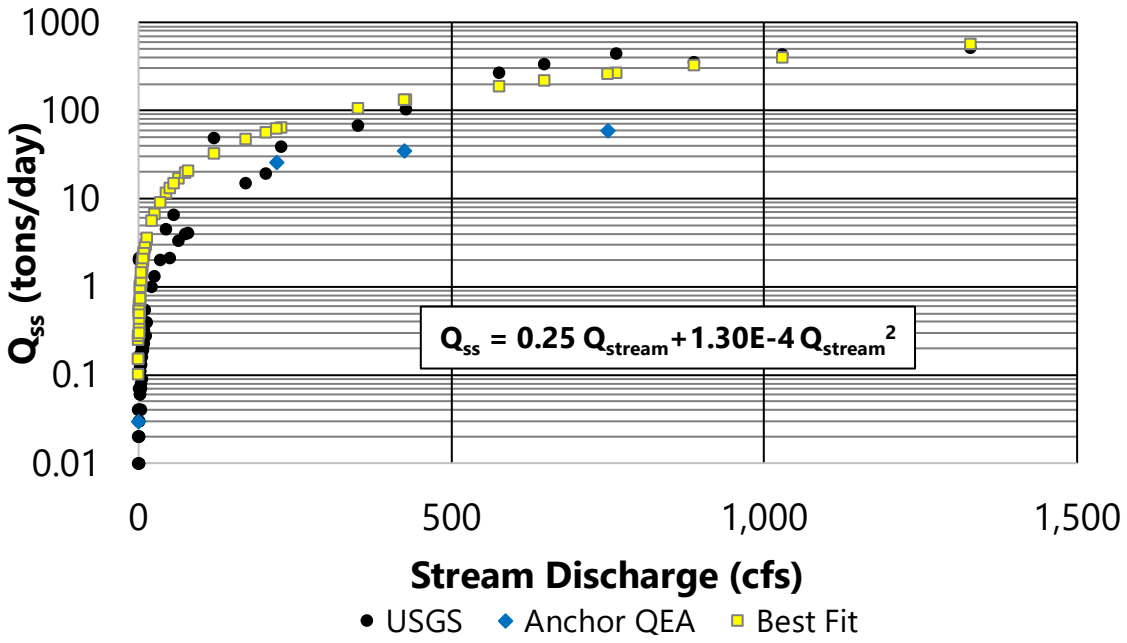


Figure 33
Suspended Sediment Transport Rates and Fluvial Discharge Measured on the Spring River near Quapaw, Oklahoma

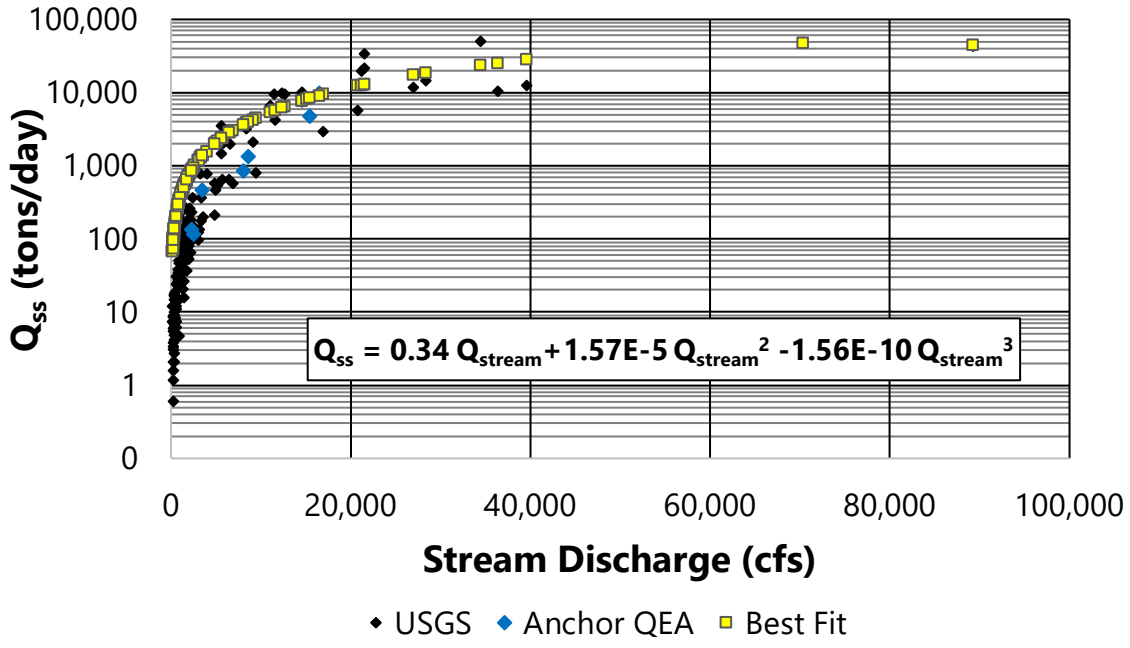


Figure 34
Suspended Sediment Transport Rates and Fluvial Discharge Measured on the Elk River near Tiff City, Missouri

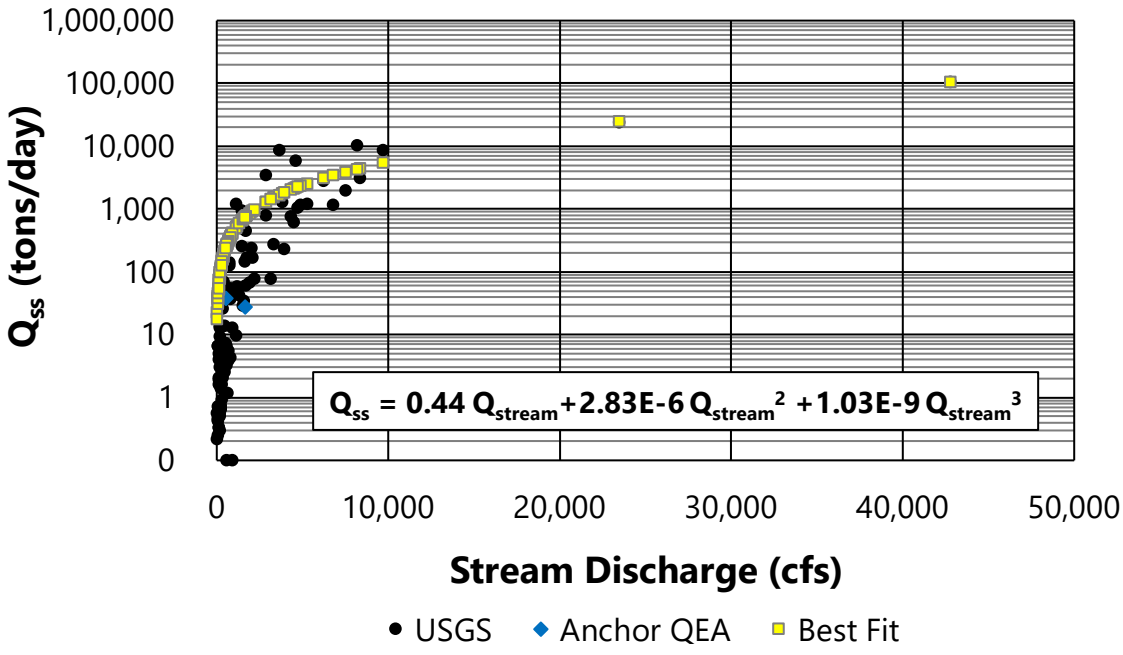


Table 16 presents the coefficients in the regression equations along with the correlation coefficient r for the polynomial equations used to develop the suspended sediment transport rating curves where:

Equation 2

$$Q_{ss} = a + b\,Q_{stream} + c\,Q_{stream}^2 + d\,Q_{stream}^3$$

where:

Q_{ss}	=	suspended sediment discharge in tons per day
a, b, c, d	=	coefficients
Q_{stream}	=	stream discharge in cubic feet per second (cfs)

Table 16
Regression Coefficients for the Suspended Sediment Transport Rating Curves

Location	a	b	c	d	Correlation Coefficient r
Neosho River near Commerce, Oklahoma	0.00	2.37	-1.25E-05	-3.47E-12	0.654
Tar Creek near Commerce, Oklahoma	0.00	0.25	1.30E-04	0.00	0.932
Spring River near Quapaw, Oklahoma	0.00	0.34	1.57E-05	-1.56E-10	0.884
Elk River near Tiff City, Missouri	0.00	0.44	2.83E-06	1.03E-09	0.993

Analysis of the particle size distribution of the suspended sediment samples collected by Anchor QEA are shown in Figures 35 through 38. These data show that suspended sediment is predominantly finer than 0.0625 millimeters (mm), which is the break point between sand and silt. Consistent with the bed material in the reservoir, most of the suspended sediment consists of silt and clay-sized sediment, which is being transported into the reservoir.

Figure 35
Fine Sediment as Fraction of Total Suspended Sediment Sampled on the Neosho River near Commerce, Oklahoma

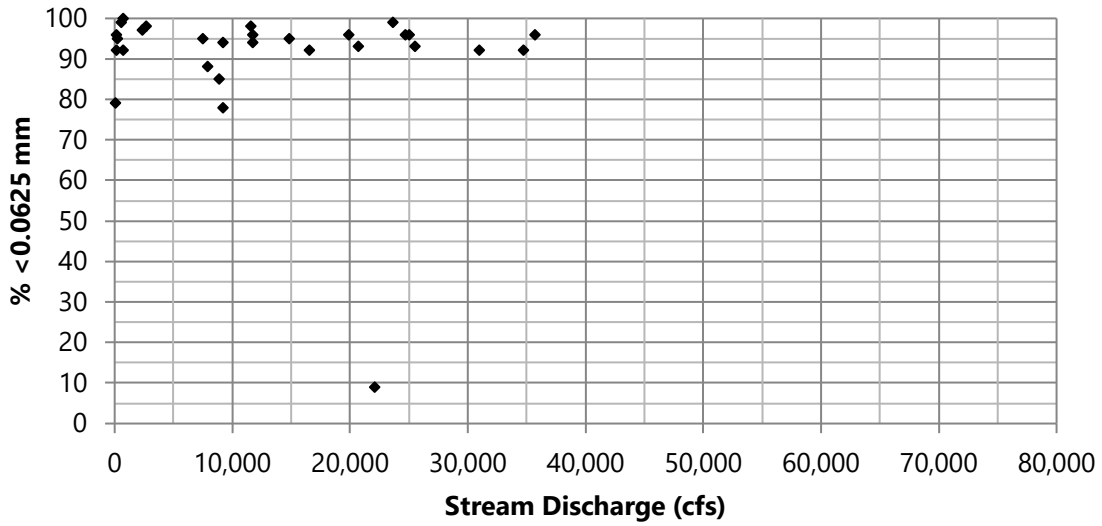


Figure 36
Fine Sediment as Fraction of Total Suspended Sediment Sampled on Tar Creek near Commerce, Oklahoma

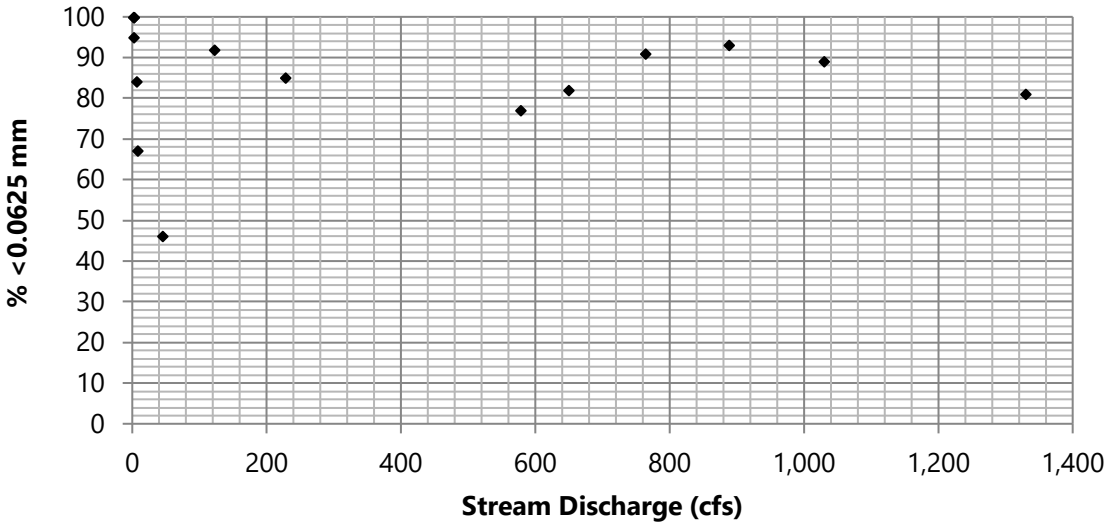


Figure 37
Fine Sediment as Fraction of Total Suspended Sediment Sampled on the Spring River near Quapaw, Oklahoma

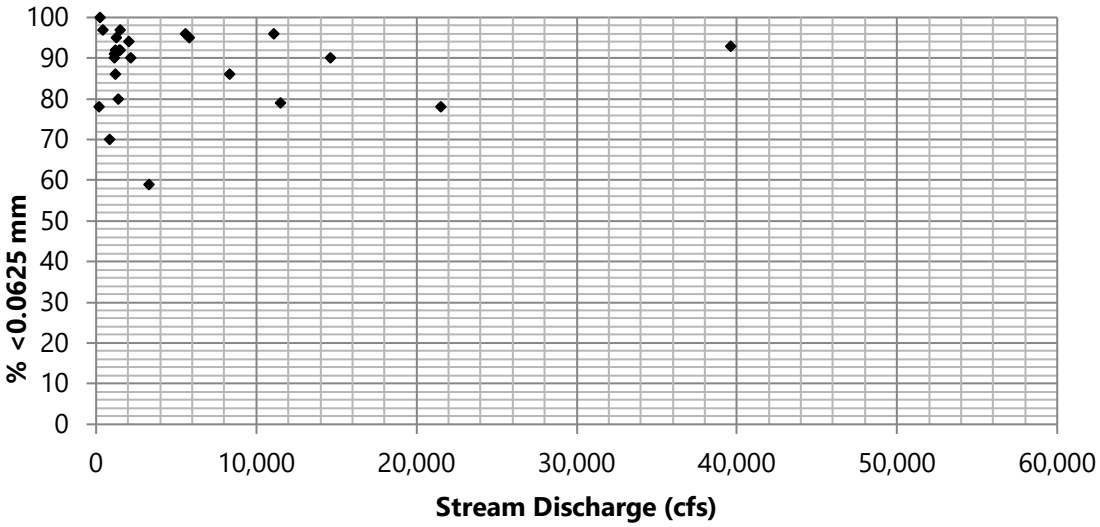
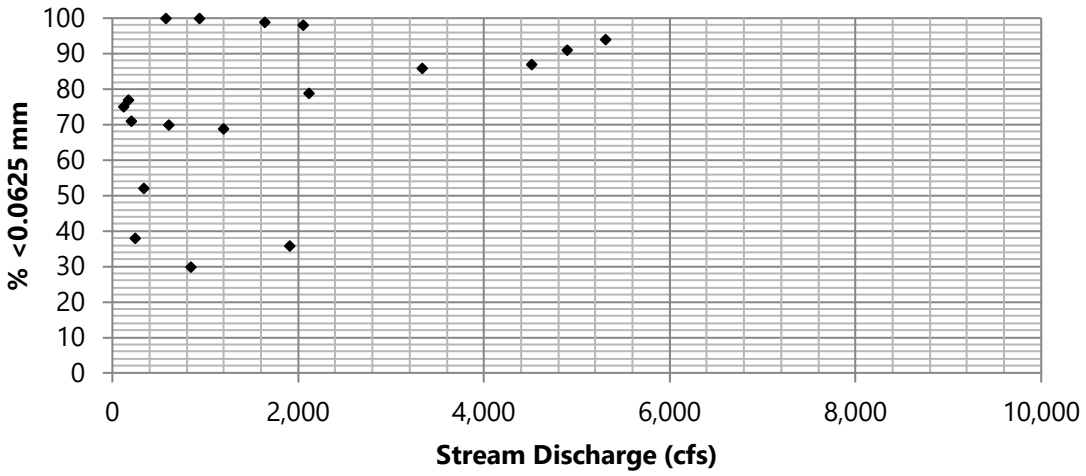


Figure 38
Fine Sediment as Fraction of Total Suspended Sediment Sampled on the Elk River near Tiff City, Missouri



3.1.4.1.2 Bedload Sediment Transport

While bedload sediment transport data have been sampled, these samples indicate virtually no bedload transport. This is likely because shear stresses induced by the velocity of the flowing water has not been sufficient to mobilize, erode, and transport the coarse sediment sizes (primarily gravel) in the upstream river reaches where bedload sampling was conducted. This will be further evaluated in the STM using critical shear criteria for non-cohesive sediments.

4 Sediment Transport Model Development

Following the data-gathering phase of the project, the team developed the STM. Terrain files, USGS gaging station records, sediment transport rates, and sediment sampling information were used as inputs for the model.

The STM was developed using *HEC-RAS v 5.0.7* as available from the USACE. The software is one of the leading fluvial system modeling packages and is frequently used for flood evaluations, hydrologic and hydraulic studies, and sediment transport estimates. It supports both one-dimensional (1D) and two-dimensional (2D) hydraulic evaluations with hydraulic routines to account for bridges along streams. Mead & Hunt developed the hybrid 1D/2D Comprehensive Hydraulic Model (CHM) using this version of HEC-RAS, taking advantage of these features.

Sediment transport models are more limited than their hydraulic-only counterparts with this version of HEC-RAS. Only 1D models are supported in sediment evaluations, and bridge routines are unavailable for modeling as well. Because it was based on the CHM, the STM required significant modifications to the terrain.

4.1 Terrain Information

Terrain files were developed by Mead & Hunt as part of the CHM. These files were compilations from a range of surveys performed in support of the 1998 REAS, 2009 OWRB survey, and various USGS efforts as discussed in Section 3.1.1.1. All elevations reported in the model and its outputs are referenced in feet above the National Geodetic Vertical Datum of 1929 (NGVD29).

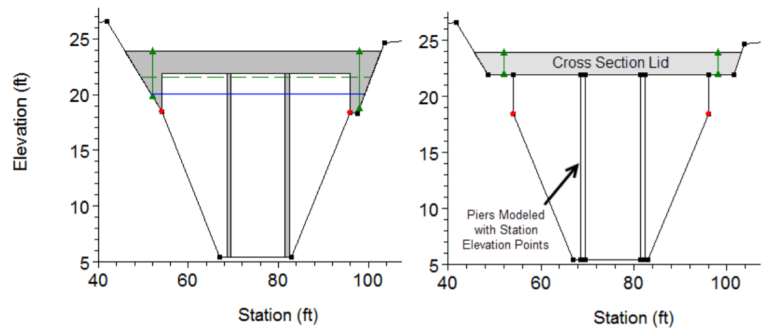
The CHM's 2D flow areas were converted to 1D cross sections. These were cut from the relevant model terrain using built-in features of the HEC-RAS geometry editor. Cross-section stations were then filtered to limit station-elevation points at each cross section to a maximum of 500 individual values in accordance with HEC-RAS modeling requirements. Filtering was also performed using standard HEC-RAS features; data was filtered using the program's "Minimize Area Change" option.

Land-use patterns were used to determine the base Manning's *n* values for the model. Where cross sections were copied from the CHM to the STM, these were left unchanged. Where 2D flow areas had been converted to 1D cross sections, river stations were used to define the Manning's *n* values to match the CHM values at those locations.

Bridge geometry information was gathered from the Oklahoma Department of Transportation, Missouri Department of Transportation, local and county road commissions, and from measurements provided by GRDA. Bridge geometries in HEC-RAS typically are input as separate structures, with bridge deck geometry, support piles, and abutments entered into the program along with widths and cross sections immediately upstream and downstream of the structure.

The bridges in the STM were modified from those present in CHM models following USACE guidelines (Brunner 2016). Recommendations included converting piles from bridge components to terrain data as station-elevation points. The bridge deck was then converted to a lid with the same geometry, and abutments were tied into the bank (Figure 39).

Figure 39
Example Bridge Replacement Using Modified Station-Elevation Terrain Data and a Cross Section Lid



Source: Brunner 2016, Figure 17-24

4.2 Streams

The STM consisted of four streams: the Neosho, Spring, and Elk rivers, as well as Tar Creek.

4.2.1 Neosho River

The Neosho River was modeled from RM 152.25 to RM 77.12 at Pensacola Dam (USGS gage 07190000). It was divided into three reaches with junctions at the confluence with the Spring and Elk rivers (upstream of RM 122.25 and 105.35, respectively). The confluence with Tar Creek was modeled as a lateral structure emptying from Tar Creek into the Neosho at approximately Neosho RM 134.

4.2.2 Spring River

The Spring River was modeled from RM 21 to its confluence with the Neosho River at RM 0.

4.2.3 Elk River

The Elk River was modeled from RM 19.59 to the confluence with the Neosho River and Grand Lake at RM 0.

4.2.4 Tar Creek

Tar Creek was modeled from RM 7.6 to the confluence with the Neosho River. The confluence was modeled as a lateral structure at the downstream extent of the creek rather than a traditional junction to improve WSE accuracy. Geometry of the lateral structure was cut from the terrain and

filtered to 500 data points to comply with model requirements. The STM therefore does not contain cross sections below Tar Creek RM 1.6; the rest of the creek was included in the lateral extent of Neosho River cross sections.

4.3 Boundary Conditions

Boundary conditions (BCs) define parameters at the model limits. HEC-RAS offers several options for BC types, including WSE, discharge, and normal depths. WSE and discharge can be set as a specified time series, and normal depths can be calculated based on the friction slope. For the STM, upstream BCs (at the upstream extents of the Neosho, Spring, and Elk rivers, as well as Tar Creek) were defined by USGS discharge measurements stepped at intervals ranging from 15 to 60 minutes. The downstream BC was set as normal depth with a friction slope of 0.0033 vertical feet per horizontal feet [ft/ft] (for Tar Creek) and recorded WSE at Pensacola Dam (Neosho River). WSE measurements taken at Pensacola Dam were used to set the downstream water levels in the model. These data points are provided at one-hour intervals.

4.4 Quasi-Unsteady Modeling

HEC-RAS offers three modes of hydraulic modeling: *Steady*, *Unsteady*, and *Quasi-Unsteady*. In *Steady* mode, static BCs are defined, and constant discharges, WSE, and other outputs are reported. Short-term simulations of specific events are often modeled using *Unsteady* models, which allow engineers to evaluate changing BCs over a known flood event lasting several days or weeks. When evaluating long-term events over the course of years—such as evaluations of sediment transport, deposition, and erosion—*Quasi-Unsteady* models are more commonly used.

The STM is built using *Quasi-Unsteady* model routines. BCs are therefore assumed static between time steps, with no ramping of discharge or WSE over time as one would see in *Unsteady* models. In the STM, upstream BCs are set as discharges; under *Quasi-Unsteady* mode, those discharges are simulated throughout the entire reach of the relevant tributary simultaneously. In typical flow events, a peak flow rate moves downstream over time, with hydrographs peaking later the closer one gets to the reservoir. With *Quasi-Unsteady* model routines, that pulse occurs simultaneously at all points along the stream.

4.5 Sediment Data

Input data for the STM includes the sediment supply for the upstream boundary for each stream, the sediment characterizing the bed of each stream through the various reaches, and the erosion parameters defining the cohesive sediment where it is found in the river or lake beds. Data from field work was adapted to create the inputs. Specific parameters are described in the following sections.

4.5.1 Upstream Sediment Supply

The upstream sediment supply applies the suspended sediment regression curves to develop a sediment rating curve (table of suspended sediment transport rate in tons per day with flow). This table is input into the HEC-RAS model for each stream: Neosho River, Tar Creek, Spring River and Elk River. These tables can be seen as input files for the STM. The model then computes suspended sediment inflow at the upstream boundary of each stream for each time step of the model using the flow data for the calibration time period (2009 through 2019). The upstream sediment supply for these rivers and creek are tabulated versions of the regression equations developed in Section 3.1.4.1.1.

4.5.2 Bed Material

For each cross-section and for each stream, a bed material size distribution is developed as input into the STM. These data are based on the particle size distributions for the bed material and core sampling analysis and can be seen as input tables of the particle size distribution for each cross-section.

As previously shown (see Section 3.1.3.2), the bed of these streams and the reservoir consists of a wide range of sediment sizes resulting in a bi-modal distribution of sediment, one of which is fine, cohesive material (primarily silt and clay), and the other distribution being non-cohesive material (primarily gravel with some sand and finer material as well as cobble sized material). Further complicating the bi-modal distributions, samples of primarily non-cohesive gravel exist near samples of predominantly cohesive silt and clay. In addition, samples do not show any clear longitudinal trend of sediment characteristics where an upstream sample may be fine, cohesive sediment and the next sample farther downstream may be coarse, non-cohesive sediment. This range of longitudinal distributions of sediment in close proximity complicate development of input data that describe the characteristics of the bed of these streams. The following examples demonstrate this complexity.

A profile of the Neosho River showing the bed (2009) and water surface (at 743.07 feet NGVD29), Figure 40; along with Figures 41 and 42 show the wide range of bed material sizes along the Neosho River.

Figure 40
Water Surface and Thalweg Profile of the Neosho River above Tar Creek

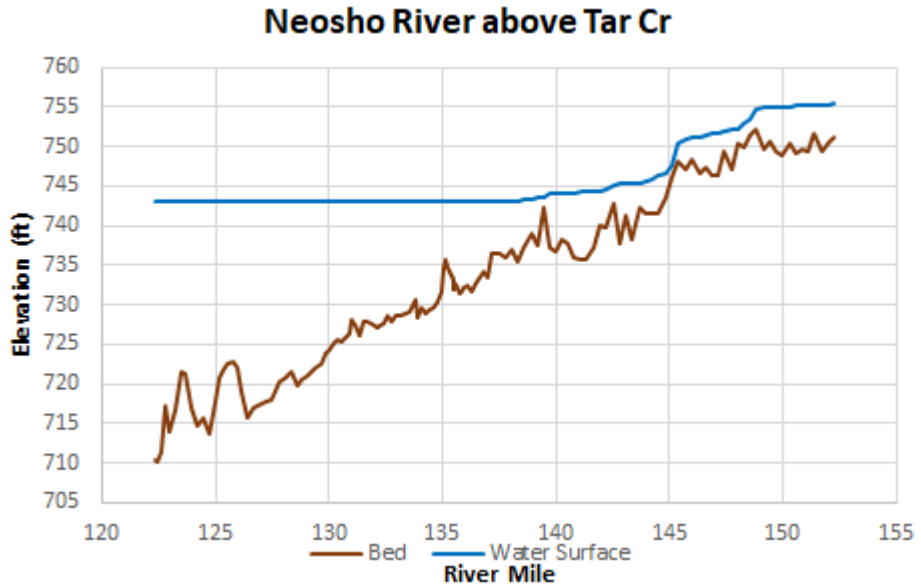


Figure 41
Neosho River Sediment Size Gradation Results Comparison

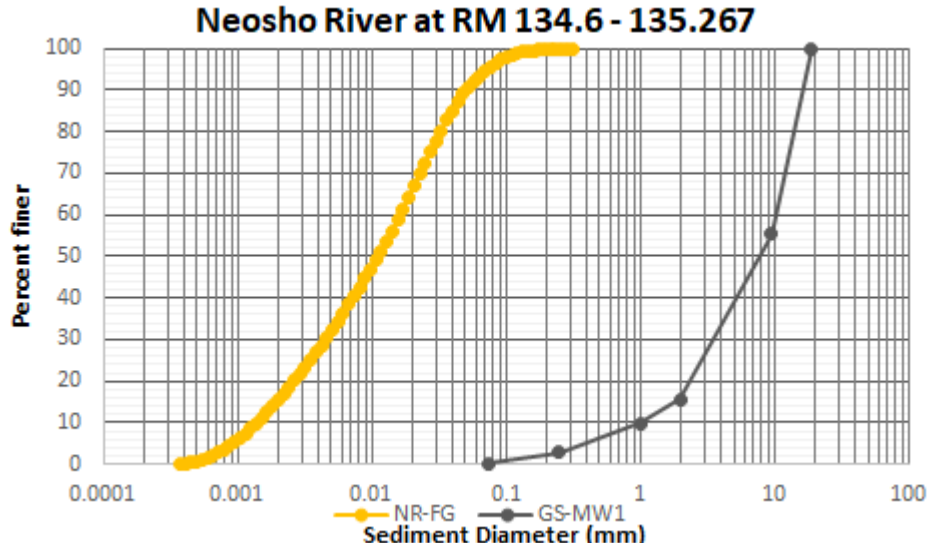
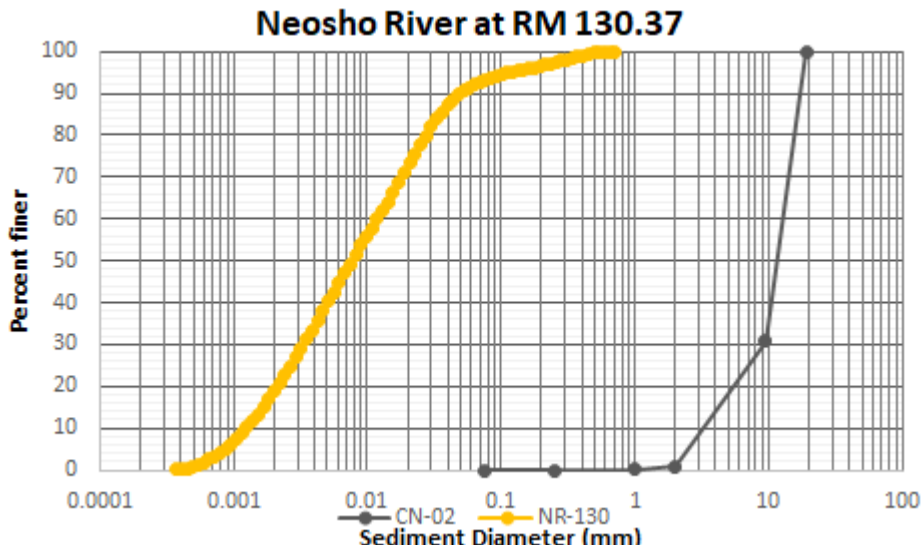


Figure 42
Neosho River Sediment Size Gradation Results Comparison



Farther downstream in the upper reservoir, this same wide range in bed material size distributions continue in close proximity to these separate samples (Figures 43 through 45).

Figure 43
Water Surface and Thalweg Profile of Upper Grand Lake between Twin Bridges and the Elk River Confluence

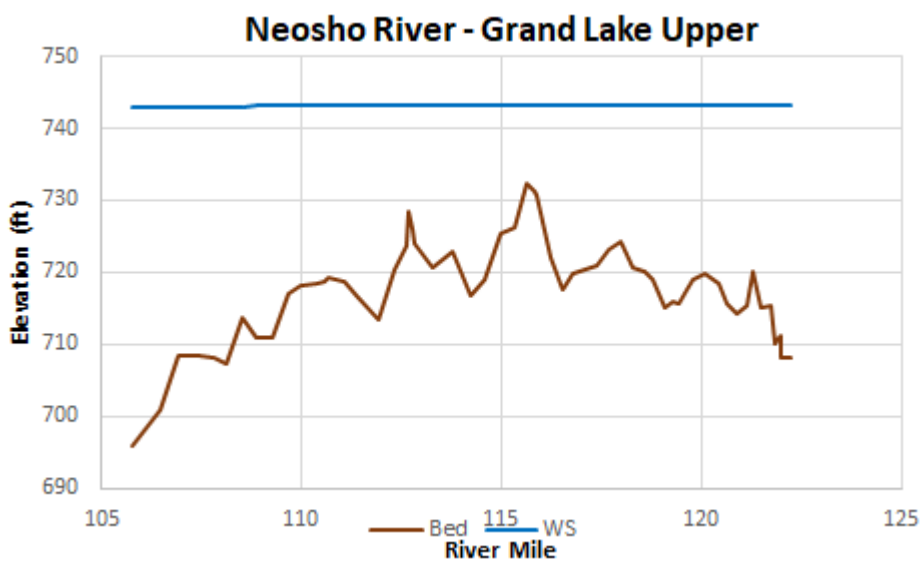


Figure 44
Upper Grand Lake Sediment Size Gradation Results Comparison

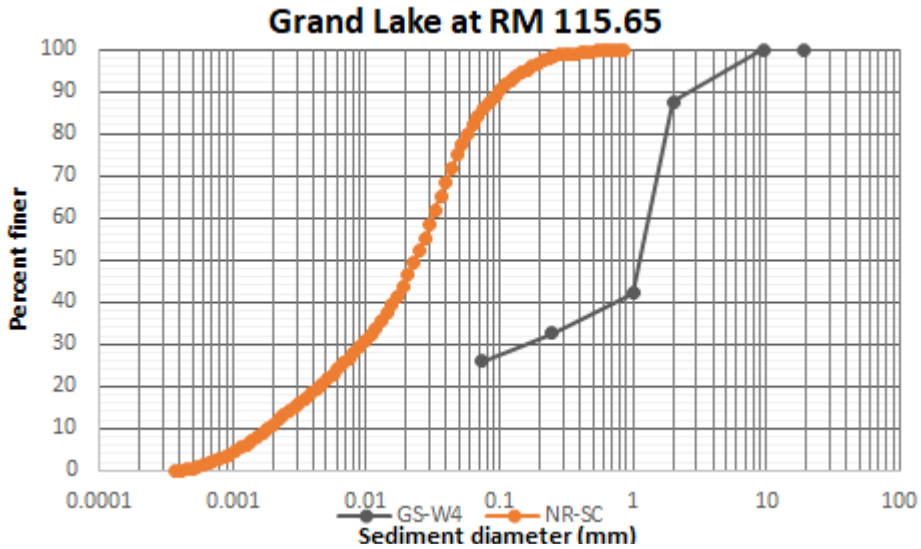
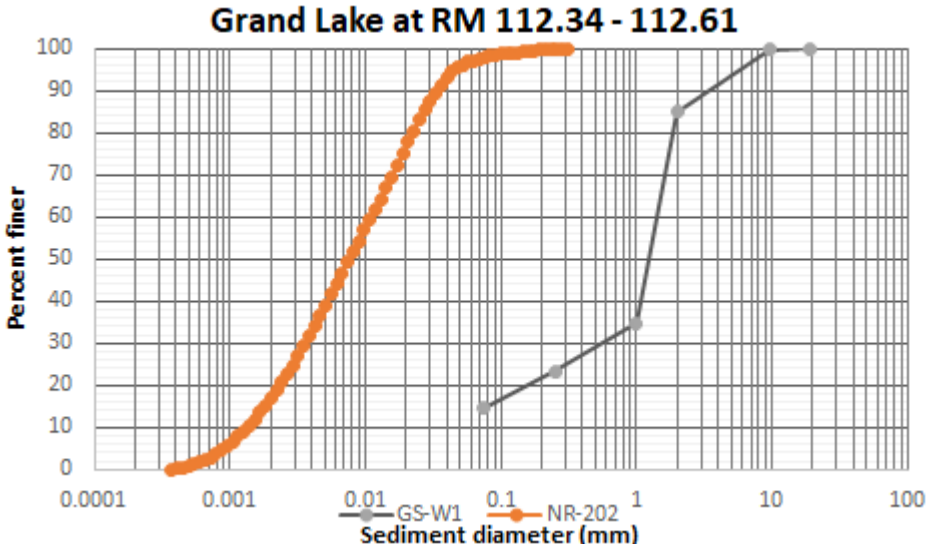


Figure 45
Upper Grand Lake Sediment Size Gradation Results Comparison



This same disparity in adjacent samples continues on the tributaries as well (Figures 46 through 54).

Figure 46
Water Surface and Thalweg Profile of Tar Creek

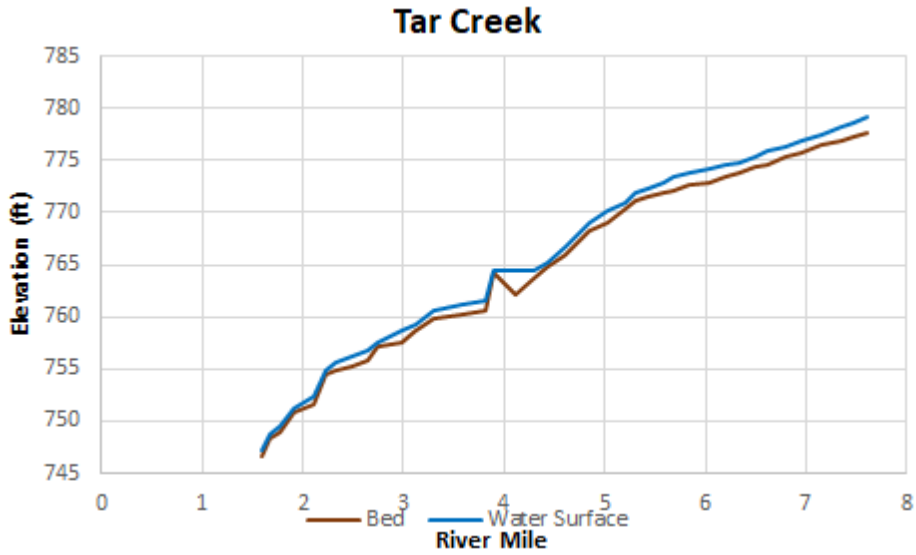


Figure 47
Tar Creek Sediment Size Gradation Results Comparison

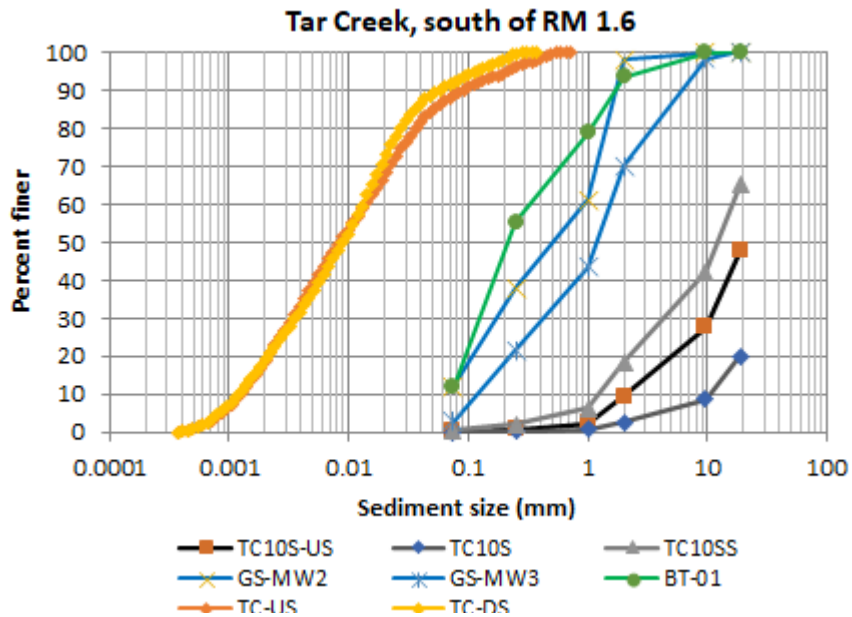


Figure 48
Water Surface and Thalweg Profile of the Spring River

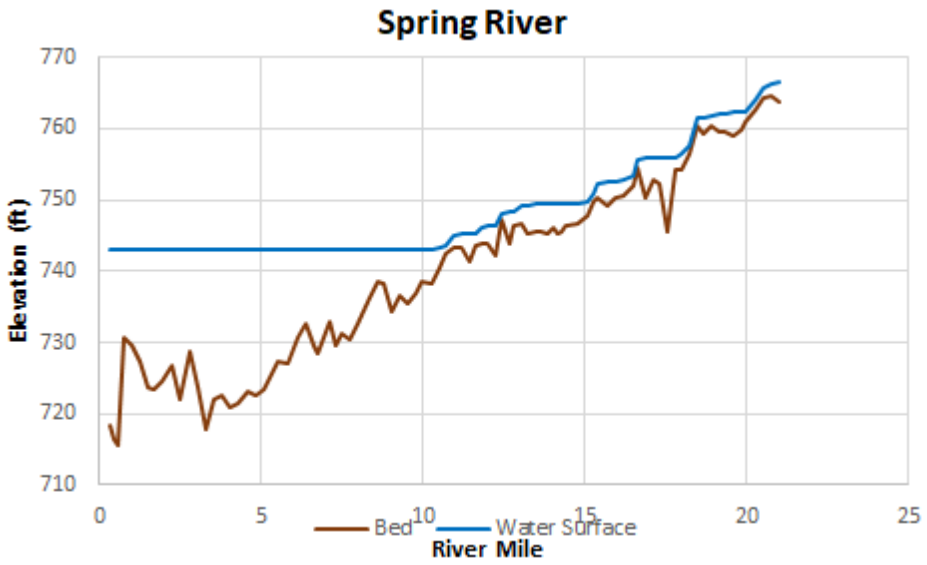


Figure 49
Spring River Sediment Size Gradation Results Comparison

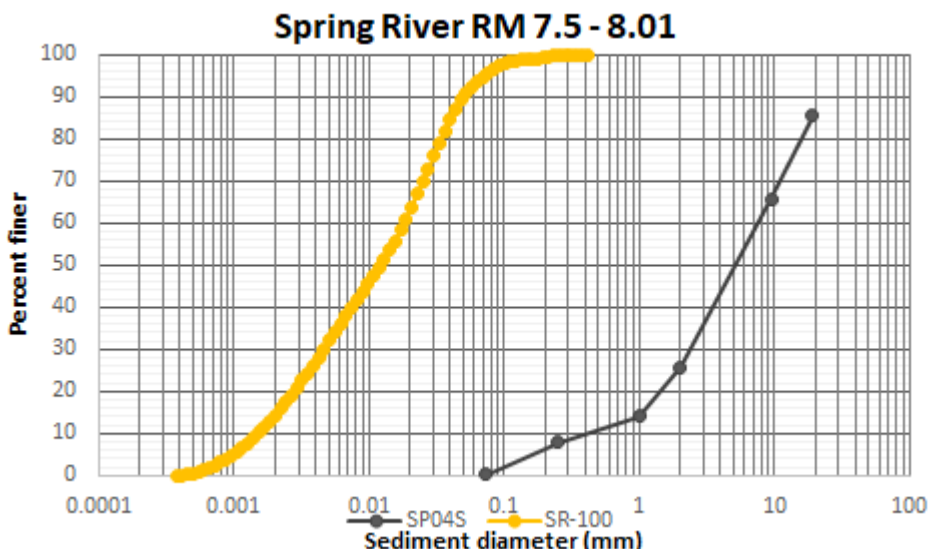


Figure 50
Spring River Sediment Size Gradation Results Comparison

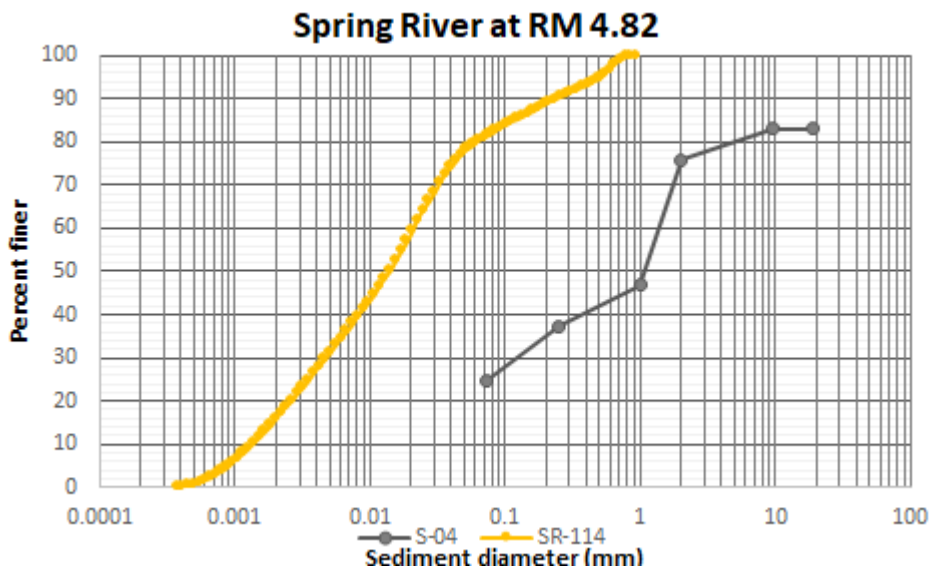


Figure 51
Spring River Sediment Size Gradation Results Comparison

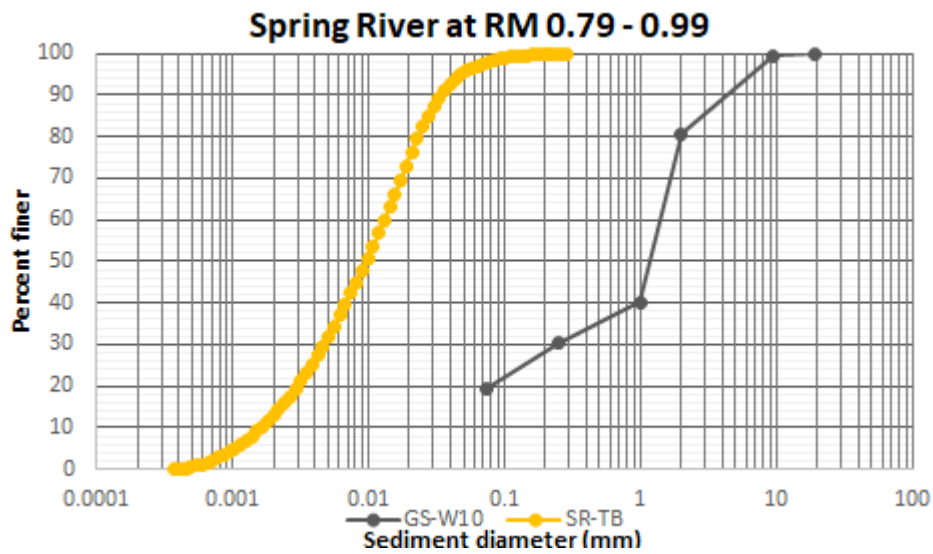


Figure 52
Water Surface and Thalweg Profile of the Elk River

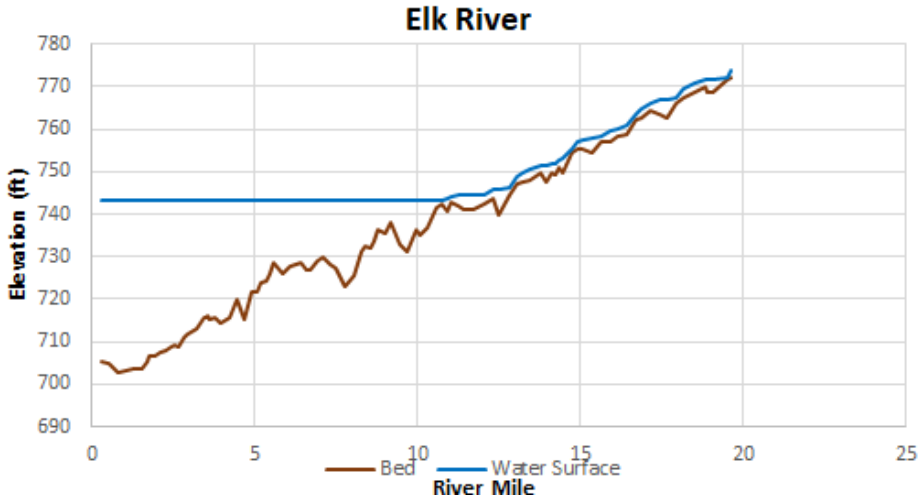


Figure 53
Elk River Sediment Size Gradation Results Comparison

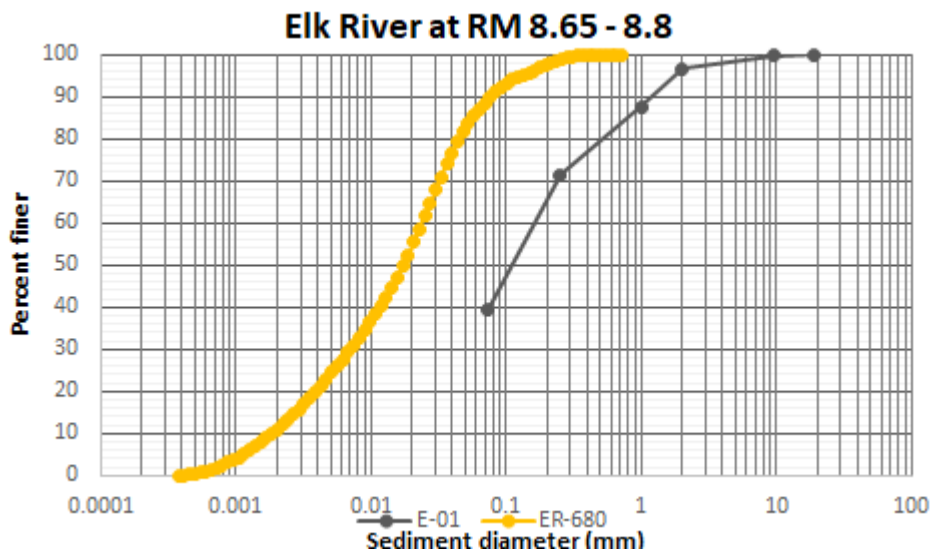
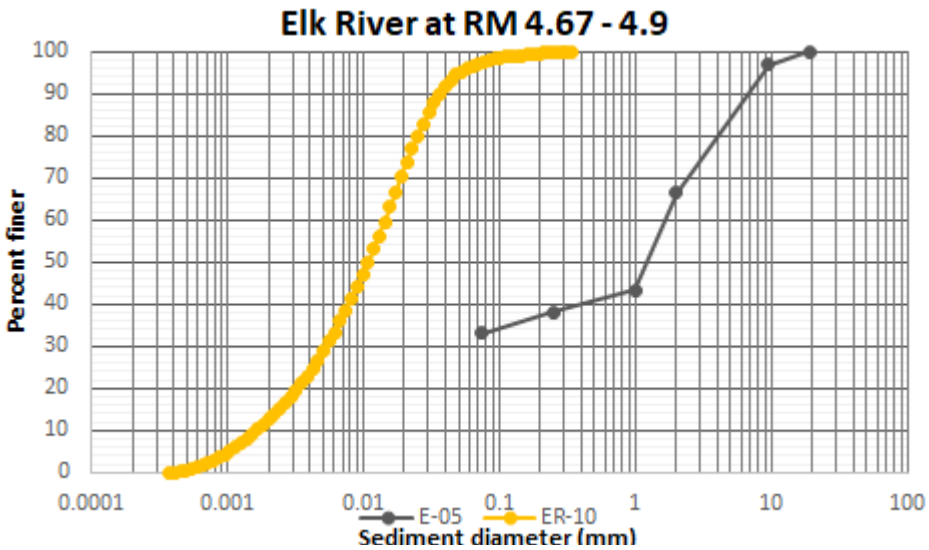


Figure 54
Elk River Sediment Size Gradation Results Comparison



The above plots show that samples taken along the Neosho, Spring, and Elk rivers, as well as Tar Creek include both fine cohesive sediment (primarily silt and clay) near non-cohesive sediment (primarily gravel along with some finer sediment and coarser sediment). These bi-modal distributions cover six log cycles of sediment size in samples collected in relatively close proximity (but different times: December 2019 and March 2020). This wide range of sediment types and sizes may be due to fine sediment being transported down river and deposited in the reservoir during certain events or seasons and then may be flushed farther downstream under other flow and reservoir conditions.

Mussetter, in *Evaluation of the Roughness Characteristics of the Neosho River in the Vicinity of Miami, Oklahoma* (Mussetter 1998), made observations regarding the bed of the river.

> Based on field observations and sediment samples taken from bank-attached bars and from the bed of the river, the bed material in the reach upstream from approximately the I-44 bridge (RM 142) is composed primarily of gravel and sand (Plate 4). Downstream from I-44, the surface bed material at the time of sampling in late 1996, which was performed when the discharge in the river was relatively low, was primarily silt and clay (Mussetter, 1997).
>
> In reaches that are affected by backwater, the bed is composed of smaller material because the river does not have sufficient energy to transport the gravel into the reach and at least a portion of the smaller sand- and silt-sized material deposits on the bed.

> At higher discharge, the flow velocities in this reach are probably sufficient to transport the silt farther downstream into the reservoir. The velocities are not, however sufficiently high to transport upstream gravels beyond the upstream end of the backwater effect.

Mussetter suggests that as the finer sediments are transported farther downstream into the reservoir, the bed reverts to something closer to its coarser, non-cohesive nature:

> Prior to construction of the dam, the bed of the river downstream of Miami was most likely gravel and sand, similar to that found upstream. (Mussetter 1998)

These observations and suggestions are consistent with the bed samples collected in 2019 and 2020. Under some conditions, the bed consists of fine sized sediment (silt and clay) and under other conditions, in close proximity to the fine samples, the bed consists primarily of coarser, non-cohesive sediment (gravel and sand). The data and observations indicate that the fine sediment transported down river into the upstream reaches of the reservoir as suspended load tends to deposit temporarily under some hydrologic and hydraulic conditions and then is flushed farther downstream under other hydrologic and hydraulic conditions as suggested previously by Mussetter.

Tetra Tech's discussion from both the 2015 and 2016 reports, *Hydraulic Analysis to Evaluate the Impacts of the Rule Curve Change at Pensacola Dam on Neosho River Flooding in the Vicinity of Miami, Oklahoma* (Tetra Tech 2015, 2016), make comparisons between 1940, 1995/1998, and 2015 survey data and basic hydraulic and sediment transport concepts to conclude that:

> Because the amount of sediment that can be carried by the river is controlled by the local hydraulic energy, and the required amount of energy increases with increasing particle size, the coarser-grained portion of the sediment load (i.e., sands and gravels) will typically deposit on the river bed near the head of the reservoir and the finer grained sediment will be carried progressively farther downstream into the reservoir. (Tetra Tech 2016)

And regarding the quantities of deposition:

> Based on the bank elevations, there has been approximately 15 feet of overbank deposition in the vicinity of Twin Bridges between 1940 and 2015.
>
> Comparison of the thalweg (i.e., minimum bed elevation) profiles from the 2015 bathymetry with thalweg elevations measured in 1940 indicates that the bed has aggraded by an average of about 5 feet, with over 10 feet of

aggradation in some locations in the 6- to 7-mile reach upstream from Twin Bridges/U.S. Highway 60. (Tetra Tech 2016)

Based on our review of the earlier data sets, such as the 1995/1998 data (discussed in more detail in Section 5.1.3.1), which proved to be unreliable, and about which Tetra Tech states that data at some locations "appears to be anomalously high compared to the adjacent river profile," there is no reasonable accuracy test of the 1940 data that would verify the validity of conclusions based on these comparisons.

While Tetra Tech presents a logical position that the coarser-grained portion of the sediment load (sands and gravels) would tend to deposit in the upper reach of the reservoir, recent collection of bedload transport data showed virtually no transport of those grain sizes in the rivers. The sediment team used equipment specifically designed to capture sands and gravels and found no evidence of coarse material transport even at the highest flows sampled in 2019 and 2020, which represents. It is difficult to conclude significant deposition of these sizes of sediment is occurring on the bed when no movement of such materials has been measured.

Sediment transport sampling shows that virtually all sediment transport consists of fine silts and clays, and that bed samples at a given location alternate between stationary coarse materials and fines. It is therefore likely that the earlier observation of Mussetter and current observations of the transitory nature of fine sediment deposition are valid and that most of the fine sediment load is eventually moved farther down into the reservoir without permanent or ongoing deposition in the more riverine sections of the river. These are the complexities of the sediment transport analysis, which are being addressed through the data collection, analysis, and modeling process. Any previous quantification and conclusions regarding the sediment transport and deposition process must be evaluated considering these complexities, significantly increased data, and further analysis including the modeling process.

Several factors contribute to a complicated analysis and model development effort, as follows:

- Sediment sizes and types are quite different, even when collected near other samples representing entirely different sediments.
- There is a wide range in sediment density from sample to sample and depth below sediment surface.
- Non-cohesive sediments are expected to follow standard transport equations and parameters and are found in certain bed samples but not in the bulk of the incoming sediment load.
- Incoming sediment load consists primarily of fine sediment that may deposit under some conditions and exhibit a wide range of erosion and transport parameters that vary location to location and depth below sediment surface.

Further complicating the physical characteristics of the diversity of sediment types, sizes, and characteristics is the fact that the bulk of data collected to develop the sediment characteristics were collected in 2019 and 2020 whereas the model calibration period starts in 2009. If these types of data were collected in 2009, it was collected before this study began and the findings have not been available to the STM development team. As a result, while channel and reservoir geometry were surveyed in 2009, the river and lakebed sediment characteristics for 2009 are based on data collected a decade later, which may or may not represent conditions at the beginning of the calibration period. STM setup and calibration present a very complicated and challenging task.

4.5.3 Sediment Transport Model Parameters

For non-cohesive sediment transport, a standard equation from the HEC-RAS model will be used to compute critical shear and sediment transport rate. For the cohesive sediment component of sediment transport, critical shear and erosion rate parameters will be based on the laboratory analysis conducted to measure these parameters. Actual values for all parameters can be seen in the model itself. With these values as a starting point, parameters may be adjusted in the calibration process.

5 Sediment Transport Model Calibration

STM calibration was performed in two components. As with any model calibration procedure, it is easiest to start with the simplest format available, ensure accuracy, then increase complexity. For the STM, that meant beginning with hydraulic calibration and neglecting sediment movement, erosion, and deposition. Once the hydraulics were well-calibrated, sediment transport was added to the STM, and the sediment model parameters were finalized.

Initial plans for STM calibration started with the 1998 terrain data. Once hydraulics were calibrated against known WSE measurements, sediment transport calibration would begin. Sediment erosion and deposition from 1998 to 2009 would be used to calibrate the model and running the model from 2009 to 2019 would be used as validation. Due to geometry inconsistencies discussed in Section 5.1.3.1, the approach was modified: the 1998 geometry was not used, and validation was therefore not possible. Instead, the model used the 2009 terrain as a baseline and calibrated to the 2019 geometry.

The overall goal of this step was to create a baseline geometry using the 2009 terrain dataset that could be used to predict future sediment transport, erosion, and deposition patterns.

5.1 Hydraulic Calibration

Hydraulic calibration for this phase focused on matching peak WSE records. WSE information was provided by a collection of USGS gages, WSE monitoring stations placed by the project team, and high water mark information provided by Tetra Tech.

5.1.1 Model Inputs

Model input parameters were developed specifically for the hydraulic calibration components. Sediment modeling was not included in this part of the calibration procedure.

5.1.1.1 Sediment Information

The process started with hydraulic calibration. To remove any sediment influence, an empty sediment dataset was created for the entire model domain. This dataset included an arbitrary bed gradation and set maximum erodible depths to 0 feet throughout the model. The BCs were set to equilibrium load inflows as well.

5.1.1.2 Modeled Events

Hydraulic calibration involved using known parameters from USGS data. BCs were defined as described in Section 4.3 for several flow events. The modeling team selected four events for calibration; these were also used for CHM calibration procedures. The timing of specific events and peak stream discharges used for hydraulic calibration are listed in Table 17.

Table 17
Modeled Flow Events and Stream Discharges

Event Date	Peak Stream Discharge (cfs)			
	Elk River @ Hwy 43	Neosho River @ E 60 Rd	Tar Creek @ E 50 Rd	Spring River @ E 57 Rd
July 2007	4,830	141,000	2,490	105,000
October 2009	39,300	46,100	5,150	66,200
December 2015	107,000	45,400	3,320	151,000
January 2017	1,140	10,200	672	15,900
April 2017	107,000	58,200	2,980	114,000

The downstream WSE at Pensacola Dam was defined by USGS gage records, and the downstream BC for Tar Creek at its confluence with the Neosho River was set at normal depth with a friction slope of 0.0033 ft/ft.

5.1.2 Roughness Parameters

Calibration of hydraulic models in HEC-RAS relies primarily on hydraulic roughness parameters. These are typically reported as Manning's *n* values and are usually defined within a set range by land cover type (Table 18). The STM values were based on CHM roughness parameters throughout the model domain. Generally, higher *n* values produce slower flows and raise WSE whereas lower *n* values decrease WSE.

Table 18
Typical Overland Manning's *n* Values by Land Cover

Land Cover	*n* Value
Field crops	0.040
Pasture	0.080
Urban	0.070
Urban, dense	0.090
Water	0.040
Woody vegetation	0.100
Woody vegetation, dense	0.150

In-channel Manning's *n* values were adjusted iteratively until simulated WSE results showed reasonable agreement with recorded measurements. Table 19 lists in-channel roughness values developed during the calibration process.

Table 19
Base Manning's *n* Roughness Parameters for Streams in the Sediment Transport Model

Reach	*n* Value
Grand Lake (reservoir, up to RM 121.29)	0.020
Neosho River (RM 121.51 up to 122.33)	0.025
Neosho River (RM 122.46 up to 130.87)	0.024
Neosho River (RM 131.01 up to 133.99)	0.035
Neosho River (RM 134.09 up to 135.37)	0.015
Neosho River (RM 135.46 up to RM 152.2)	0.030
Elk River	0.015–0.053
Spring River (full reach)	0.0332
Tar Creek	0.027–0.100

These base roughness values were then modified based on changes in stream discharge values. River bedforms have a significant influence on hydraulic roughness. As stated by Mussetter (1998), the bedforms are affected by flow volumes, generating different bed roughness values as a function of total discharge. In HEC-RAS, "Flow Roughness Factors" were used to tune the model to account for changes in bed roughness at higher or lower flow rates. Calibration results for the Elk and Spring rivers and Tar Creek are shown in Table 20.

Table 20
Flow Roughness Parameters for Elk and Spring Rivers and Tar Creek in the Sediment Transport Model

Elk River		Spring River		Tar Creek	
Discharge (cfs)	Flow Roughness	Discharge (cfs)	Flow Roughness	Discharge (cfs)	Flow Roughness
0	1.30	0	0.90	0	0.80
40,000	1.25	50,000	1.00	4,600	0.95
75,000	0.80	110,000	1.00	4,800	1.00
105,000	0.80	120,000	1.20		
110,000	1.00	151,000	1.20		
		152,000	1.00		

The Neosho River roughness parameters were adjusted in two sections of the stream to calibrate the model. Results of the calibration process are shown in Table 21.

Table 21
Flow Roughness Parameters for the Neosho River in the Sediment Transport Model

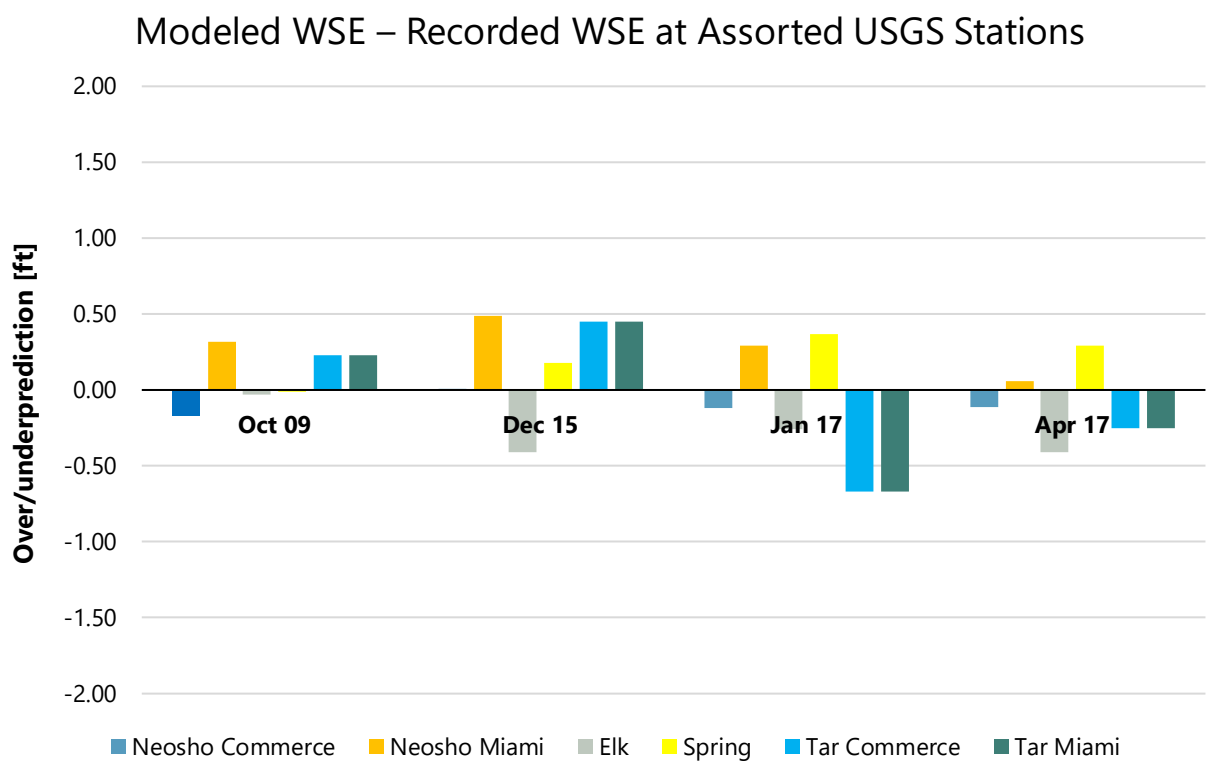
RM 130.54–135.267		RM 135.37–152.25	
Discharge (cfs)	**Flow Roughness**	**Discharge (cfs)**	**Flow Roughness**
0	0.80	0	0.80
45,000	0.80	45,000	1.10
60,000	1.30	60,000	1.20
65,000	1.30	61,000	1.00
70,000	1.00		

5.1.3 Results

Model calibration results showed good agreement with measured WSEs, as discussed herein.

Model calibration results as compared to USGS gages are shown in Figure 55. The average difference between simulated WSE and measured USGS gage WSEs is 0.04 feet; the model slightly overpredicts WSE at the USGS gages for the calibration events.

Figure 55
Overprediction and Underprediction of Simulated WSE at USGS Gages



STM calibration results were also compared to high water marks as compiled by Tetra Tech (2016). Model results from the July 2007, October 2009, and December 2015 calibration run are shown in Figure 56 through Figure 58. Average model difference is 0.6 feet for July 2007, -0.5 feet for October 2009, and 0.2 feet for December 2015; the model overpredicted WSE during the July 2007 and December 2015 events and underpredicted WSE during the October 2009 event.

Quasi-unsteady modeling presents difficulties when evaluating WSE measurements downstream of tributaries. WSE is heavily influenced by the arrival times of peak flow pulses from contributing streams. Because quasi-unsteady models change the relative arrival times downstream of confluences, it is difficult to accurately model maximum WSE at those locations. For sediment transport modeling, it is impractical to model with fully unsteady flows; for WSE evaluations, the CHM is a more fitting tool.

Figure 56
Comparison of STM WSE Results and Measured High Water Marks during the July 2007 Event

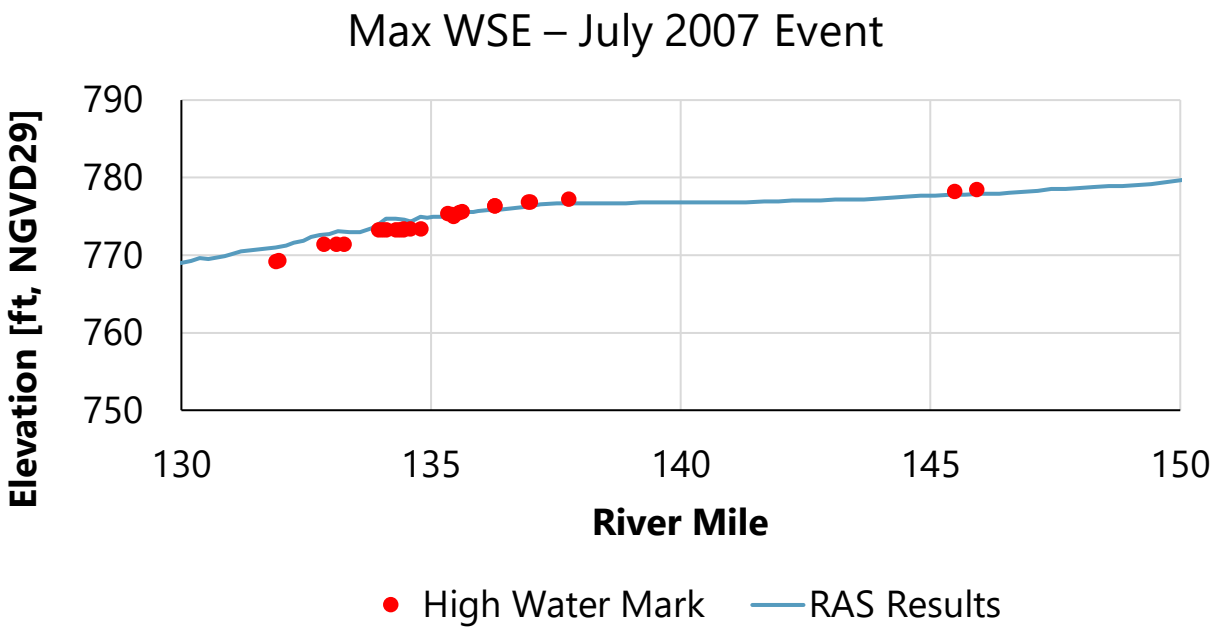


Figure 57
Comparison of STM WSE Results and Measured High Water Marks during the October 2009 Event

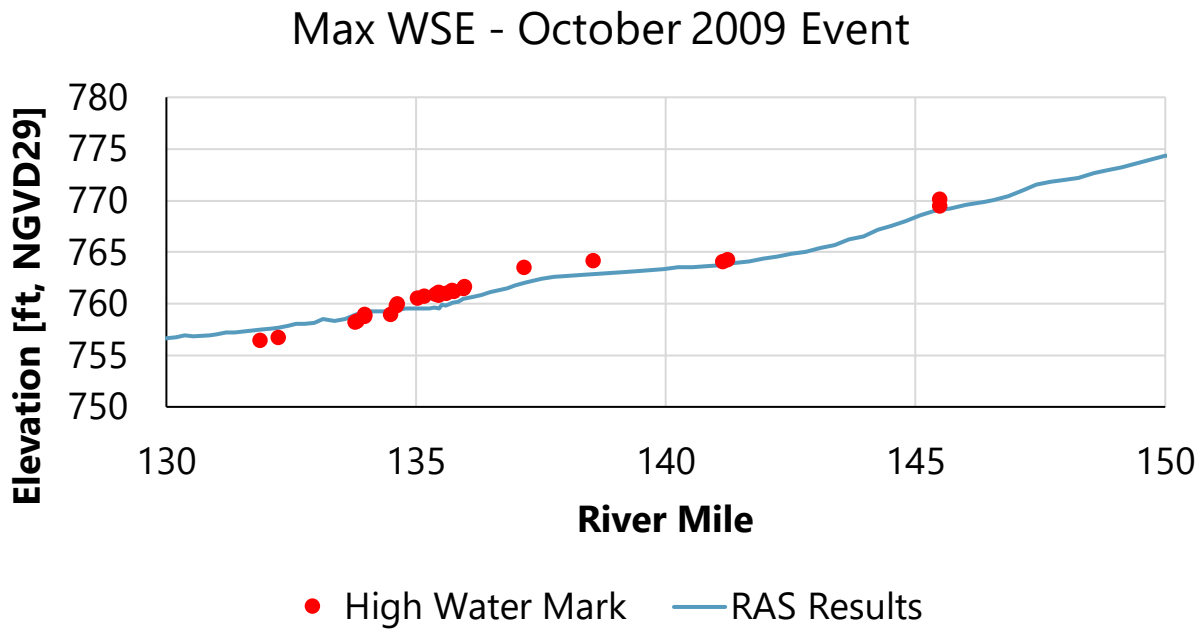
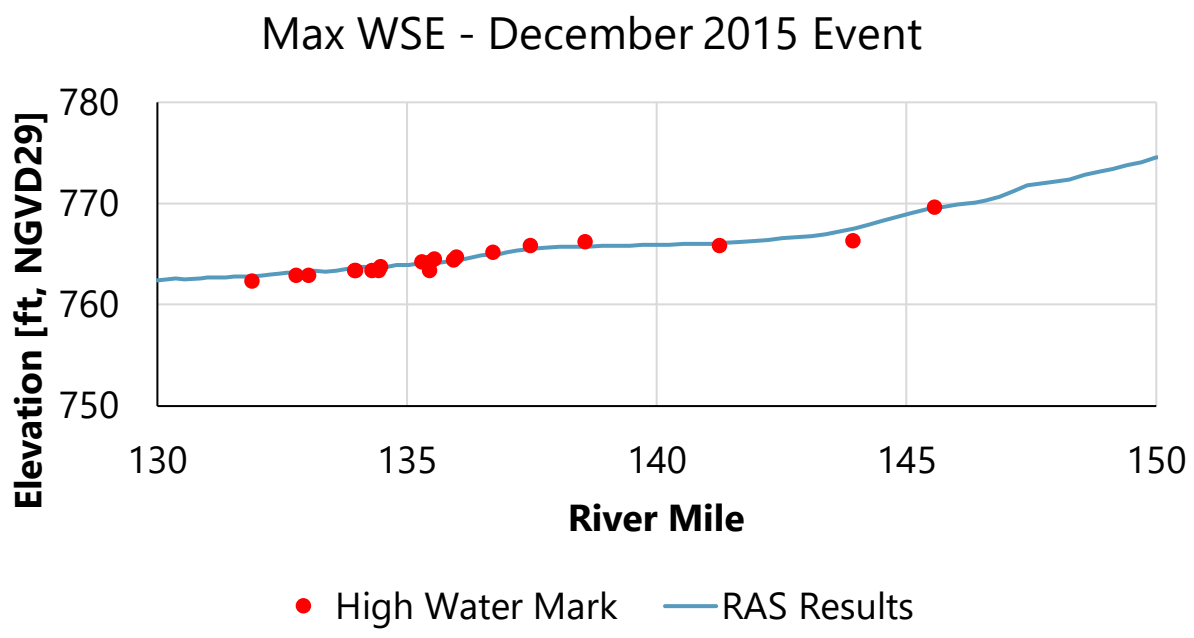
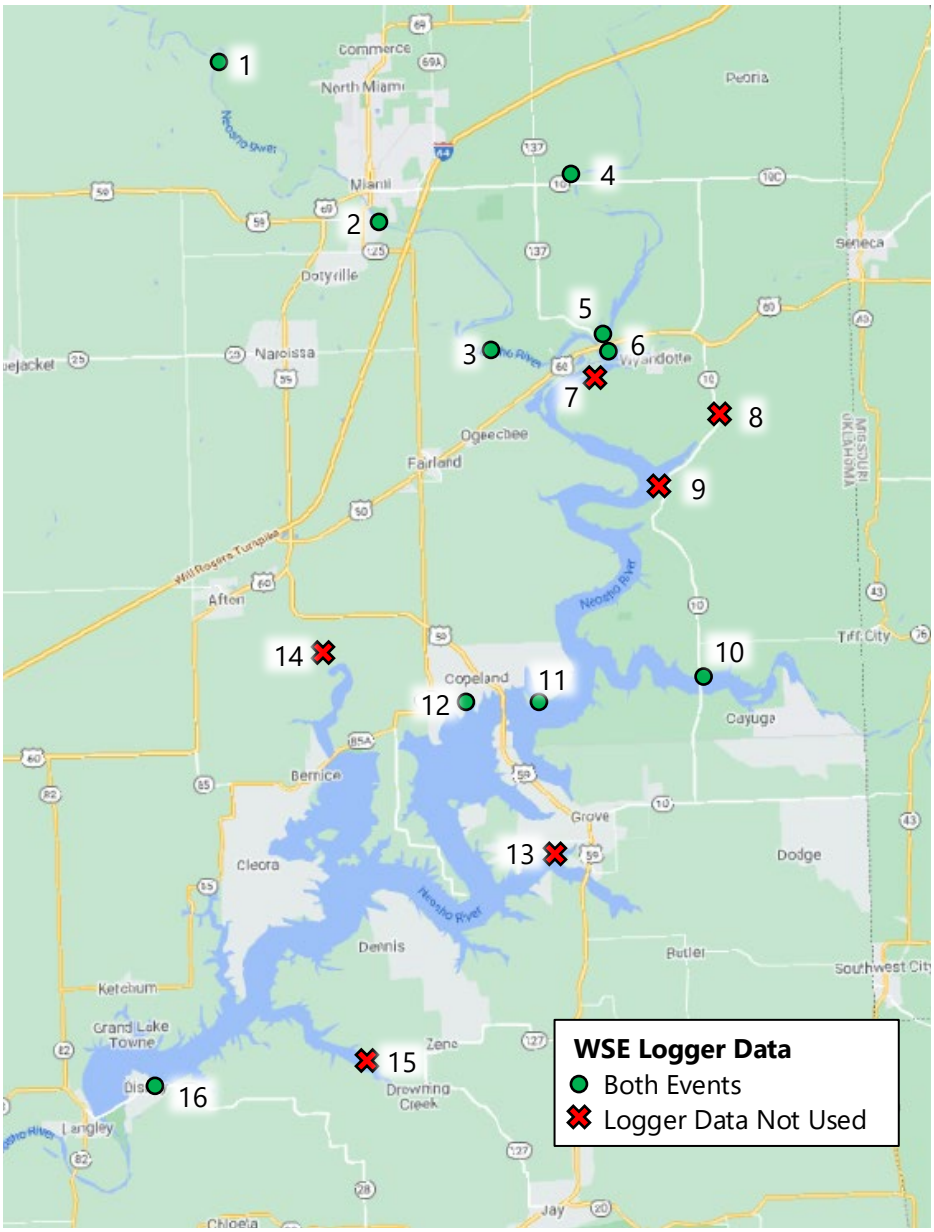


Figure 58
Comparison of STM WSE Results and Measured High Water Marks during the December 2015 Event



A third source of calibration WSEs was the field monitoring data collected during the study. The WSE loggers were in place for two of the calibration events: January and April 2017. Not all logger locations have data for a given event; some were washed away or vandalized when attempts were made to retrieve data. Logger 9 was missing for both events, and data from loggers 7, 8, 13, 14, and 15 were not included in calibration as they were located in areas where incoming, ungaged streams affected WSE reporting. These were initially placed before model parameters had been fully defined. Figure 59 shows the location of loggers used in the calibration process.

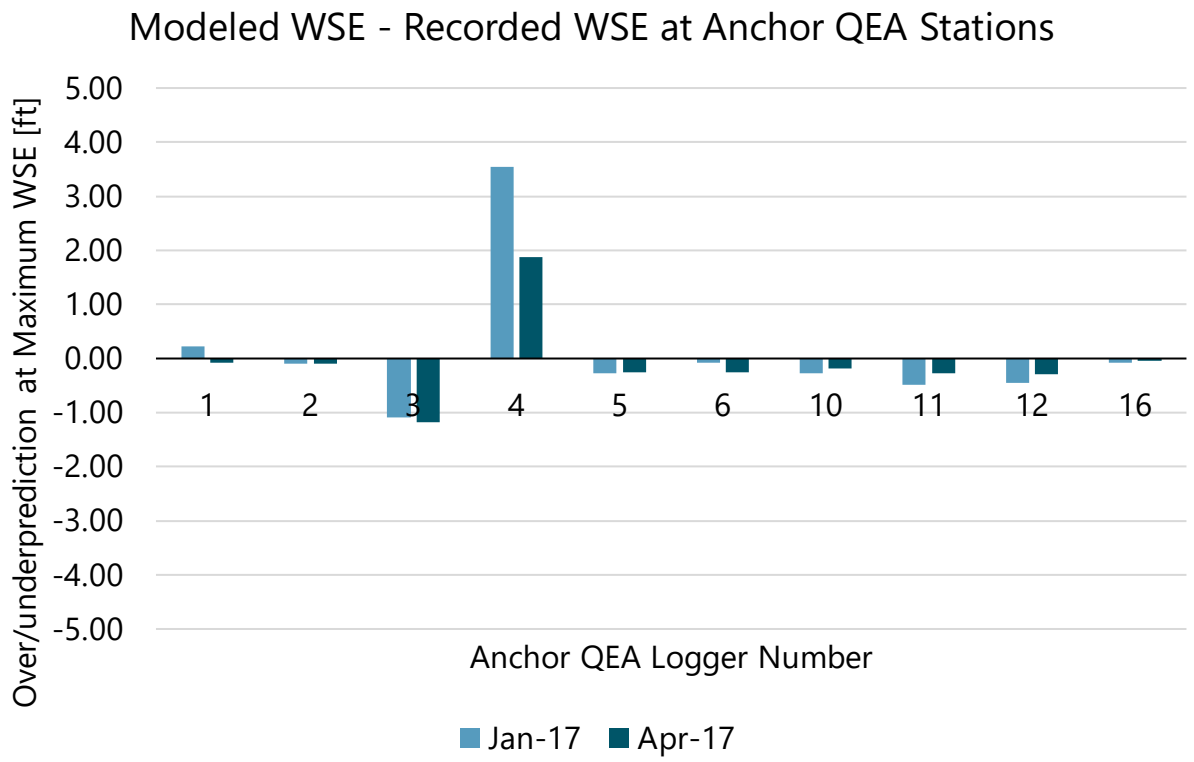
Figure 59
Locations of Anchor QEA Loggers



Note: Data from loggers 7, 8, 9, 13, 14, and 15 were not used in the analysis as discussed above.

Figure 60 shows the over and underprediction of peak WSE at the logger locations for those loggers used as calibration points. During the January 2017 event, the model averaged an overprediction of WSE by 0.10 feet. During the April event, the model averaged an underprediction of 0.08 feet.

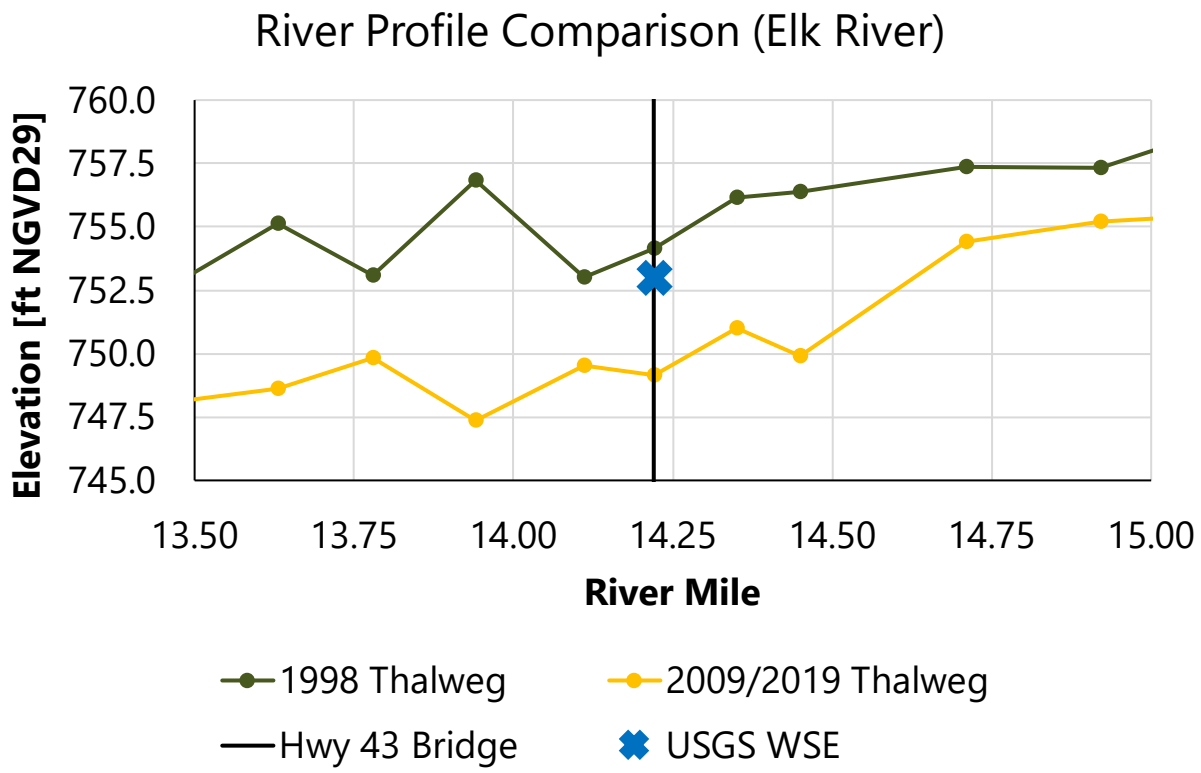
Figure 60
Comparison of STM WSE Results and Measured Values from Anchor QEA Loggers



5.1.3.1 Geometry Inconsistencies

During calibration, issues were noted with the 1998 terrain data. Calibration of high flows was achievable, but model results overpredicted WSE at lower discharges. Evaluation of the terrain file showed that the 1998 bathymetry thalweg was higher than WSE measurements on the Elk River (Figure 61). As a result, the model would never predict a WSE of 753.0 feet NGVD29 at the Elk River gage, despite measured values at or below that level during calibration events. See January 13, 2017, at 00:00, (USGS 2021e) as an example.

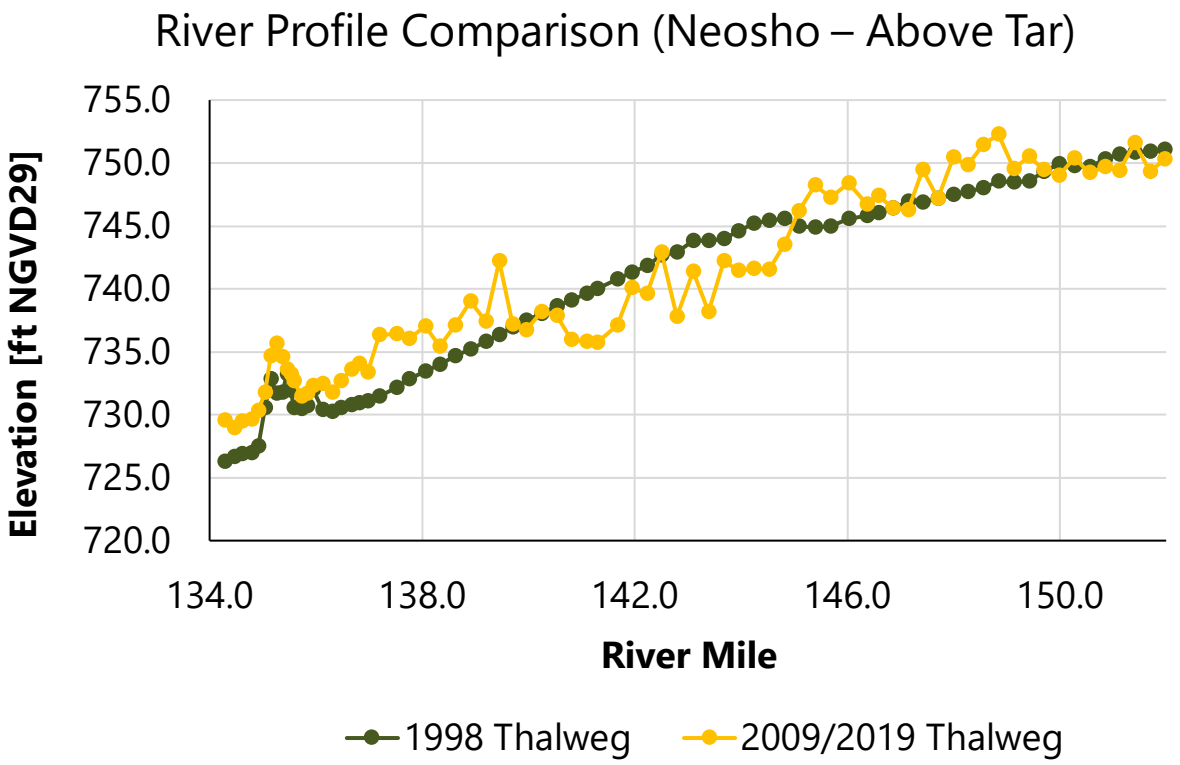
Figure 61
Elk River Thalweg Comparison and WSE Measurement



Note: Elk River geometry information for the 2009 and 2019 datasets are identical at this location; both are from the 2017 USGS bathymetric survey (USGS 2017).

Further evaluation of the 1998 dataset revealed other inconsistencies. Above the confluence with Tar Creek, the Neosho River profile in the 1998 dataset appears artificially smooth (Figure 62). This indicates that relatively few cross sections were directly surveyed, and bathymetric data was instead interpolated across long portions of the river. The data from the 2017 USGS survey (incorporated into both the 2009 and 2019 terrain files) shows the expected undulating stream profile (USGS 2017).

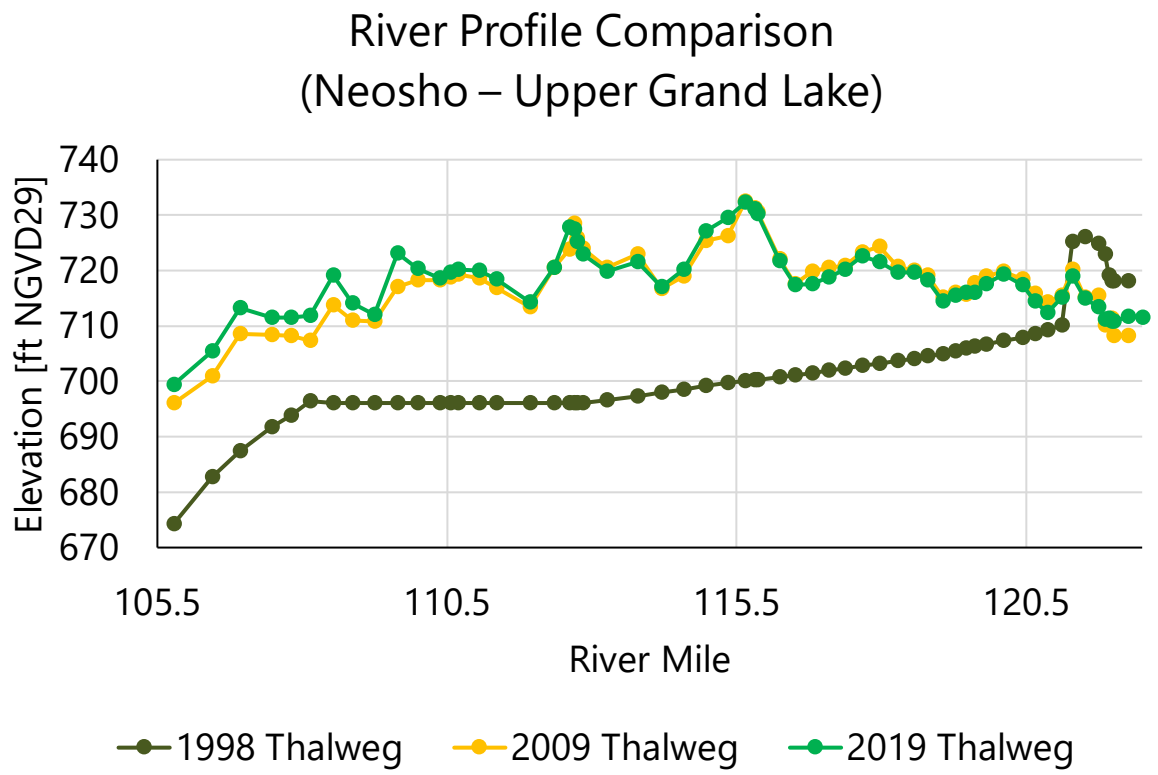
Figure 62
Neosho River Thalweg Comparison



Note: Neosho River geometry information for the 2009 and 2019 datasets are identical at this location; both are from the 2017 USGS bathymetric survey.
This graph covers the Neosho River between the USGS gage near Commerce at RM 152.2 and the confluence with Tar Creek at RM 134.0.

Other locations raised similar concerns. The Neosho River upstream of the Elk River confluence indicated as much as 30 feet of sediment deposition along the thalweg between 1998 and 2009 followed by limited deposition between 2009 and 2019 (Figure 63). This is unlikely to be accurate and cannot be reasonably explained by typical sediment transport phenomena.

Figure 63
Upper Grand Lake Thalweg Comparison



Note: This plot covers the stretch of Grand River between Twin Bridges at RM 122.25 to the confluence with the Elk River at RM 105.78.

To confirm these findings in the STM, the modeling team reviewed thalweg elevations using the original datasets. All elevations in the STM were confirmed, indicating that the original 1998 bathymetric dataset is unreliable for the purposes of this study and was not used in STM development.

The team also evaluated changes in the reservoir and modeled domain to further evaluate the 1998 terrain information in two ways. First, stage-storage curves provided by the USGS, USACE, and OWRB were compared to evaluate the magnitude and rate of changes from 1998 to 2009. This rate was then compared to long-term historical rates to evaluate plausibility. Second, the amount of deposition in the reservoir was compared to the sediment transport supplied by the tributaries by applying the sediment transport rating curves to the historic flow data over the life of the reservoir. If the deposition were as significant from 1998 to 2009, as shown in the above graphics, it would be reasonable to expect noticeable and corresponding variations in sediment supply with a significantly greater sediment supply from 1998 to 2009 yet a smaller amount of sediment transport from 2009 to 2019. Such trends were not found in the sediment transport analysis. The analysis of sediment

transport over time compared to sediment deposition in the reservoir further calls into question the 1998 data.

STM calibration was thus limited to the period from 2009 to 2019. Because the 1998 dataset does not provide a useful baseline, it is impossible to calibrate from 1998 to 2009 followed by a validation run from 2009 to 2019. Instead, calibration was limited to comparisons between the 2009 and 2019 datasets. These largely consisted of Grand Lake evaluations because the terrain files were derived from a shared 2017 USGS survey in the upper reaches of each tributary (USGS 2017) with different data sources in the reservoir (the 2009 OWRB and 2019 USGS surveys).

5.2 Sediment Calibration

Sediment model calibration uses the 2009 channel geometry (OWRB 2009; USGS 2017) as the initial condition defining the geometry of the rivers and reservoir. The bed material is based on the bed samples collected in 2019 and 2020. Above RM 121.93 on the Neosho River, RM 3.29 on the Spring River, and RM 9.68 on the Elk River, the bathymetric survey data are from 2017 (USGS 2017). Downstream of those cross sections, the in-channel data are from the 2009 OWRB Grand Lake bathymetry survey; this represents the greatest unknown because the samples representing the bed material were collected about a decade later than the channel geometry survey, and the particle size distribution samples vary widely (by several orders of magnitude) even when collected in relatively close physical proximity. Observations indicate that the particle size distributions at a given location may vary widely over time because the original bed material is likely to have consisted primarily of non-cohesive gravels with some sand and some coarser material, but as deposition occurs with fine sediment, the bed may have changed to fine, cohesive sediment. These observations further indicate that–based on sediment inflow, hydrologic, and hydraulic conditions–fine sediment may temporarily deposit over coarser sediment and then be transported further downstream as the hydrologic and hydraulic conditions vary over time. Extreme changes in key model data, as demonstrated in the wide variation in types and sizes of sediment, as well as sediment density, may cause unrealistic responses in model calculations and stability. Model response will be assessed regarding these extreme variations in model input during the calibration process.

The upstream BCs include the historic flow data from 2009 to 2019 for the Neosho, Spring, and Elk rivers, as well as Tar Creek (USGS 2021a, 2021c, 2021d, 2021e); and the corresponding historic water level data for Grand Lake (USGS 2021b). Upstream sediment inflow is developed using the historic flow data coupled with the sediment rating curves for each stream.

Computed model output for bed elevation within Grand Lake at the end of the calibration period in 2019 will be compared with the bathymetric and cross-section survey collected in 2019. Because the upstream reaches of the 2009 and 2019 datasets are based on 2017 USGS survey data, it will not be possible to calibrate bathymetric changes from 2009 to 2019 in the upper reaches of the system

(above RM 121.93 on the Neosho River, above RM 3.29 on the Spring River, and above RM 9.68 on the Elk River). In addition to calibration on bathymetric change, computed sediment transport rates and concentrations will be compared to measured data at locations where suspended sediment data were collected.

Based on the comparison between computed and measured cross-section, and sediment transport data, model parameters (sediment transport equation parameters and density and consolidation parameters) will be adjusted within a reasonable range to achieve an acceptable match between computed and measured channel geometry and sediment transport data over the period from 2009 to 2019. Once a reasonable match has been obtained between computed and measured data, results will be documented (including a discussion of model sensitivity to adjustment of parameters). The model files for the calibration run will be provided as part of the documentation and review process. The documentation of model calibration and review will occur before model runs of potential future operation or hydrologic scenarios are performed.

6 Results

Following presentation of the ISR and calibrated model, the STM will be revised and recalibrated as appropriate. Using the revised STM, the modeling team will perform the following tasks as specified in the Study Plan:

1. Run a 50-year synthetic flow period with current rule-curve applied to the reservoir operations to evaluate sedimentation over the license period.
2. Run the same 50-year synthetic flow period with historical rule-curves applied to reservoir operations to evaluate sedimentation over the license period.
3. Identify and evaluate potential mitigation measures to eliminate or mitigate dam-related sedimentation effects over the license period.

The findings from these analyses will then be presented in the Updated Study Report.

7 References

Andrews, W.J., M.F. Becker, S.L. Mashburn, and S.J. Smith. 2009. *Selected Metals in Sediments and Streams in the Oklahoma Part of the Tri-State Mining District, 2000–2006*. U.S. Geological Survey Scientific Investigations Report SIR 2009-5032. July 2009.

Borrowman, T.D., E.R. Smith, J.Z. Gailani, and L. Caviness, 2006. *Erodibility Study of Passaic River Sediments Using USACE SEDflume*. Dredging Operations and Environmental Research Program. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi Environmental Laboratory. September 2006.

Brunner, G.W., 2016. *HEC-RAS, River Analysis System Hydraulic Reference Manual*. Version 5.0. Davis, California: U.S. Army Corps of Engineers Hydrologic Engineering Center. February 2016.

Dewberry, 2011. *USGS Grand Lake, OK LiDAR Project*. Prepared for the U.S. Geological Survey.

Edwards, T.K., G.D. Glysson, 1999. "Field Methods for Measurement of Fluvial Sediment." *Technique of Water-Resources Investigations of the U.S. Geological Survey*. Book 3, Chapter C2. Denver, Colorado: U.S. Geological Survey.

FEMA (Federal Emergency Management Agency), 2019. *Flood Insurance Study – Ottawa County, Oklahoma and Incorporated Areas (40115CV000B)*. Washington.

Hunter, S.L., A.R. Trevisan, J. Villa, and K.A. Smith, 2020. *Bathymetric Map, Surface Area, and Capacity of Grand Lake O' the Cherokees, Northeastern Oklahoma, 2019*. Denver, Colorado: U.S. Geological Survey.

Ingersoll, C.G. C.D. Ivey, W.G. Brumbaugh, J.M. Besser, N.E. Kemble, and S. Dudding, 2009. *Toxicity Assessment of Sediments from the Grand Lake O' the Cherokees with the Amphipod* Hyalella azteca. U.S. Geological Survey Administrative Report CERC-8335-FY09-20-01.

Integral Consulting, 2020. *Grand Lake Waterways SEDflume Analysis: Grand Lake o' the Cherokees, Oklahoma*. SEDflume Study, Grand Lake o' the Cherokees. Santa Cruz, California.

Juracek, K.E. and M.F. Becker, 2009. *Occurrence and Trends of Selected Chemical Constituents in Bottom Sediment, Grand Lake O' the Cherokees, Northeast Oklahoma, 1940-2008*. U.S. Geological Survey Scientific Investigations Report 2009-5258, 28 p.

McNeil, J., C. Taylor, and W. Lick, 1996. "Measurements of Erosion of Undisturbed Bottom Sediments with Depth." *Journal of Hydraulic Engineering* 122(6):316–324.

Mussetter, B., 1997. *Analysis of Backwater Conditions Caused by Pensacola Dam on the Neosho River in the Vicinity of Miami, Oklahoma*. Fort Collins, Colorado.

Mussetter, B., 1998. *Evaluation of the Roughness Characteristics of the Neosho River in the Vicinity of Miami, Oklahoma*. Fort Collins, Colorado.

Pope, L.M., 2005. *Assessment of Contaminated Streambed Sediment in the Kansas Part of the Historic Tri-State Lead and Zinc Mining District, Cherokee County, 2004* (No. 2005-5251).

Smith, D.C. 2016. *Occurrence, Distribution, and Volume of Metals-Contaminated Sediment of Selected Streams Draining the Tri-State Mining District, Missouri, Oklahoma, and Kansas, 2011*-12. U.S. Geological Survey Scientific Investigations Report 2016-5144, 86 p., Available at: ,http://dx.doi.org/10.3133/sir20165144.

Smith, S., Hunter, S., and C. Ashworth, 2017. *Bathymetric Surveys of the Neosho River, Spring River, and Elk River, Northeastern Oklahoma and Southwestern Missouri, 2016-2017*. Denver, Colorado: U.S. Geological Survey.

Tetra Tech, 2018. *Pensacola hydropower project FERC project no. 1494-438: Sedimentation Study Plan*. Fort Collins, Colorado: Tetra Tech, Inc.

USACE (U.S. Army Corps of Engineers), 1998. *Grand Lake, Oklahoma Real Estate Adequacy Study*.

USGS (U.S. Geological Survey). 2006. Collection of Water Samples (ver. 2.0). *US Geological Survey Techniques of Water-Resources Investigations,* Book 9.

USGS, 2017. "National Geospatial Program." *The National Map Viewer*. Available at: https://www.usgs.gov/core-science-systems/national-geospatial-program/national-map.

USGS, 2021a. "USGS 07185000 Neosho River near Commerce, OK." *National Water Information System*. Accessed February 5, 2021. Available at: https://waterdata.usgs.gov/nwis/uv?site_no=07185000.

USGS, 2021b. "USGS 07185080 Neosho River at Miami, OK." *National Water Information System*. Accessed February 5, 2021. Available at: https://waterdata.usgs.gov/ok/nwis/uv?site_no=07185080.

USGS, 2021c. "USGS 07185095 Tar Creek at 22nd Street Bridge at Miami, OK." *National Water Information System*. Accessed February 5, 2021. Available at: https://waterdata.usgs.gov/nwis/uv?site_no=07185095.

USGS, 2021d. "USGS 07188000 Spring River near Quapaw, OK." N*ational Water Information System*. Accessed February 5, 2021. Available at: https://waterdata.usgs.gov/nwis/uv?site_no=07188000.

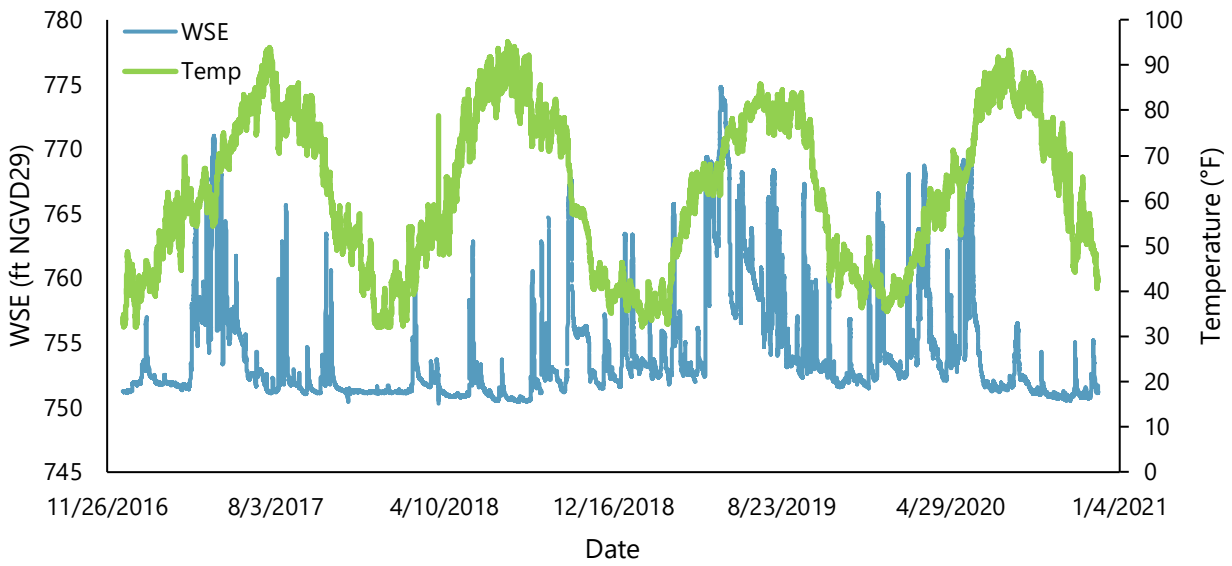
USGS, 2021e. "USGS 07189000 Elk River near Tiff City, Mo." *National Water Information System*. Accessed February 5, 2021. Available at: https://waterdata.usgs.gov/mo/nwis/uv?site_no=07189000.

USGS, 2021f. "USGS 07190000 Lake O' the Cherokees at Langley, OK." *National Water Information System*. Accessed February 5, 2021. Available at: https://waterdata.usgs.gov/ok/nwis/uv?site_no=07190000.

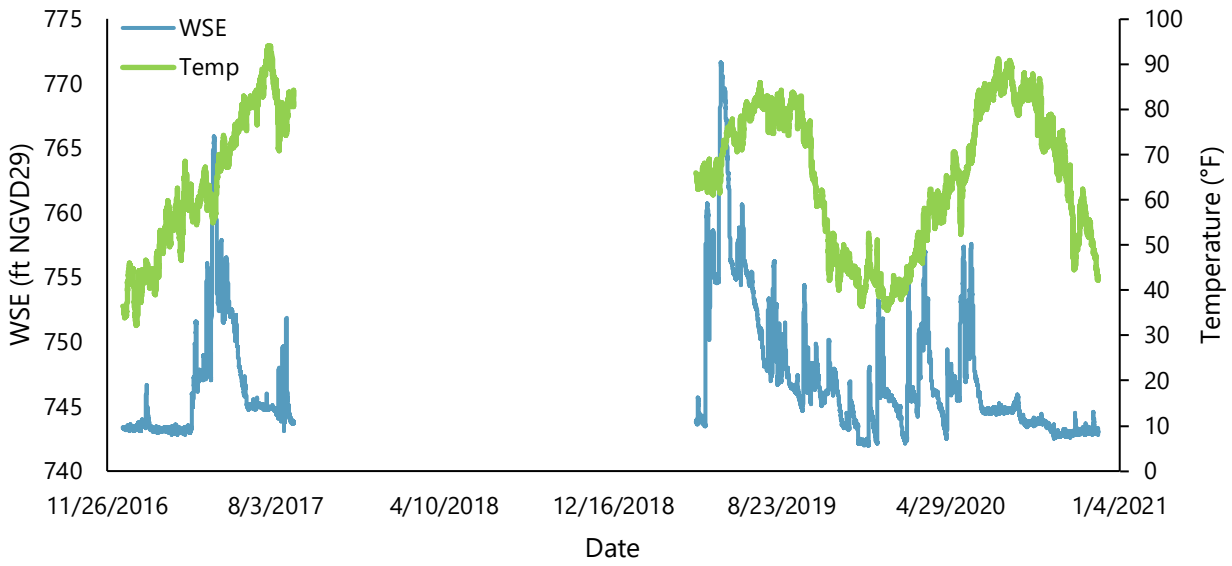
USSD (United States Society on Dams, 2015. *Modeling Sediment Movement in Reservoirs.* Prepared by the United States Society on Dams Committee on Hydraulics of Dams, Subcommittee on Reservoir Sedimentation, June 2015.

Appendix A
Water Surface Elevation Monitoring

Station 1: Neosho River near Commerce, Oklahoma

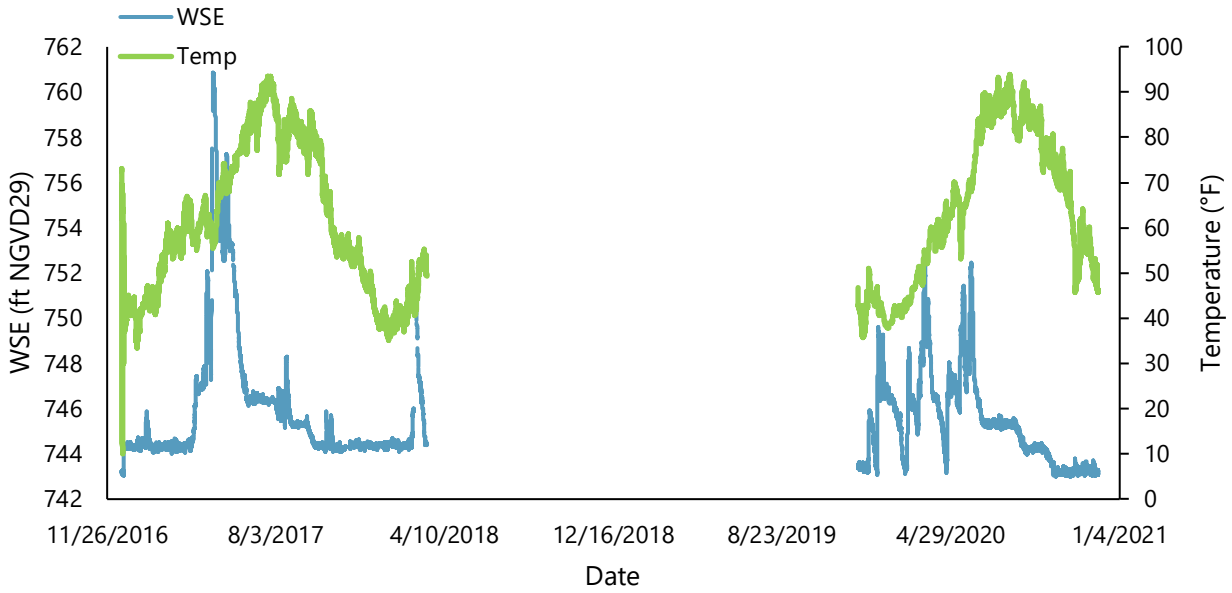


Station 2: Neosho River at Riverview Park in Miami, Oklahoma



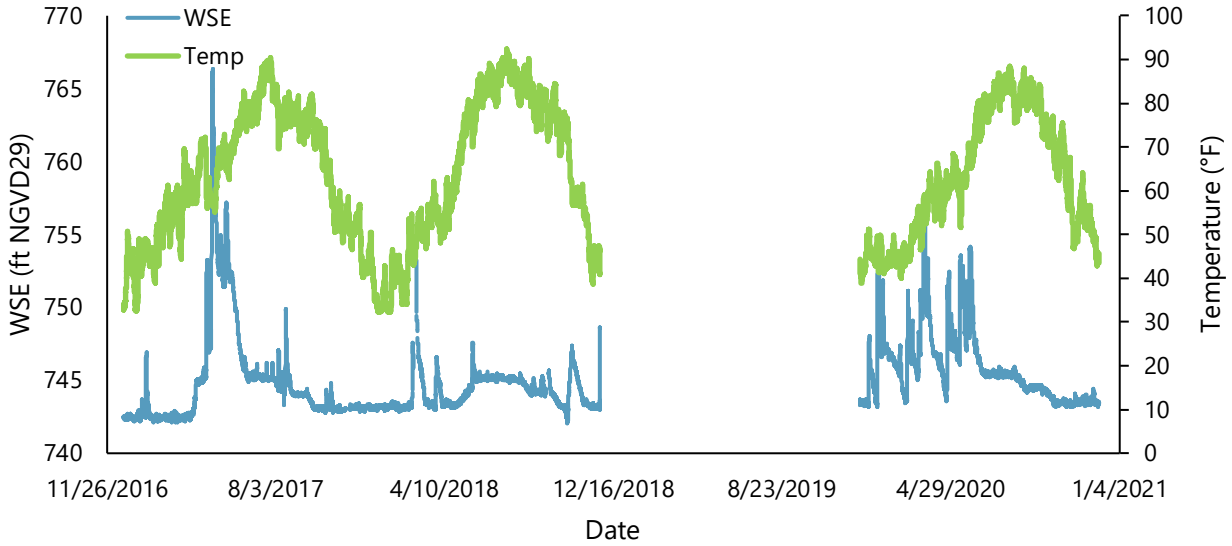
Note: WSE logger not recoverable after August 2017 and had washed away by April 2019. It was replaced and has been recording since April 2019.

Station 3: Neosho River at Connors Bridge at South 590 Road



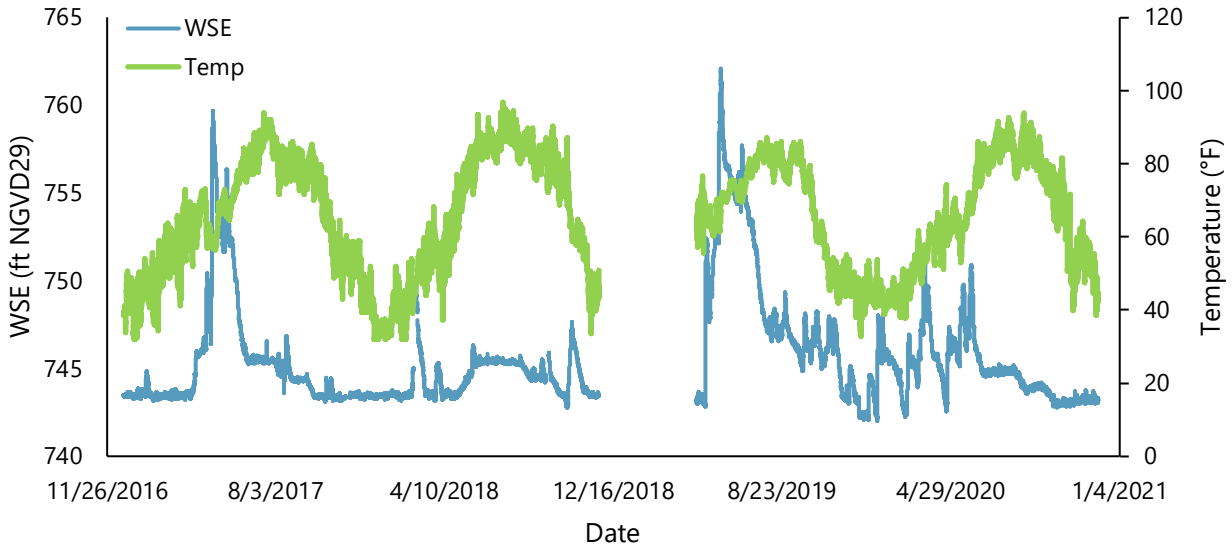
Note: WSE logger not recoverable between August 2017 and April 2019. Internal storage was filled by March 2018. It was re-deployed in April 2019 but washed away between April and December 2019 and was replaced.

Station 4: Spring River Upstream of Highway 10 Bridge



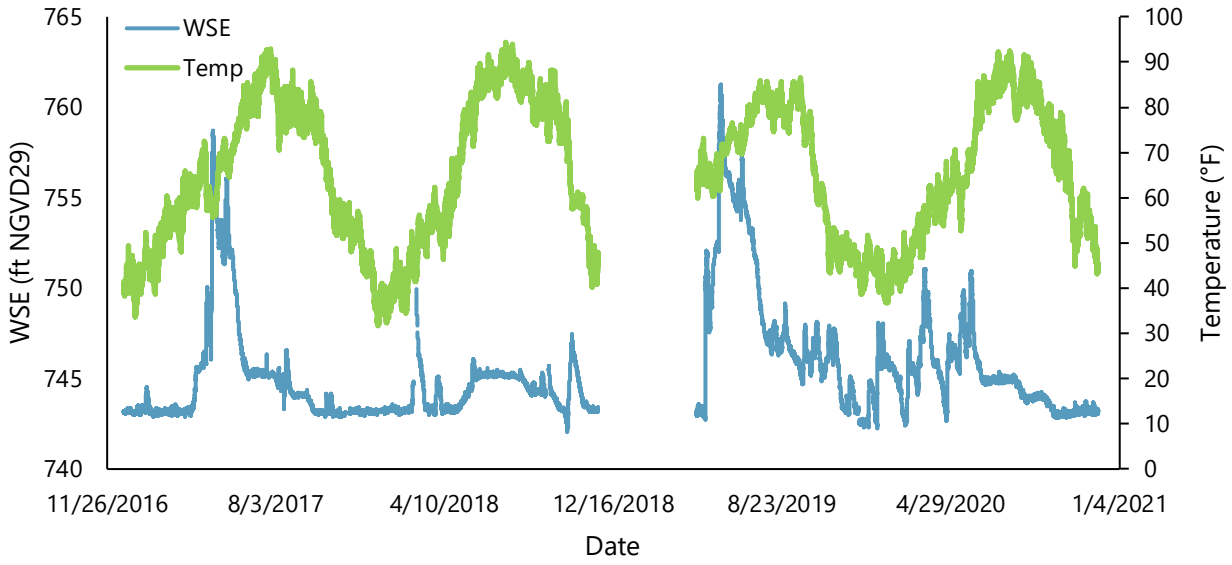
Note: WSE logger not recoverable between August 2017 and April 2019. Logger washed away between April and December 2019 and was replaced.

Station 5: Spring River at Twin Bridges Area at Grand Lake State Park Boat Launch



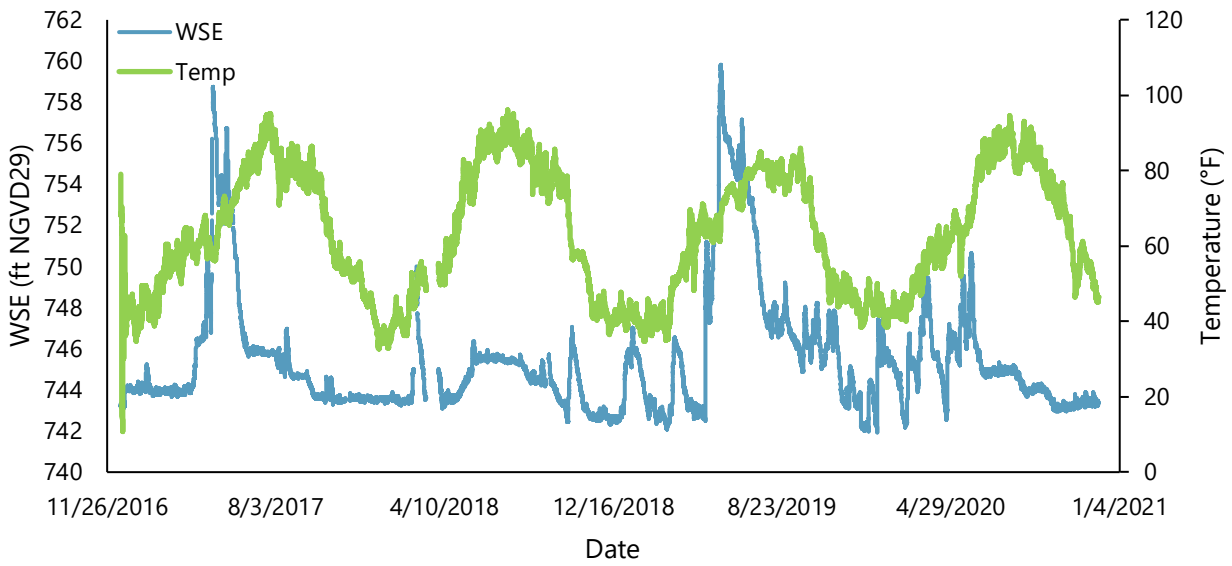
Note: WSE logger not recoverable between August 2017 and April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Station 6: Confluence of Neosho River and Spring River at Twin Bridges Area at Grand Lake State Park

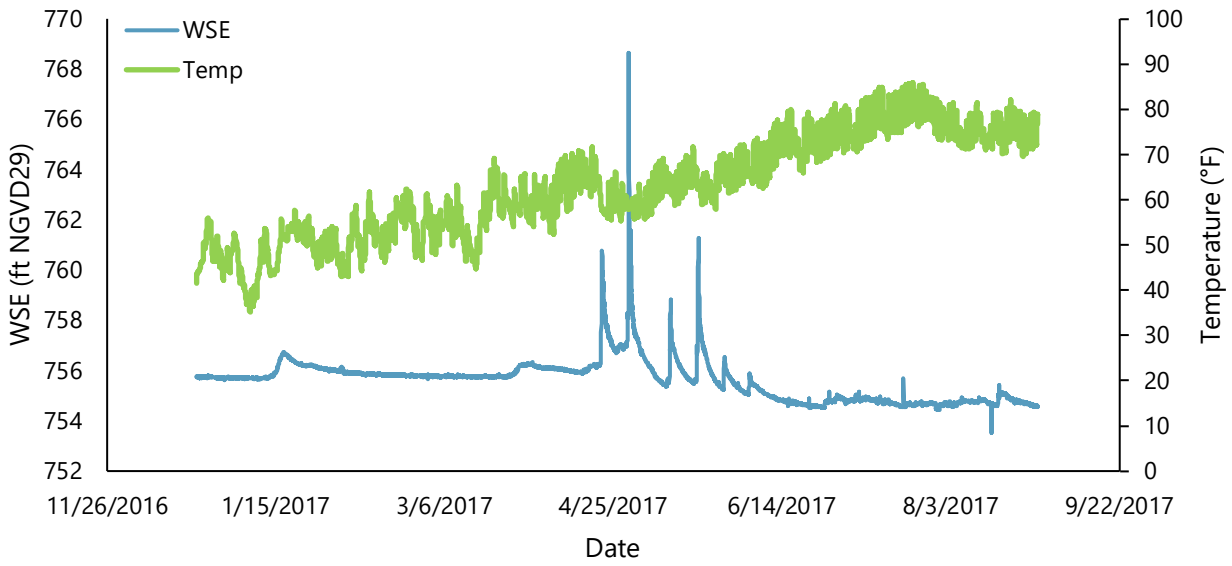


Note: WSE logger not recoverable between August 2017 and April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Station 7: Neosho River off East 157 Road Downstream of Railroad Bridge



Station 8: Sycamore Creek at Highway 10 Bridge

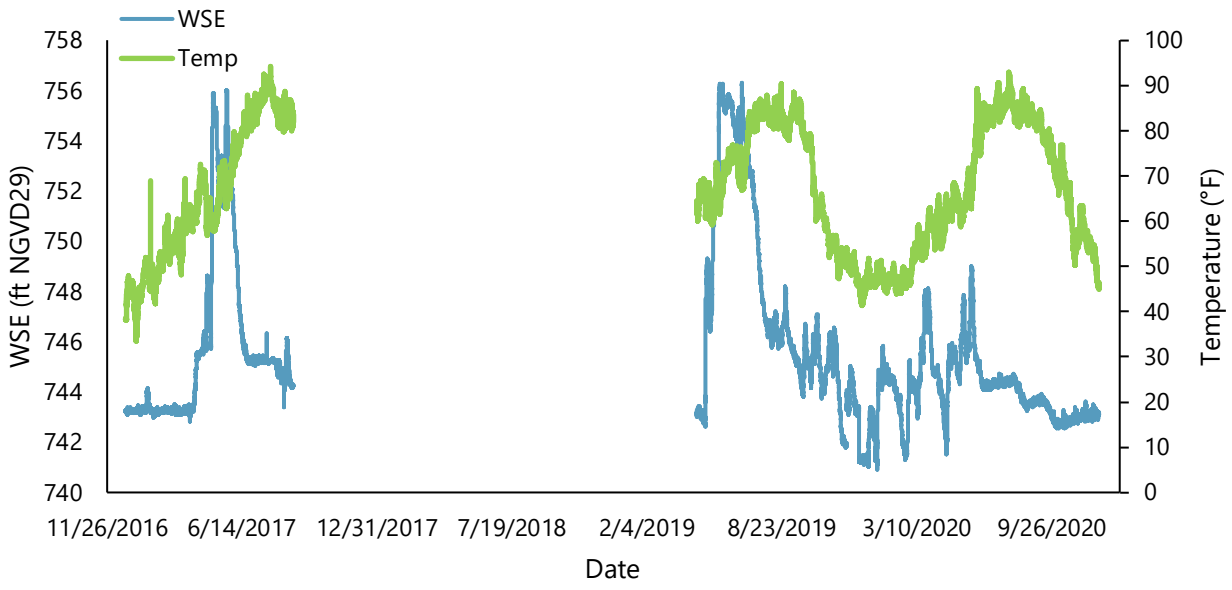


Note: WSE logger not recoverable since August 2017. Logger washed away three times and was replaced in both April and December 2019 as well as December 2020.

Station 9: Neosho River at Roadside Park off Highway 10

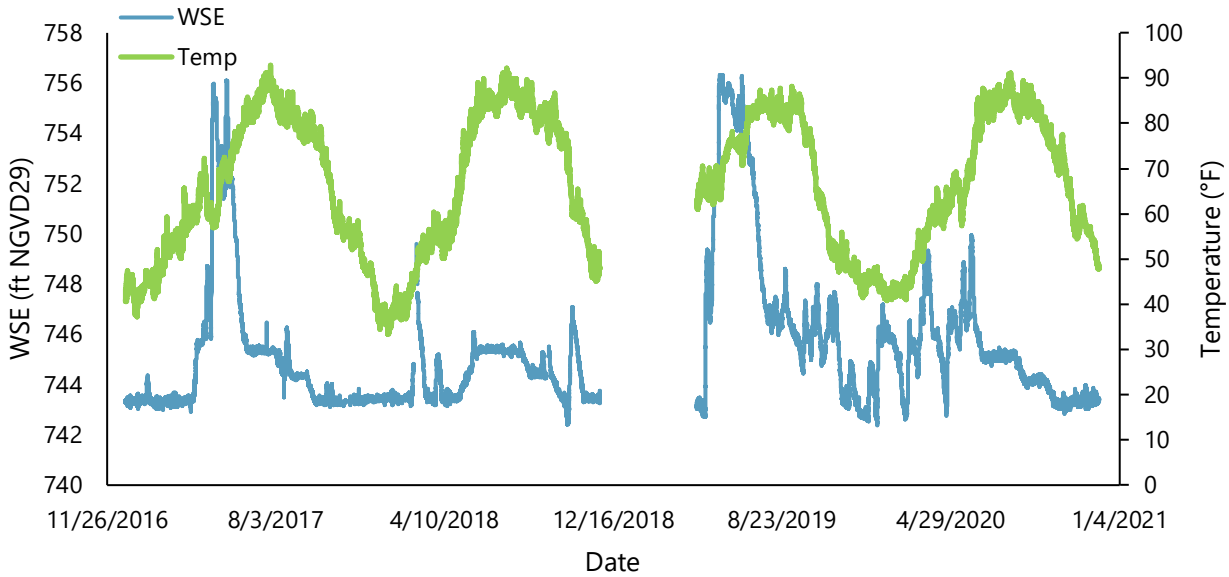
Note: WSE logger not recoverable since August 2017

Station 10: Grand Lake/Elk River Upstream of Highway 10 Bridge North of Grove, Oklahoma



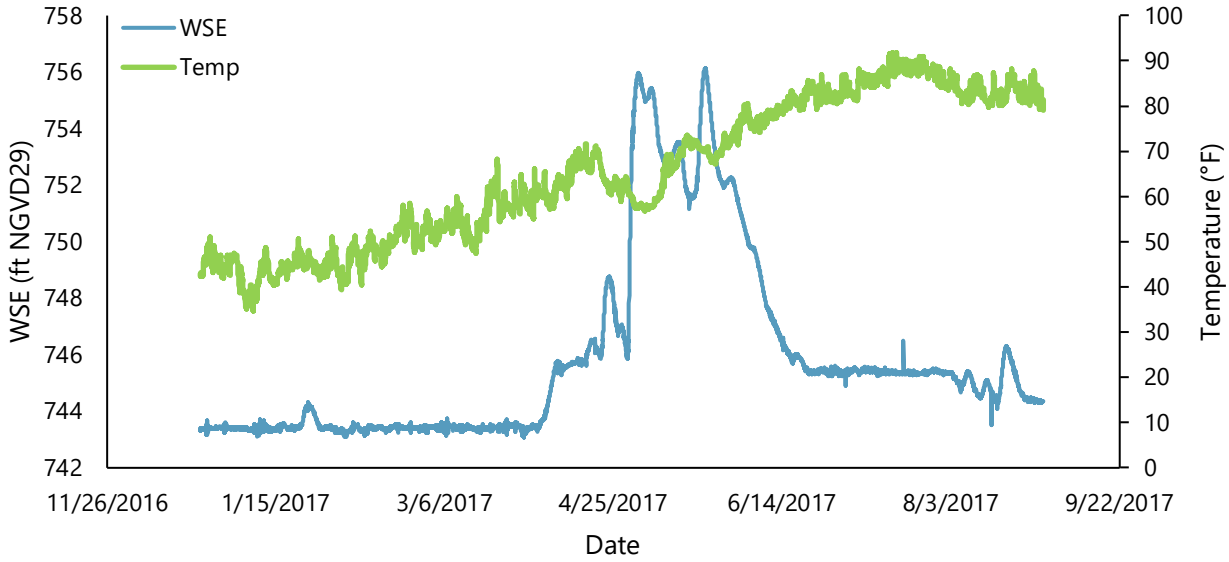
Note: WSE logger not recoverable after August 2017 and had washed away by April 2019. It was replaced and has been recording since April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Station 11: Grand Lake at Hickory Point, Upstream of Highway 59 Bridge



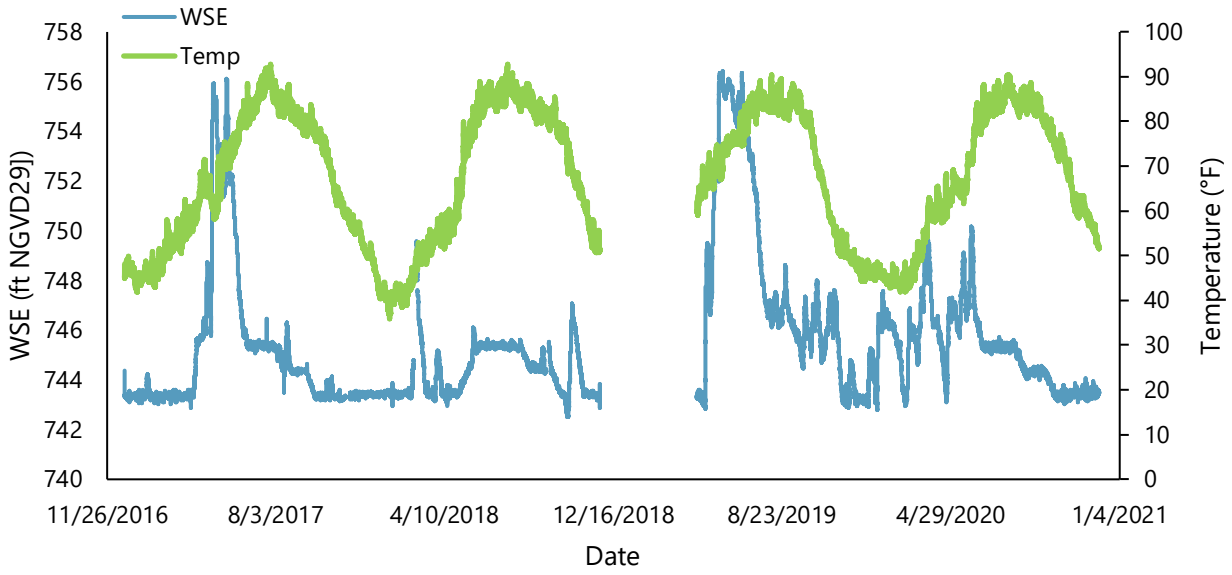
Note: WSE logger not recoverable between August 2017 and April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Station 12: Grand Lake at Public Access off South 580 Road, Downstream of Highway 59 Bridge



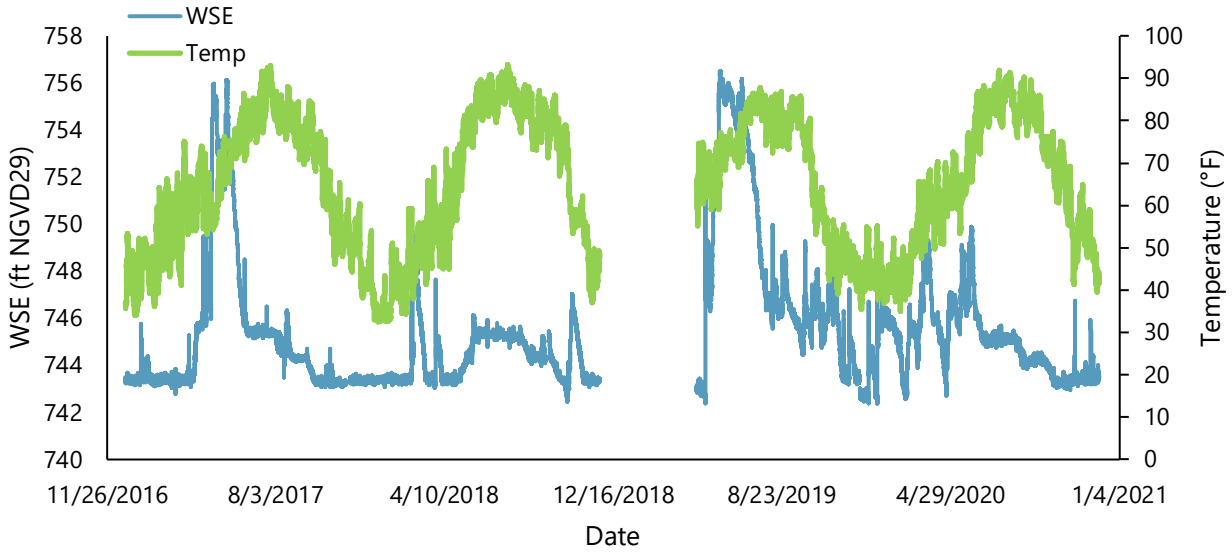
Note: WSE logger not recoverable since August 2017.

Station 13: Grand Lake at Honey Creek State Park



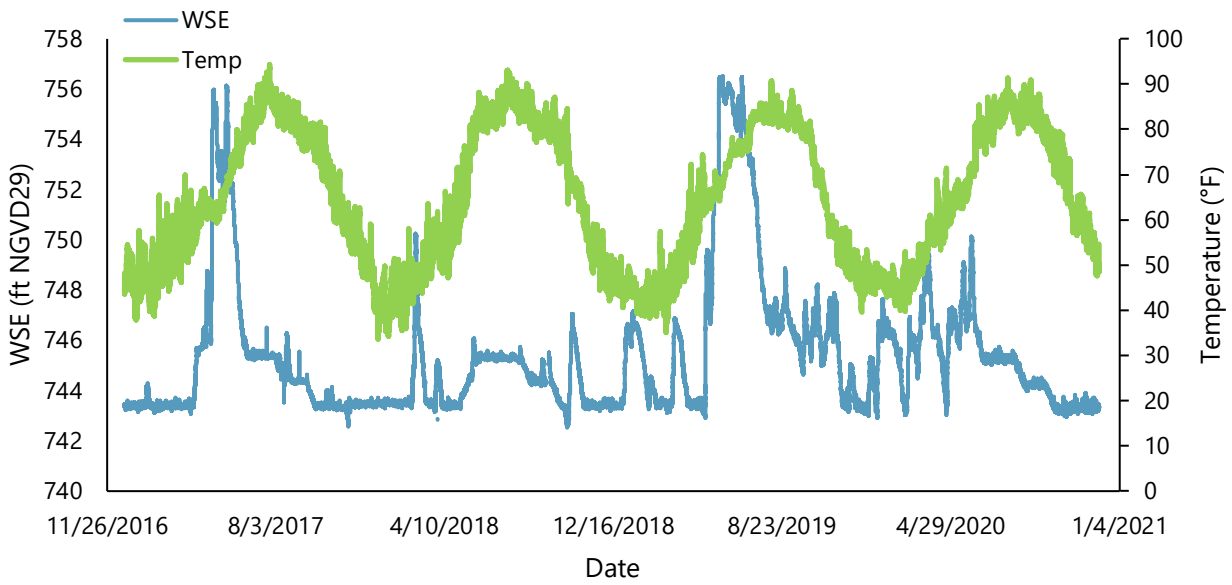
Note: WSE logger not recoverable between August 2017 and April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Station 14: Horse Creek off East 249 Road

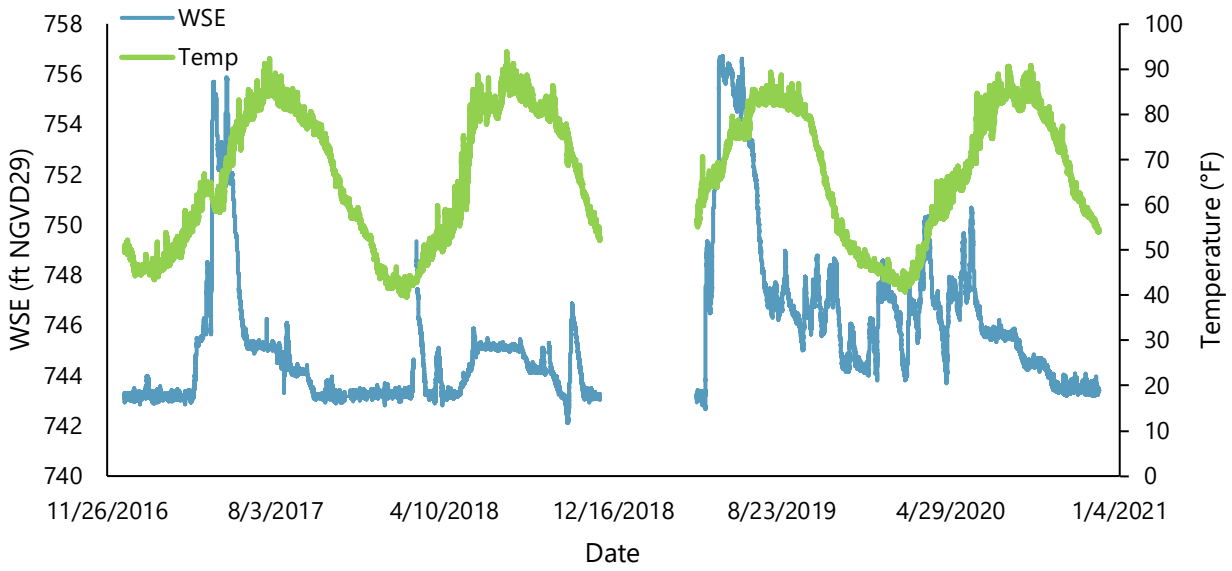


Note: WSE logger not recoverable between August 2017 and April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Station 15: Grand Lake near Woods Spring Branch off South 560 Road and East 360 Road



Station 16: Grand Lake at Cherokee State Park Boat Ramp in Disney, Oklahoma



Note: WSE logger not recoverable between August 2017 and April 2019. Data gap due to insufficient internal memory following August 2017 deployment.

Table A-19
RTK-GPS Water Surface Elevation Measurements

Site No.	Location Description	Status	Date	Time [U.S. Central]	Northing [ft, OK N]	Easting [ft, OK N]	Elevation [ft NGVD29]
2	Neosho River at Riverview Park; Miami, OK	FIXED	04/17/2019	9:47	691658.298	2882200.694	743.774
3	Neosho River at Connors Bridge at S 590 Rd	FIXED	04/17/2019	16:43	670153.750	2899762.406	743.316
4	Spring River upstream of HWY 10 Bridge	***FLOAT***	04/17/2019	15:38	697539.664	2914724.085	747.985
5	Spring River at Twin Bridges Area at Grand Lake State Park boat launch	FIXED	04/17/2019	19:44	672656.026	2918379.484	743.124
6	Confluence of Neosho and Spring Rivers at Twin Bridges Area at Grand Lake State Park	FIXED	04/17/2019	20:05	670392.455	2918839.044	743.033
7	Neosho River off E 157 Road downstream of railroad bridge	FIXED	04/18/2019	7:52	665496.805	2917824.623	743.052
8	Sycamore Creek at HWY 10 Bridge	FIXED	04/18/2019	9:07	660201.790	2937133.318	754.728
10	Grand Lake/Elk River upstream of HWY 10 Bridge; north of Grove, OK	FIXED	04/18/2019	9:52	617897.988	2935022.412	743.286
11	Grand Lake at Hickory Point, upstream of HWY 59 Bridge	FIXED	04/18/2019	10:53	613027.180	2908379.085	743.223
12	Grand Lake at public access off S 580 Rd, downstream of HWY 59 Bridge	FIXED	04/18/2019	11:31	612194.062	2896453.042	742.883
13	Grand Lake at Honey Creek State Park	FIXED	04/18/2019	16:57	588620.786	2911838.008	743.266
14	Horse Creek off E 249 Rd	FIXED	04/18/2019	13:26	624203.231	2875288.114	742.929
15	Grand Lake near Woods Spring Branch off S 560 Rd & E 360 Rd	FIXED	04/18/2019	15:50	556696.710	2881255.658	743.104
16	Grand Lake at Cherokee State Park Boat Ramp; Disney, OK	FIXED	04/18/2019	14:31	552673.819	2847801.546	743.160
1	Neosho River near Commerce, OK	FIXED	08/14/2019	11:07	715787.060	2857696.142	762.693
2	Neosho River at Riverview Park; Miami, OK	FIXED	08/16/2019	11:10	691694.498	2882172.159	747.276
3	Neosho River at Connors Bridge at S 590 Rd	FIXED	08/16/2019	11:52	670169.134	2899764.755	747.150
4	Spring River upstream of HWY 10 Bridge	FIXED	08/16/2019	14:07	697038.562	2914621.602	**723.284**
5	Spring River at Twin Bridges Area at Grand Lake State Park boat launch	FIXED	08/16/2019	12:44	672645.296	2918394.628	746.758
6	Confluence of Neosho and Spring Rivers at Twin Bridges Area at Grand Lake State Park	FIXED	08/16/2019	12:58	670401.875	2918830.210	746.535
7	Neosho River off E 157 Road downstream of railroad bridge	FIXED	08/17/2019	12:31	665497.806	2917855.086	746.721
8	Sycamore Creek at HWY 10 Bridge	FIXED	08/17/2019	12:12	660158.317	2937196.121	755.483
9	Neosho River at roadside park off HWY 10	FIXED	08/17/2019	12:01	649343.294	2929170.012	746.653
10	Grand Lake/Elk River upstream of HWY 10 Bridge; north of Grove, OK	FIXED	08/17/2019	11:48	617894.238	2935003.439	745.961
13	Grand Lake at Honey Creek State Park	FIXED	08/17/2019	11:09	588622.899	2911844.853	746.420
15	Grand Lake near Woods Spring Branch off S 560 Rd & E 360 Rd	FIXED	08/17/2019	10:27	556783.467	2881176.310	746.769
16	Grand Lake at Cherokee State Park Boat Ramp; Disney, OK	FIXED	08/17/2019	9:46	552689.099	2847945.632	746.253
1	Neosho River near Commerce, OK	FIXED	12/12/2019	11:50	715877.597	2857162.787	751.844
1	Neosho River near Commerce, OK	FIXED	12/13/2019	13:38	715876.418	2857161.820	752.124
2	Neosho River at Riverview Park; Miami, OK	FIXED	12/13/2019	14:18	691693.165	2882187.376	743.394
3	Neosho River at Connors Bridge at S 590 Rd	FIXED	12/13/2019	15:36	670153.753	2899760.180	743.472
4	Spring River upstream of HWY 10 Bridge	FIXED	12/14/2019	8:16	697067.767	2914585.433	743.632
4	Spring River upstream of HWY 10 Bridge	FIXED	12/15/2019	17:15	697733.625	2914844.643	743.520
5	Spring River at Twin Bridges Area at Grand Lake State Park boat launch	FIXED	12/14/2019	9:28	672655.499	2918380.029	743.352
6	Confluence of Neosho and Spring Rivers at Twin Bridges Area at Grand Lake State Park	FIXED	12/14/2019	10:03	670395.980	2918845.765	743.400
7	Neosho River off E 157 Road downstream of railroad bridge	FIXED	12/14/2019	11:01	665496.584	2917821.749	743.447
8	Sycamore Creek at HWY 10 Bridge	FIXED	12/14/2019	12:27	660147.944	2937238.325	755.437

Table A-19
RTK-GPS Water Surface Elevation Measurements

Site No.	Location Description	Status	Date	Time [U.S. Central]	Northing [ft, OK N]	Easting [ft, OK N]	Elevation [ft NGVD29]
8	Sycamore Creek at HWY 10 Bridge	FIXED	12/15/2019	15:43	660151.595	2937222.997	755.485
9	Neosho River at roadside park off HWY 10	FIXED	12/14/2019	12:52	649312.398	2929135.362	743.144
10	Grand Lake/Elk River upstream of HWY 10 Bridge; north of Grove, OK	FIXED	12/14/2019	13:08	617890.491	2935018.927	743.295
11	Grand Lake at Hickory Point, upstream of HWY 59 Bridge	FIXED	12/14/2019	16:05	613059.851	2908384.212	743.288
13	Grand Lake at Honey Creek State Park	FIXED	12/14/2019	14:34	588657.222	2911737.544	743.161
14	Horse Creek off E 249 Rd	FIXED	12/15/2019	13:48	624518.073	2875233.239	743.428
15	Grand Lake near Woods Spring Branch off S 560 Rd & E 360 Rd	FIXED	12/15/2019	11:13	556701.317	2881246.886	743.147
16	Grand Lake at Cherokee State Park Boat Ramp; Disney, OK	FIXED	12/15/2019	10:07	552700.649	2847980.396	744.178
1	Neosho River near Commerce, OK	FIXED	12/03/2020	9:31	715879.316	2857162.495	751.701
2	Neosho River at Riverview Park; Miami, OK	FIXED	12/03/2020	11:49	691664.321	2882203.087	743.194
3	Neosho River at Connors Bridge at S 590 Rd	FIXED	12/03/2020	13:10	670153.687	2899734.638	743.236
4	Spring River upstream of HWY 10 Bridge	FIXED	12/04/2020	7:37	697091.619	2914603.187	743.476
5	Spring River at Twin Bridges Area at Grand Lake State Park boat launch	FIXED	12/03/2020	15:03	672650.395	2918388.949	743.258
6	Confluence of Neosho and Spring Rivers at Twin Bridges Area at Grand Lake State Park	FIXED	12/03/2020	16:10	670402.201	2918854.959	743.226
7	Neosho River off E 157 Road downstream of railroad bridge	FIXED	12/04/2020	11:01	665512.468	2917841.979	743.393
8	Sycamore Creek at HWY 10 Bridge	FIXED	12/04/2020	8:51	660159.476	2937217.898	755.754
9	Neosho River at roadside park off HWY 10	FIXED	12/04/2020	10:41	649350.815	2929145.018	743.320
10	Grand Lake/Elk River upstream of HWY 10 Bridge; north of Grove, OK	FIXED	12/04/2020	11:03	617870.337	2934983.314	743.195
11	Grand Lake at Hickory Point, upstream of HWY 59 Bridge	FIXED	12/04/2020	16:09	613045.080	2908374.723	743.297
12	Grand Lake at public access off S 580 Rd, downstream of HWY 59 Bridge	FIXED	12/05/2020	9:23	612070.218	2896299.887	743.456
13	Grand Lake at Honey Creek State Park	FIXED	12/04/2020	12:53	588671.915	2911713.703	743.437
14	Horse Creek off E 249 Rd	FIXED	12/05/2020	7:56	624543.162	2875241.079	743.404
15	Grand Lake near Woods Spring Branch off S 560 Rd & E 360 Rd	FIXED	12/04/2020	15:06	556774.614	2881150.404	743.208
16	Grand Lake at Cherokee State Park Boat Ramp; Disney, OK	FIXED	12/04/2020	14:04	552706.889	2847914.361	742.976

Notes:

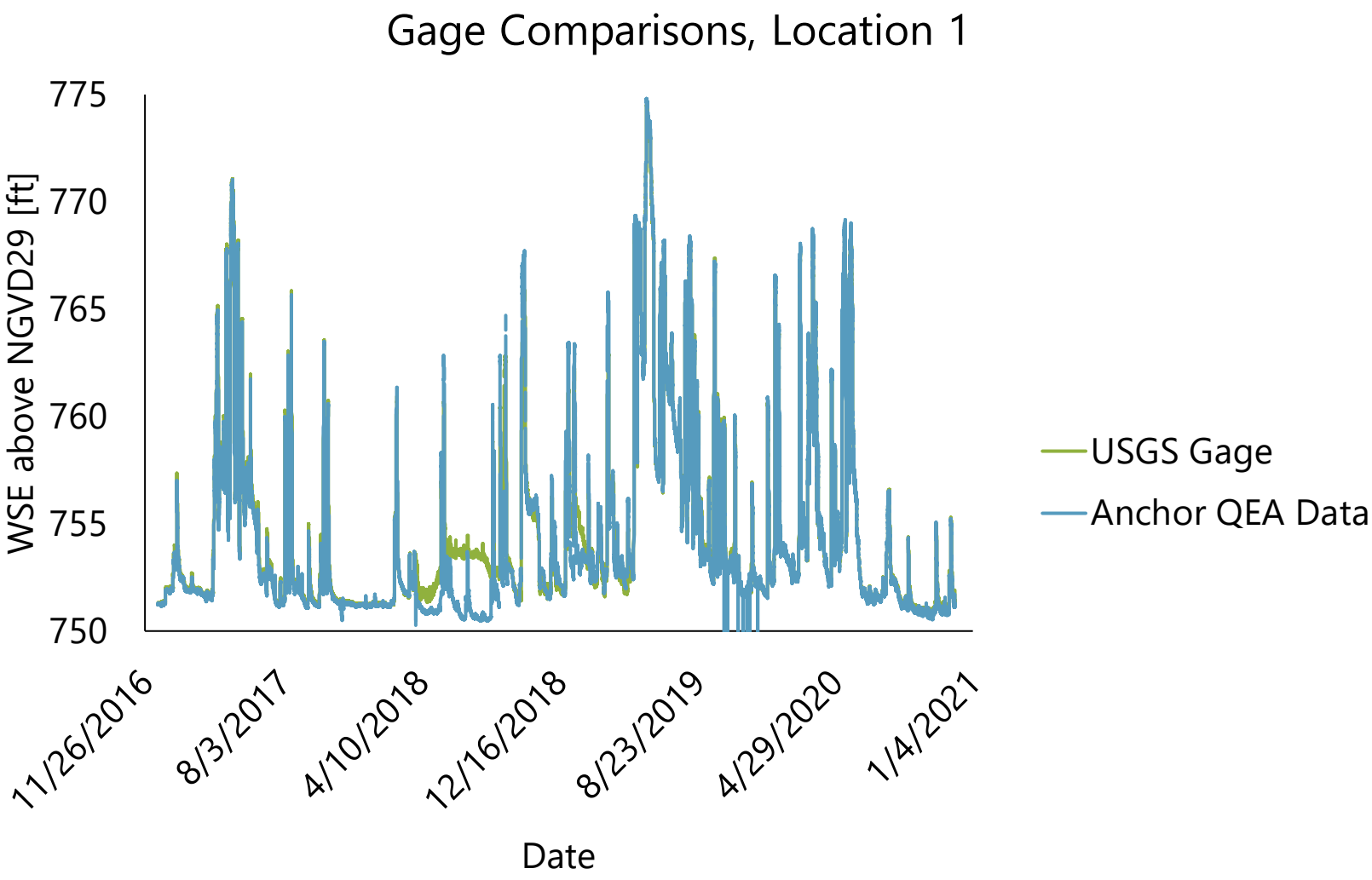
—: data unavailable

ft: feet

NGVD29: National Geodetic Vertical Datum of 1929

Temp: temperature in degrees Fahrenheit

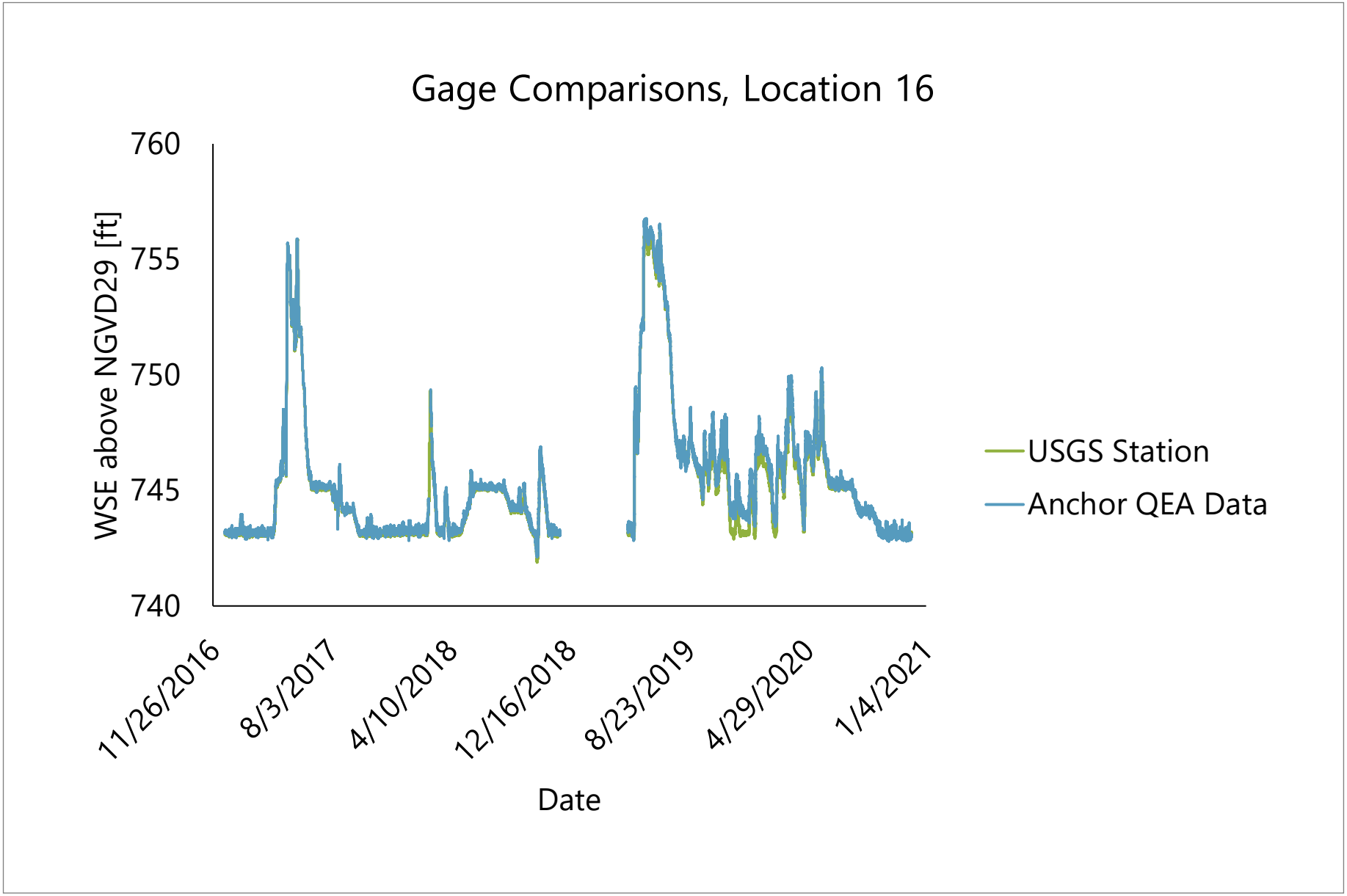
Figures

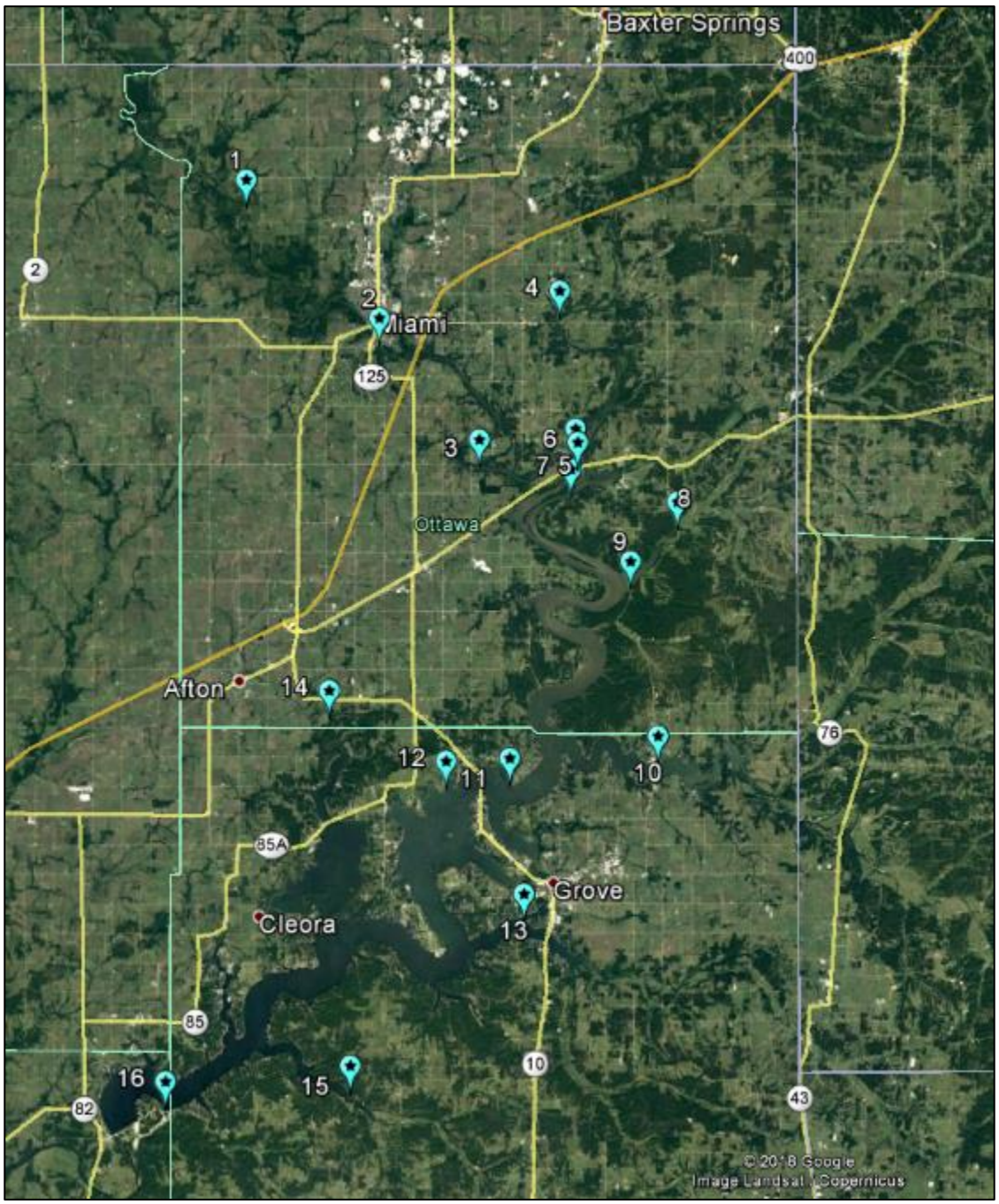


ANCHOR QEA

Figure A-1
Gage Comparisons, Location 1

Initial Study Report
Grand Lake Sedimentation Study


Gage Comparisons, Location 16
760
755
750
745
740
WSE above NGVD29 [ft]
11/26/2016
8/3/2017
4/10/2018
12/16/2018
8/23/2019
4/29/2020
1/4/2021
Date
USGS Station
Anchor QEA Data



ANCHOR QEA

Figure A-3
Location Map

Initial Study Report
Grand Lake Sedimentation Study

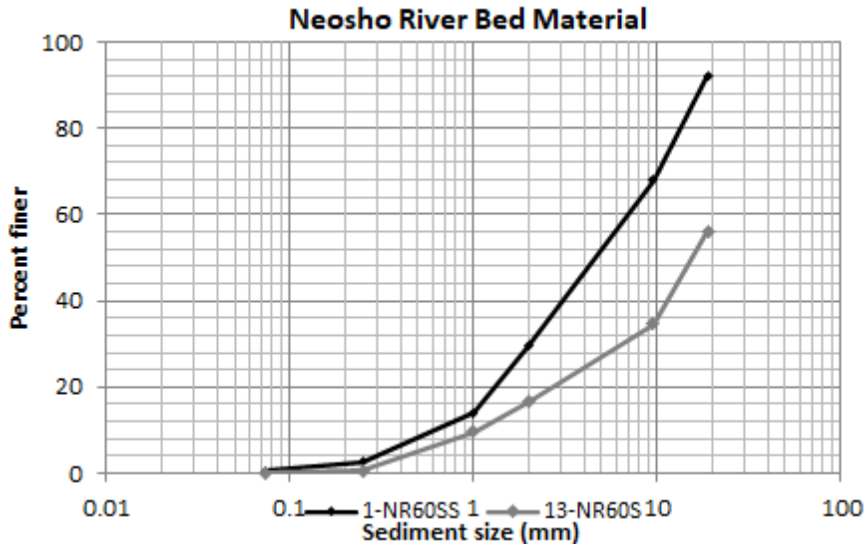
Appendix B
Sediment Grab Sampling

Particle Size Distribution Results

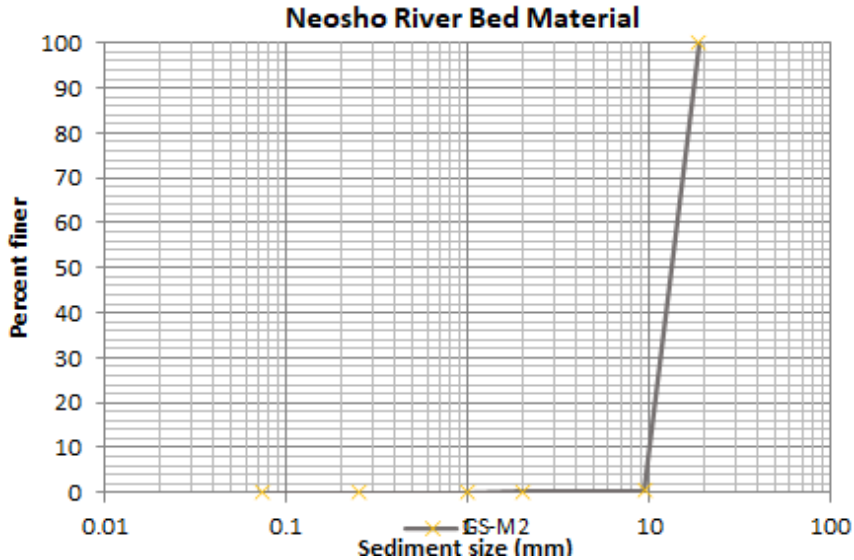
Note: Graphs are provided for each stream in an upstream to downstream direction showing HEC-RAS River Mile for each sample. Core sample particle size distributions are also included with other samples to provide context and completeness. Unless otherwise noted, samples are from the riverbed.

Neosho River above Tar Creek

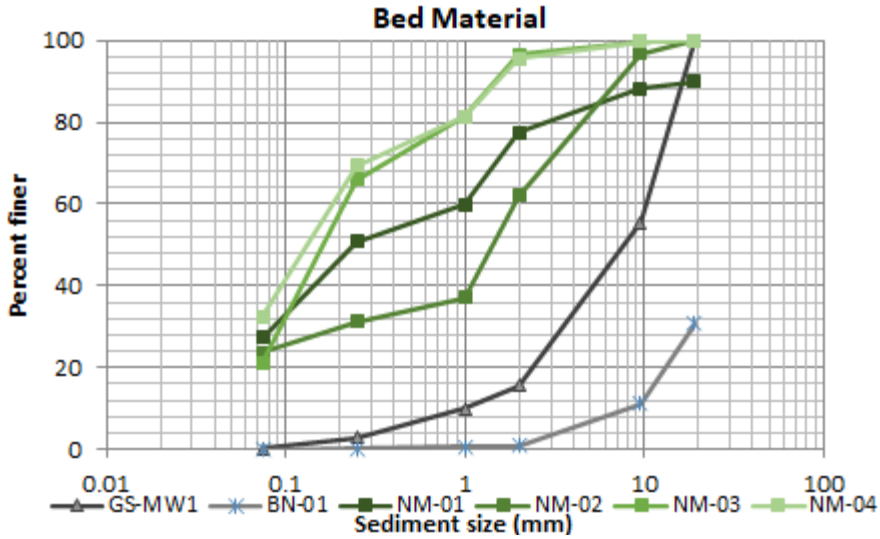
River Mile 145.5



River Mile 135.95

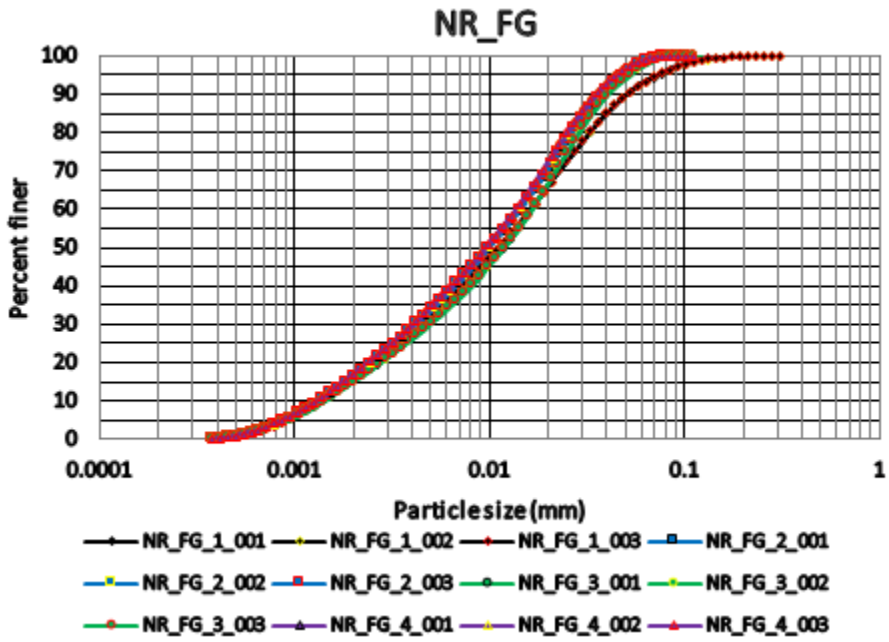


River Mile 134.6–135.46

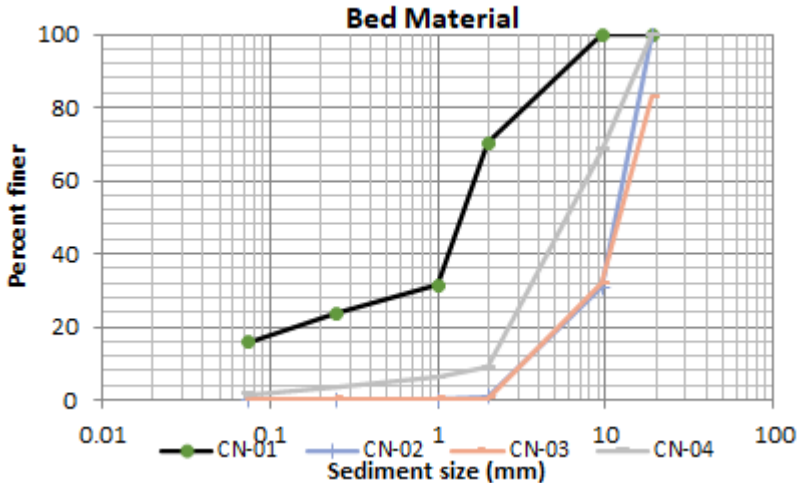


Note: NM-01 – left bank surface, NM-02 – floodplain surface, NM-04 – right bank surface

River Mile 135.04

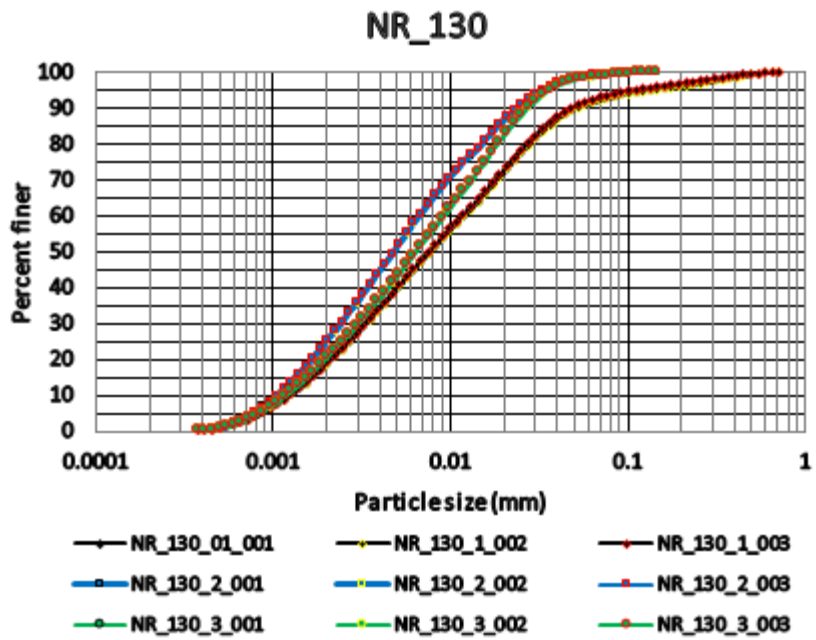


River Mile 128.81–130.37

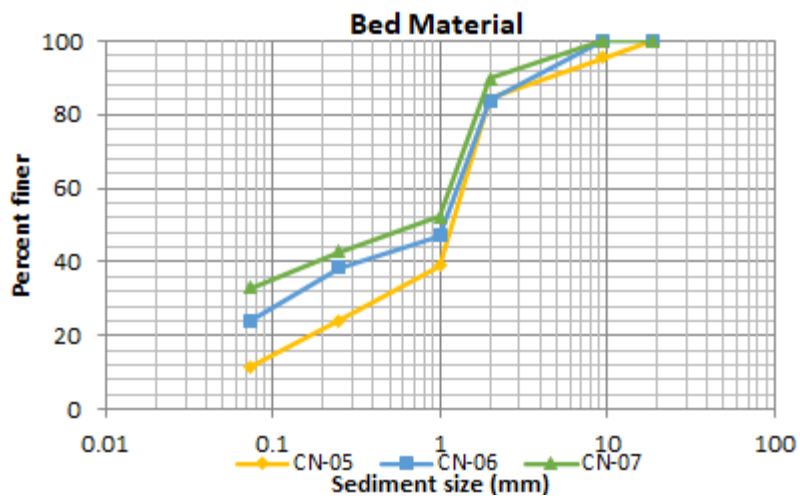


Note: CN-01 – bank

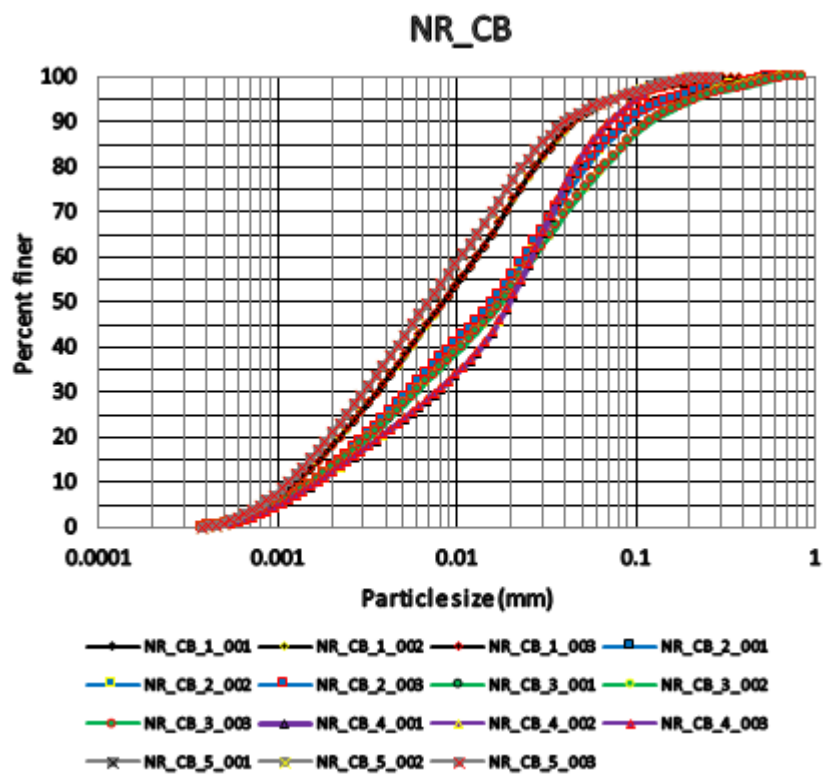
River Mile 130.37



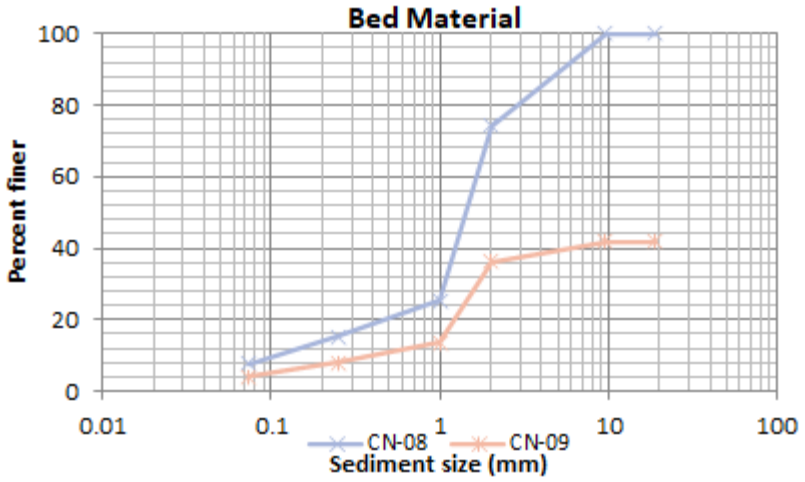
River Mile 126.69–127.85



River Mile 126.69

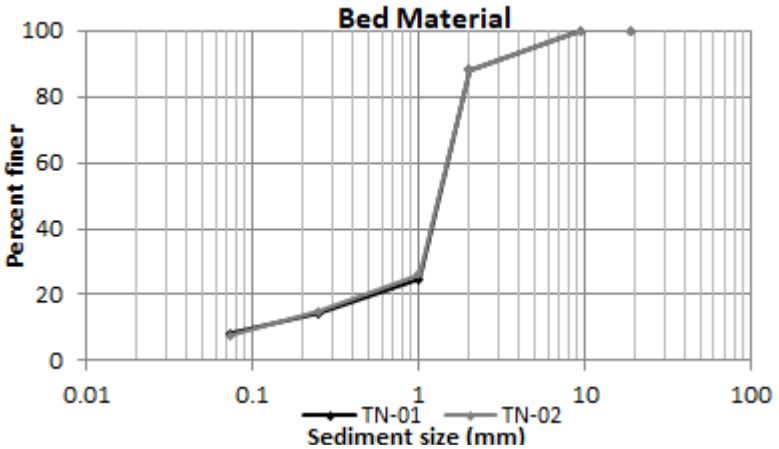


River Mile 124.2–125.33



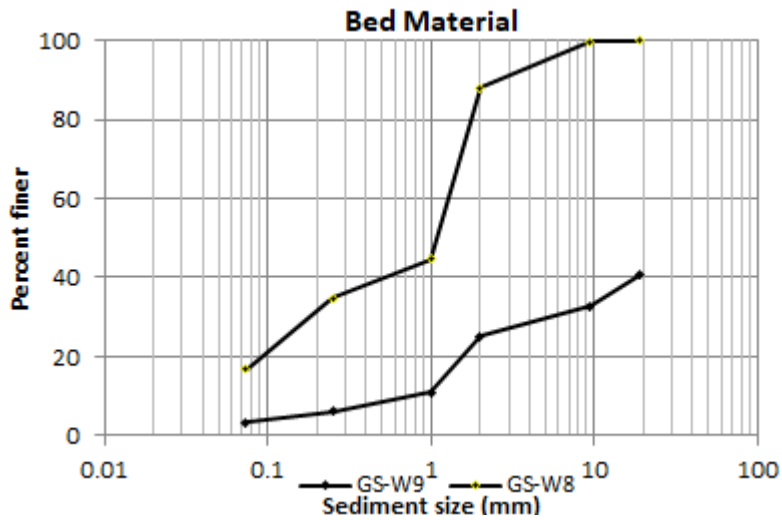
Note: CN-08 – left bank

River Mile 122.57–123.24

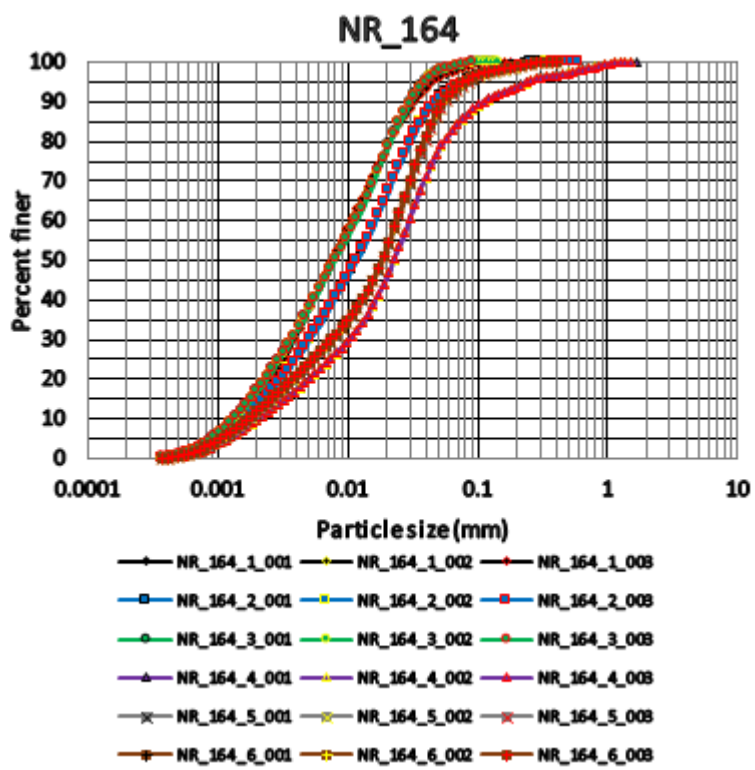


Neosho River – Grand Lake

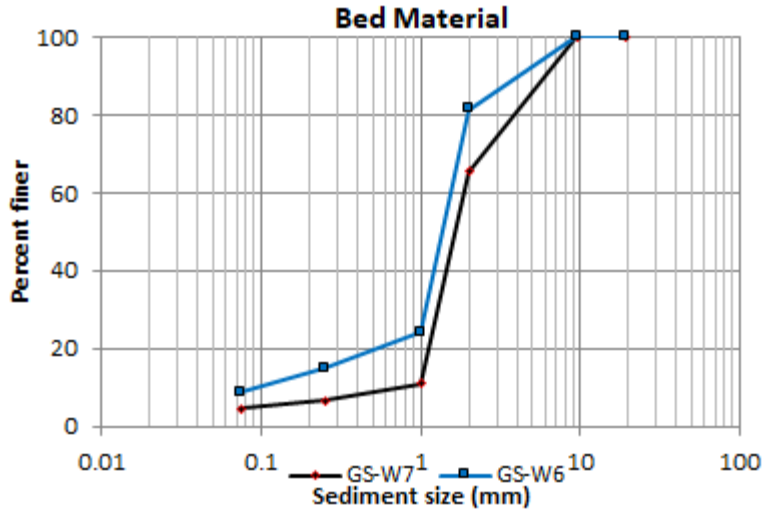
River Mile 120.1–122.25



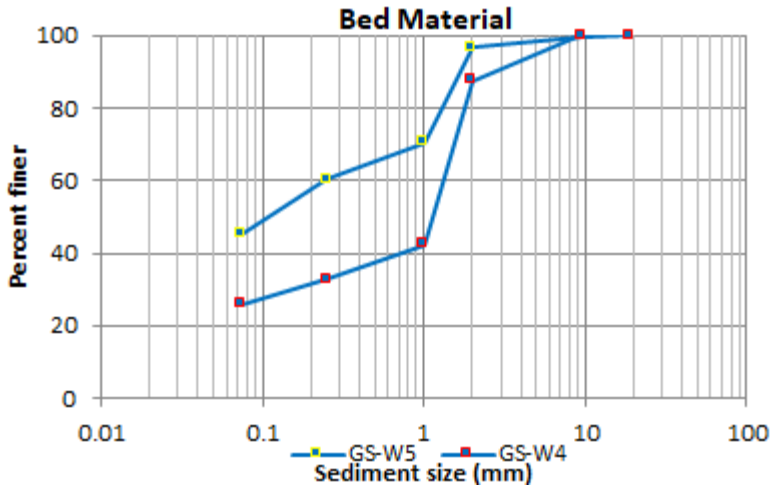
River Mile 120.1–120.43



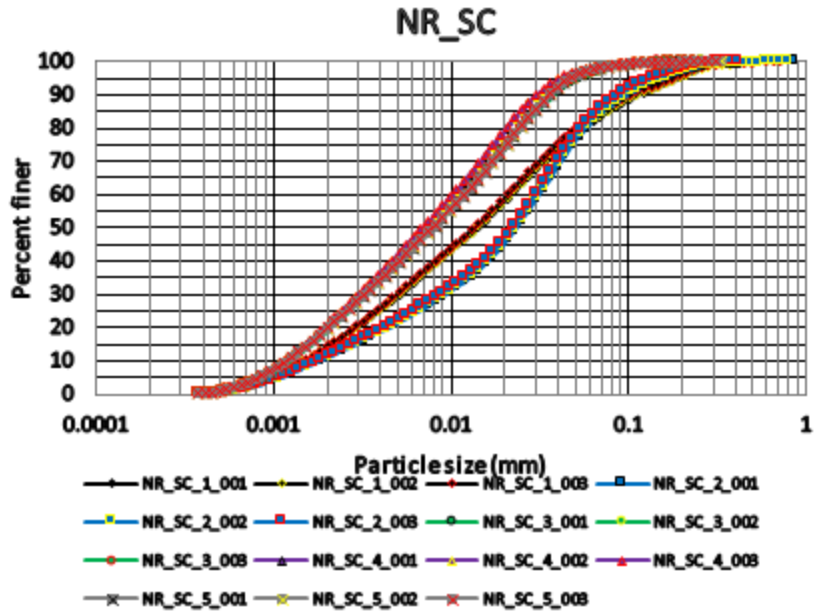
River Mile 117.66–119.06



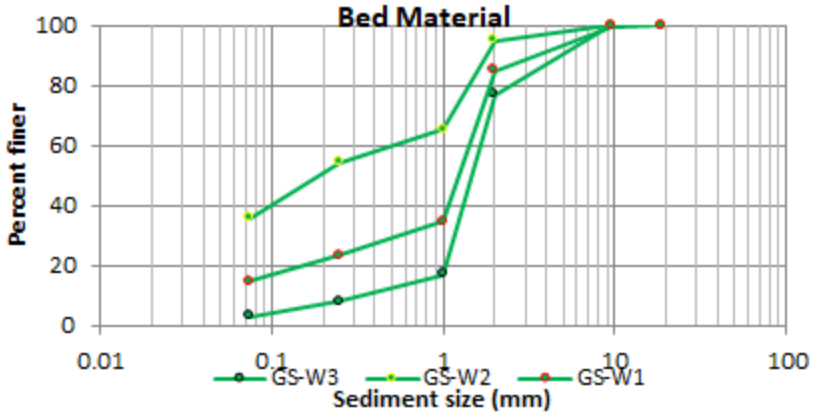
River Station 115.65–115.86



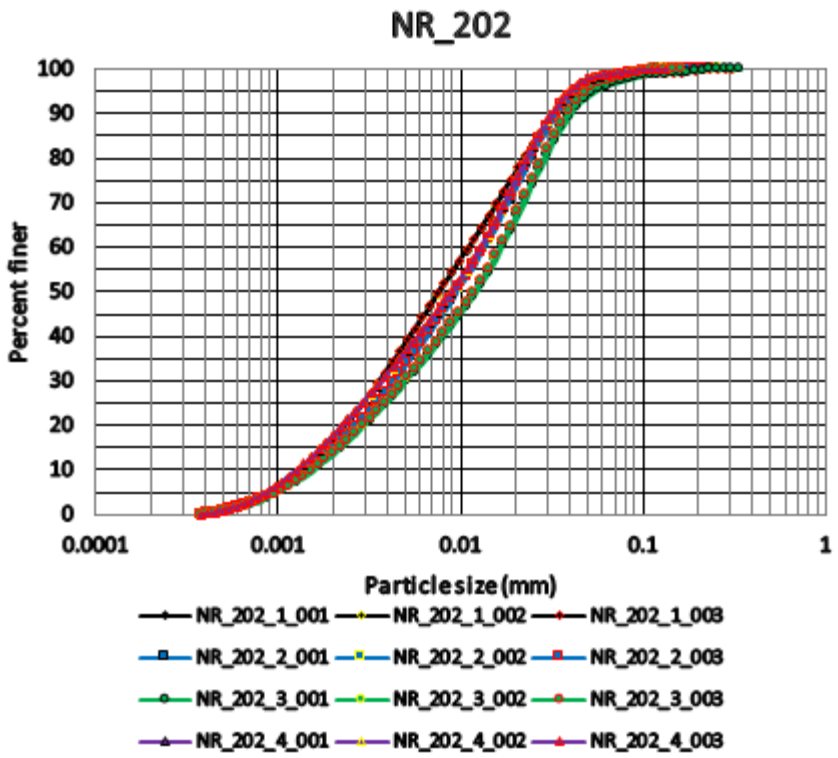
River Station 115.65–115.86



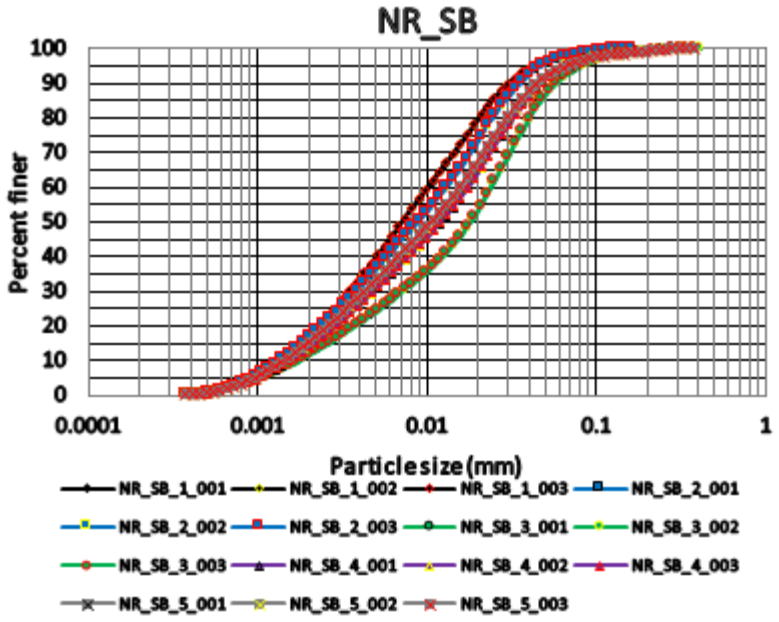
River Mile 112.34–114.21



River Mile 112.34–112.61

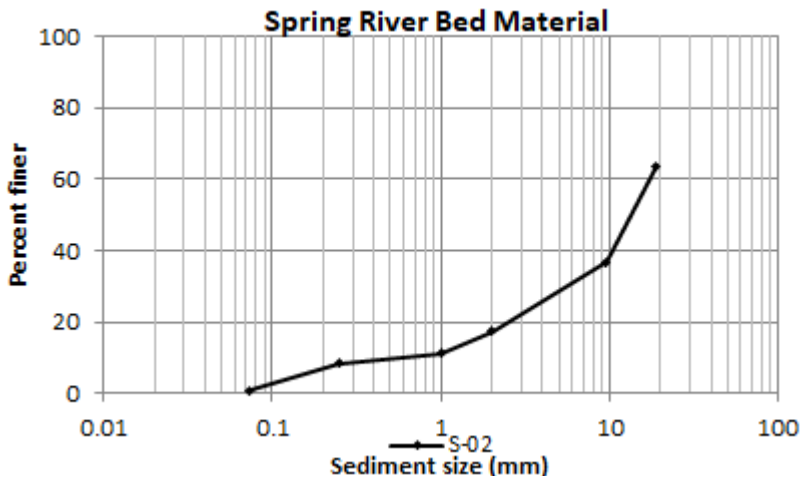


River Mile 108.87–109.25

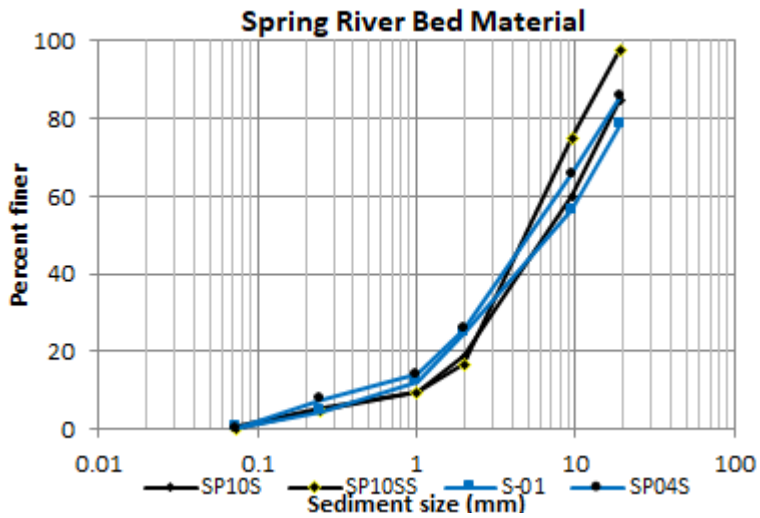


Spring River

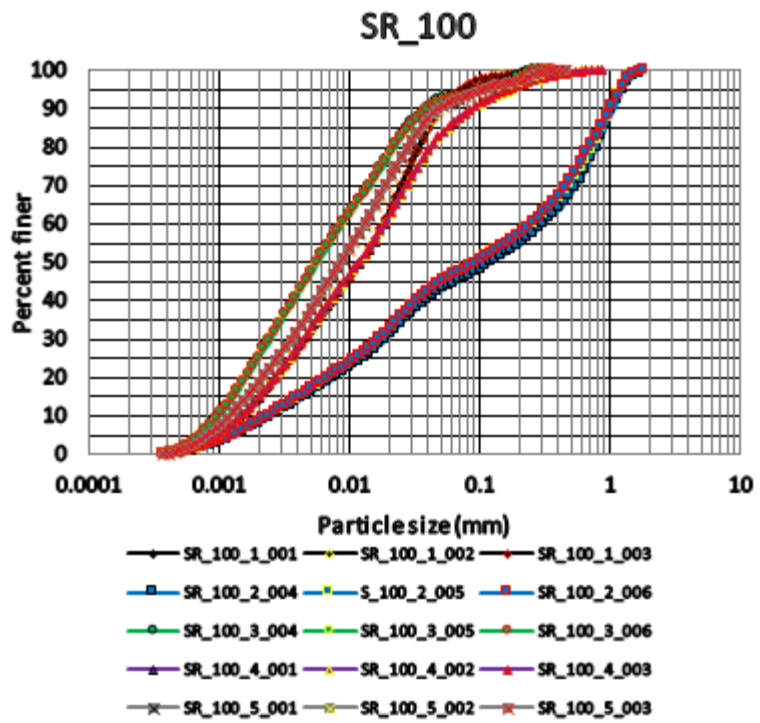
River Mile 14.16



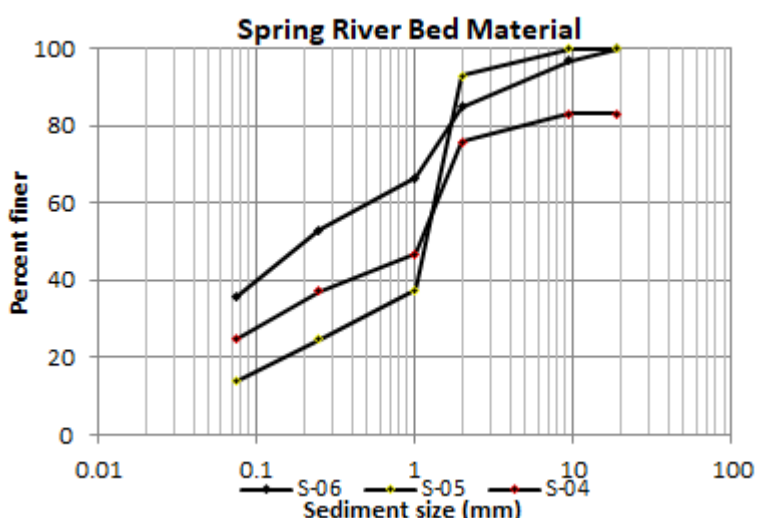
River Mile 8.01



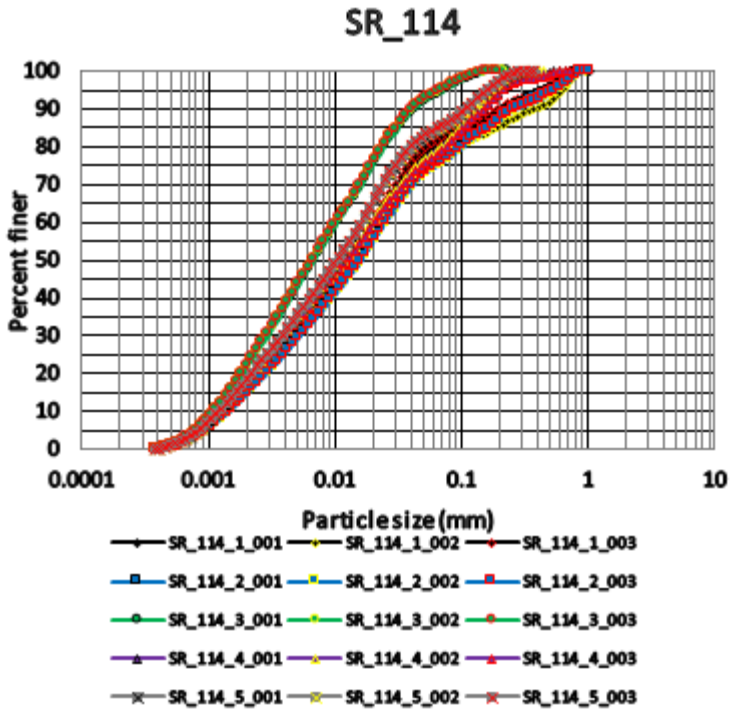
River Mile 7.5



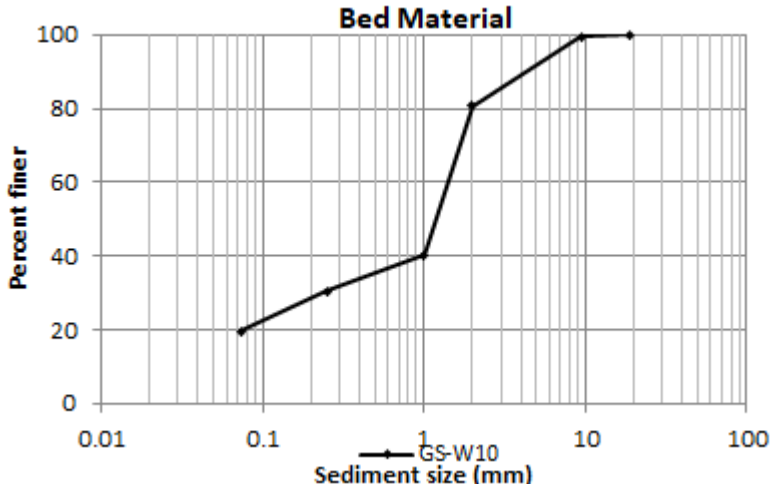
River Mile 2.26–5.1



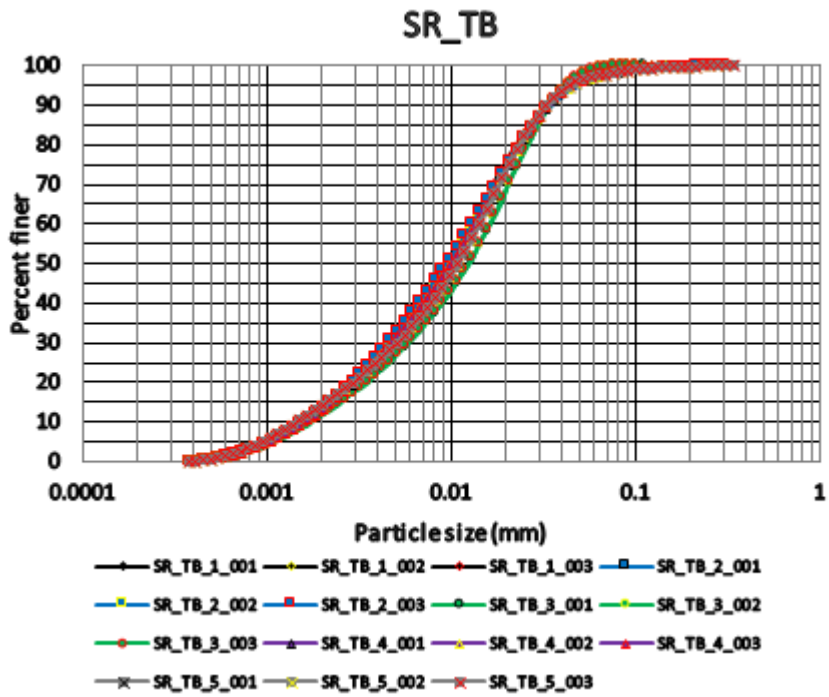
River Mile 4.82



River Mile 0.57–0.69

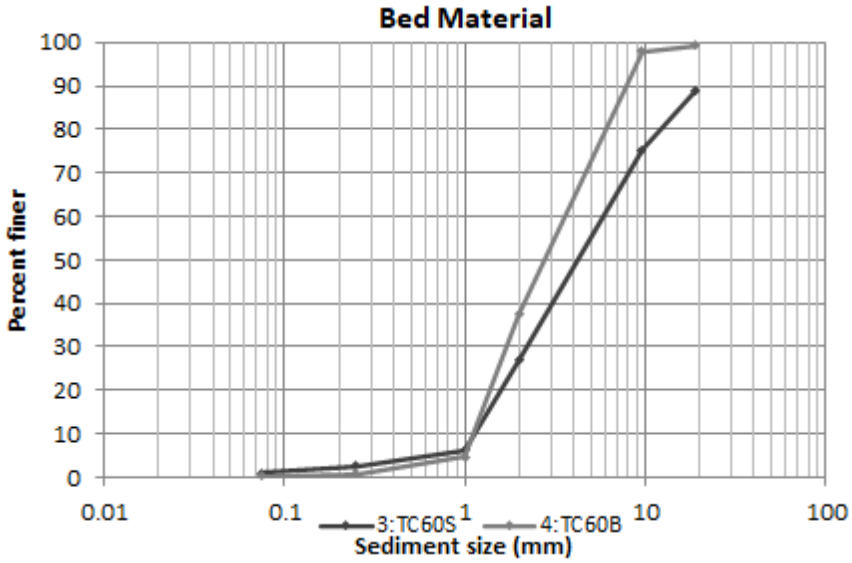


River Mile 0.79–0.99

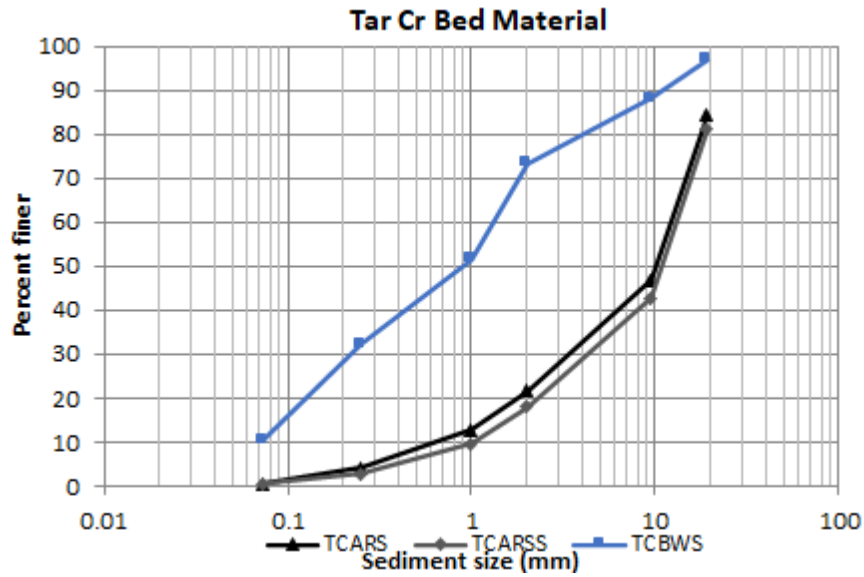


Tar Creek

River Mile 6.33

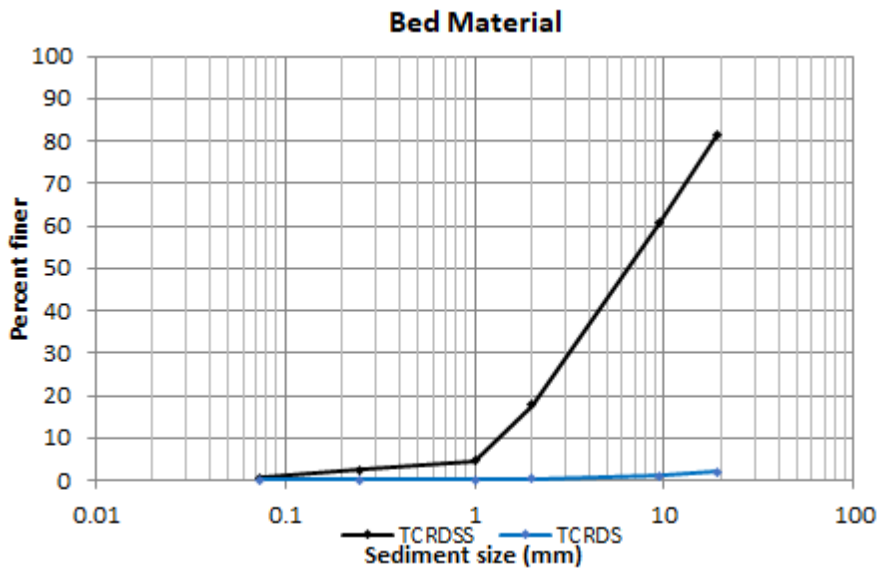


River Mile 2.74–2.98

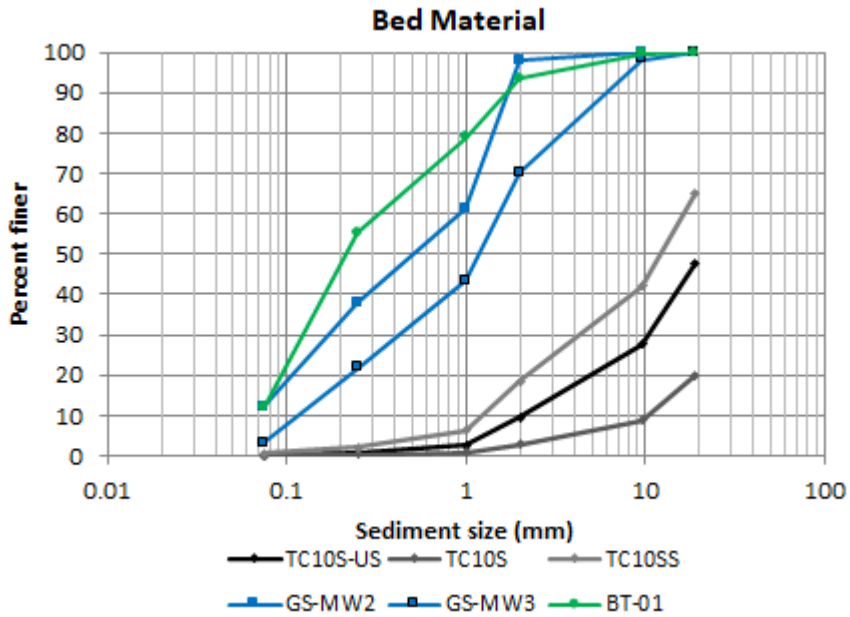


Note: BW: backwater

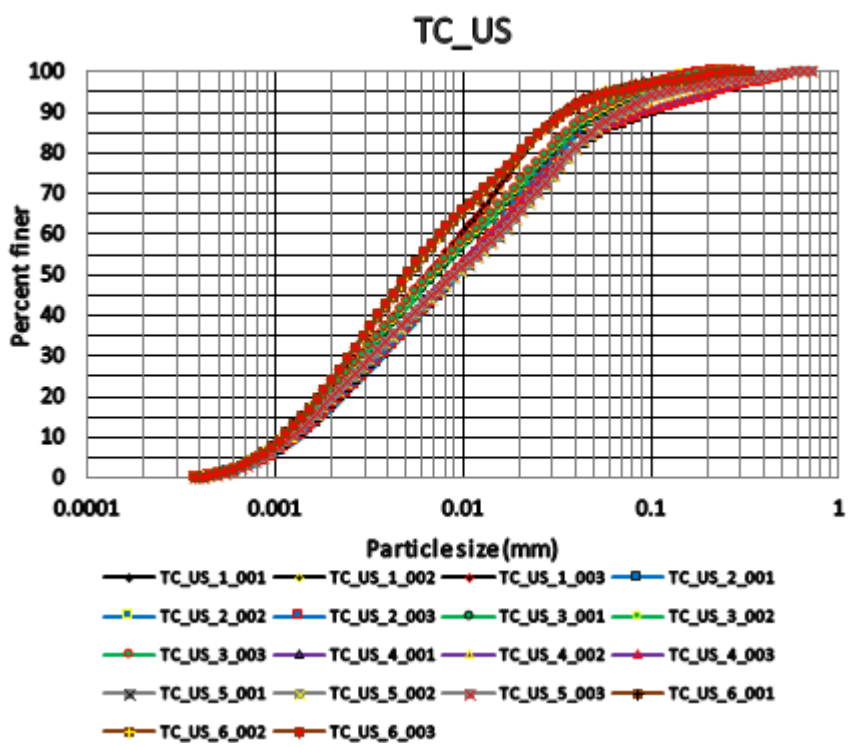
River Mile 2.23



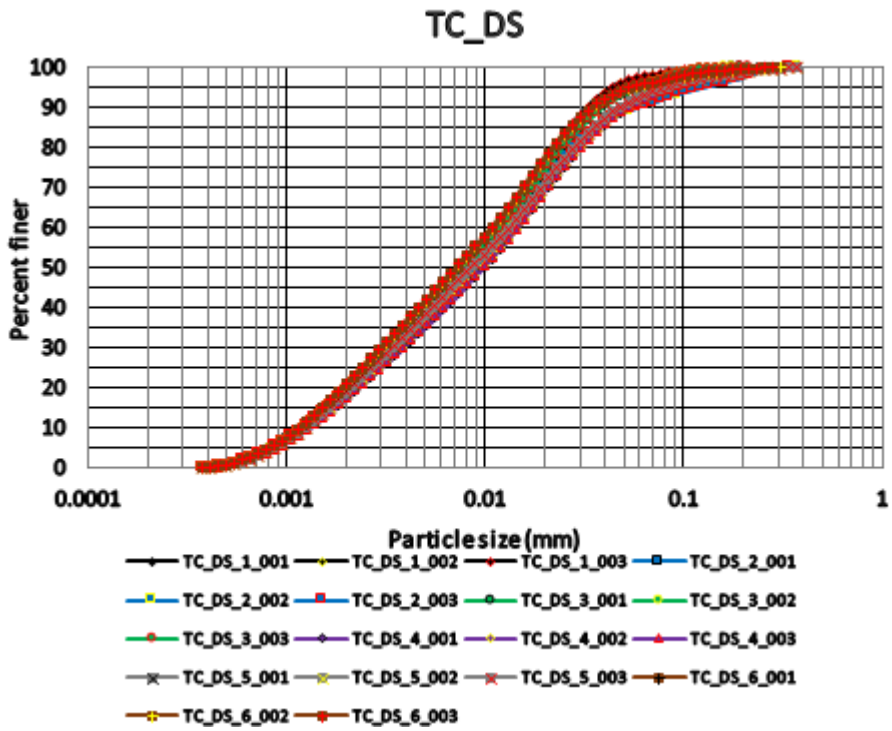
River Mile 1.6



River Mile 1.6

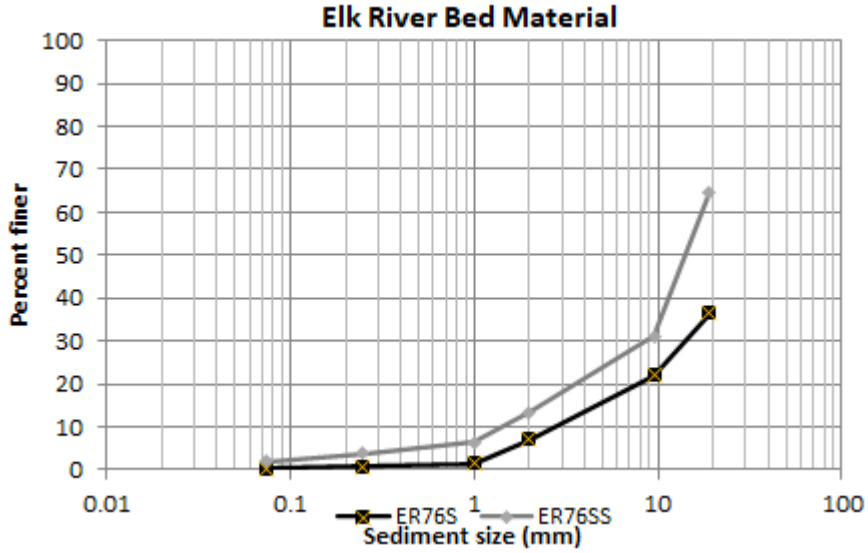


River Mile 1.6

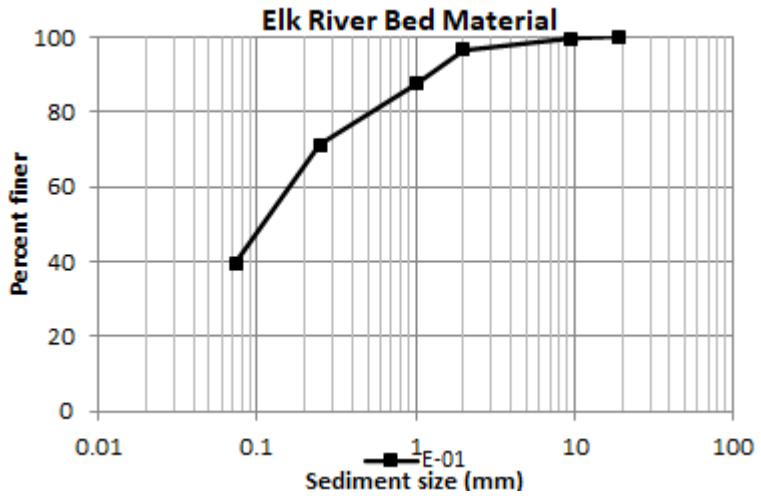


Elk River

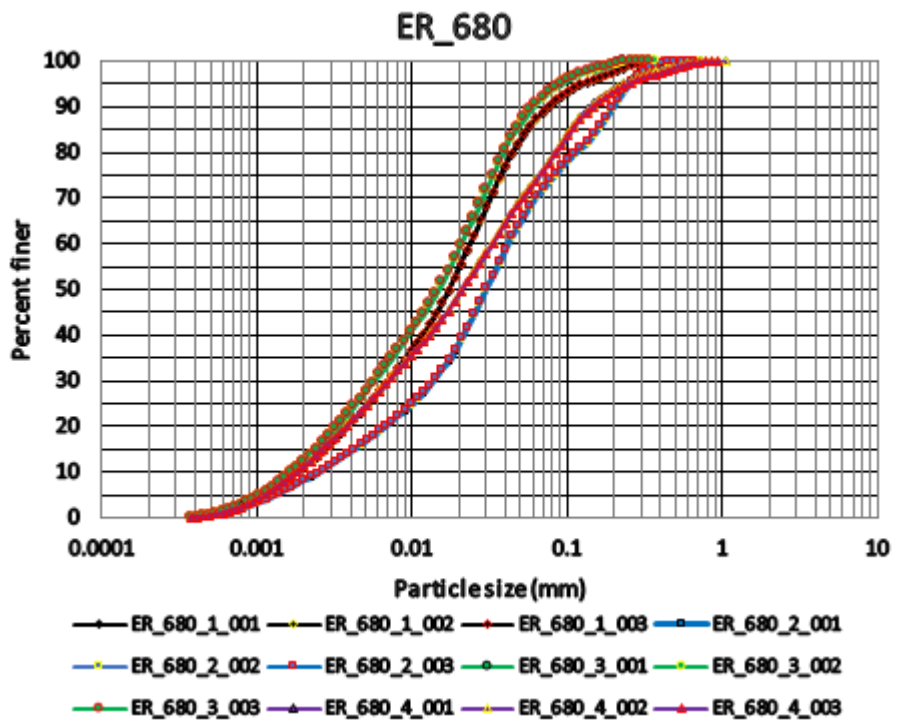
River Mile 14.22



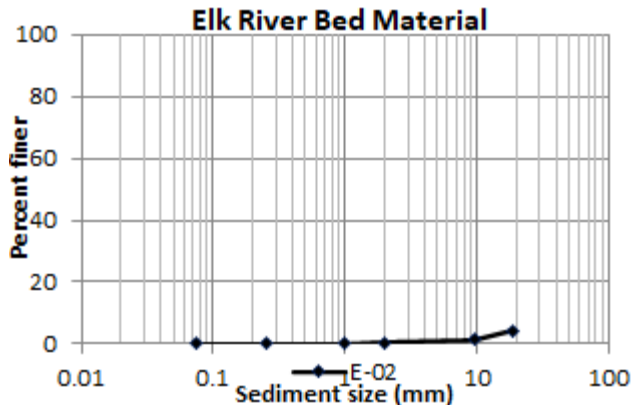
River Mile 8.8



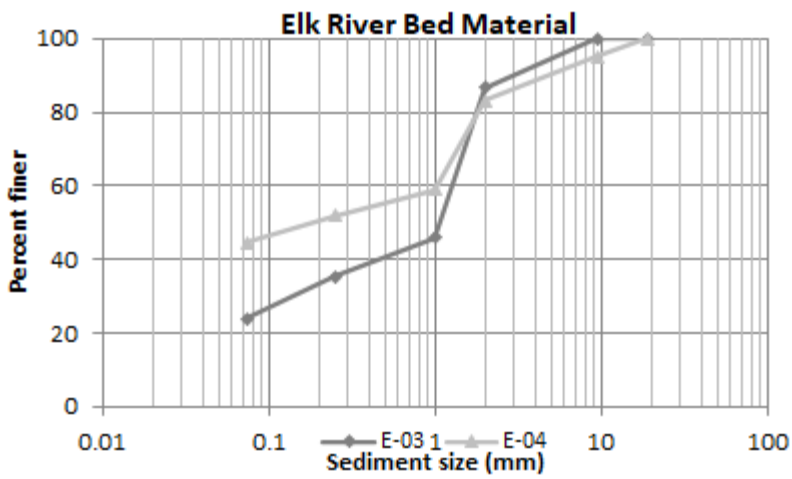
River Mile 8.8



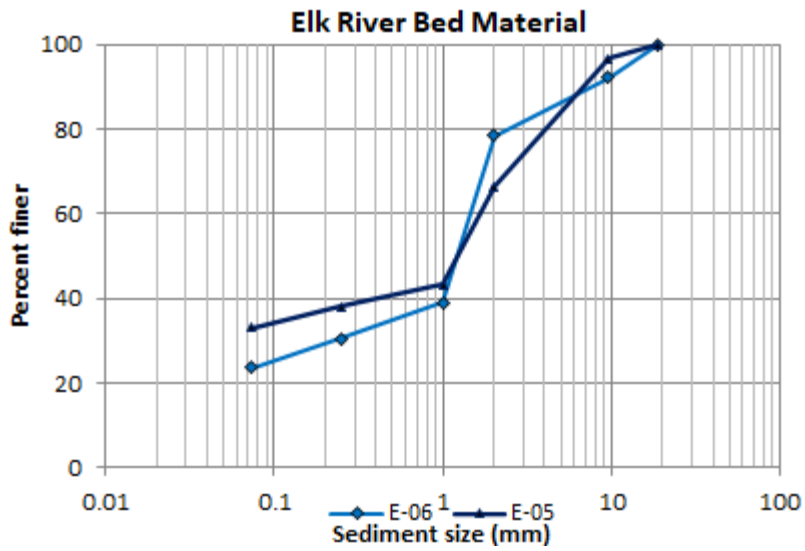
River Mile 7.5-7.79



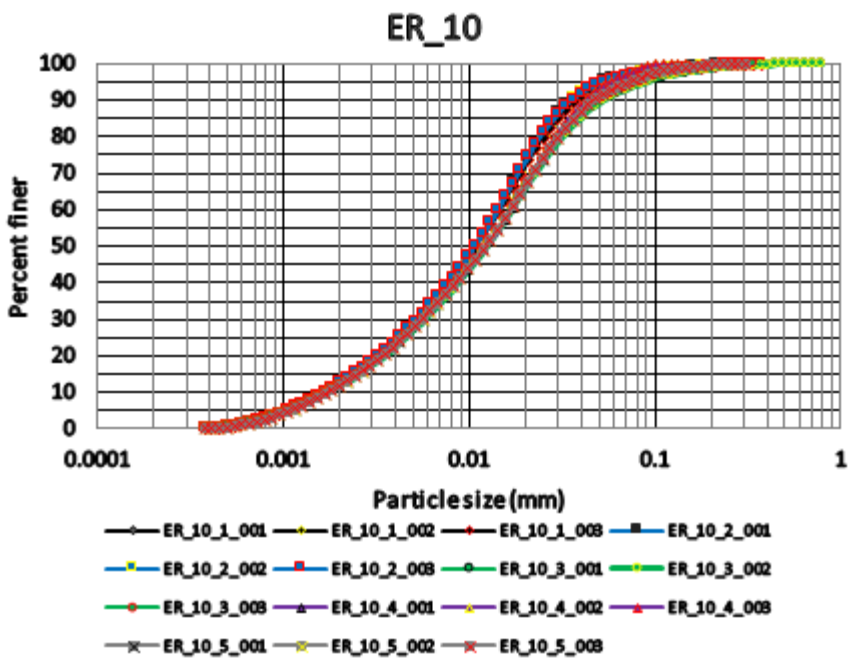
River Mile 5.86–6.57



River Mile 4.67–4.9 (E-05 and ER_10)



River Mile 3.2–3.43 E-06



Appendix C
SEDflume Core Sampling

GRAND LAKE WATERWAYS SEDFLUME ANALYSIS

Grand Lake o' the Cherokees, OK

Prepared for

FreshWater Engineering

Prepared by

integral consulting inc.

200 Washington Street
Suite 201
Santa Cruz, CA 95060

May 2020

CONTENTS

LIST OF FIGURES ..... **iv**

LIST OF TABLES ..... **vii**

ACRONYMS AND ABBREVIATIONS ..... **ix**

EXECUTIVE SUMMARY ..... **x**

1 INTRODUCTION TO SEDFLUME **1-1**

1.1 SAMPLE COLLECTION 1-1
1.2 EXPERIMENTAL PROCEDURES 1-2
1.2.1 SEDflume Setup 1-2
1.2.2 Measurements of Sediment Erosion Rate 1-4
1.2.3 Measurement of Sediment Bulk Properties 1-7
1.2.4 Intra- and Intercore Comparisons 1-9

2 RESULTS **2-1**

2.1 SED-ER-10 2-1
2.2 SED-ER-680 2-5
2.3 SED-NR-130 2-8
2.4 SED-NR-164 2-11
2.5 SED-NR-202 2-14
2.6 SED-NR-CB 2-17
2.7 SED-NR-FG 2-20
2.8 SED-NR-SB 2-23
2.9 SED-NR-SC 2-26
2.10 SED-SR-100 2-29
2.11 SED-SR-114 2-32
2.12 SED-SR-TB 2-35
2.13 SED-TC-DS 2-39
2.14 SED-TC-US 2-42
2.15 SED-ER-640 2-45
2.16 SED-NR-HB 2-45

3 SUMMARY **3-1**

4 REFERENCES **4-1**

Appendix A. Sampling Locations

Appendix B. Particle Size Distributions

LIST OF FIGURES

Figure 1. Schematic of SEDflume setup showing top and side views 1-3
Figure 2. SEDflume in Integral's laboratory, Santa Cruz, California 1-3
Figure 3. Photograph of Core ER-10 aligned with applied shear stresses and associated erosion rates 2-3
Figure 4. Intercore erosion rates of ER-10 2-3
Figure 5. Physical properties of ER-10 with depth 2-4
Figure 6. Photograph of Core ER-680 aligned with applied shear stresses and associated erosion rates 2-6
Figure 7. Intercore erosion rates in ER-680 2-6
Figure 8. Physical properties of ER-680 with depth 2-7
Figure 9. Photograph of Core NR-130 aligned with applied shear stresses and associated erosion rates 2-8
Figure 10. Invertebrate in burrow in NR-130 2-9
Figure 11. Intercore erosion rates in NR-130 2-9
Figure 12. Physical properties of NR-130 with depth 2-10
Figure 13. Photograph of Core NR-164 aligned with applied shear stresses and associated erosion rates 2-12
Figure 14. Grouping of invertebrates in NR-164 2-12
Figure 15. Intercore erosion rates in NR-164 2-13
Figure 16. Physical properties of NR-164 with depth 2-13
Figure 17. Photograph of Core NR-202 aligned with applied shear stresses and associated erosion rates 2-15
Figure 18. Intercore erosion rates in NR-202 2-16
Figure 19. Physical properties of NR-202 with depth 2-16
Figure 20. Photograph of Core NR-CB aligned with applied shear stresses and associated erosion rates 2-18
Figure 21. Intercore erosion rates in NR-CB 2-18
Figure 22. Physical properties of NR-CB with depth 2-19
Figure 23. Photograph of Core NR-FG aligned with applied shear stresses and associated erosion rates 2-21

Figure 24. Intercore erosion rates in NR-FG 2-21
Figure 25. Physical properties of NR-FG with depth 2-22
Figure 26. Photograph of Core NR-SB aligned with applied shear stresses and associated erosion rates 2-24
Figure 27. Intercore erosion rates for NR-SB 2-24
Figure 28. Physical properties of NR-SB with depth 2-25
Figure 29. Photograph of Core NR-SC aligned with applied shear stresses and associated erosion rates 2-27
Figure 30. Intercore erosion rates of NR-SC 2-27
Figure 31. Physical properties of NR-SC with depth 2-28
Figure 32. Photograph of Core SR-100 aligned with applied shear stresses and associated erosion rates 2-30
Figure 33. Intercore erosion rates for SR-100 2-30
Figure 34. Physical properties of SR-100 with depth 2-31
Figure 35. Photograph of Core SR-114 aligned with applied shear stresses and associated erosion rates 2-33
Figure 36. Intercore erosion rates of SR-114 2-33
Figure 37. Physical properties of SR-114 with depth 2-34
Figure 38. Wood chips found in SR-114 2-34
Figure 39. Evidence of biotic activity on surface of SR-TB 2-36
Figure 40. Photograph of Core SR-TB aligned with applied shear stresses and associated erosion rates 2-37
Figure 41. Intercore erosion rate of SR-TB 2-37
Figure 42. Physical properties of SR-TB with depth 2-38
Figure 43. Photograph of Core TC-DS aligned with applied shear stresses and associated erosion rates 2-40
Figure 44. Intercore erosion rates of TC-DS 2-40
Figure 45. Physical properties of TC-DS with depth 2-41
Figure 46. Photograph of Core TC-US aligned with applied shear stresses and associated erosion rates 2-43
Figure 47. Intercore erosion rates for TC-US 2-43
Figure 48. Physical properties of TC-US with depth 2-44

Figure 49. Intercore erosion rate ratios: Depth-averaged core erosion rates compared to the site-wide average erosion rates. 3-2

Figure 50. Intracore erosion rate by interval for each core. 3-3

LIST OF TABLES

Table 1. Summary of SEDflume samples....1-1
Table 2. Parameters measured and computed during the SEDflume analysis....1-9
Table 3. Physical properties and derived critical shear stresses of ER-10....2-4
Table 4. Power law fit parameters for SED-ER-10....2-5
Table 5. Physical properties and derived critical shear stresses of ER-680....2-7
Table 6. Power law fit parameters of ER-680....2-7
Table 7. Physical properties and derived critical shear stresses of NR-130....2-10
Table 8. Power law fit parameters for NR-130....2-10
Table 9. Physical properties and derived critical shear stresses of NR-164....2-14
Table 10. Power law fit parameters in NR-164....2-14
Table 11. Physical properties and derived critical shear stresses of NR-202....2-17
Table 12. Power law fit parameters for NR-202....2-17
Table 13. Physical properties and derived critical shear stresses of NR-CB....2-19
Table 14. Power law fit parameters in NR-CB....2-20
Table 15. Physical properties and derived critical shear stresses of NR-FG....2-22
Table 16. Power law fit parameters in NR-FG....2-23
Table 17. Physical properties and derived critical shear stresses of NR-SB....2-25
Table 18. Power law fit parameters of NR-SB....2-26
Table 19. Physical properties and derived critical shear stresses of NR-SC....2-28
Table 20. Power law fit parameters of NR-SC....2-29
Table 21. Physical properties and derived critical shear stresses of SR-100....2-31
Table 22. Power law fit parameters of SR-100....2-32
Table 23. Physical properties and derived critical shear stresses of SR-114....2-35
Table 24. Power law fit parameters of SR-114....2-35
Table 25. Physical properties and derived critical shear stresses of SR-TB....2-38
Table 26. Power law fit parameters of SR-TB....2-39
Table 27. Physical properties and derived critical shear stresses of TC-DS....2-41
Table 28. Power law fit parameters of TC-DS....2-42

Table 29. Physical properties and derived critical shear stresses of TC-US 2-44
Table 30. Power law fit parameters of TC-US.....2-45

ACRONYMS AND ABBREVIATIONS

Grand Lake	Grand Lake o' the Cherokees
Integral	Integral Consulting Inc.
LISST	laser *in situ* scattering and transmissometry
SEDflume	sediment-erosion-at-depth flume

EXECUTIVE SUMMARY

The complex and dynamically linked relationships between biological activity, hydrodynamic forcing, and sediment properties can regulate morphological bed changes in aquatic systems. The ongoing investigation of sediment mobility within the tributaries and waterways of the Grand Lake o' the Cherokees (Grand Lake) calls for the development of a site-specific sediment transport model. Quantification of the erosional and physical characteristics of a sediment bed can help define ranges of values to bound uncertainty in sediment transport models. Integral Consulting Inc. collected and conducted a sediment-erosion at depth flume (SEDflume) analysis on 14 sediment cores representing a range of bed types and areas within the system. SEDflume analysis produced erosion rate data, determined critical bed shear stresses, and measured particle size distribution and bulk density across multiple sediment types and depths within the sediment bed.

This report provides a summary of the SEDflume analysis for each SEDflume core collected during field sampling efforts. Laboratory measurements of erosion rates at applied shear stresses, ranging from 0.1 to 12.8 Pa, were used to determine the critical shear stress for erosion at multiple depth intervals within each sediment core. The critical shear stress for erosion governs the threshold at which sediment may become suspended. Coefficients relating shear stress and erosion rate based on a power law fit are provided. Supplemental data of grain size distributions via laser diffraction and bulk density measurements at each depth interval are also provided to characterize the physical characteristics of the sediment bed.

In general, sediment consisted of silt and clay with a surface layer of unconsolidated, relatively mobile sediment. Below the surface layer, sediment became more consolidated resulting in larger computed critical shear stresses. Prominent biotic activity, such as invertebrate burrows, extended up to 10 cm from the surface, resulting in a range of erosion conditions. Leaves and root structures present within some samples also modified the erosional properties of the surrounding sediment. Measured and computed parameters varied between different water bodies. It is advised that SEDflume results be analyzed in conjunction with other system characteristics, such as hydrodynamic forcing, to assess overall site stability and sediment transport trends.

1 INTRODUCTION TO SEDFLUME

Analysis of sediment erosion properties using SEDflume can provide quantitative information on sediment bed characteristics. The sediment bed is governed by a complex and dynamically linked relationship between biologic activity, hydrodynamic forcing, and the physical and chemical makeup of the bed. SEDflume provides measurements of erosion rates to inform how the bedded sediment responds to controlled, measurable hydrodynamic flow. The following section outlines collection efforts of 16 cores within the Grand Lake connected waters. An overview of SEDflume setup and processing procedures, as well as methods used for determining the critical shear stresses for erosion. Supplemental information regarding physical characteristic analyses including particle size distribution and bulk density is also provided.

1.1 SAMPLE COLLECTION

Sample collection occurred between March 9 and March 12, 2020. Samples were collected via a box-core collection system by staff from Integral Consulting Inc. (Integral) and FreshWater Engineering. A summary of samples collected and their locations is provided in Table 1. Of the 16 proposed sampling sites, 14 were successfully collected. Alterations to originally proposed locations were determined based on viability of collection on site. The presence of tree limbs and gravel at some sites necessitated the field team to move to more conducive sampling areas. Soft, sediment-rich banks of the river were targeted rather than deeper center channels where gravel and cobble are present.

Samples were collected using a push coring system to penetrate clear acrylic box cores into the sediment bed. When pushing by hand did not result in sufficient penetration, blows from a post-hole hammer were applied. At some sites, such as ER-680, multiple attempts to collect a sufficient sample were performed. Further description of sampling efforts is provided on a core-by-core basis in Sections 2.1 through 2.16.

Table 1. Summary of SEDflume samples

Sample ID	Date	Time	Water depth (ft)	Length (cm)	Latitude	Longitude
SED-ER-10	3/12/2020	3:30:00 PM	8	30	36.64759	-94.704862
SED-ER-640	3/12/2020	----	----	----	36.65529	-94.728458
SED-ER-680	3/9/2020	5:30:00 PM	5	22	36.65639	-94.656731
SED-NR-130	3/11/2020	4:00:00 PM	1	17	36.82961	-94.808654
SED-NR-164	3/10/2020	6:00:00 PM	5	41	36.7801	-94.774844
SED-NR-202	3/10/2020	4:35:00 PM	5	23	36.72824	-94.772617

Sample ID	Date	Time	Water depth (ft)	Length (cm)	Latitude	Longitude
SED-NR-CB	3/11/2020	5:02:00 PM	1	32	36.79897	-94.819643
SED-NR-FG	3/11/2020	11:00:00 AM	1	23	36.85977	-94.875079
SED-NR-HP	3/12/2020	---	---	---	36.64564	-94.779563
SED-NR-SB	3/10/2020	2:00:00 PM	6	37	36.69502	-94.748474
SED-NR-SC	3/10/2020	5:10:00 PM	6	27	36.73894	-94.726088
SED-SR-100	3/10/2020	11:40:00 AM	5	43	36.86481	-94.762871
SED-SR-114	3/10/2020	12:30:00 PM	5	41	36.85253	-94.721566
SED-SR-TB	3/10/2020	11:10:00 AM	4	32	36.8039	-94.754402
SED-TC-DS	3/11/2020	2:30:00 PM	8	44	36.85475	-94.858931
SED-TC-US	3/11/2020	2:00:00 PM	6	44	36.85717	-94.860699

1.2 EXPERIMENTAL PROCEDURES

Detailed descriptions of SEDflume analysis and its application are given in McNeil et al. (1996), Jepsen et al. (1997), and Roberts et al. (1998). The following sections supplement those reports with a general description of the SEDflume analysis procedures used in this study. Supplemental analyses of grain size distribution using laser diffraction (ISO Standard 13-320), water content (ASTM Method D2216-05), and bulk density (ASTM Method D2216-10; Håkanson and Jansson 1983), and loss on ignition (ASTM Method D7348-13) were also implemented at the beginning of each interval to quantify physical sediment characteristics.

1.2.1 SEDflume Setup

A SEDflume is essentially a straight flume with an open bottom section through which a rectangular, cross-sectional core barrel containing sediment can be inserted (Figure 1). The main components of the flume are the water tank, pump, inlet flow converter (which establishes uniform, fully developed, turbulent flow), the main duct, test section, hydraulic jack, and the core barrel containing sediment (Figure 2). The core barrel, test section, flow inlet section, and flow exit section are made of transparent acrylic so that the sediment–water interactions can be observed visually. The core barrel has a rectangular cross section, 10 by 15 cm, and a length of 60 cm.

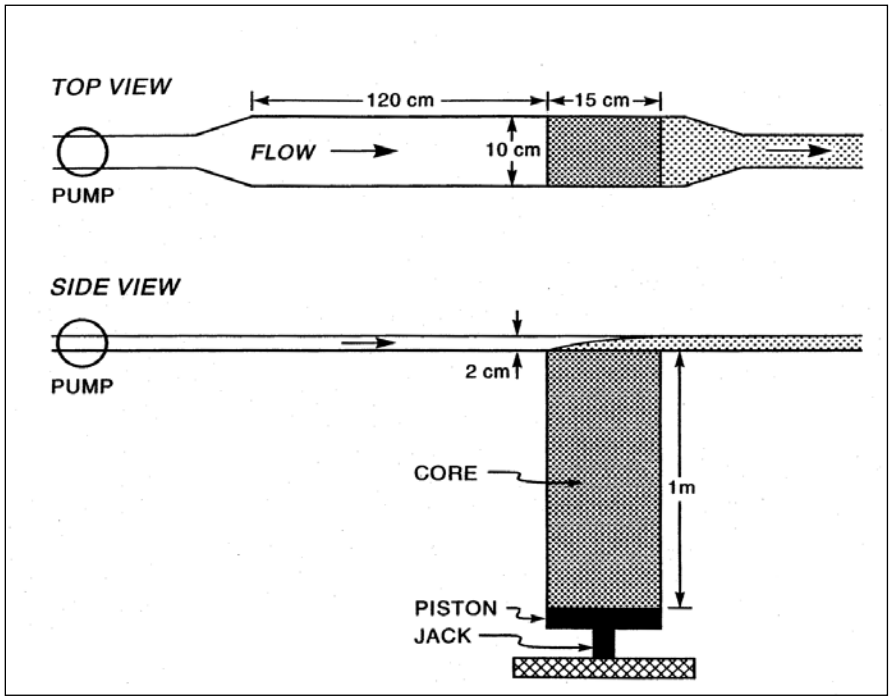


Figure 1. Schematic of SEDflume setup showing top and side views

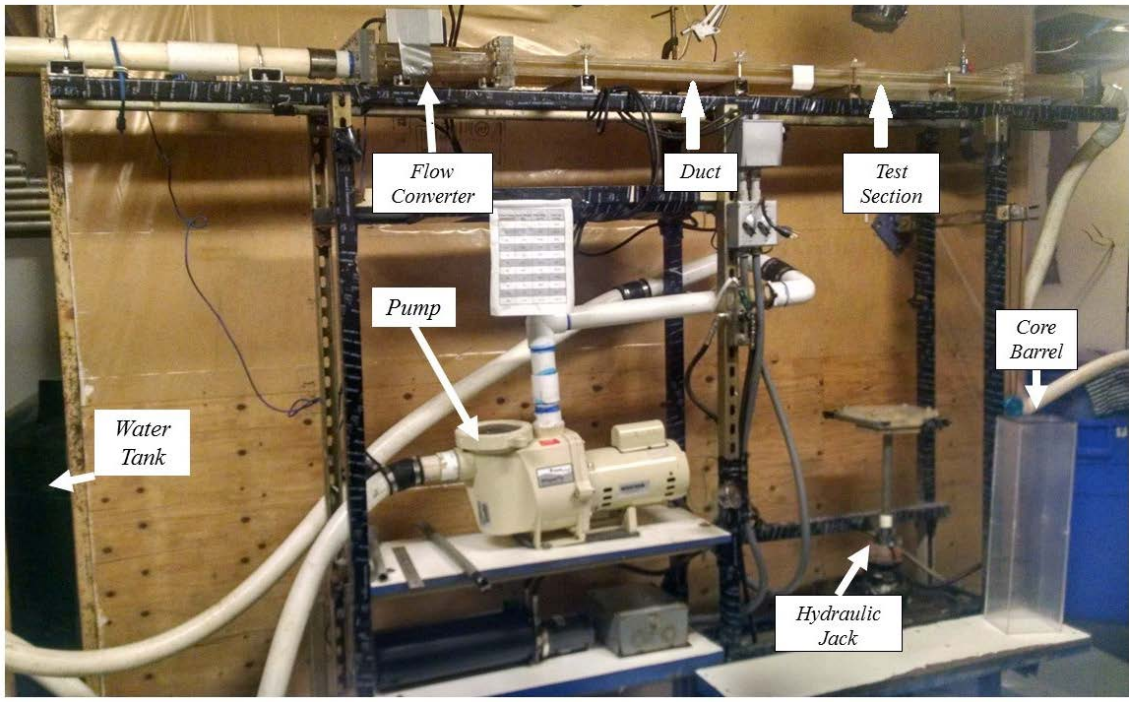


Figure 2. SEDflume in Integral's laboratory, Santa Cruz, California

Water is pumped from a 300-gallon storage tank into a 5-cm-diameter pipe and then through the flow converter into the main duct. The duct is rectangular, 2 cm in height, 10 cm in width, and 120 cm in length; it connects to the test section, which has the same cross-sectional area (2 by 10 cm) and is 15 cm long. The flow converter changes the shape of the cross section from circular to rectangular while maintaining a constant cross-sectional area. A ball valve regulates the amount of water entering the flume so that the flow rates can be carefully controlled. The flume also has a small valve immediately downstream from the test section that opens to the atmosphere, preventing a pressure vacuum from forming and enhancing erosion.

At the start of each test, a core barrel and the sediment it contains are inserted into the bottom of the test section. The sediment surface is aligned with the bottom of the SEDflume channel. When fully enclosed, water is forced through the duct and test section over the surface of the sediment. The shear stress produced by the flow and imparted on the particles causes sediment erosion. As the sediment on the surface of the core erodes, the remaining sediment in the core barrel is slowly moved upward so that the sediment–water interface remains level with the bottom of the flume.

An operator moves the sediment upward using a hydraulically controlled piston that is inside the core barrel. The jack is driven by a release of pressure that is regulated with a switch and valve system. In this manner, the sediment can be raised and made level with the bottom of the test section. The movement of the hydraulic jack can be controlled for measurable increments as small as 0.5 mm.

1.2.2 Measurements of Sediment Erosion Rate

At the start of each core analysis, an initial reference measurement is made of the starting core length. The flume is then operated at a specific flow rate corresponding to a particular shear stress, and sediment is eroded (McNeil et al. 1996; Jepsen et al. 1997). As erosion proceeds, the core is raised if needed to keep the core's surface level with the bottom of the flume. This process is continued until either 10 minutes has elapsed or the core has been raised roughly 2 cm. The erosion rate for the applied shear stress is then calculated as:

$$E = \frac{\Delta z}{T} \qquad [1]$$

Where:

E	=	erosion rate
Δz	=	distance that sediment is raised during a particular measurement period
T	=	measurement time interval

Because material is eroded and the core structure is broken down, repetitive erosion measurements at a given depth are not possible. The following procedures were performed for all Grand Lake waterway cores to best determine the erosion rate at several different shear stresses and depths using only one core:

1. The core was inserted into the bottom of the SEDflume test section.
2. The total length of sediment in the core barrel was measured and recorded.
3. Two 5 g (approximately) subsamples of sediment from the core surface were collected using a clean spoon. Sediment sampling was constrained to the downstream (relative to the SEDflume flow direction) end of the sediment surface, to minimize potential scour effects.
4. Shear stresses (from low to high) were applied to the core's surface, and sediment erosion was measured (if it occurred; 0.5 mm of erosion in 10 minutes was considered quantifiable). Applied shear stresses started at 0.1 Pa and were sequentially doubled until a given shear stress caused approximately 2 cm of erosion in 20 seconds, or a maximum of 5 cm was eroded in a given interval (defined as a continuous succession of increasing shear stress cycles where erosion is measured). Each shear stress cycle was applied for a minimum of 20 seconds and a maximum of 10 minutes. To the extent possible, no more than 2 cm of sediment was allowed to erode at a single shear stress.
5. Once the threshold—2 cm of erosion in 20 seconds, or a maximum of 5 cm of erosion in a single interval—was met, a new depth interval was started. Steps 3 and 4 were repeated.[1] Also, if the sediment composition changed noticeably in appearance or erosion properties, the depth interval was stopped, sediment subsamples were collected, and a new depth interval was started (Step 4).
6. Where practicable, at least three and up to five depth intervals were tested per core.

1.2.2.1 Determination of Critical Shear Stress

The critical shear stress of a sediment bed, τ_{cr}, is the applied shear stress at which sediment motion is initiated. In this study, it is operationally defined as the shear stress required to produce 0.001 mm of erosion in 1 second. This represents an erosion rate of 10^{-4} cm/s, or roughly 1 mm of erosion in 15 minutes.[2]

---

[1] If a particular shear stress did not cause any observable erosion over a 10-minute period for consecutive depth intervals (e.g., less than 0.5 mm eroded in 10 minutes), that shear stress was removed from subsequent testing cycles; higher shear stresses were added, as appropriate, to attempt to measure at least three erosion rates.

[2] Though other definitions of critical shear stress erosion rate thresholds can be argued (and considered valid), the value of 10^{-4} cm/s threshold is used here for consistency with previous SEDflume efforts and to keep testing times to a practical duration.

Because it is difficult to measure τ_{cr} exactly at the 10^{-4} cm/s threshold, erosion was instead measured over a range of shear stresses designed to bracket the initiation of erosion threshold. The highest applied shear stress where erosion *did not occur* is defined by τ_{no}, and τ_{first} is the lowest applied shear stress where erosion *did occur*.

Using the measured erosion rate data in each depth interval, a power law regression analysis (described below) was employed to determine the shear stress (τ_{power}) required to cause 10^{-4} cm/s of erosion. Assimilating the bracketed shear stress values (τ_0 and τ_1) and τ_{power}, the critical shear stress of each interval was then chosen according to the following criteria (where τ_{no} and τ_{first} are determined directly from the SEDflume measurements):

- If $\tau_{no} \leq \tau_{power} \leq \tau_{first}$, then τ_{power} was the selected critical shear stress, τ_{cr}, for the interval.
- If $\tau_{no} \geq \tau_{power}$, then τ_{no} was the selected critical shear stress for the interval.
- If $\tau_{power} \geq \tau_{first}$, then τ_{first} was the selected critical shear stress for the interval.
- If $r^2 < r^2_{thresh}$, then τ_{linear} was selected as the critical shear stress for the interval.

The τ_{cr} criteria allowed for selection of critical shear stresses using the power law results where the regression analysis was in agreement with measured erosion rate data.

1.2.2.2 Power Law Regression

Following the methods of Roberts et al. (1998), the erosion rates for sediment can be approximated by the power law regression:

$$E = A\tau^n \rho^m \qquad [2]$$

Where:

E	=	erosion rate (cm/s)
τ	=	bed shear stress (Pa)
ρ	=	sediment bulk density (g/cm^3)
A, n, and m	=	constants that depend on sediment characteristics

The equation used in the present analysis is an abbreviated variation of Equation 2:

$$E = A\tau^n \qquad [3]$$

where the constant A is a function of the sediment bulk density and other difficult properties to measure, such as sediment geochemistry and biological influences. The variation of erosion rate with density typically cannot be determined for field sediment because of natural variation in

other sediment properties (e.g., mineralogy, particle size, and electrochemical forces). Therefore, the density term from the equation above, for a particular interval of approximately constant density, is incorporated into the constant *A*.

For each depth interval, the measured erosion rates (*E*) and applied shear stresses (τ) were used to determine the *A* and *n* constants that provide a best-fit power law curve to the data for that interval. Good regression fits of these parameters, where they existed, were then used to estimate the critical shear stress for the respective intervals. A coefficient of determination (r^2) of 0.70 was used as a threshold criterion for acceptance.[3]

1.2.3 Measurement of Sediment Bulk Properties

In addition to the measurement of erosion rates during the analysis, sediment subsamples were periodically collected at depth to determine the water content, particle size distribution, and loss on ignition of the sediment in each core. Water content and loss on ignition values are incorporated into the determination of wet and dry bulk densities. Subsamples were collected from the undisturbed core surface (prior to analysis) as well as the sediment surface at the beginning of each subsequent depth interval. Samples were weighed, dried, and reweighed to determine the mass of water. Samples were then subjected to sufficient heat to ignite the organic material to determine loss on ignition.

Wet bulk density was determined by first measuring the wet and dry weight of the collected sample to determine the water content (*W)* as described in Håkanson and Jansson (1983):

$$W = \frac{M_w - M_d}{M_w} * 100\% \qquad [4]$$

Where:

W	=	water content
M_w	=	wet weight of sample
M_d	=	dry weight of sample

For the determination of wet bulk density, water content in this formulation have value from 0 to 1. Wet bulk densities were then determined using the method described by Håkanson and Jansson (1983):

[3]The coefficient of determination, r^2, is a function of Pearson's *r,* which is a measure of the linear dependence (correlation) between two variables. Pearson's *r* can be positive or negative, and is a value between –1 and +1. The more common usage of the correlation coefficient is to square Pearson's *r*, r^2, and report that value.

$$\rho_{wet} = \frac{(100 * \rho_s)}{100 + (W + IG)(\rho_s - 1)} \quad [5]$$

Where

ρ_w	=	density of water (assumed 1 g/cm^3)
ρ_s	=	density of sediment particle (assumed 2.65 g/cm^3)
IG	=	% loss on ignition based on wet weight (ASTM Method D7348-13)

Dry bulk densities are based on the moisture content (*MC*) defined by ASTM D2216-05 as

$$MC = \frac{M_w - M_d}{M_d} \quad [6]$$

This formulation represents the ratio of water to solids. Using the moisture content value, dry bulk densities were calculated using the following relationship:

$$\rho_{dry} = \frac{\rho_{wet}}{1 + MC} \quad [7]$$

Particle size distributions were determined using laser diffraction analysis at Integral's laboratory in Santa Cruz, California. Sediment samples were screened with a 2,000-µm sieve to remove large pieces of organic material, dispersed in water, and inserted into a Beckman Coulter LS 13-320 laser diffraction analyzer. Each sample was analyzed in three 1-minute intervals, and the results of the three analyses were averaged automatically by the instrument. The Beckman Coulter LS 13-320 measures volumetric distribution of particles from 0.4 to 2,000 µm. Caution should be taken when comparing directly to more narrowly ranged instruments such as a laser *in situ* scattering and transmissometry (LISST) instrument or traditional mass-based sieve and hydrometer studies. A LISST measures aggregated particles in the natural environment and has detection ranges different from that of the desktop instrument. Use of the Beckman Coulter involves the disaggregation of particles so any direct comparison must consider these factors.

The relationships used to determine sediment bulk properties are summarized in Table 2.

Table 2. Parameters measured and computed during the SEDflume analysis

Measurement	Definition	Units	Detection Limit	Internal Consistency
Water Content	$W = \frac{M_w - M_d}{M_w}$	Dimensionless	0.001 g in sample weight ranging from 1 to 50 g	0 < W < 1
Moisture Content	$MC = \frac{M_w - M_d}{M_d}$	Dimensionless	0.001 g in sample weight ranging from 1 to 50 g	
Wet Bulk Density	$\rho_{wet} = \frac{(100 * \rho_s)}{100 + (W + IG)(\rho_s - 1)}$	g/cm^3	0.001 g in sample weight ranging from 1 to 50 g	$\rho_w < \rho_{wet} < 2.6\ \rho_w$
Dry Bulk Density	$\rho_{dry} = \frac{\rho_{wet}}{1 + MC}$	g/cm^3	0.001 g in sample weight ranging from 1 to 50 g	$\rho_w < \rho_{dry} < \rho_{wet}$
Particle size distribution below 2,000 µm	Distribution of particle sizes by volume percentage using laser diffraction	µm	Method specific	1 µm < grain size < 2,000 µm

Notes:
M_w = wet weight of sample
M_d = dry weight of sample
ρw = density of water (assumed 1 g/cm^3)
ρs = density of sediment particle (assumed 2.65 g/cm^3)

1.2.4 Intra- and Intercore Comparisons

A potentially useful method of comparing sediment characteristics at a specific site is to compute intracore and intercore erosion rates. This method provides a means to quantify the erosion rates within each core (intracore) as well as the general erosion rates of the cores across the site (intercore).

1.2.4.1 Intracore Erosion Rate Ratios

Once the power law regression *A* and *n* coefficients for each depth interval within an individual core were known, the *interval-average* erosion rate for the core was determined using Equation 3

and the logarithmic average of the range of shear stresses tested in the SEDflume analysis.[4] C*ore-average* erosion rates were then computed by:

1. Log-averaging the *A* coefficient values from each depth interval within a core to arrive at an average *A* coefficient for the entire core
2. Arithmetically averaging the *n* coefficient values from each depth interval within a core to arrive at an average *n* coefficient for the entire core
3. Solving for the core-average erosion rate following Equation 3 and using the log-average of the range of shear stresses applied to the depth interval (1.13 Pa).

An intracore erosion-rate-ratio was then defined by dividing the interval-average erosion rate by the core-average erosion rate, providing a quantitative estimation of the relative erosion susceptibility of each depth interval. This method highlights the core intervals that are more or less susceptible to erosion within a particular core, and may indicate layering within a core.

1.2.4.2 Intercore Erosion Rate Ratios

Two additional ratios were computed to evaluate large-scale spatial erosion susceptibility. An intercore erosion rate ratio was computed by comparing the individual core-average erosion rate with a site-wide average erosion rate. The site-wide average erosion rate was computed by:

1. Log-averaging the core-average *A* coefficient values from each core to arrive at an average *A* coefficient for the entire site
2. Arithmetically averaging the core-average *n* coefficient values in each core to arrive at an average *n* coefficient for the entire site
3. Solving for the site-wide average erosion rate following Equation 3 and using the log-average of the range of shear stresses (1.13 Pa).

The intercore erosion rate ratio computed in this manner provided a qualitative estimate of the erosion susceptibility of each core (as a whole) relative to other cores in the site, potentially indicating spatial locations that are more or less susceptible to erosion than other locations.

[4]The shear stress values averaged were 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 Pa. The logarithmic average of these, used to compute erosion rate ratios, was 1.13 Pa.

2 RESULTS

This section of the report contains both qualitative and quantitative findings from the SEDflume analysis. Results are presented on a core-by-core basis. Appendix A contains additional grain size statistics and distribution plots for each interval in each core. Raw data from the grain size analysis can be provided upon request.

Results are presented both graphically and in tabular form. Erosion rates at applied shear stresses are presented with depths adjacent to an image of the core. The indication of no erosion measured refers to the thin dotted line at 10^{-5} cm/s. As described in the previous sections, values of 10^{-4} cm/s are defined as the erosion rate related to minimum measurable critical shear stress. Tables of the derived constants *A* and *n* are provided with the r^2 value. Mean values are also presented over the entire core. The coefficient *A* is log-averaged because of the order of magnitude variations that can occur within its values, while *n* is arithmetically averaged because its range is narrow. Values of *n* typically range from 1 to 4, and values outside of this range may also indicate a spurious data fit.

A table of particle sizes, wet and dry bulk densities, loss on ignition, greatest applied shear with no erosion measured, first applied shear with erosion measured, and power law derived critical shear is also presented. The power law-derived critical shear was determined using the *A* and *n* values from tables also provided for each sample. A column labeled "Final Critical Shear" provides the recommended value based on the criteria outlined in Section 1.2.2.1.

Qualitative descriptions of the type of erosion are included when necessary to highlight changing processes. Erosion of the core surface generally occurs via individual particles becoming suspended, aggregated clumps of sediment (clump erosion) breaking off causing an uneven surface, or sheets of material peeling off the sediment bed. Noncohesive materials such as sands, in the absence of any organic matter acting as a "glue," will erode as individual particles. Fine-grained sediment such as silts and clays can bind together and will move together under an applied shear. Cracks and uneven sedimentation may cause these bonded sediments to move together as clumps. Sediment deposited cyclically may deposit in uniform layers and can erode as thin sheets.

Cores were processed according to the procedures in Section 1.2.2. Cores were processed until at least five intervals were completed or processing came within 5 cm from the end of the core.

2.1 SED-ER-10

Core ER-10 was collected on March 12, 2020, at 3:30 p.m. in 8 ft of water. The 30 cm length of core was collected east of the Highway 10 Bridge using a combination of hand pressure and post-hammer blows. Collected sediment consisted of olive, brown silty material with a uniform

fine texture throughout with a lighter oxidized layer extending up to 3 cm from the surface. Worm tubes and possible feeding voids 0.25 to 0.5 cm in diameter were observed up to 15 cm below the surface. Sediment below the biotic influenced zone was uniform in olive color and silty texture. Leaves and stems were uncovered 25 cm below the surface but were not observed prior to that depth.

A photograph of the recovered sediment aligned with applied shear stresses and resulting erosion rates is presented in Figure 3. Shear stresses ranging from 0.1 to 12.8 Pa were applied during five shear stress intervals. Not all shear stresses were included in each interval as described in Section 1.2.2. The surface was more erodible than underlying sediment. Intervals 2, 3, and 4 exhibited uniform erosion rates and erodibility while interval 5 encompassed the least erodible sediment analyzed in ER-10 (Figure 4). In interval 1 extending 5.3 cm from the surface, sediment eroded evenly across the bed as individual grains or pieces of the surface were suspended. As depth and shear stress increased, erosion occurred when pieces or larger clumps of the surface broke free. Pieces ranged in size relative to applied shear stress and the surface eroded unevenly.

Sediment properties were relatively uniform throughout the core with the exception of low-density sediment at the surface (Figure 5, Table 3). The low-density material is associated with the lowest critical shear stresses determined from the measured erosion rates. Table 3 provides a summary of shear stress measurement as well the final critical shear stress based on the criteria outlined in Section 1.2.2.1. Derived critical shear stresses ranged from 0.25 to 1.73 Pa. Power law fit parameters relating the erosion rate to applied shear stress are presented in Table 4.

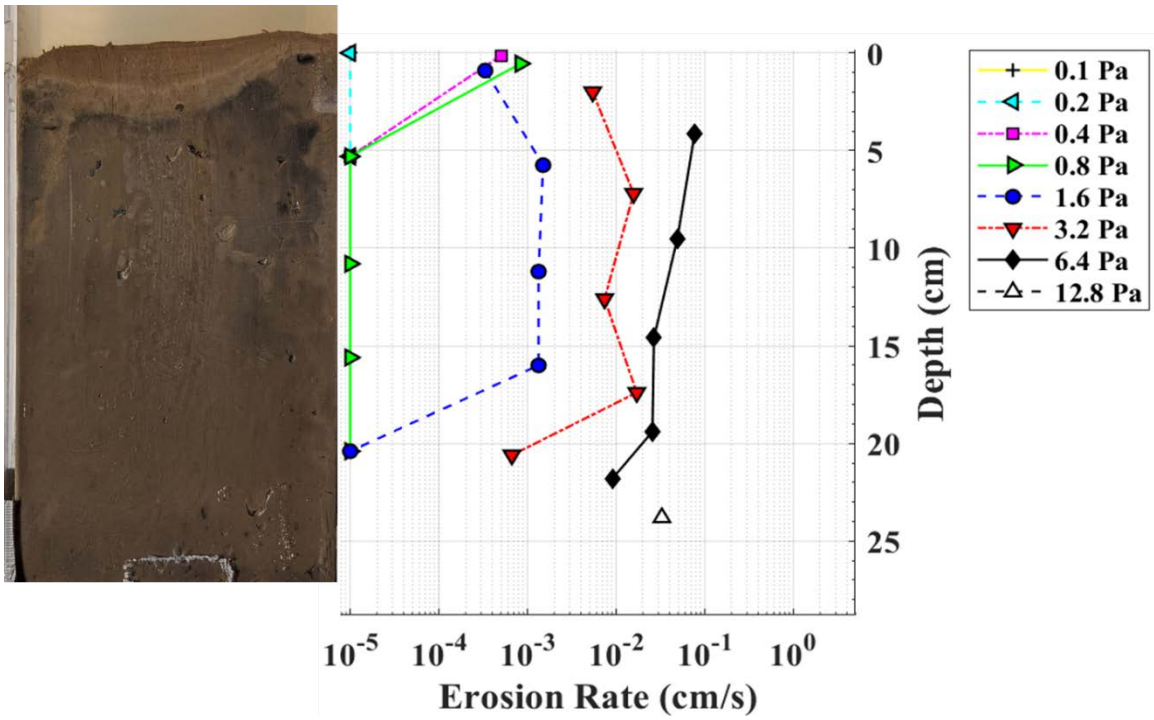


Figure 3. Photograph of Core ER-10 aligned with applied shear stresses and associated erosion rates

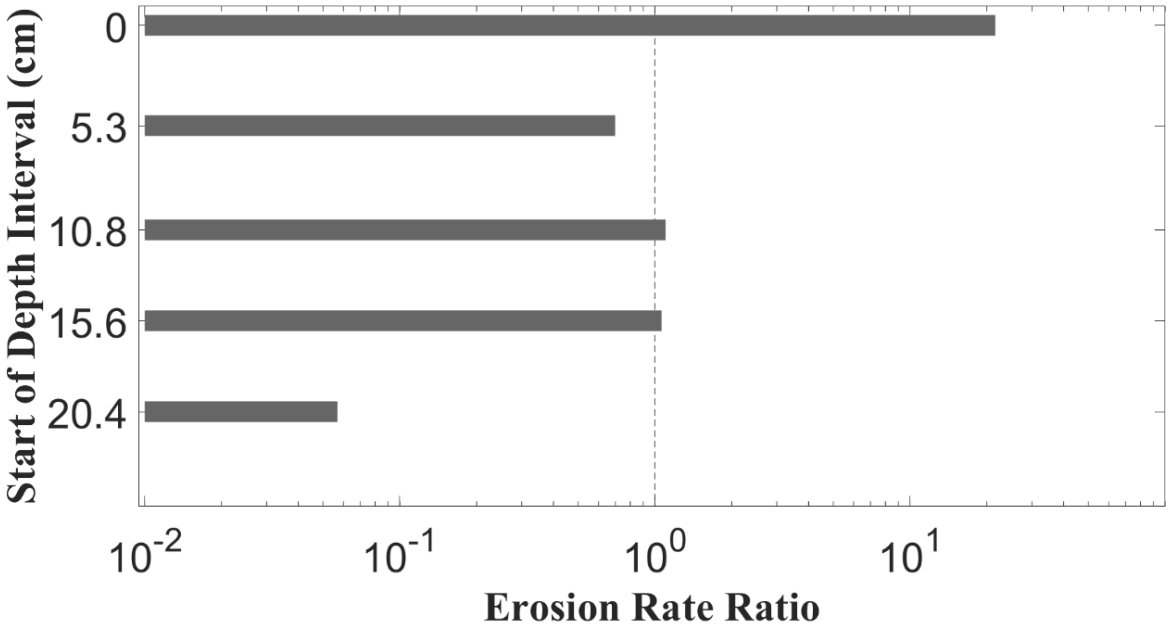


Figure 4. Intracore erosion rates of ER-10

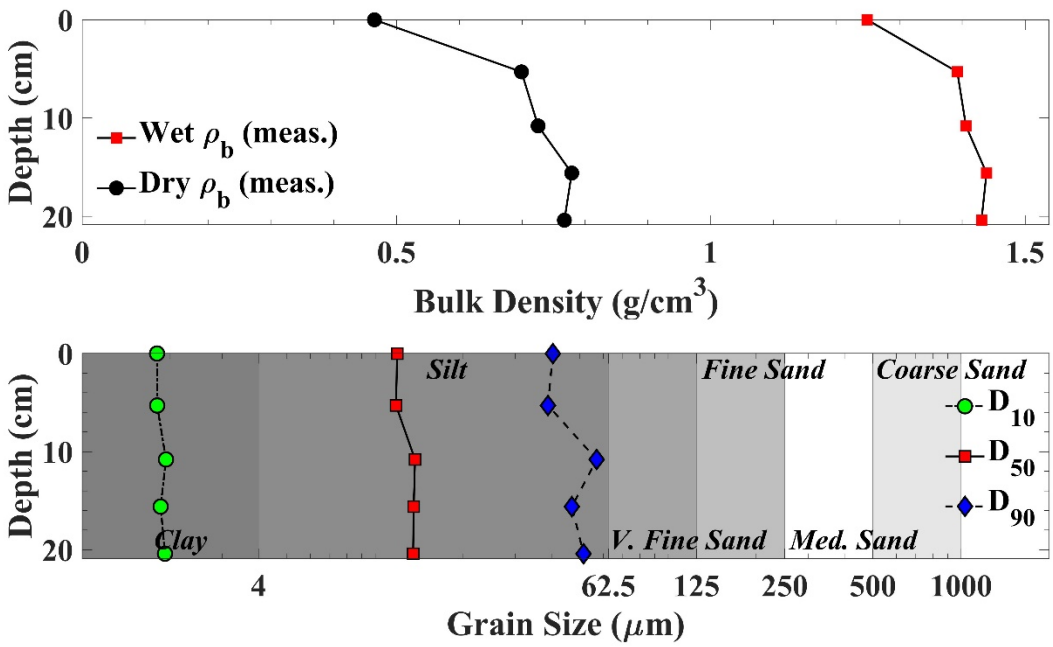


Figure 5. Physical properties of ER-10 with depth

Table 3. Physical properties and derived critical shear stresses of ER-10

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	11.89	1.25	0.46	5.2%	0.2	0.4	0.24	0.25	0.25
5.3	11.78	1.39	0.7	5.0%	0.8	1.6	0.86	0.75	0.8
10.8	13.68	1.41	0.73	5.2%	0.8	1.6	0.86	0.74	0.8
15.6	13.54	1.44	0.78	5.2%	0.8	1.6	0.86	0.72	0.8
20.4	13.47	1.43	0.77	5.3%	1.6	3.2	1.84	1.73	1.73
Mean	12.87	1.38	0.69	5.2%	0.84	1.68	0.93	0.84	0.88

Table 4. Power law fit parameters for SED-ER-10

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	5.3	2.1E-05	1.69	0.79
2	5.3	10.8	1.93E-07	3.1	0.96
3	10.8	15.6	4.21E-07	2.74	0.97
4	15.6	20.4	3.71E-07	2.84	0.92
5	20.4	24.8	1.64E-08	3.06	0.98

2.2 SED-ER-680

Core ER-680 was collected on March 9, 2020, at 5:30 p.m. in 5 ft of water and is the easternmost sample in the Elk River. This was the first core collected during the study and required multiple attempts and the use of a post-hammer to achieve adequate penetration resulting in 22 cm of sediment collected. The sample contained evidence of biotic activity at the surface in the upper 10 cm of the sample in form of tubes and possible feeding voids. Below a 1−3 cm surface layer of lighter sediment, an olive gray mixture of silt and sand extended throughout the sample. On the surface, the sediment was unconsolidated, yellow-tan material with some biotic mounds present. A translucent fish approximately 2 cm in length was also observed in the overlying water and burrowed into the sand when disturbed.

A photograph of the recovered sediment aligned with applied shear stress and associated erosion rates is presented in Figure 6. Shear stresses of 0.1 to 6.4 Pa were applied in three intervals utilizing 13.7 cm of material. The unconsolidated surface material eroded more easily than the underlying material possibly due to bioturbation (Figure 7). Sediment eroded in streams of individual grains as the loose sandy material eroded from the surface. Below the surface interval, sediment eroded as individual grains giving way to larger pieces of the surface 1−3 mm in diameter breaking away. Pockets of interspersed sandy material eroded as individual grains causing the exposed sediment level to erode unevenly. Critical shear stresses ranged from 0.12 to 0.4 Pa from the first to third interval (Table 5). Intervals 2 and 3 had similar properties resulting in an average critical shear stress of 0.3 Pa. Power law fit parameters governing the relationship between shear stress and erosion rate are provided in Table 6. The r^2 values show an excellent fit relating the two variables.

Four subsamples of material were collected for density and particle size distribution testing. The first three correlate to the beginning of each shear stress interval and the fourth corresponds to the end of the third interval. The low-density surface material comprised sand, silt, and clay

(Figure 8, Table 5). Below, sediment had a larger density and the proportions of sand, silt, and clay varied.

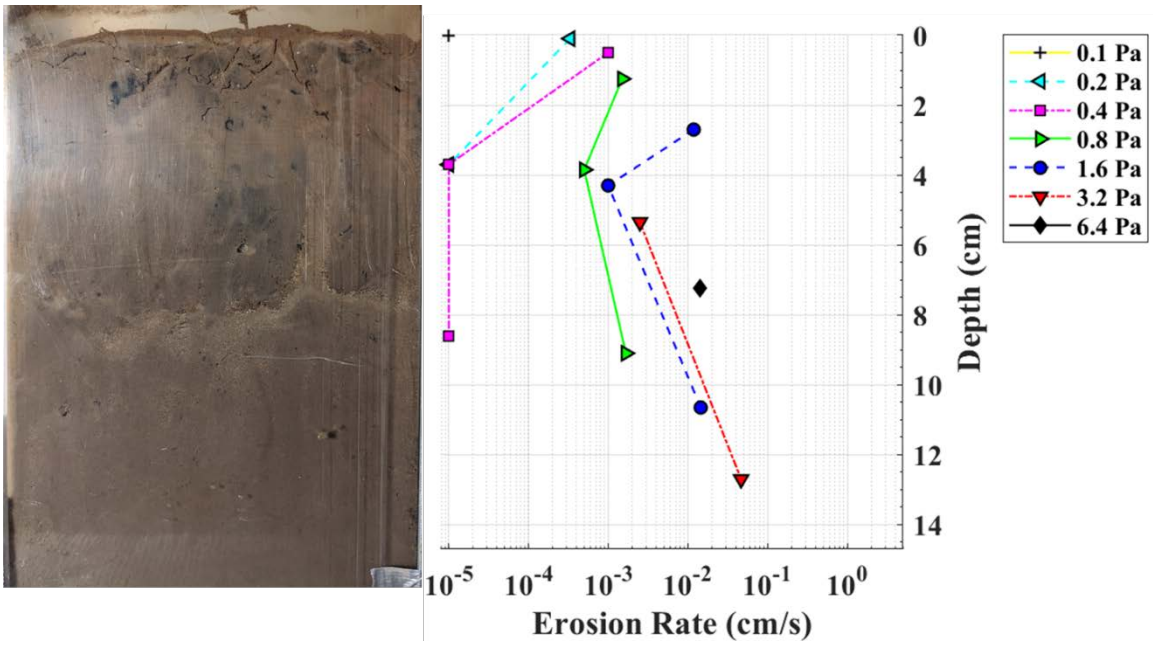


Figure 6. Photograph of Core ER-680 aligned with applied shear stresses and associated erosion rates

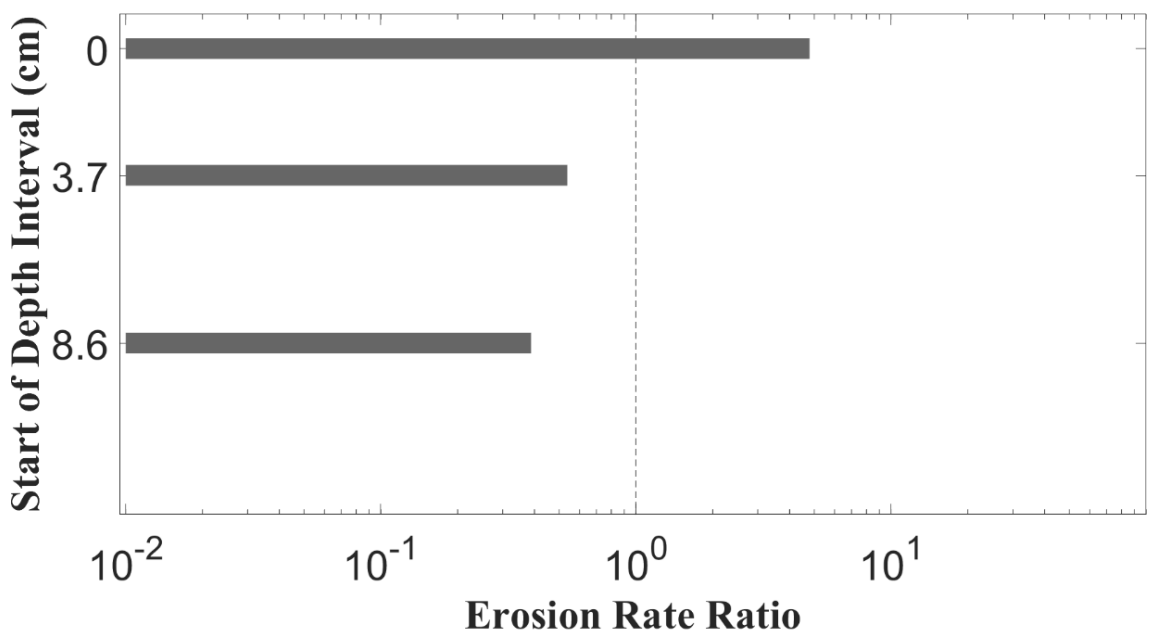


Figure 7. Intracore erosion rates in ER-680

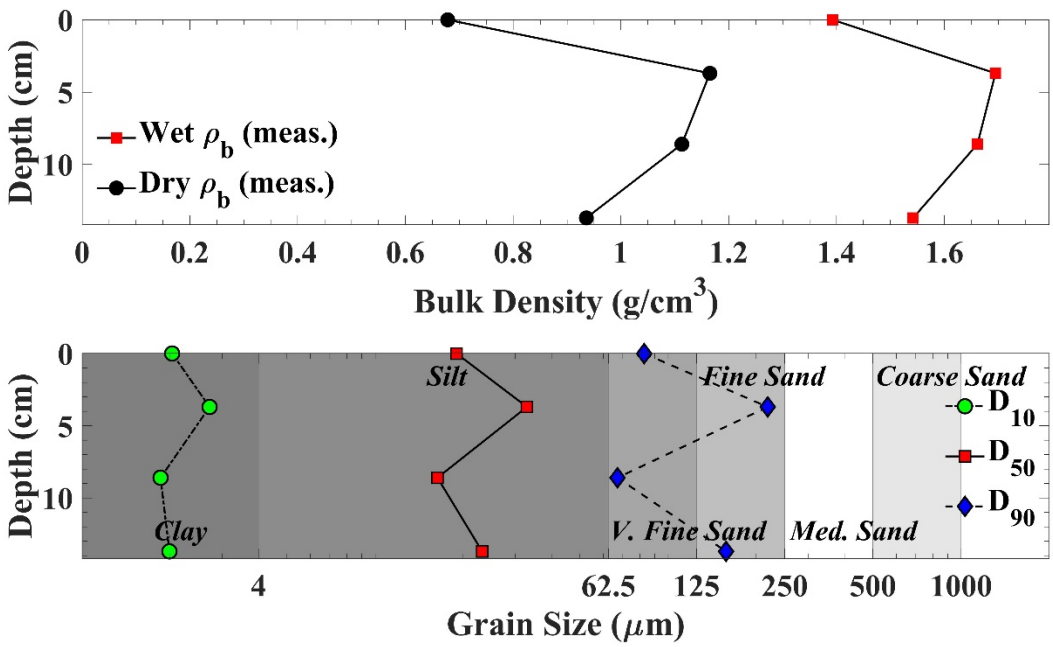


Figure 8. Physical properties of ER-680 with depth

Table 5. Physical properties and derived critical shear stresses of ER-680

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0	18.95	1.39	0.68	3.4%	0.1	0.2	0.13	0.12	0.12
3.7	32.96	1.7	1.16	2.9%	0.4	0.8	0.48	0.42	0.42
8.6	16.32	1.66	1.11	3.0%	0.4	0.8	0.43	0.37	0.4
13.7	23.18	1.54	0.94	4.2%	---	---	---	---	---
Mean	22.85	1.57	0.97	3.4%	0.3	0.6	0.35	0.30	0.31

Table 6. Power law fit parameters of ER-680

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	3.7	7.64E-05	1.71	0.95
2	3.7	8.4	8.35E-06	1.74	0.97
3	8.6	13.7	1.88E-06	3.05	0.96

2.3 SED-NR-130

Core NR-130 was collected on March 11, 2020, at 4:00 p.m. on the east bank of the Neosho River. The sample was collected along the bank due to the flow of the river. The core recovery length was 17 cm, and a post-hammer was required to achieve penetration through the sediment. Shown in Figure 9, the collected sediment contained invertebrate burrows and tubes that extended and criss-crossed throughout the sample. An example of the worm observed in this core as well as other collected samples and presumably responsible for these burrows is shown in Figure 10. Patches of oxic sediment associated with the presence of worm tubes extended 10−12 cm below the surface. Darker patches of olive silt were present in the absence of worm tubes.

A photograph of the collected sediment core and applied shear stresses is provided in Figure 9. Due to the limited material collected at NR-130, shear stresses ranging from 0.1 to 6.4 Pa were applied to only two intervals of the sediment. Both intervals exhibited similar erosive (Figure 11) and physical properties as summarized in Table 7 and visualized in Figure 12. Critical shear stresses ranged from 0.33 to 0.4 Pa and fit parameters suggest good agreement with a power law relationship relating shear stress and erosion rate (Table 8). Grain sizes were consistent down-core, and densities increased with depth.

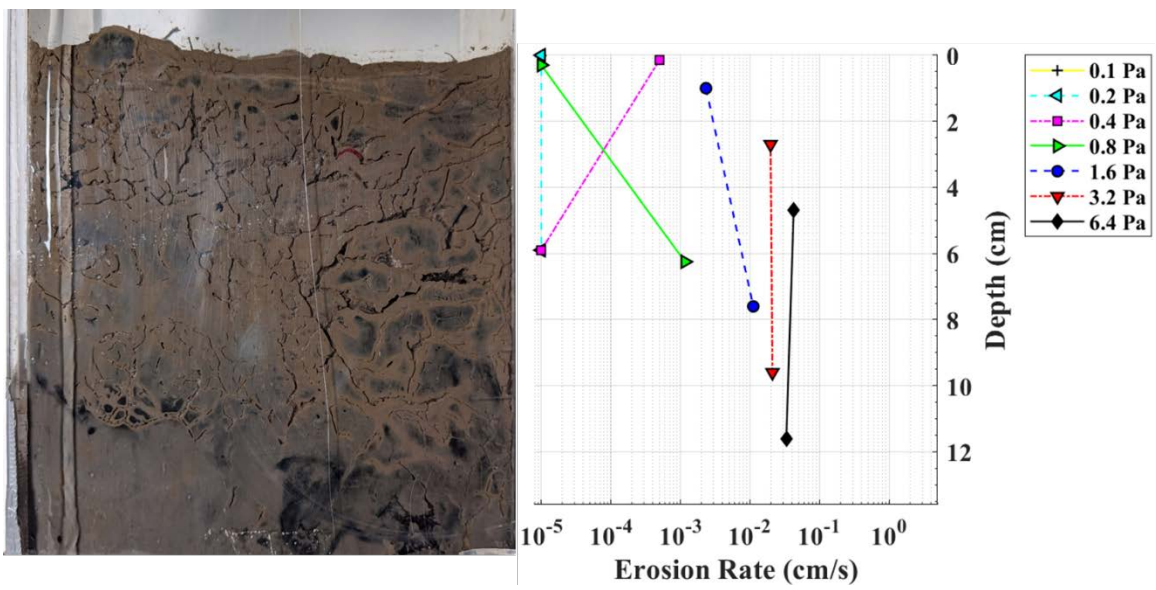


Figure 9. Photograph of Core NR-130 aligned with applied shear stresses and associated erosion rates

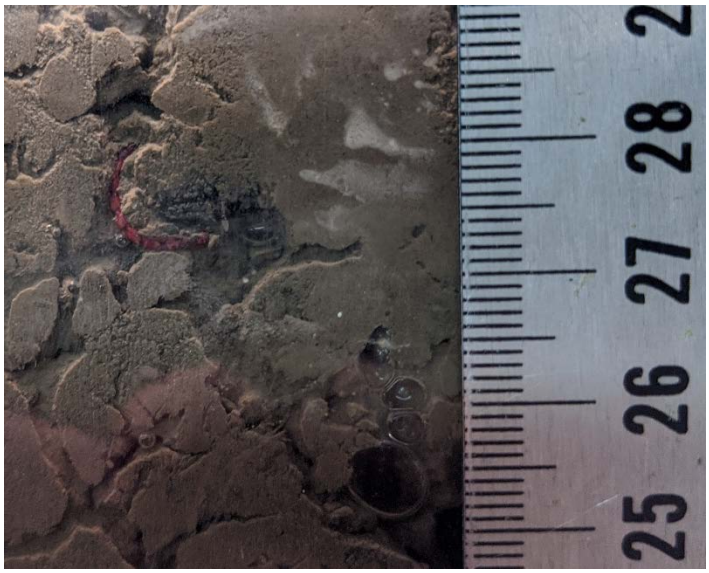


Figure 10. Invertebrate in burrow in NR-130

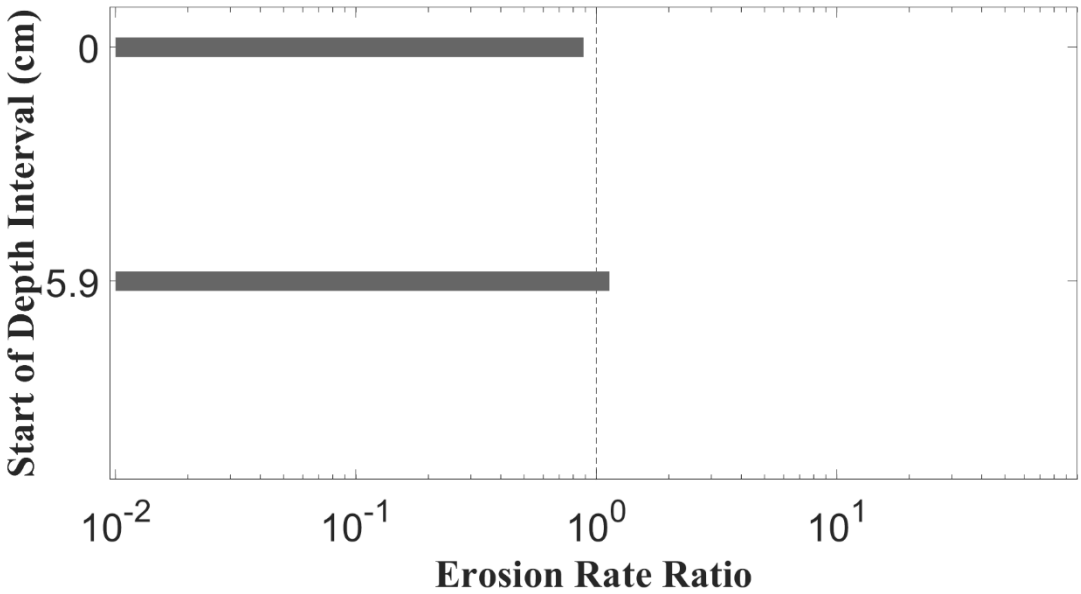


Figure 11. Intracore erosion rates in NR-130

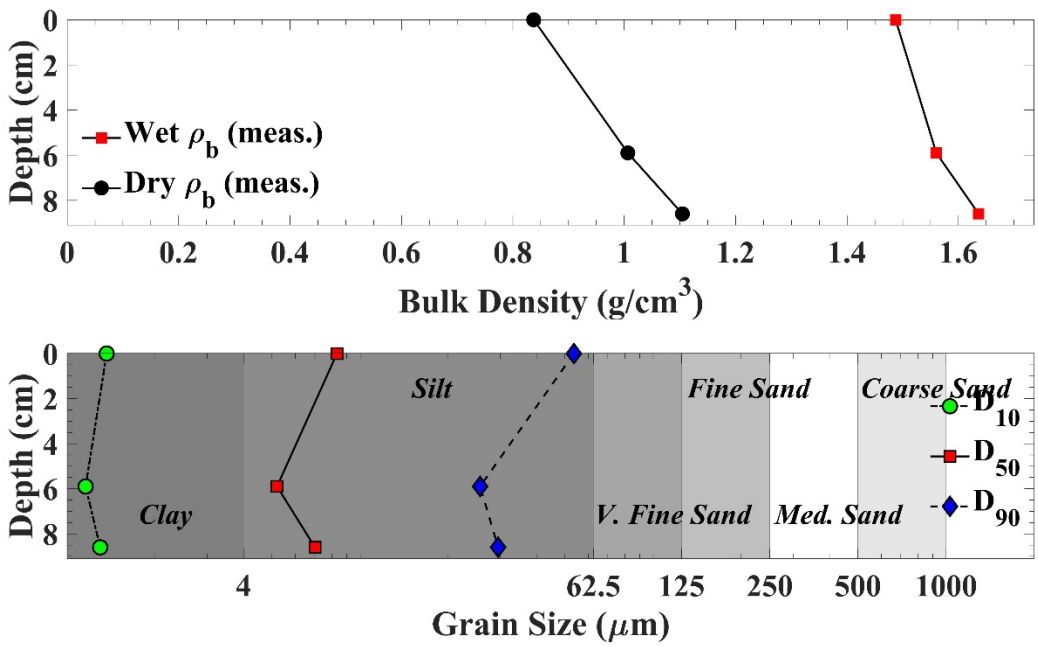


Figure 12. Physical properties of NR-130 with depth

Table 7. Physical properties and derived critical shear stresses of NR-130

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	8.34	1.49	0.84	3.7%	0.2	0.4	0.84	0.33	0.33
5.9	5.2	1.56	1.01	6.8%	0.4	0.8	0.44	0.29	0.4
8.6	7.01	1.64	1.1	5.0%	---	---	---	---	---
Mean	6.85	1.56	0.98	5.2%	0.30	0.60	0.64	0.31	0.37

Table 8. Power law fit parameters for NR-130

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	5.7	8.57E-06	2.04	0.78
2	5.9	12.6	1.01E-05	2.13	0.88

2.4 SED-NR-164

Core NR-164 was collected on the eastern bank of the Neosho River downstream of the confluence of the Neosho and Spring rivers. Sampling required light blows from the post-hammer and resulted in the recovery of 41 cm of sediment. Recovered material appeared dark brown or olive in color with a lighter oxidized layer 1–2 cm on the surface. Sediment less than 10 cm from the surface showed signs of biotic activity and contained leaves and twigs.

A photograph of the recovered sediment aligned with applied shear stresses and resulting erosion rates is presented in Figure 13. Shear stresses ranging from 0.1 to 12.8 Pa were applied to six intervals of sediment in the upper 25 cm of sample. The first interval extended 1.8 cm from the original surface and ended when the unconsolidated material was eroded away leaving a much firmer looking, gray material. In subsequent intervals, bedded material did not respond to applied shear stresses less than 1.6 Pa. The material contained worms (Figure 14) and their structures and eroded in pieces or in some instances larger episodes of multiple millimeters of sediment peeled away. The sediment in intervals 2 through 6 behaved in a similar way to the applied shear stresses (Figure 15).

Low-density surface material gave way to generally denser material down-core. Sediment grain size distributions varied with some sand present intermittently around 10 cm below the recovered surface (Figure 16, Table 9). Derived critical shear stresses ranged from 0.12 at the surface to a uniform 0.8 Pa at deeper intervals. The 0.8 value was determined using the criteria in Section 1.2.2.1 because the critical shear stress derived using the power law fell below the *tau_no* value. Power law fit parameters indicate that despite the critical shear stress values being lower than the *tau_no*, there is still generally good agreement with the erosion rates and shear stresses (Table 10).

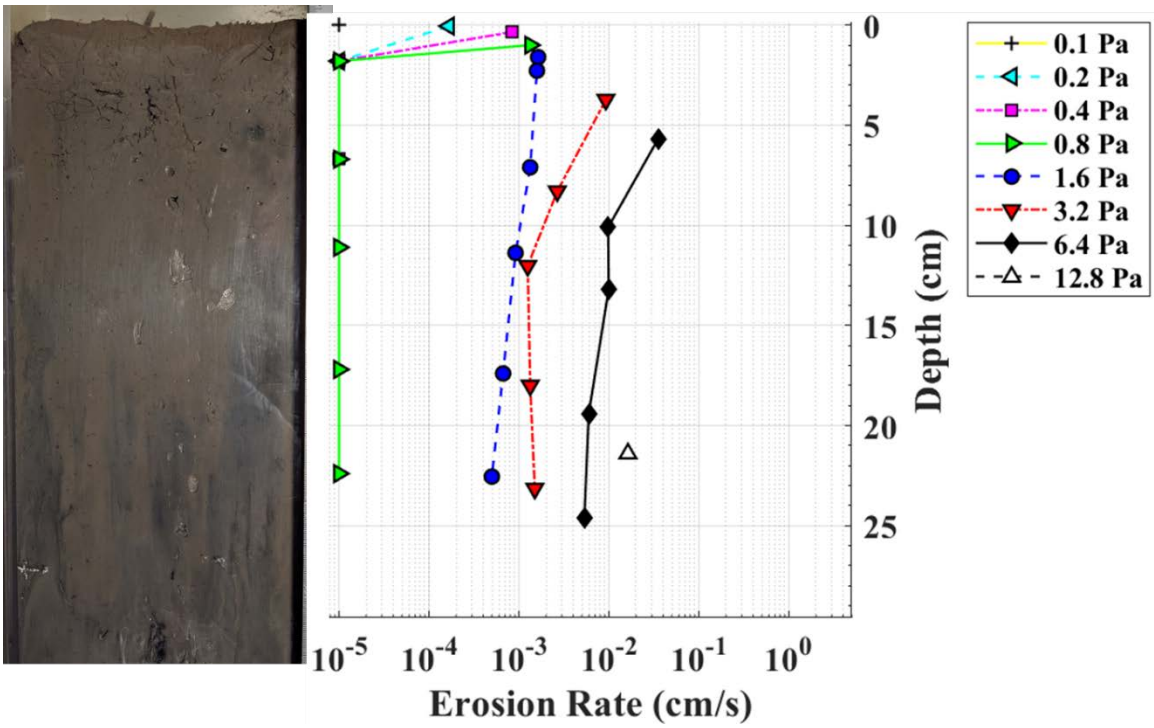


Figure 13. Photograph of Core NR-164 aligned with applied shear stresses and associated erosion rates

Figure 14. Grouping of invertebrates in NR-164

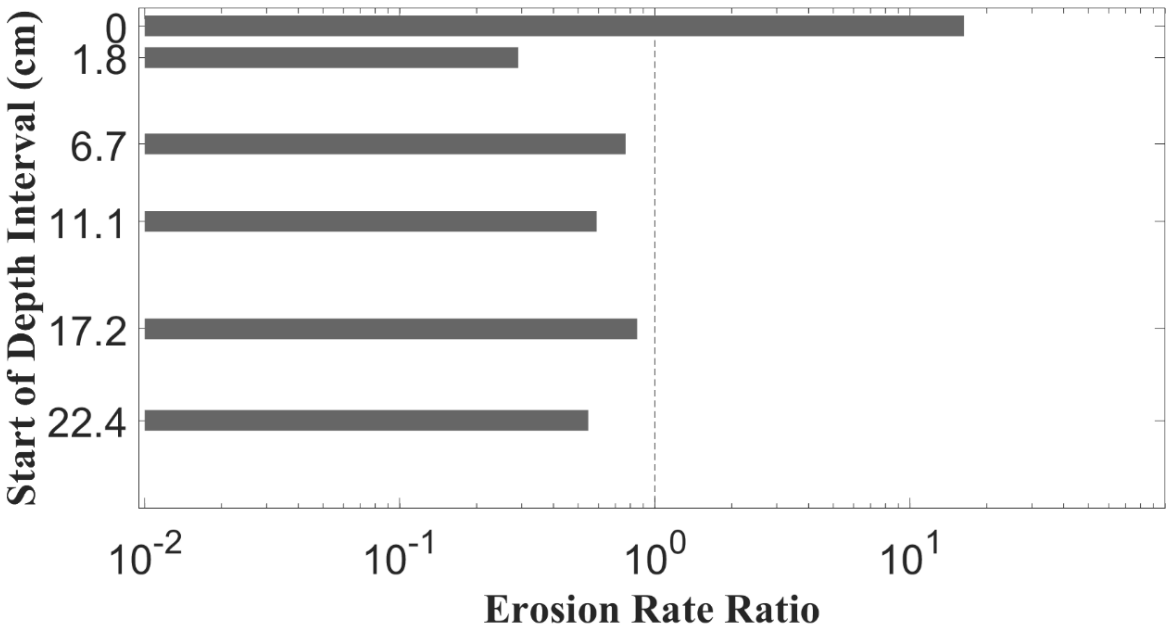


Figure 15. Intracore erosion rates in NR-164

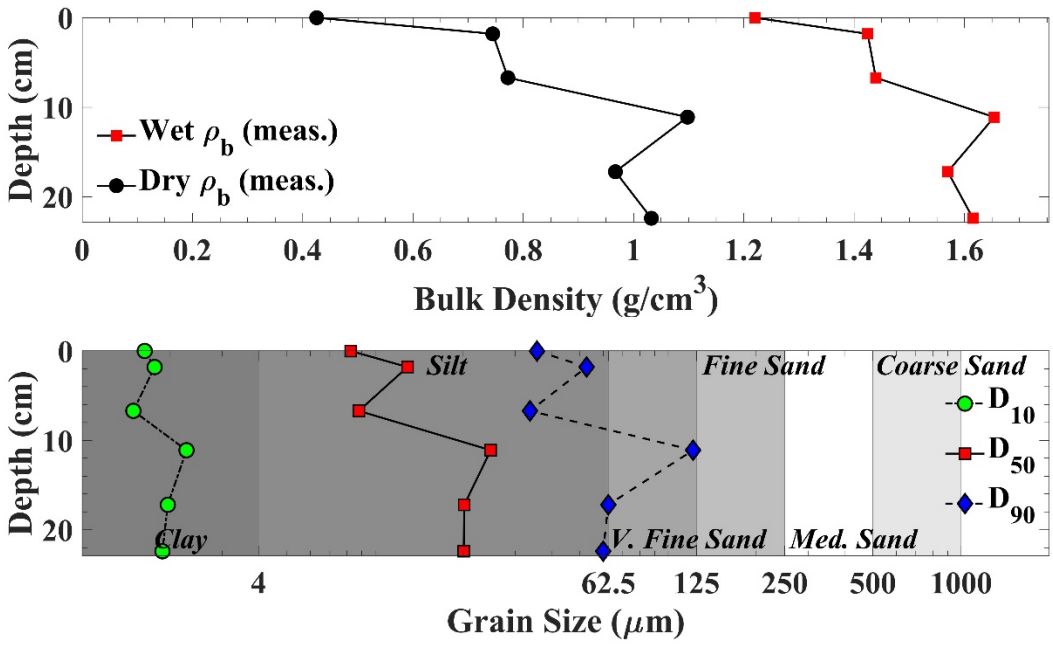


Figure 16. Physical properties of NR-164 with depth

Table 9. Physical properties and derived critical shear stresses of NR-164

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	8.25	1.22	0.43	5.9%	0.1	0.2	0.16	0.12	0.12
1.8	12.89	1.42	0.74	4.4%	0.8	1.6	0.86	0.73	0.8
6.7	8.8	1.44	0.77	4.6%	0.8	1.6	0.86	0.68	0.8
11.1	24.8	1.65	1.1	2.9%	0.8	1.6	0.89	0.77	0.8
17.2	20.15	1.57	0.97	3.3%	0.8	1.6	0.92	0.75	0.8
22.4	20.05	1.62	1.03	2.7%	0.8	1.6	0.96	0.85	0.85
Mean	15.82	1.49	0.84	4.0%	0.68	1.37	0.78	0.65	0.70

Table 10. Power law fit parameters in NR-164

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	1.8	7.93E-05	1.24	0.88
2	1.8	6.7	3.32E-07	2.87	0.96
3	6.7	11.1	1.68E-06	2.14	0.92
4	11.1	14	1.31E-06	2.12	0.93
5	17.2	22.4	2.41E-06	1.85	0.97
6	22.4	25.6	1.33E-06	2.02	0.98

2.5 SED-NR-202

Core NR-202 was collected on March 10, 2020, at 4:35 p.m. in 5 ft of water. The sediment bed resisted penetration and required multiple blows from a post-hammer to achieve a core recovery length of 23 cm from the eastern bank along the inside bend of the Neosho River. A 3.5 cm layer of oxidized, unconsolidated sediment covered dark, anoxic silty material. The presence of visible worm tubes in the upper 7 cm of sediment suggests that observations on the undisturbed surface are the result of bioturbation and biotic mounds.

A photograph of NR-202 aligned with applied shear stresses and resulting shear stresses highlights the reduction in erodibility with depth (Figure 17). The surface sediment eroded at lower shear stresses and more easily than the material below (Figure 15). The reduction in erodibility correlates with the increase in density with depth (Figure 16, Table 11). Critical shear

stresses ranges from 0.15 to 1.14 and fit parameters indicate excellent agreement in measurements and the use of a power law relationship (Table 12). When erosion occurred, sediment suspended in the form of cloud erosion at the surface and individual grains and pieces of the bed as depth increased.

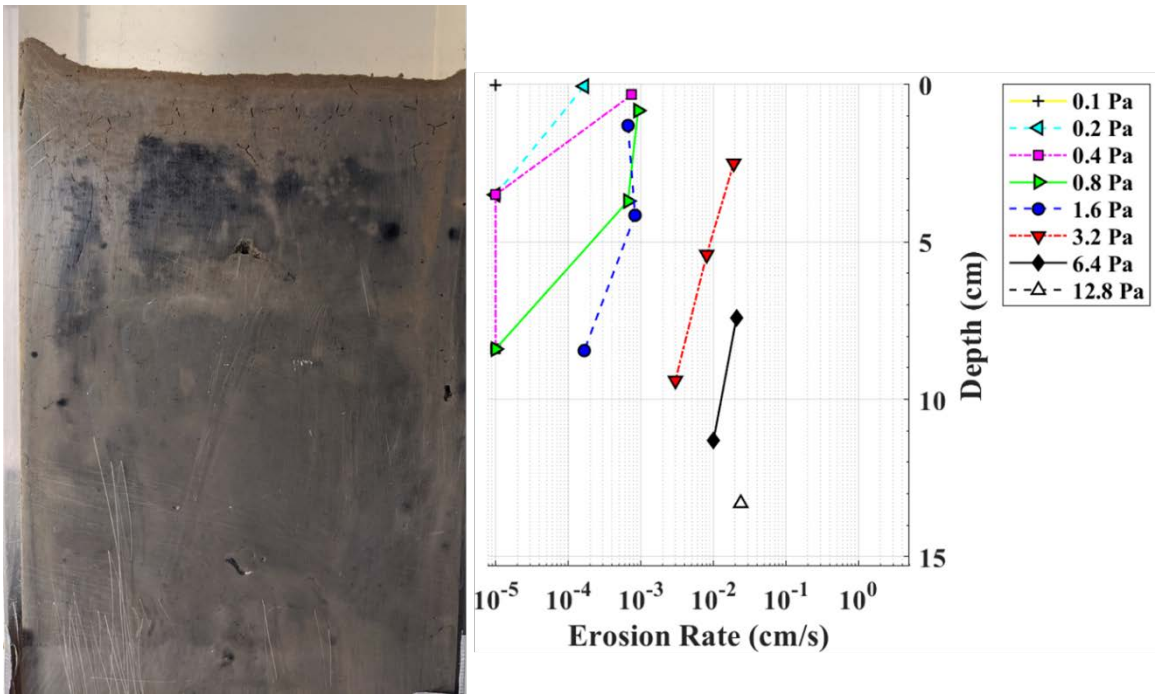


Figure 17. Photograph of Core NR-202 aligned with applied shear stresses and associated erosion rates

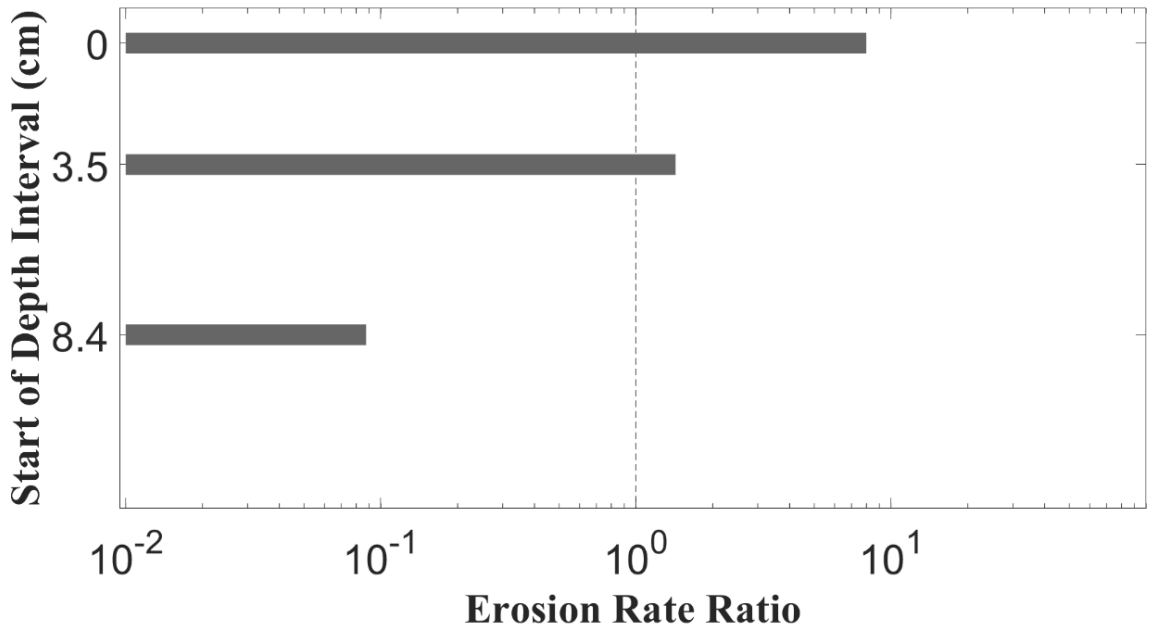


Figure 18. Intracore erosion rates in NR-202

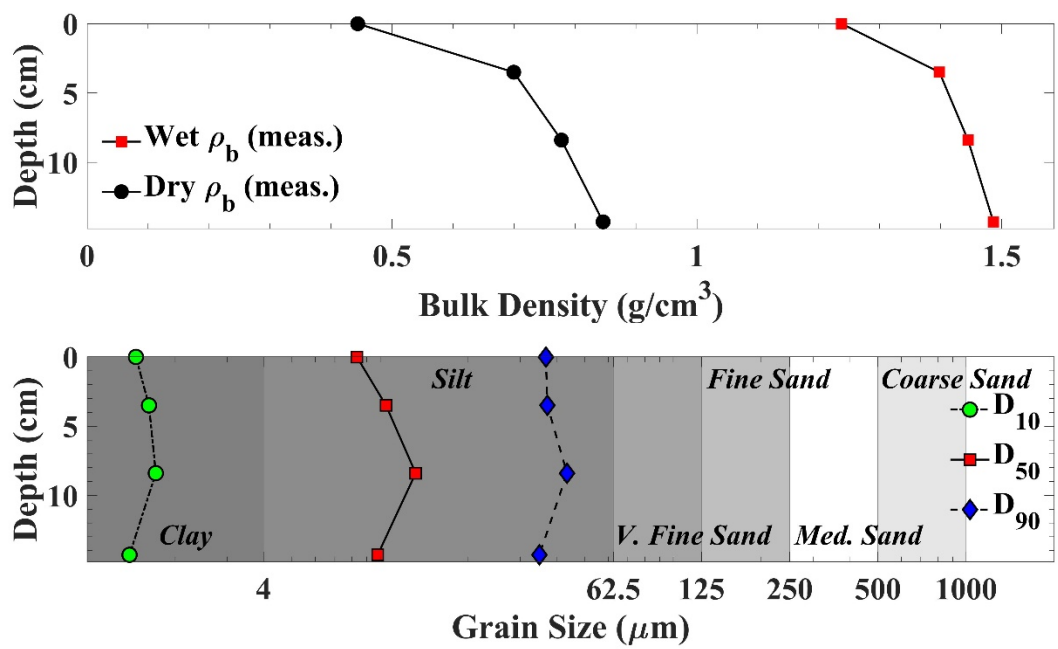


Figure 19. Physical properties of NR-202 with depth

Table 11. Physical properties and derived critical shear stresses of NR-202

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	8.33	1.24	0.44	5.1%	0.1	0.2	0.16	0.15	0.15
3.5	10.47	1.4	0.7	4.3%	0.4	0.8	0.46	0.41	0.41
8.4	13.22	1.44	0.78	4.4%	0.8	1.6	1.28	1.14	1.14
14.3	9.81	1.49	0.85	4.4%	---	---	---	---	---
Mean	10.46	1.39	0.69	4.6%	0.43	0.87	0.63	0.57	0.57

Table 12. Power law fit parameters for NR-202

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	3.5	5.85E-05	1.39	0.8
2	3.5	8.4	6.22E-06	1.97	0.95
3	8.4	14.3	2.43E-07	2.48	0.95

2.6 SED-NR-CB

Core NR-CB was collected on the Neosho River north of Connors Bridge at 5:02 p.m. on March 11, 2020. Sampling occurred on the bank of the river away from the known gravel and rocky substrate in the center of the river. The steep slope of the bank resulted in multiple attempts to collect a sample. Samples were pushed by hand in the upper 10 cm but required post-hammer blows to recover 32 cm of sediment.

A photograph of NR-CB aligned with applied shear stresses and resulting erosion rates is presented in Figure 20. Light gray sediment at the surface contained evidence of biotic activity that extended up to 12 cm into the sediment bed. Below the surface layer, sediment was silty in texture and transitioned from olive to dark gray material approximately 15 cm below the surface. Resulting erosion rates varied with the most erodible sediment occurring in the second interval (Figure 21). This may be due to the effects of wetting and drying associated with the shallow bank where the core was collected.

Variations in density mimic trends in erodibility but median grain sizes generally increased throughout the sample (Figure 22, Table 13). Critical shear stresses also varied in a similar manner to density ranging from 0.2 in interval 2 to 0.8 Pa at interval 5. Fit parameters indicate good and excellent fits relating shear stress to erosion rate (Table 14).

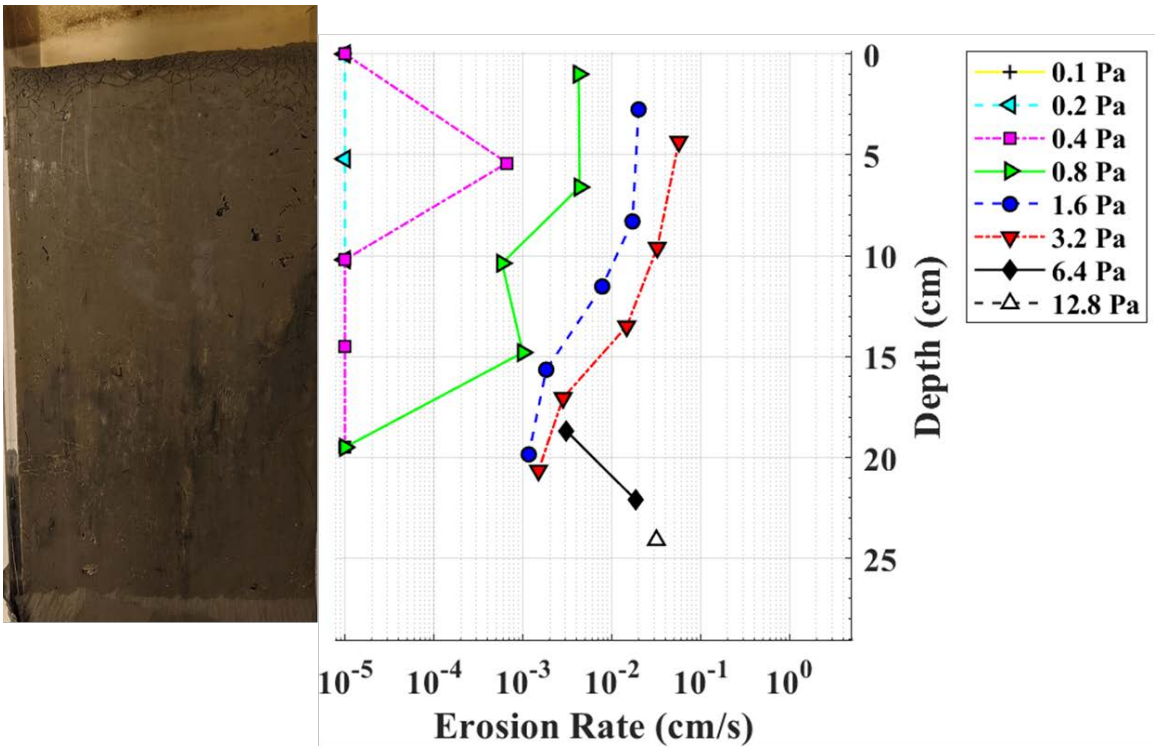


Figure 20. Photograph of Core NR-CB aligned with applied shear stresses and associated erosion rates

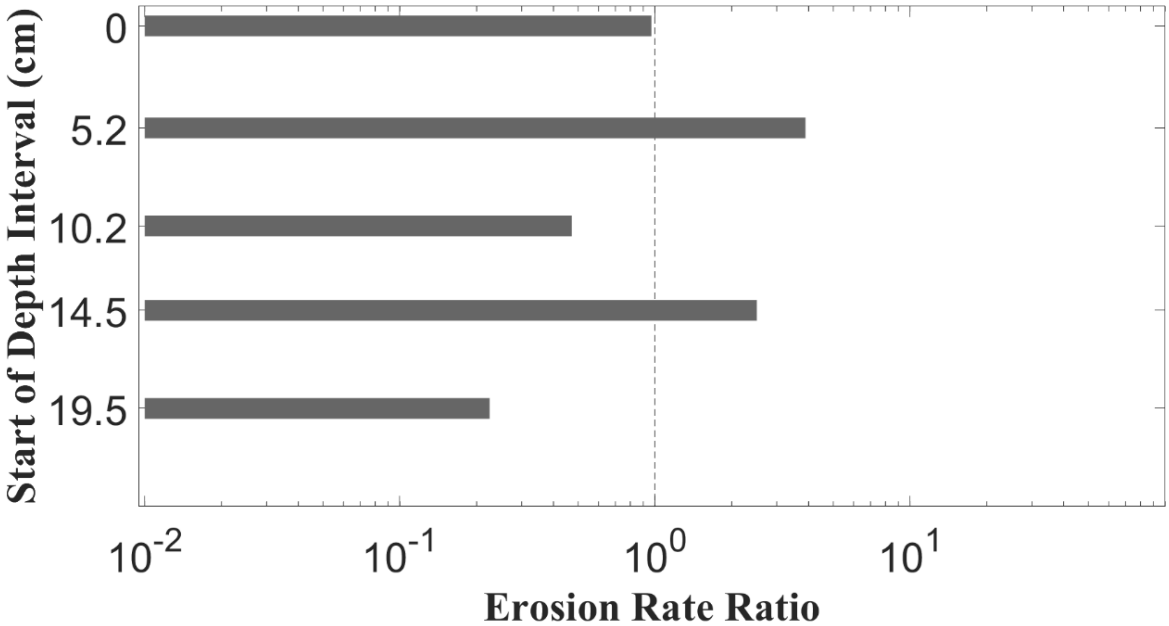


Figure 21. Intracore erosion rates in NR-CB

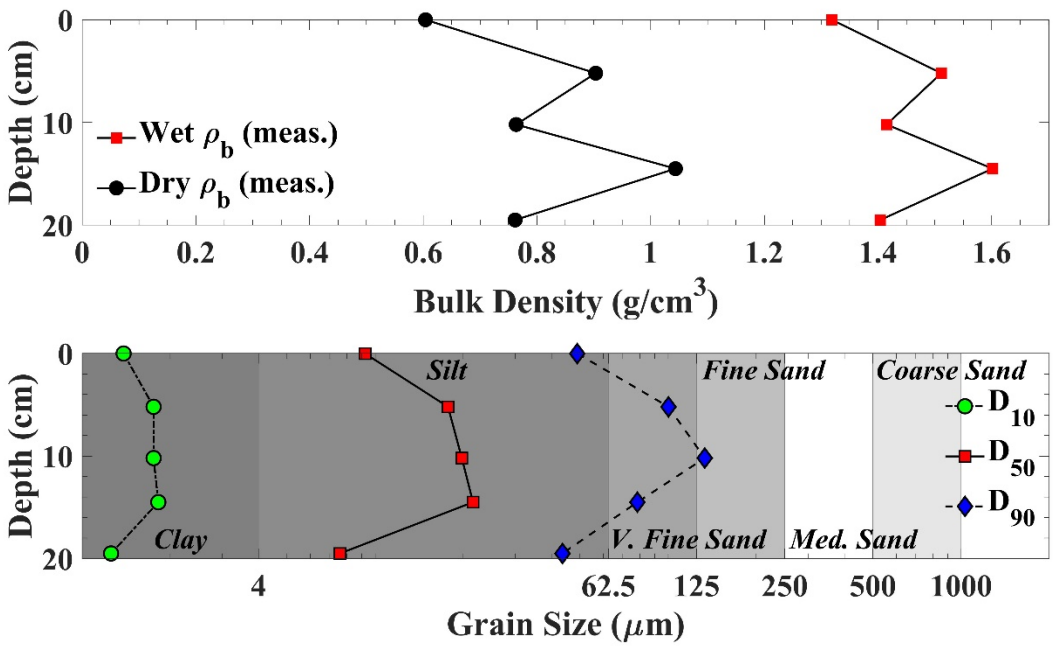


Figure 22. Physical properties of NR-CB with depth

Table 13. Physical properties and derived critical shear stresses of NR-CB

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	9.23	1.32	0.6	7.0%	0.4	0.8	0.41	0.31	0.4
5.2	17.73	1.51	0.9	5.4%	0.2	0.4	0.23	0.18	0.2
10.2	19.76	1.42	0.76	6.8%	0.4	0.8	0.47	0.42	0.42
14.5	21.58	1.6	1.04	4.9%	0.4	0.8	0.45	0.21	0.4
19.5	7.58	1.4	0.76	8.0%	0.8	1.6	0.87	0.7	0.8
Mean	15.18	1.45	0.81	6.4%	0.44	0.88	0.49	0.36	0.44

Table 14. Power law fit parameters in NR-CB

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	5.2	3.24E-06	2.99	0.91
2	5.2	10.2	2.62E-05	2.21	0.96
3	10.2	14.5	2.05E-06	2.7	0.94
4	14.5	19.5	4.31E-05	1.16	0.75
5	19.5	25.1	1.66E-06	2.1	0.94

2.7 SED-NR-FG

Core NR-FG was collected near the Miami fairgrounds on March 11, 2020, at 11:00 a.m. The 23 cm length of core was collected from the east bank of the river. The area was noted to be seasonally wet and dry by the FreshWater Engineering team members. The surface was covered in clumps of sediment and resisted penetration from the coring system due to the presence of stiff sediment. Sediment at NR-FG was light gray or tan with evidence of anoxic patches as depth increased.

A photograph of NR-FG with applied shear stresses and resulting erosion rates is presented in Figure 23. Shear stress was applied successfully to three intervals of the sample. The loose surface material that formed broken clumps was tested for grain size distribution and density but was not considered for critical shear stress determination. To reduce anthropogenic disturbance, the clumpy material was subjected to a 1.6 Pa flow that removed the clumps from the surface. After their removal, processing took place as normal. Sediment properties remained relatively constant with depth but erodibility (and subsequently critical shear stress) declined as depth increased (Figure 24, Figure 25).

Critical shear stresses increased an order of magnitude from 0.4 Pa at interval 1 to 2.46 Pa in interval 3 located 10 cm below the surface (Table 15). Sediment eroded unevenly across the surface and sporadically during the application of shear stresses. The sediment appeared to be crumbly and eroded by pieces breaking away often resulting in a subsequent event occurring where more particles or pieces eroded. Power law fit parameters provided in Table 16 were used to determine the critical shear stresses for each successful interval.

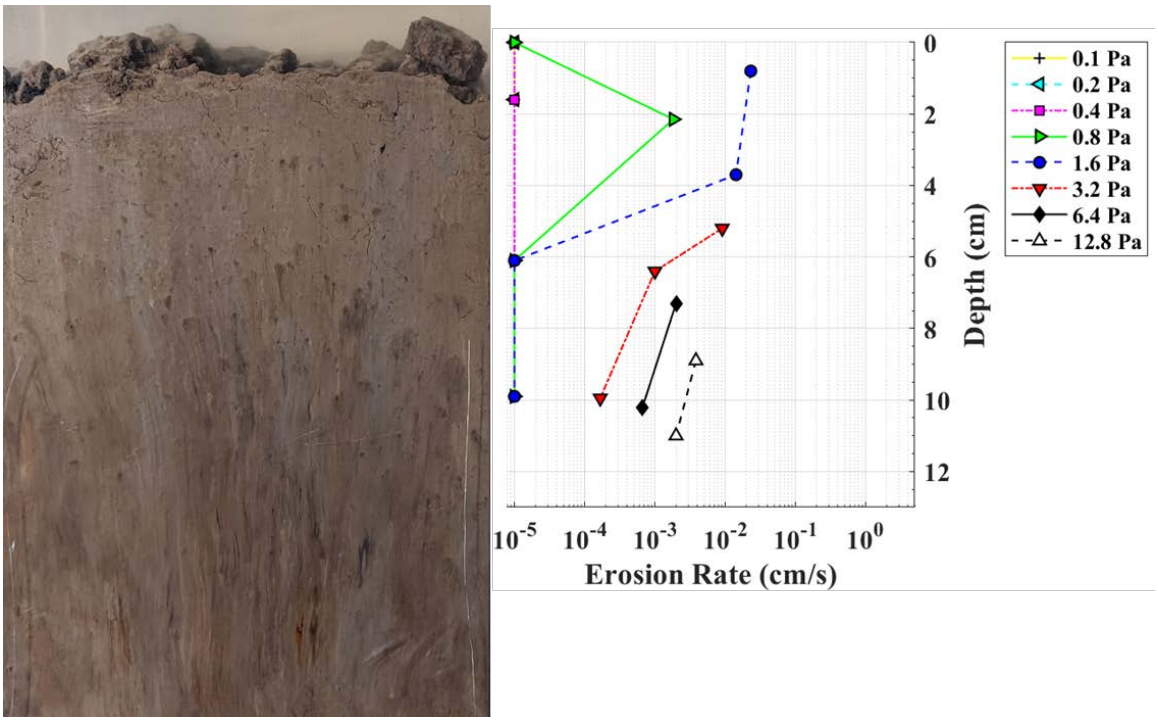


Figure 23. Photograph of Core NR-FG aligned with applied shear stresses and associated erosion rates

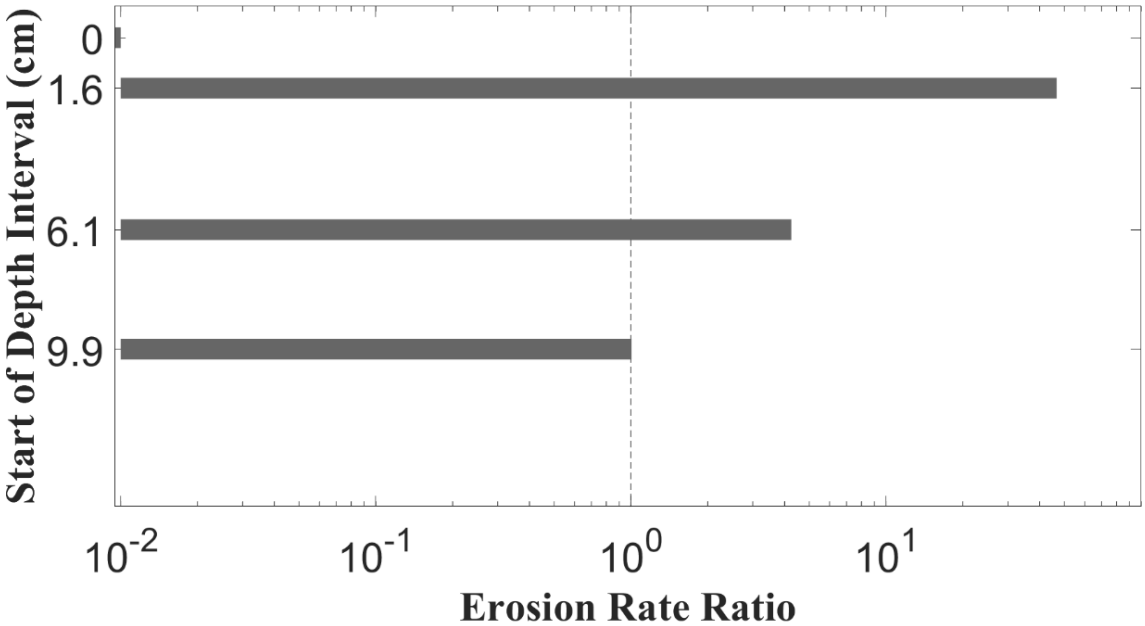


Figure 24. Intracore erosion rates in NR-FG

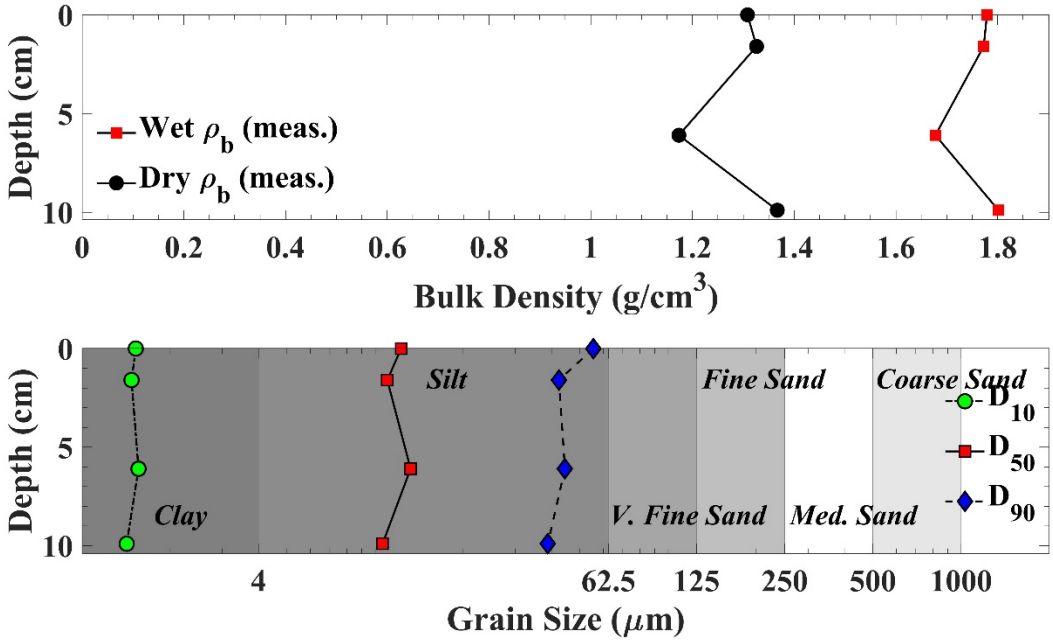


Figure 25. Physical properties of NR-FG with depth

Table 15. Physical properties and derived critical shear stresses of NR-FG

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	12.27	1.78	1.31	3.2%	---	---	---	---	---
1.6	11	1.77	1.33	4.8%	0.4	0.8	0.43	0.3	0.4
6.1	13.21	1.68	1.17	5.1%	1.6	3.2	1.77	1.27	1.6
9.9	10.6	1.8	1.37	4.4%	1.6	3.2	2.56	2.46	2.46
Mean	11.77	1.76	1.30	4.4%	1.1	2.2	1.39	1.21	1.32

Table 16. Power law fit parameters in NR-FG

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	---	---	---	---	---
2	1.6	5.7	8.1E-06	2.29	0.79
3	6.1	9.9	1.22E-06	1.73	0.87
4	9.9	11.6	2.57E-07	1.86	1.0

2.8 SED-NR-SB

Core NR-SB was collected in the Neosho River on March 10, 2020, at 2:00 p.m. On the second collection attempt, a 37 cm length of sediment core was collected in 6 ft of water from the center of the river. The sample contained silty, gray sediment with a 2- to 3-cm oxic surface layer and evidence of biotic activity in the upper 10 cm.

Shear stresses ranging from 0.1 to 12.8 Pa were applied to the upper 24.6 cm of collected sediment (Figure 26). The unconsolidated surface layer was easily eroded relative to the rest of the sample. Properties such as erodibility varied with depth (Figure 27). During testing, erosion processes varied from individual grains producing even erosion across the surface to clumps of sediment breaking away leaving an uneven surface. The change in behavior was attributed to variations in grain size within the sediment bed (Figure 28, Table 17). Density increased with depth up to 20 cm below the surface.

Critical shear stresses ranged from 0.27 to 1.6 Pa and generally increased with depth.
Core NR-SB exhibits properties consistent with others from the site by having an erodible, unconsolidated surface layer and more uniform properties in the firmer sediments below. Parameters relating to erosion rate and shear stress suggest good agreement between measurements using a power law fit (Table 18).

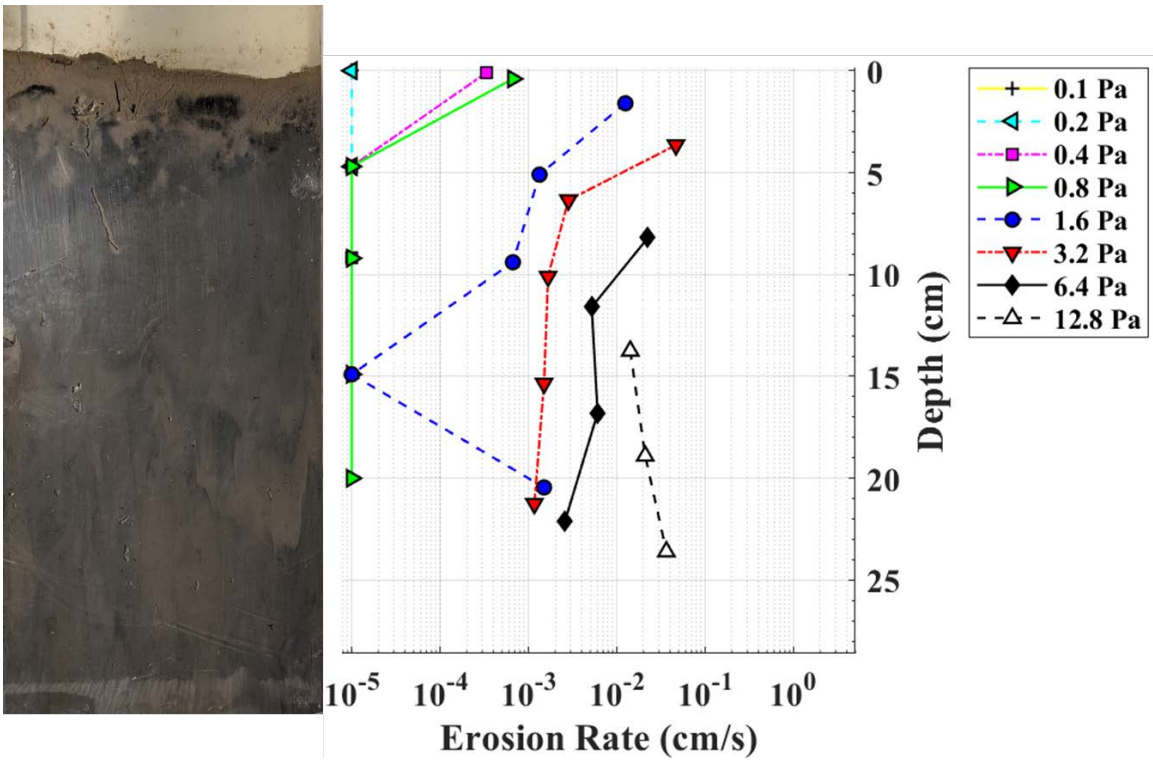


Figure 26. Photograph of Core NR-SB aligned with applied shear stresses and associated erosion rates

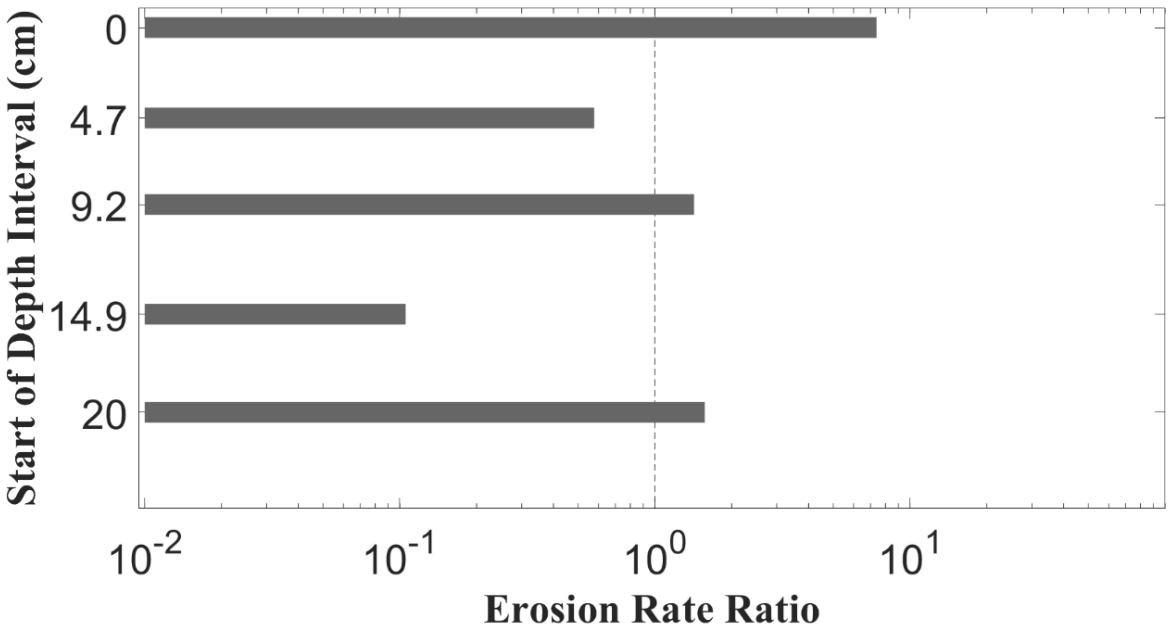


Figure 27. Intracore erosion rates for NR-SB

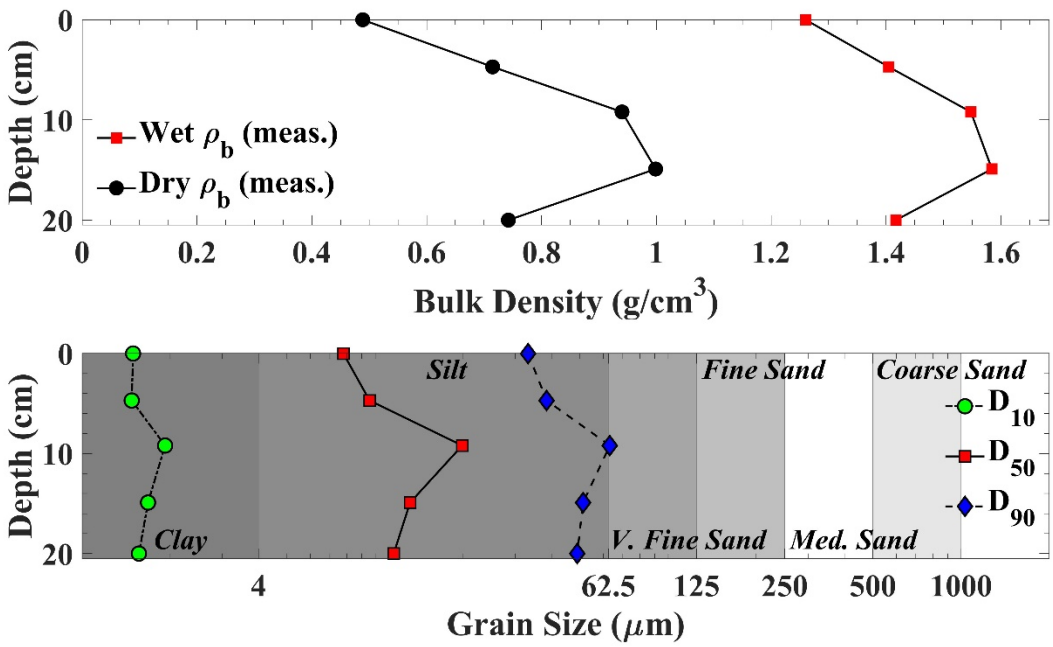


Figure 28. Physical properties of NR-SB with depth

Table 17. Physical properties and derived critical shear stresses of NR-SB

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	7.79	1.26	0.49	5.6%	0.2	0.4	0.26	0.27	0.27
4.7	9.57	1.4	0.71	4.6%	0.8	1.6	0.86	0.75	0.8
9.2	19.82	1.55	0.94	3.9%	0.8	1.6	0.92	0.72	0.8
14.9	13.16	1.58	1.00	3.8%	1.6	3.2	1.71	1.41	1.6
20.0	11.57	1.42	0.74	5.1%	0.8	1.6	0.86	0.67	0.8
Mean	12.38	1.44	0.78	4.6%	0.84	1.68	0.92	0.76	0.85

Table 18. Power law fit parameters of NR-SB

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	4.7	8.24E-06	2.49	0.97
2	4.7	9.2	6.28E-07	2.52	0.95
3	9.2	14.9	2.98E-06	1.79	0.97
4	14.9	20	1.09E-07	2.58	0.95
5	20	24.6	3.21E-06	1.81	0.85

2.9 SED-NR-SC

Core NR-SC was collected on the Neosho River on March 10, 2020, at 5:10 p.m. Located on the outer portion of a bend in the river, collection efforts in 6 ft of water resulted in a core recovery length of 27 cm. Unlike other samples from the Neosho River, NR-SC did not present evidence of biotic activity such as worm tubes, but upon processing, worms and their pathways were intermittently uncovered. In the upper 10 cm, sandier material was mixed with olive silty material (Figure 29).

Applied shear stresses ranged from 0.1 to 12.8 Pa in five intervals. Erosion rates at a given shear stress did not exhibit a consistent trend (Figure 29). The first and fifth intervals are shown to be most erodible but critical shear stresses across the sample ranged from 0.65 Pa, peaking in interval 3 at 1.6 Pa and then decreasing again to 0.8 (Figure 30, Table 19). The changes to critical shear stresses did not follow an obvious pattern with physical properties (Figure 31). Coefficients and fit parameters linking erosion rate and shear stress suggest an excellent power law relationship between the two variables (Table 20).

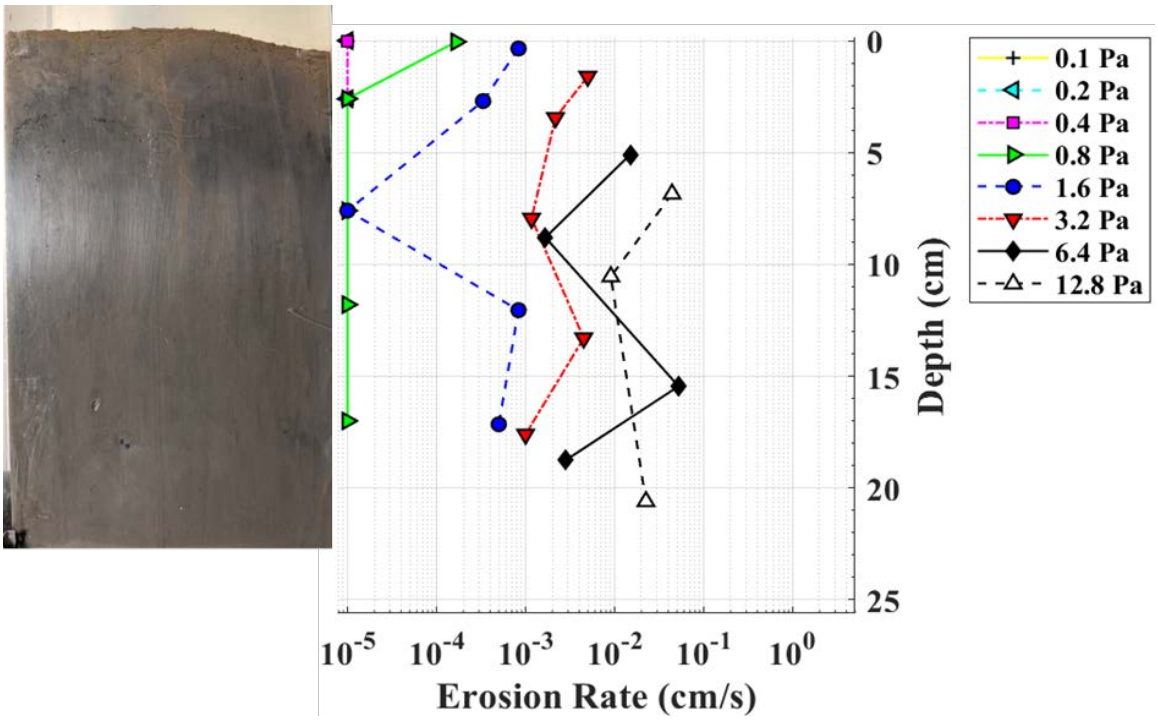


Figure 29. Photograph of Core NR-SC aligned with applied shear stresses and associated erosion rates

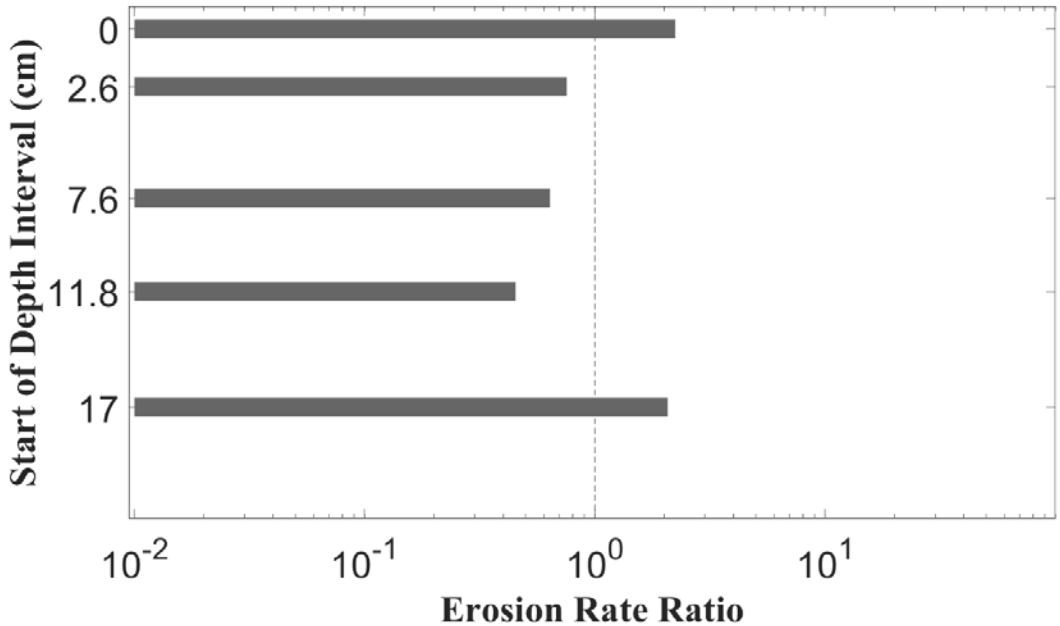


Figure 30. Intracore erosion rates of NR-SC

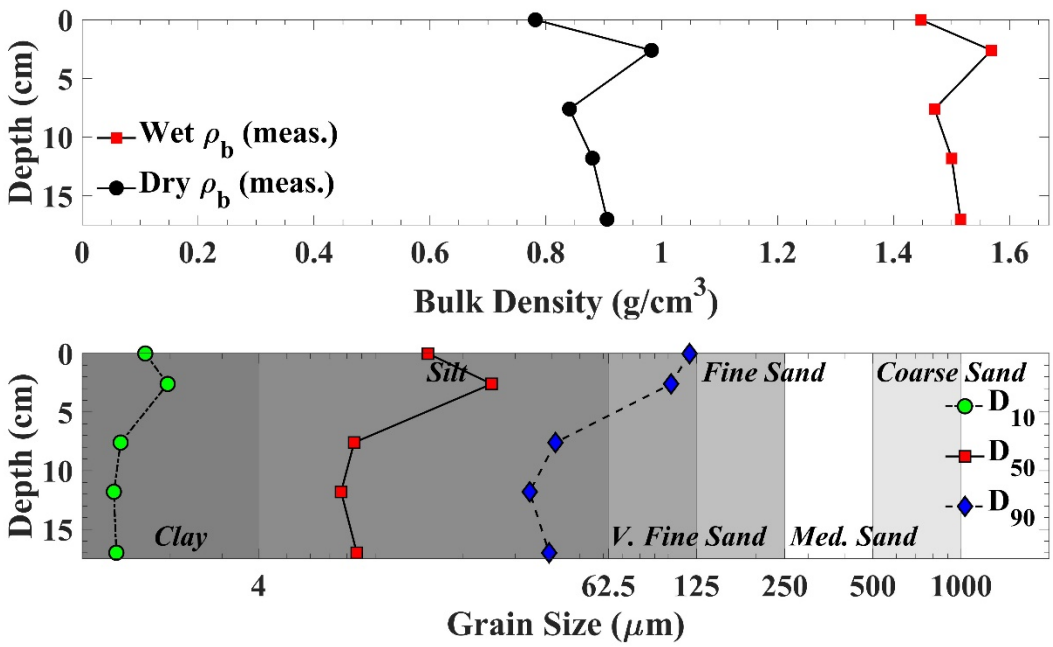


Figure 31. Physical properties of NR-SC with depth

Table 19. Physical properties and derived critical shear stresses of NR-SC

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	15.14	1.45	0.78	4.4%	0.4	0.8	0.64	0.65	0.65
2.6	24.98	1.57	0.98	4.4%	0.8	1.6	1.04	0.98	0.98
7.6	8.48	1.47	0.84	5.8%	1.6	3.2	1.74	1.41	1.6
11.8	7.65	1.5	0.88	5.1%	0.8	1.6	0.9	0.87	0.87
17.0	8.65	1.52	0.91	5.1%	0.8	1.6	0.96	0.88	0.88
Mean	12.98	1.50	0.88	5.0%	0.88	1.76	1.06	0.96	1.00

Table 20. Power law fit parameters of NR-SC

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	2.6	1.08E-06	2.42	1.0
2	2.6	7.6	3.45E-07	2.49	0.99
3	7.6	11.8	4.26E-07	2.06	0.92
4	11.8	16.6	1.19E-07	3.11	0.99
5	17.0	21.6	1.59E-06	1.91	0.97

2.10 SED-SR-100

Core SR-100 was collected in 5 ft of water on March 10, 2020, at 11:40 a.m. SR-100 is located on the Spring River and is the northernmost sample collected. Sampling took place on the eastern bank to avoid the steep slope and rocky bed on the western bank and resulted in the collection of 43 cm of sediment. Soft, brown sediment with pockets of sand and leafy debris extended throughout the sample (Figure 32). The surface contained evidence of invertebrate activity but evidence down-core was difficult to ascertain due to the presence of leaves and plant matter. Pockets present in the photograph may be attributed to biotic activity or gas pockets of decaying matter.

Applied shear stresses ranging from 0.1 to 6.4 Pa were applied to SR-100 over 26.2 cm of the recovered sample (Figure 33). Erosion rates at a specified shear stress generally decreased with depth (Figure 36). Because of the sandy material present, sediment eroded in individual grains in bedload and "clouds" as shear stress increased. Leaves and plant matter affected the sediment by alternatively sheltering sediment below and then eroding in events as the leaves broke away from the surface. The concentration of leafy material increased with depth.

Physical properties varied with depth with density increasing and grain size changing depending on the quantity of sand present (Figure 37, Table 21). Critical shear stresses increased with depth and ranged from 0.11 to 0.41 Pa. Each interval spanned approximately 5 cm of sediment and fit parameters suggest an excellent relationship using a power law relationship between erosion rate and critical shear stress (Table 22).

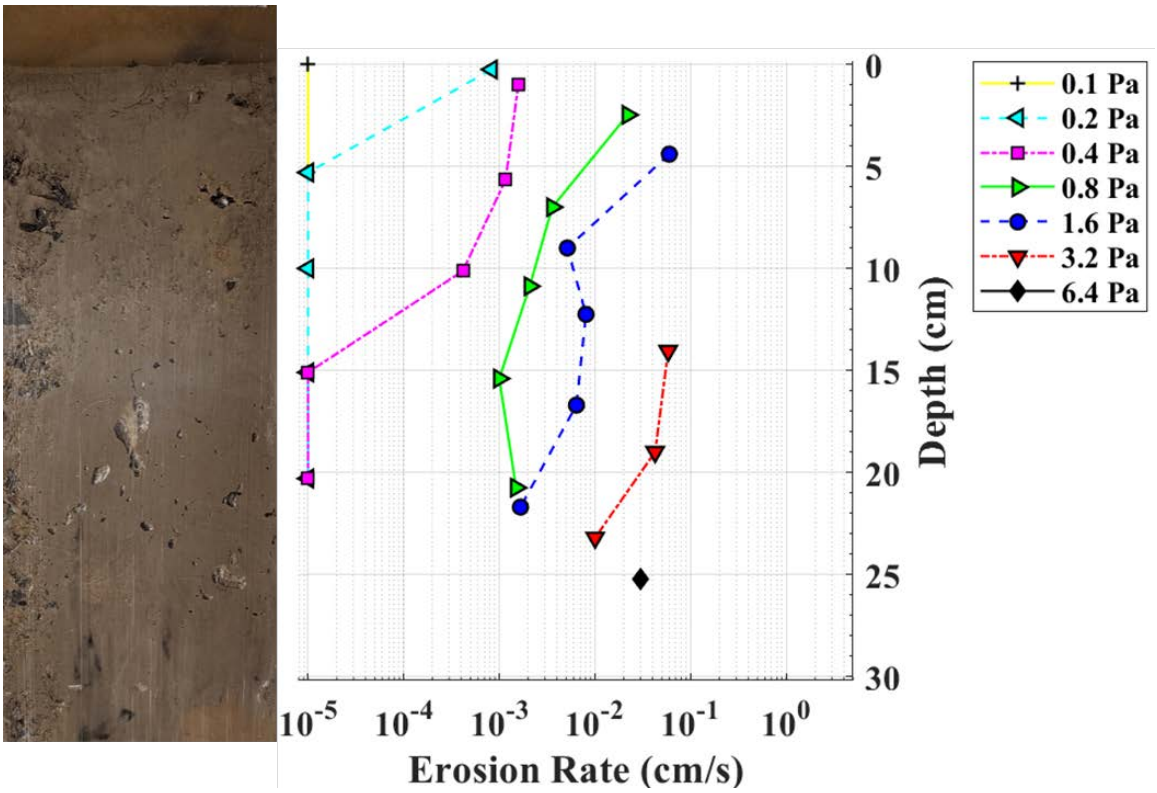


Figure 32. Photograph of Core SR-100 aligned with applied shear stresses and associated erosion rates

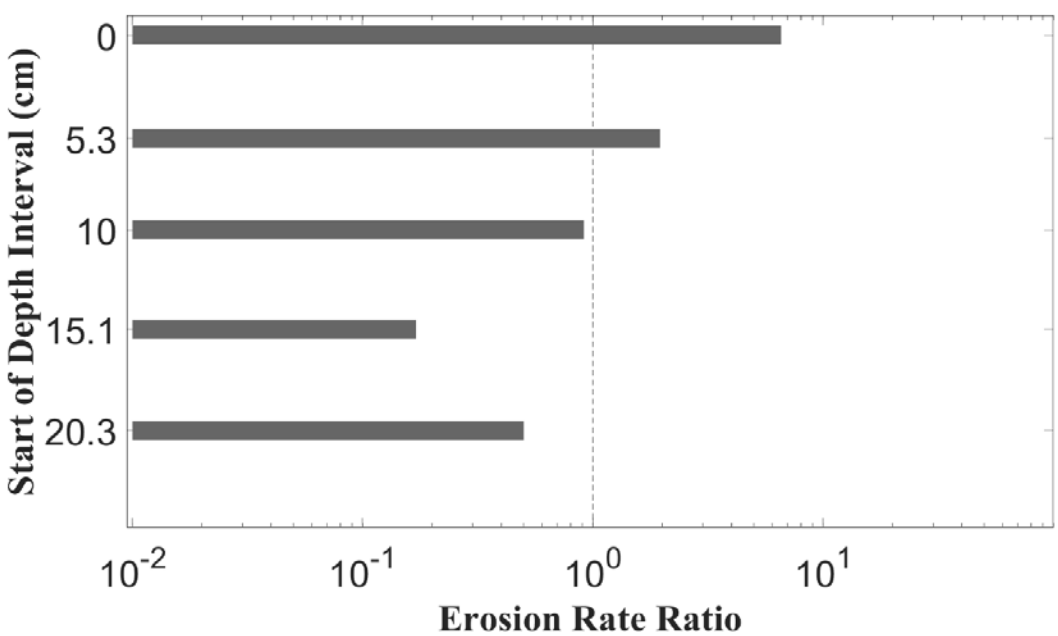


Figure 33. Intracore erosion rates for SR-100

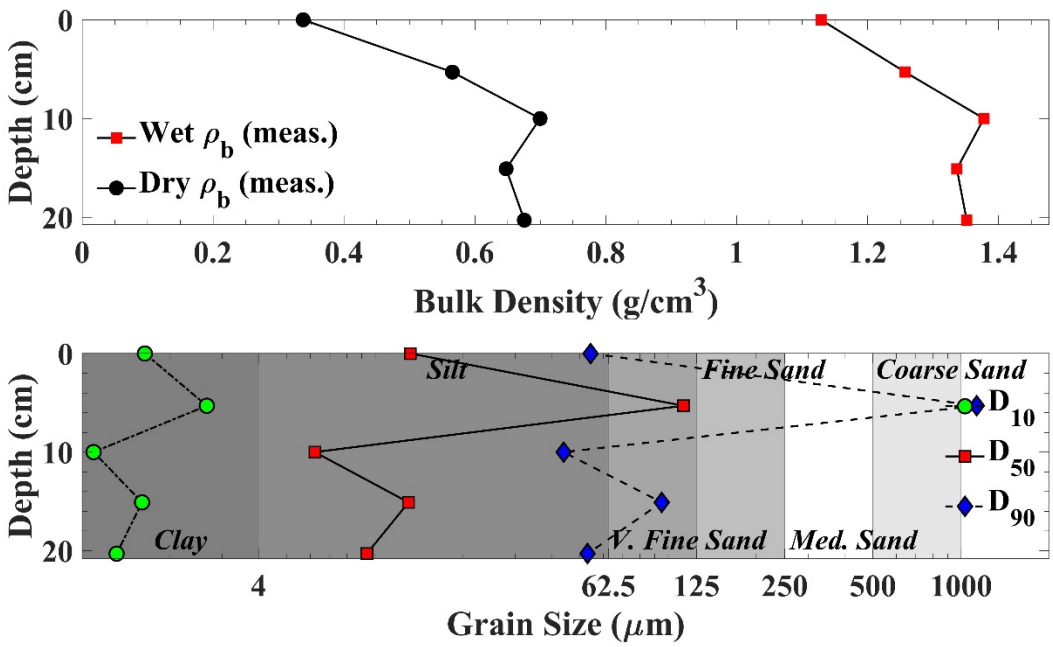


Figure 34. Physical properties of SR-100 with depth

Table 21. Physical properties and derived critical shear stresses of SR-100

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	13.2	1.13	0.34	11.6%	0.1	0.2	0.12	0.11	0.11
5.3	112.8	1.26	0.57	12.1%	0.2	0.4	0.22	0.16	0.2
10	6.22	1.38	0.7	6.8%	0.2	0.4	0.25	0.24	0.24
15.1	13	1.34	0.65	8.1%	0.4	0.8	0.45	0.41	0.41
20.3	9.37	1.35	0.68	8.2%	0.4	0.8	0.43	0.32	0.4
Mean	30.92	1.29	0.59	9.4%	0.26	0.52	0.29	0.25	0.27

Table 22. Power law fit parameters of SR-100

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	5.3	8.79E-05	2.43	0.97
2	5.3	10.0	4.14E-05	1.92	0.86
3	10.0	15.1	1.24E-05	2.41	1.0
4	15.1	20.3	1.34E-06	3.03	0.99
5	20.3	26.2	1.03E-05	1.95	0.93

2.11 SED-SR-114

Core SR-114 was collected on the Spring River on March 10, 2020, at 12:30 p.m. Located on the western bank in 5 ft of water, the bed allowed easy penetration and only one attempt was needed to recover 41 cm of sediment. The sample contained a variable mixture of organic matter, biotic activity, and sandy regions amid the predominantly silty material. A thin surface layer less than 1 cm of lighter, unconsolidated sediment was present over the olive colored mixture of silt, sand, and clay.

Applied shear stresses aligned with the core SR-114 ranged from 0.1 to 3.2 Pa in five intervals (Figure 35). Responses to individual shear stresses did not follow a consistent pattern relative to depth but overall erodibility decreased with depth (Figure 35, Figure 36). Resulting critical shear stresses determined from the power law fit and *tau_no* values ranged from 0.2 to 0.4 Pa. The under-prediction of critical shear stress by the power law fit method is attributed to the volume of organic matter in the core that can alter erosion mechanisms. The organic matter at times shielded the bed from erosion until giving way in larger events, slowing the rate of erosion measured in the 10-minute period of applied shear stress. An example of the woody debris found in the core is shown in Figure 38. However, the fit parameters still suggest that a power law relationship provides a good relationship overall for erosion rate and applied shear stress once the critical shear stress has been met (Table 24). The sandy sediment eroded in individual grains and streams of grains around the organic matter and left uneven surfaces of the firmer silt and clay mixtures. Erodibility trends correlated with the increase in density and grain size distributions. The noted trends were potentially modulated by the amount of sandy material in the interval (Figure 37, Table 23).

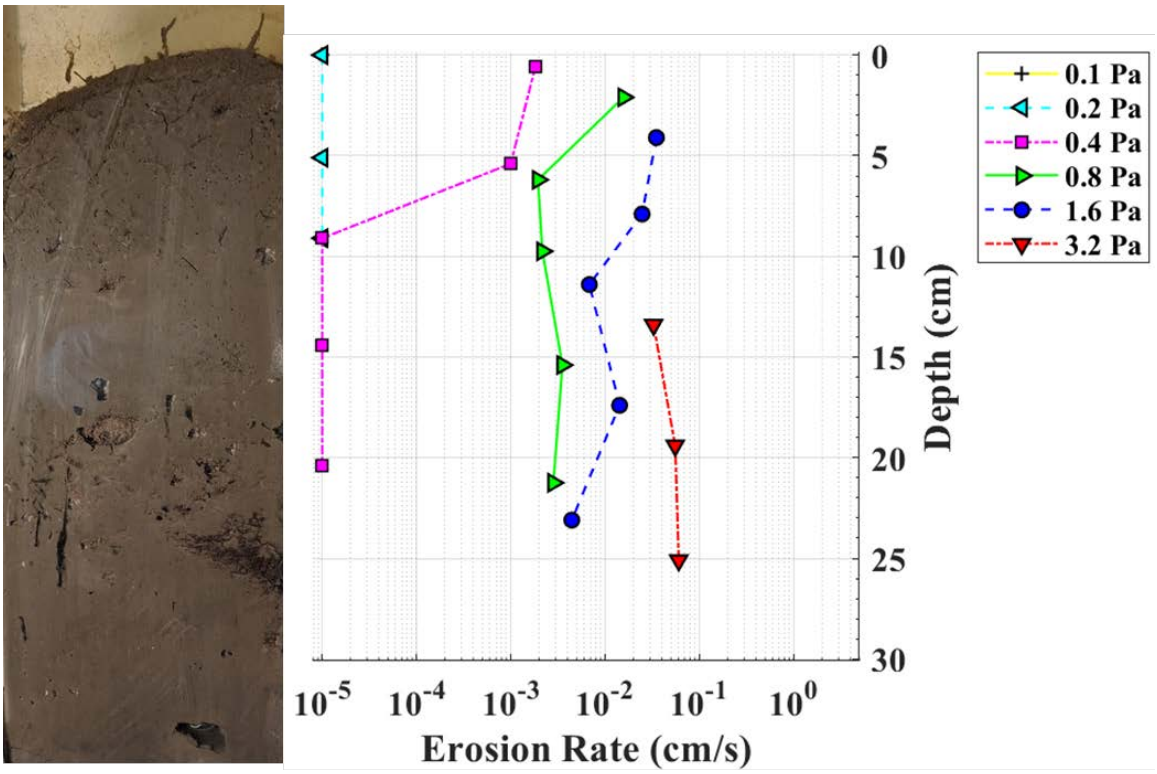


Figure 35. Photograph of Core SR-114 aligned with applied shear stresses and associated erosion rates

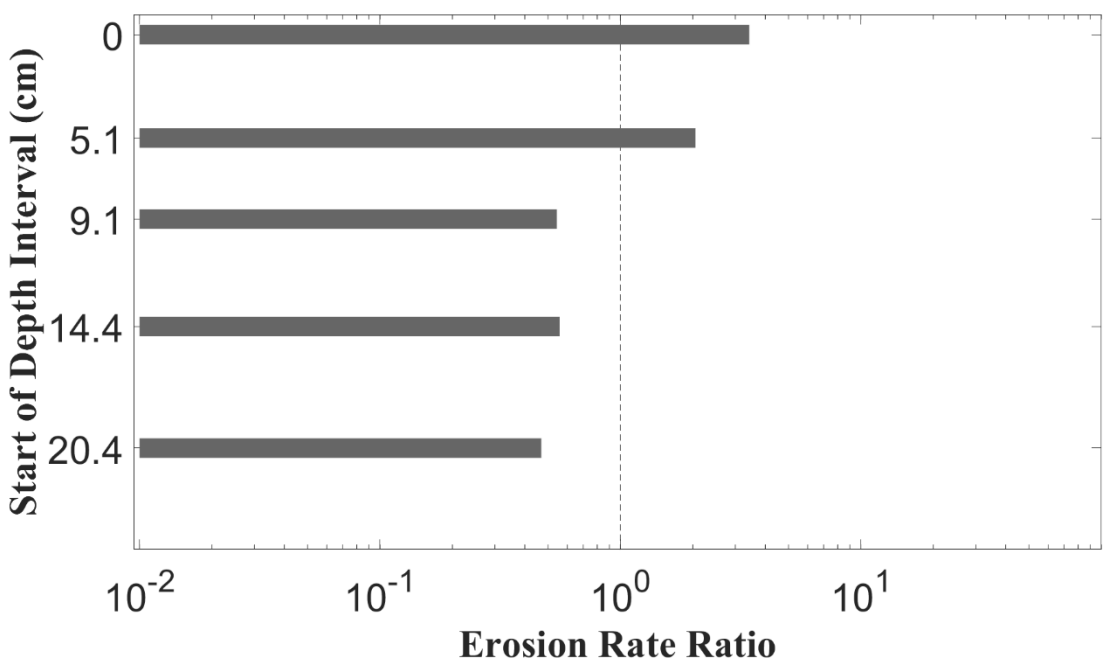


Figure 36. Intracore erosion rates of SR-114

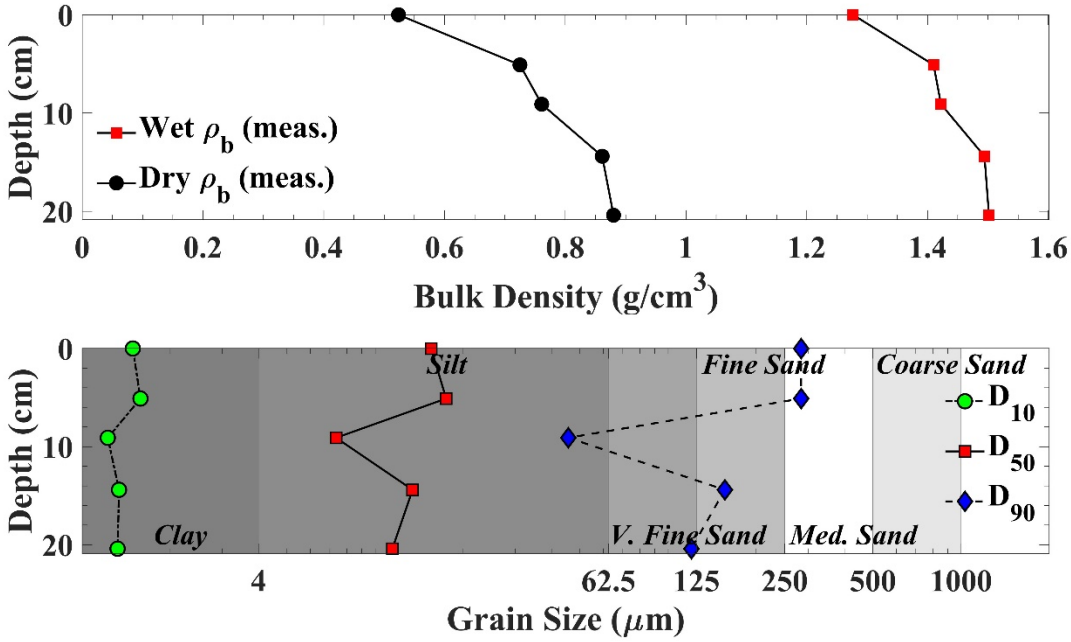


Figure 37. Physical properties of SR-114 with depth

Figure 38. Wood chips found in SR-114

Table 23. Physical properties and derived critical shear stresses of SR-114

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	15.53	1.28	0.52	6.2%	0.2	0.4	0.22	0.18	0.2
5.1	17.47	1.41	0.72	4.7%	0.2	0.4	0.23	0.21	0.21
9.1	7.36	1.42	0.76	5.8%	0.4	0.8	0.42	0.34	0.4
14.4	13.42	1.49	0.86	4.5%	0.4	0.8	0.42	0.33	0.4
20.4	11.45	1.5	0.88	4.9%	0.4	0.8	0.42	0.35	0.4
Mean	13.05	1.42	0.75	5.2%	0.32	0.64	0.34	0.28	0.32

Table 24. Power law fit parameters of SR-114

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	5.1	1.8E-05	2.94	0.93
2	5.1	9.1	1.43E-05	2.63	0.95
3	9.1	14.4	3.49E-06	2.72	0.95
4	14.4	20.4	2.83E-06	2.99	0.93
5	20.4	26.1	2.58E-06	2.89	0.93

2.12 SED-SR-TB

Core SR-TB was collected on March 10, 2020, at 11:10 a.m. in an area north of Highway 60 in the Spring River. The 32 cm long sample was collected on the second attempt after stiff material resisted initial efforts to produce a sufficient recovery length. Recovered sediment contained an unconsolidated surface layer with evidence of biotic activity such as excavation mounds seen in Figure 39. Sediment appeared to have a homogenous, fine texture, with varied color ranging from light gray to olive gray, and contained scattered gas or feeding voids.

Shear stresses applied to SR-TB produced erosion rates that decreased with depth for each shear value (Figure 40). The resulting computed critical shear stresses increased with depth, ranging from 0.2 to 1.73 Pa and correlated to an increase in sediment density (Table 25, Figure 45). While density varied with depth, the particle size distributions remained constant throughout the core (Figure 42).

The surface eroded in clouds and streams of individual grains and small (<0.5 mm) pieces of the surface. During the first interval, an event occurred at the application of 1.6 Pa resulting in a 0.7 cm layer of sediment eroding in less than 10 seconds. After the first interval, sediment eroded sporadically in fractured pieces of the surface initialized around invertebrate structures and intermittent leafy debris. Parameters relating shear stress and erosion rates suggest a good correlation using a power law fit between the two variables (Table 26).

Figure 39. Evidence of biotic activity on surface of SR-TB

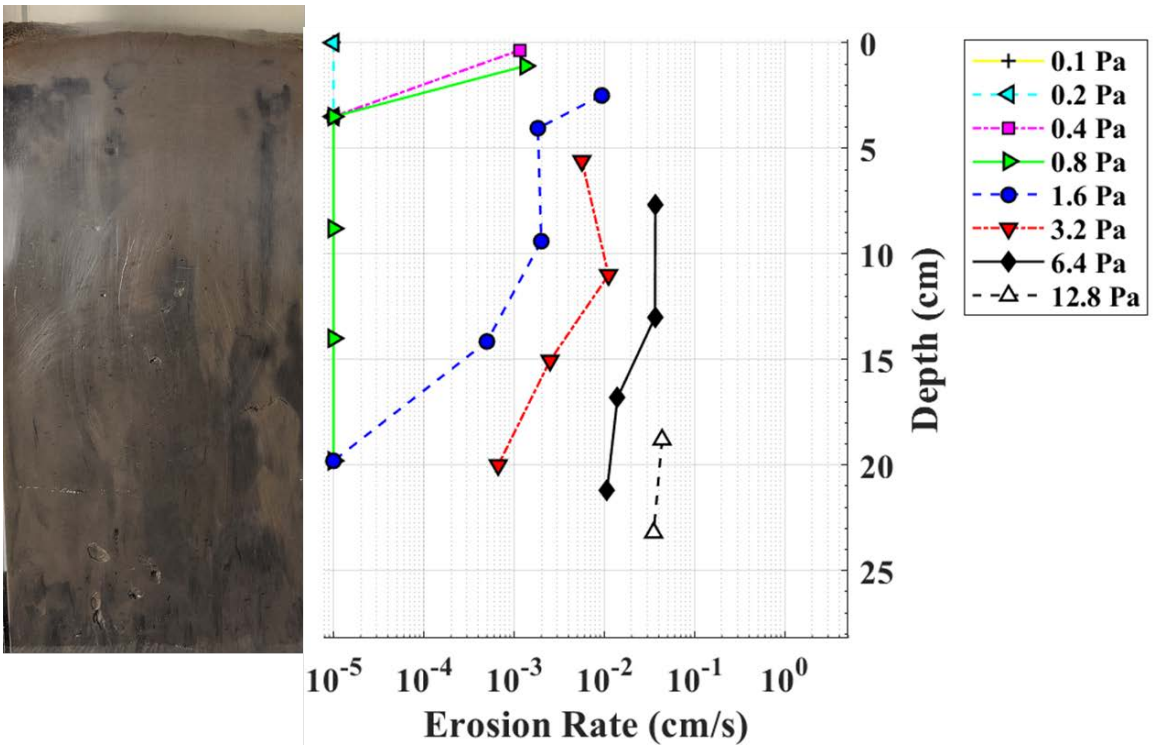


Figure 40. Photograph of Core SR-TB aligned with applied shear stresses and associated erosion rates

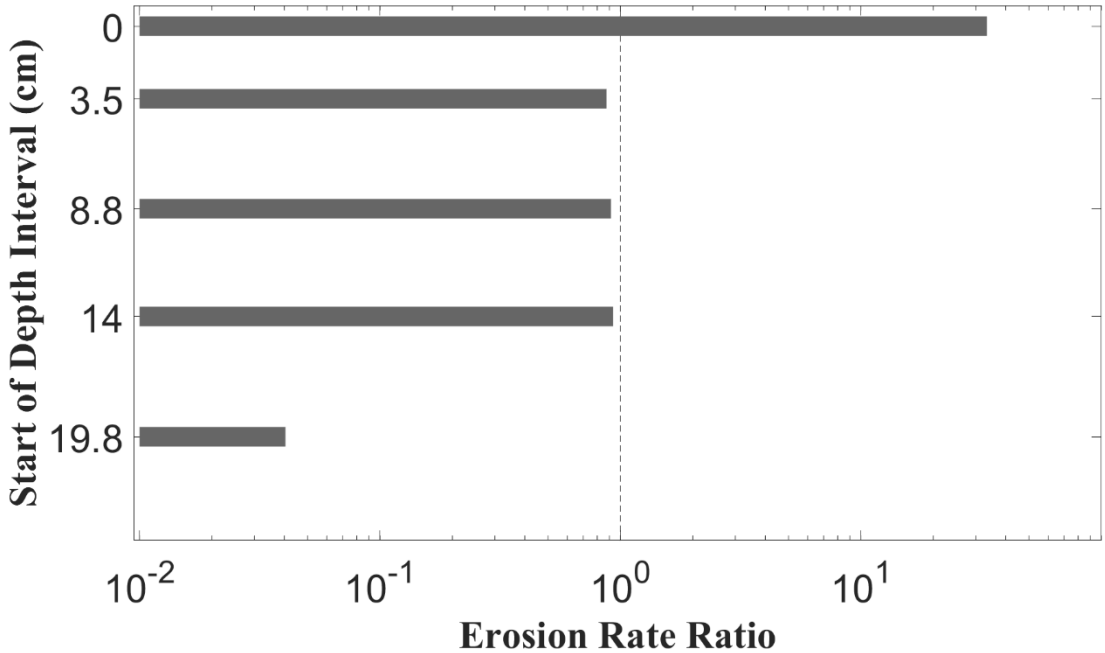


Figure 41. Intracore erosion rate of SR-TB

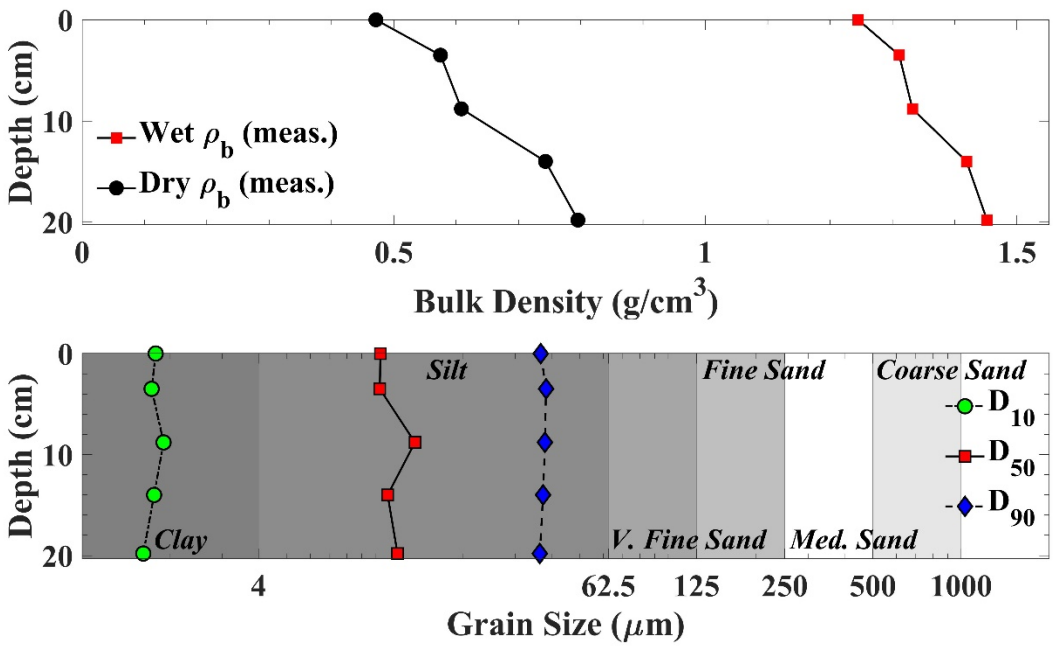


Figure 42. Physical properties of SR-TB with depth

Table 25. Physical properties and derived critical shear stresses of SR-TB

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	10.42	1.24	0.47	6.3%	0.2	0.4	0.22	0.18	0.2
3.5	10.37	1.31	0.58	5.8%	0.8	1.6	0.85	0.72	0.8
8.8	13.67	1.33	0.61	5.6%	0.8	1.6	0.84	0.69	0.8
14	11.03	1.42	0.74	5.0%	0.8	1.6	0.96	0.86	0.86
19.8	11.92	1.45	0.8	4.8%	1.6	3.2	1.84	1.73	1.73
Mean	11.48	1.35	0.64	5.5%	0.84	1.68	0.94	0.84	0.88

Table 26. Power law fit parameters of SR-TB

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	3.5	2.99E-05	2.05	0.9
2	3.5	8.8	4.09E-07	2.78	0.96
3	8.8	14	4.01E-07	2.85	0.95
4	14	19.8	6.4E-07	2.35	0.99
5	19.8	24.2	1.4E-08	3.11	0.97

2.13 SED-TC-DS

Core TC-DS was collected on March 11, 2020, at 2:30 p.m. from Tar Creek. Relative to TC-US, TC-DS is downstream closer to the Neosho River. TC-DS was collected in 8 ft of water in the center of the channel. Soft, easy to penetrate material containing leaves and twigs was collected resulting in a recovery length of 44 cm. Recovered sediment consisted of dark gray silt with pockets of leaves throughout and voids in the upper 10 cm.

Shear stresses ranging from 0.1 to 0.64 Pa were applied to the sediment core shown in Figure 43. Erosion rates were greatest at the surface, decreasing with depth but stabilizing below 20 cm (Figure 43, Figure 44). The surface responded to the lowest applied shear (0.1 Pa), which resulted in a critical shear stress determination of 0.05 Pa. The material at the surface was very soft, unconsolidated silt. Further down-core, density increased while particle size distributions stayed relatively constant (Figure 48, Table 27). Erosion in the first two intervals occurred evenly and consistently as loose particles were suspended. As depth increased, erosion was affected by the presence of leafy debris and changes in density resulting in more sporadic erosion events. A power law relationship between erosion rate and shear stress is applicable as shown by the high r^2 values and coefficients that fall into ranges typical of cohesive sediment (Table 28).

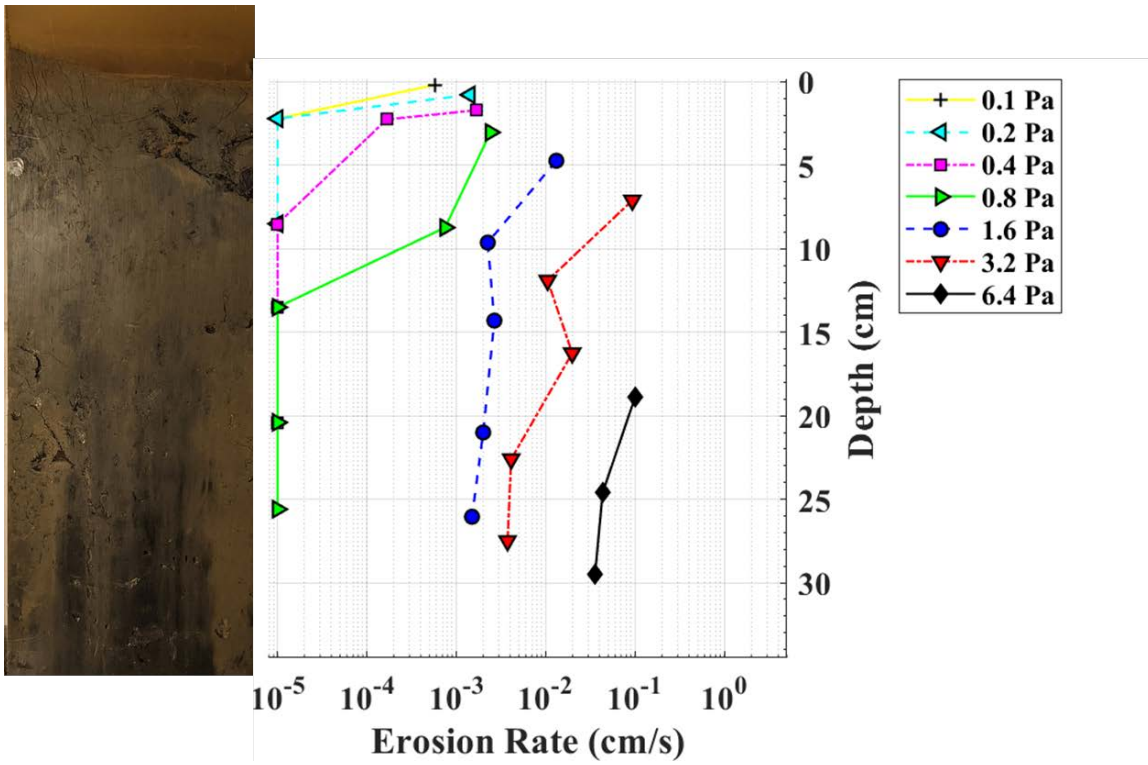


Figure 43. Photograph of Core TC-DS aligned with applied shear stresses and associated erosion rates

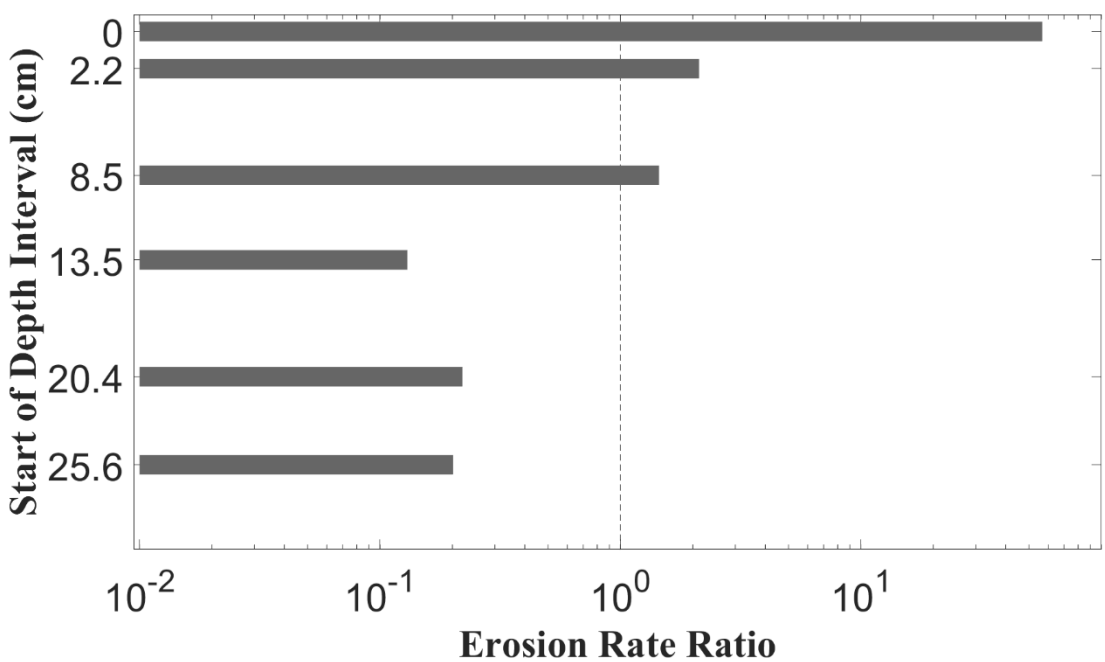


Figure 44. Intracore erosion rates of TC-DS

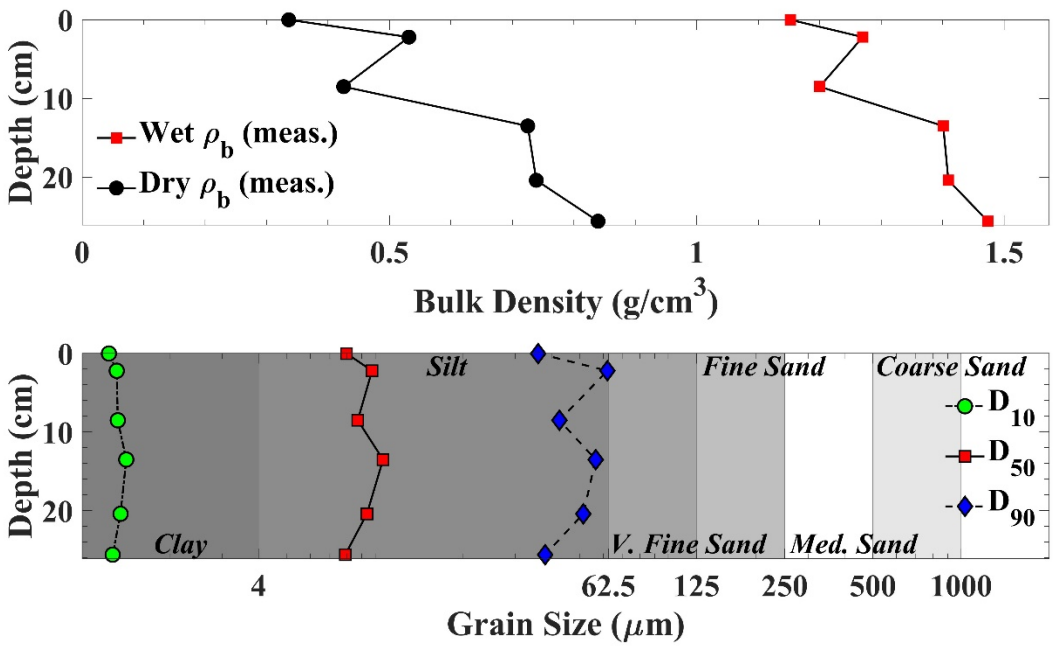


Figure 45. Physical properties of TC-DS with depth

Table 27. Physical properties and derived critical shear stresses of TC-DS

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	7.99	1.15	0.34	8.0%	0.05	0.1	0.06	0.04	0.05
2.2	9.76	1.27	0.53	7.7%	0.2	0.4	0.32	0.32	0.32
8.5	8.72	1.2	0.43	8.7%	0.4	0.8	0.46	0.4	0.4
13.5	10.64	1.4	0.72	5.8%	0.8	1.6	0.83	0.71	0.8
20.4	9.37	1.41	0.74	5.8%	0.8	1.6	0.84	0.73	0.8
25.6	7.91	1.47	0.84	5.3%	0.8	1.6	0.86	0.76	0.8
Mean	9.07	1.32	0.60	6.9%	0.51	1.02	0.56	0.49	0.53

Table 28. Power law fit parameters of TC-DS

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	2.2	3.49E-04	1.42	0.82
2	2.2	8.5	3.17E-06	3.01	0.99
3	8.5	13.5	4.07E-06	2.3	0.97
4	13.5	20.4	1.46E-07	3.32	0.97
5	20.4	25.6	4.0E-07	2.78	0.95
6	25.6	30.5	3.77E-07	2.75	0.96

2.14 SED-TC-US

Core TC-US was collected on March 11, 2020, at 2:00 p.m. TC-US is located upstream of TC-DS in Tar Creek. Sampling efforts produced 44 cm of sediment without the need for added force via use of a post-hammer. Root structures along the bank necessitated multiple attempts before successful collection was achieved. A 2 cm layer of unconsolidated, light colored, oxidized silt blanketed darker sediment containing voids, leaves, and sticks.

Shear stresses, ranging from 0.1 to 6.4 Pa were applied to TC-US over six intervals (Figure 46). The unconsolidated surface layer was shown to be the most erodible, consistent with many other cores processed in this study (Figure 47). As depth increased, erodibility relative to the core average varied as did grain size and density (Figure 47, Figure 48, Table 29). The unconsolidated and sandier sections of the core eroded in streams of particles or clouds of suspended sediment depending on shear stress magnitude. Finer sediment regimes tended to erode in larger pieces or clumps unevenly across the surface.

Derived critical shear stresses varied from 0.17 to 0.8 Pa from the first to the sixth interval. Parameters defining the relationship between erosion rate and shear stress indicate a good power law relationship between the two variables (Table 30).

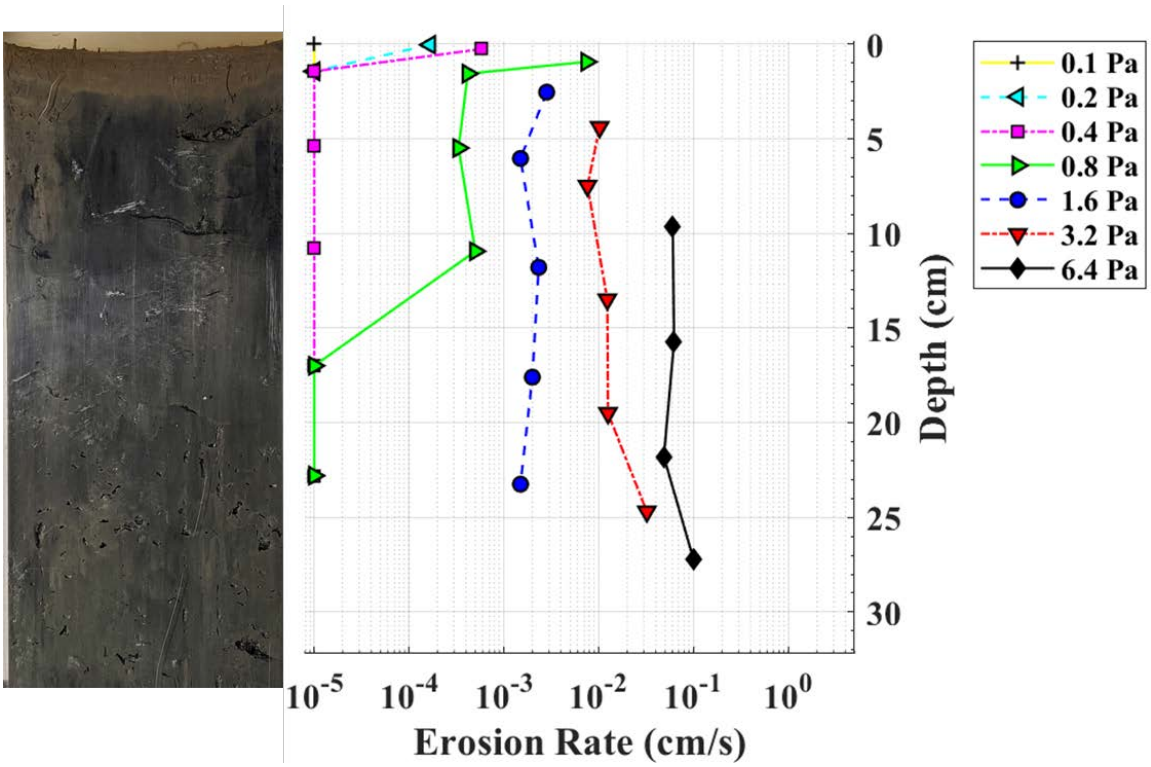


Figure 46. Photograph of Core TC-US aligned with applied shear stresses and associated erosion rates

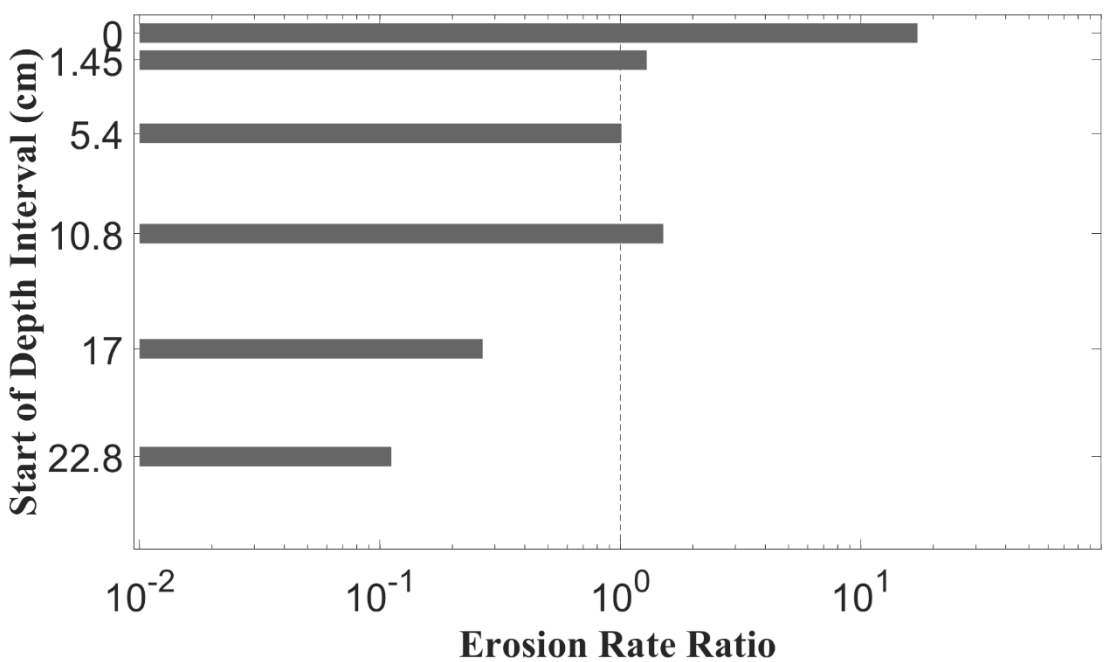


Figure 47. Intracore erosion rates for TC-US

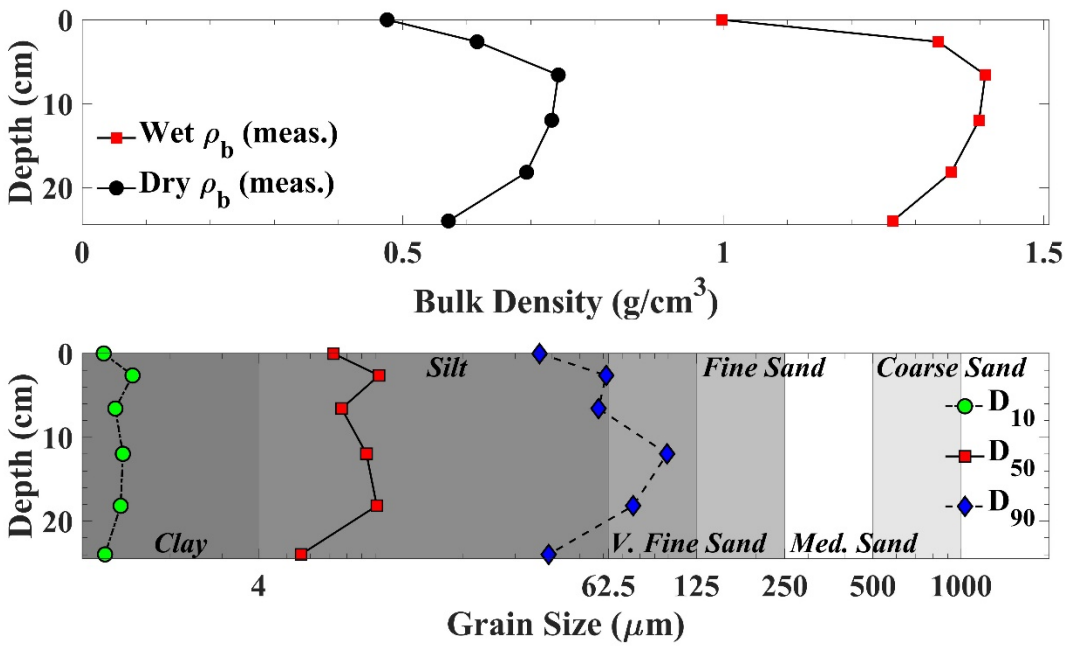


Figure 48. Physical properties of TC-US with depth

Table 29. Physical properties and derived critical shear stresses of TC-US

Sample Depth (cm)	Median Grain Size (µm)	Wet Bulk Density (g/cm³)	Dry Bulk Density (g/cm³)	Loss on Ignition (%)	Tau_no (Pa)	Tau_first (Pa)	Tau Crit Linear (Pa)	Tau Crit Power (Pa)	Final Critical Shear (Pa)
0.0	7.2	1	0.48	48.1%	0.1	0.2	0.16	0.17	0.17
1.45	10.31	1.34	0.62	5.8%	0.4	0.8	0.5	0.47	0.47
5.4	7.68	1.41	0.74	6.1%	0.4	0.8	0.52	0.52	0.52
10.8	9.34	1.4	0.73	6.5%	0.4	0.8	0.48	0.45	0.45
17.0	10.13	1.36	0.69	9.0%	0.8	1.6	0.84	0.71	0.8
22.8	5.58	1.26	0.57	11.6%	0.8	1.6	0.86	0.78	0.8
Mean	8.37	1.30	0.64	14.5%	0.48	0.97	0.56	0.52	0.54

Table 30. Power law fit parameters of TC-US

Interval	Depth Start (cm)	Depth Finish (cm)	A	n	r^2
1	0.0	1.45	2.55E-05	2.61	0.97
2	1.45	5.4	2.08E-06	2.51	0.99
3	5.4	10.8	1.66E-06	2.49	1.0
4	10.8	17.0	2.58E-06	2.44	1.0
5	17.0	22.8	2.79E-07	3.0	0.96
6	22.8	28.7	7.23E-08	3.53	0.96

2.15 SED-ER-640

No sample was recovered at ER-640, located west of the Highway 10 Bridge. The sediment bed near ER-640 was known to contain substantial portions of gravel and rock that would limit the effectiveness of collecting a sample.

2.16 SED-NR-HB

No sample was collected at ER-640. Multiple attempts were made to collect a sample, but no viable sample was produced. Despite ample penetration, recovered material was either not intact or absent in recovery of the core barrel. Unfavorable weather conditions of high winds and waves resulted in the field team aborting further attempts.

3 SUMMARY

Integral conducted a SEDflume analysis on 14 sediment cores collected from waterways connected to Grand Lake o' the Cherokees in northeast Oklahoma. The goal of this work was to characterize the erosion rates, critical shear stresses for erosion, and physical properties of the bedded sediment within the Elk River, Neosho River, Spring River, and Tar Creek. The SEDflume study results provide a baseline for the development of site-specific sediment parameters to support transport studies and bolster the conceptual understanding of dynamics within the system.

The cores were subjected to shear stresses ranging from 0.1 to 12.8 Pa to determine erosion rates as a function of shear stress and depth. In addition, cores were subsampled during the analysis to determine sediment bulk density, loss on ignition, and particle size distributions related to each shear stress interval. Critical shear stresses were calculated from the measured erosion rate data and ranged from less than 0.1 Pa in surface sediment to 2.46 Pa in deeper bedded sediment.

To better visualize the relative erodibility of the sediment throughout the system, the ratio of the mean erosion rate of each core (core vertically averaged erosion rate) to the average mean erosion rate of all cores at the site was calculated and plotted in Figure 49. The dashed line denotes a site-wide average erosion rate ratio of 1.0 Pa. A value above this line generally means that the core is more susceptible to erosion than those cores below. A similar figure to compare individual intervals between cores is also provided in Figure 50.

A few trends of note were observed. Surface intervals were the most erosive due to the presence of an unconsolidated layer up to 3 cm thick (see green bars in Figure 50). Below the "fluff" layer, sediment was pitted and pockmarked from the invertebrates present, and the sediment tended to erode in clumps nucleated by the biotic structures. The presence of leaves, twigs, stems, and worm burrows also influenced the sediment erosion by breaking away and drawing material away from the surface. Similar properties were observed in some cores collected from the same waterway. This was most obvious in the Tar Creek samples, TC-US and TC-DS. However, samples from the Neosho River exhibited a wider range of erodibility and sediment properties. Samples such as NR-FG, taken near the fairgrounds and in an area known to have wet and dry cycles, were less erosive than samples from further downriver such as NR-CB or NR-202. While predominantly silt, the presence of some fine sand in cores such as NR-CB and the Spring River samples may influence erodibility as it moves through the system.

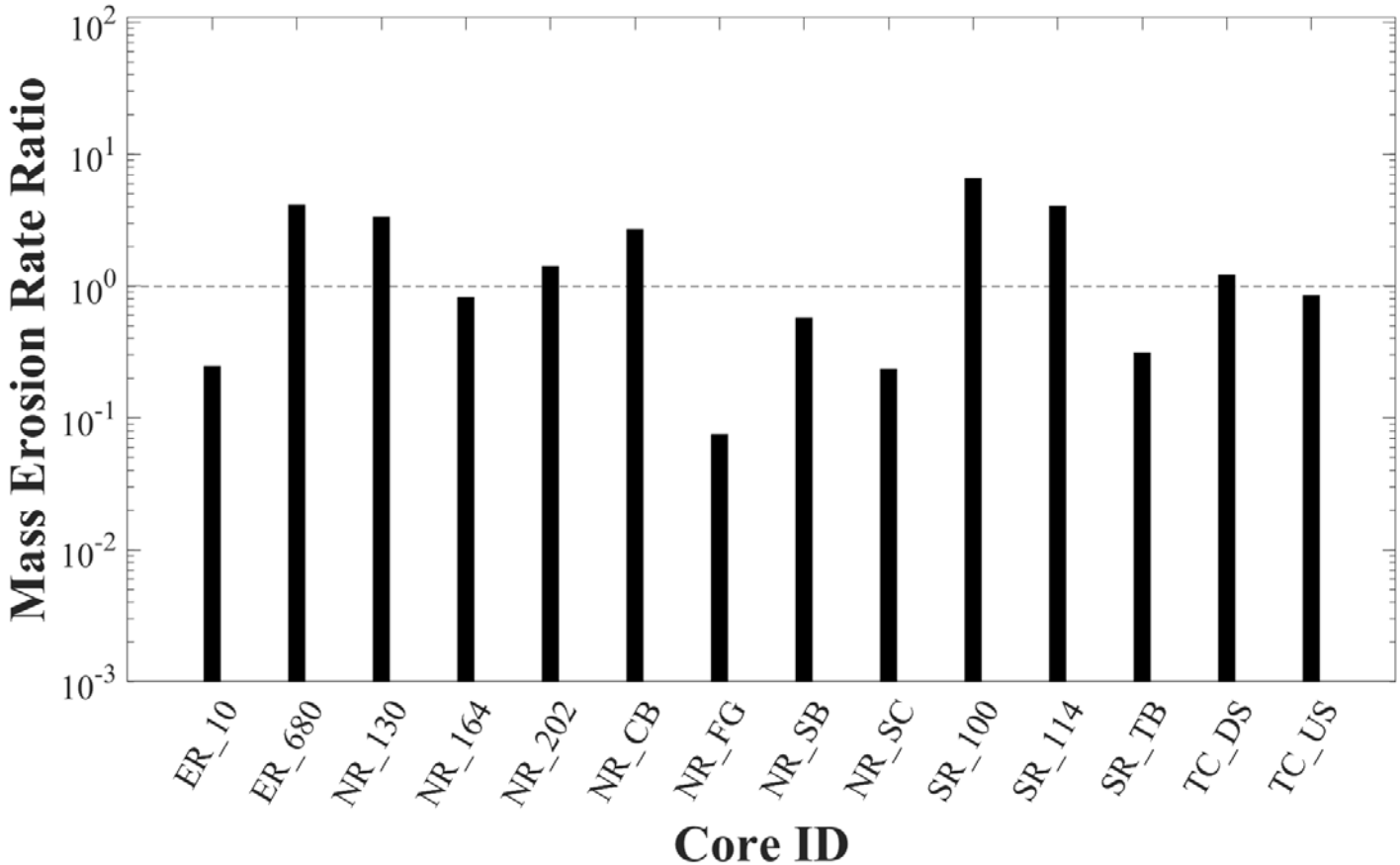


Figure 49. Intercore erosion rate ratios: Depth-averaged core erosion rates compared to the site-wide average erosion rates.

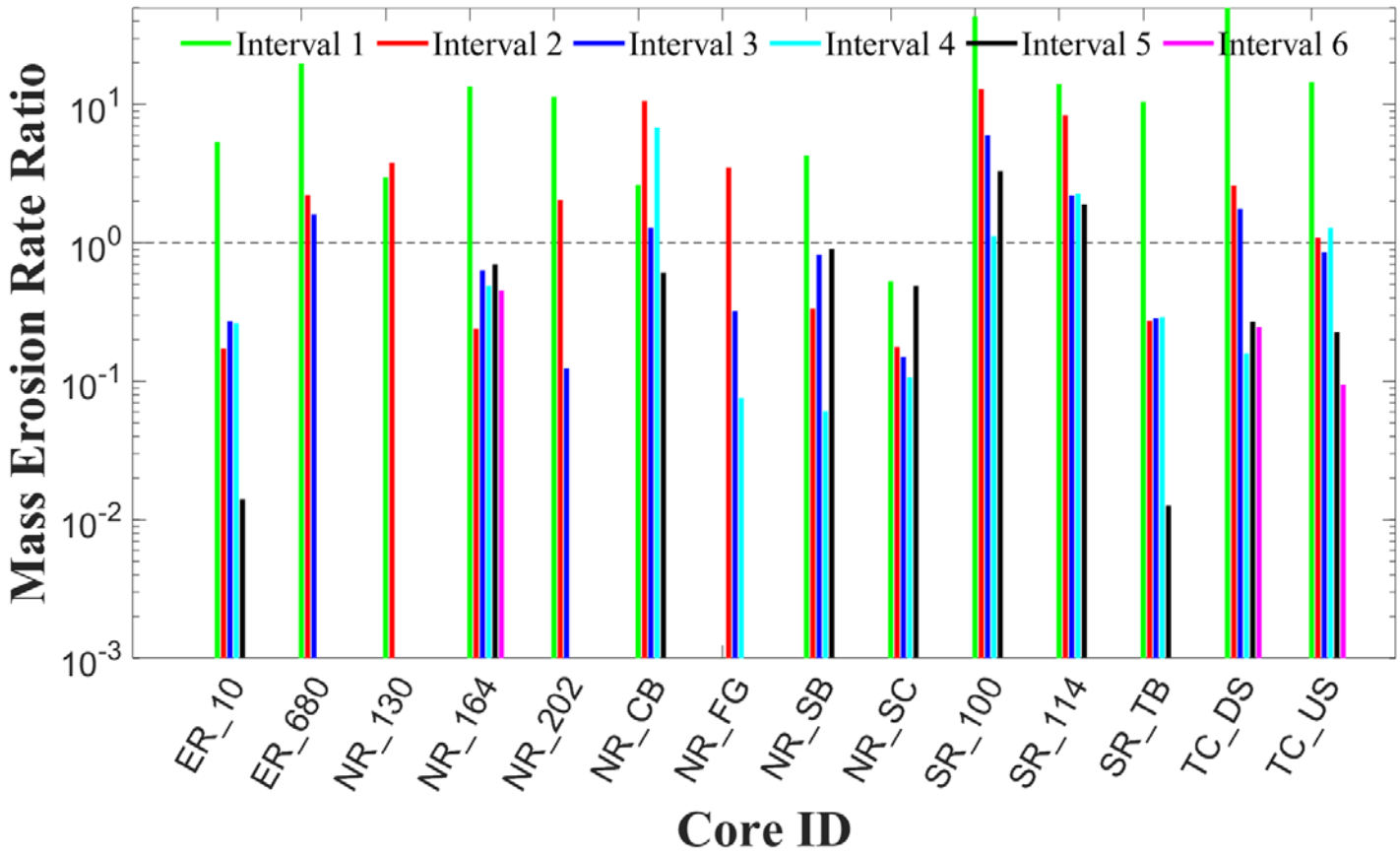


Figure 50. Intracore erosion rate by interval for each core.

4 REFERENCES

ASTM. 2007. *Annual book of ASTM standards.* Vol. 04.08, Soil and Rock (I): D420–D5611. ASTM International, West Conshohocken, PA. pp. 314–315.

Håkanson, L., and M. Jansson. 1983. *Principles of Lake Sedimentology*. 320 pp. Berlin–New York: Springer-Verlag. ISBN 3–540 (Berlin) 0–387 (New York)–12645–7. DM 98, *Int. Revue ges. Hydrobiol.*

Jepsen, R., J. Roberts, and W. Lick. 1997. Effects of bulk density on sediment erosion rates. *Water Air Soil Pollut.* 99:21–31.

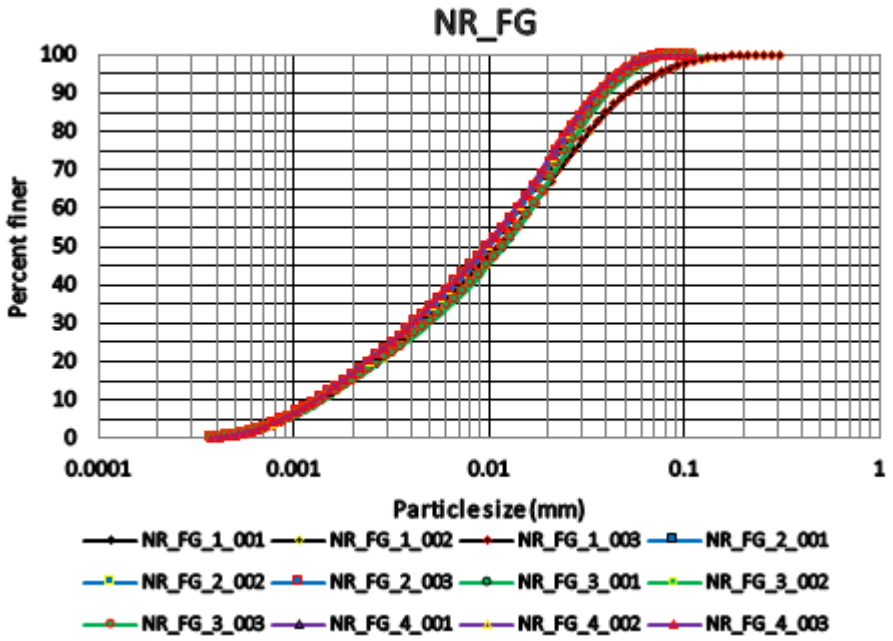
McNeil, J., C. Taylor, and W. Lick. 1996. Measurements of erosion of undisturbed bottom sediments with depth. *J. Hydr. Engr.* 122(6):316–324.

Roberts, J., R. Jepsen, D. Gotthard, and W. Lick. 1998. Effects of particle size and bulk density on erosion of quartz particles. *J. Hydr. Engr.* 124(12):1261–1267.

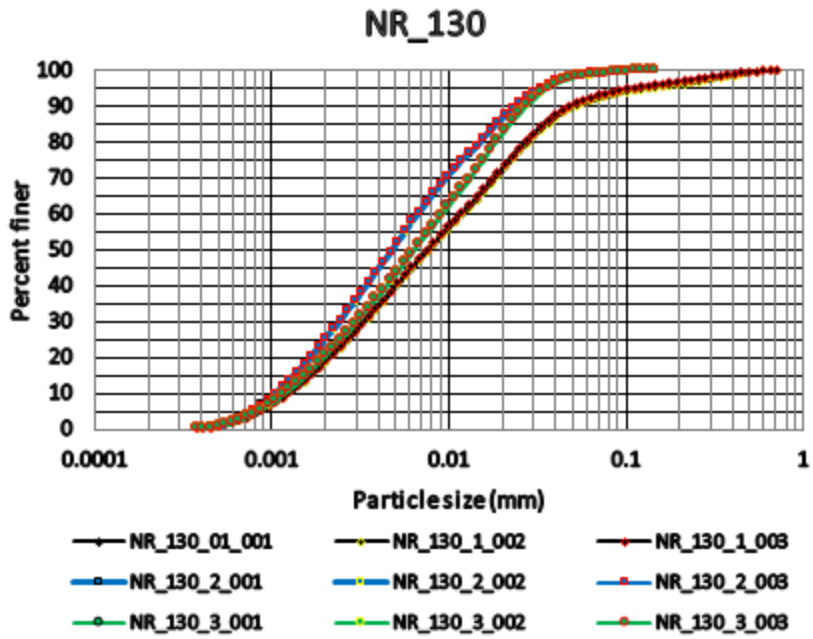
Particle Size Distribution Results

Neosho River above Tar Creek

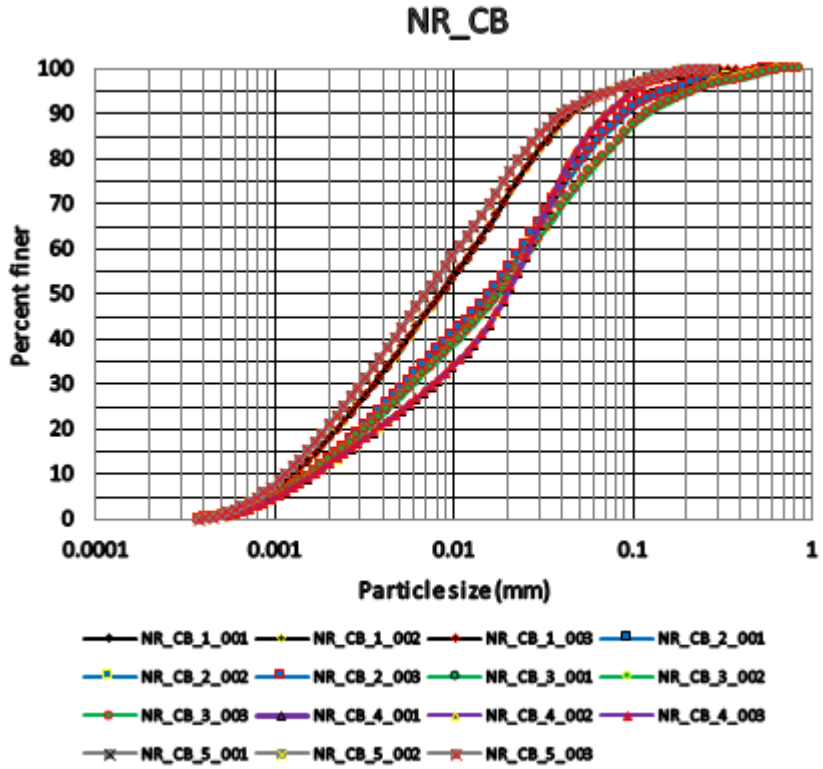
River Mile 135.15



River Mile 130.54

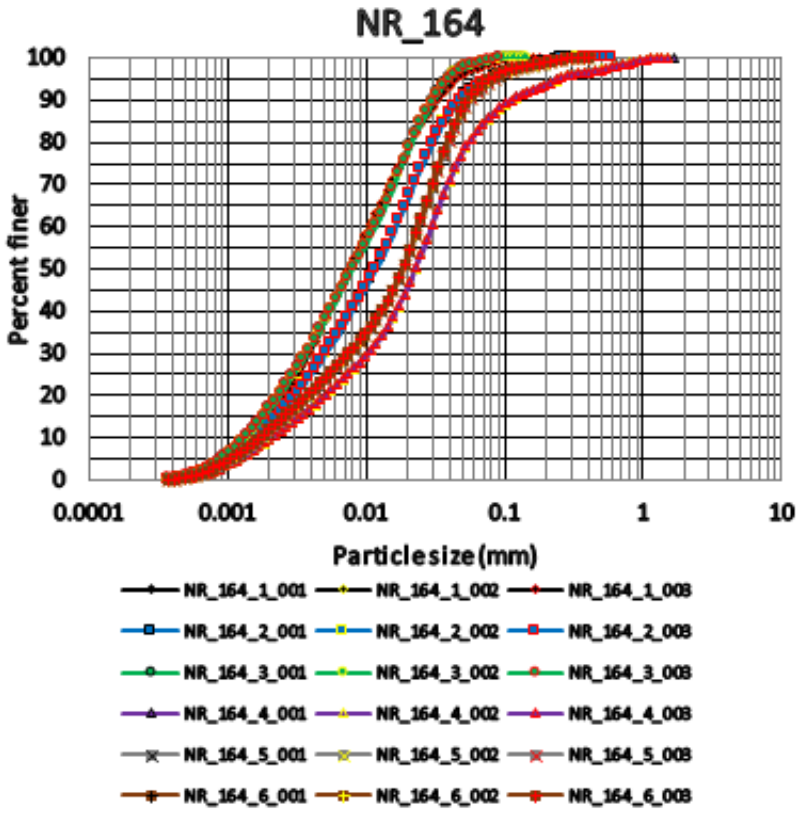


River Mile 126.69

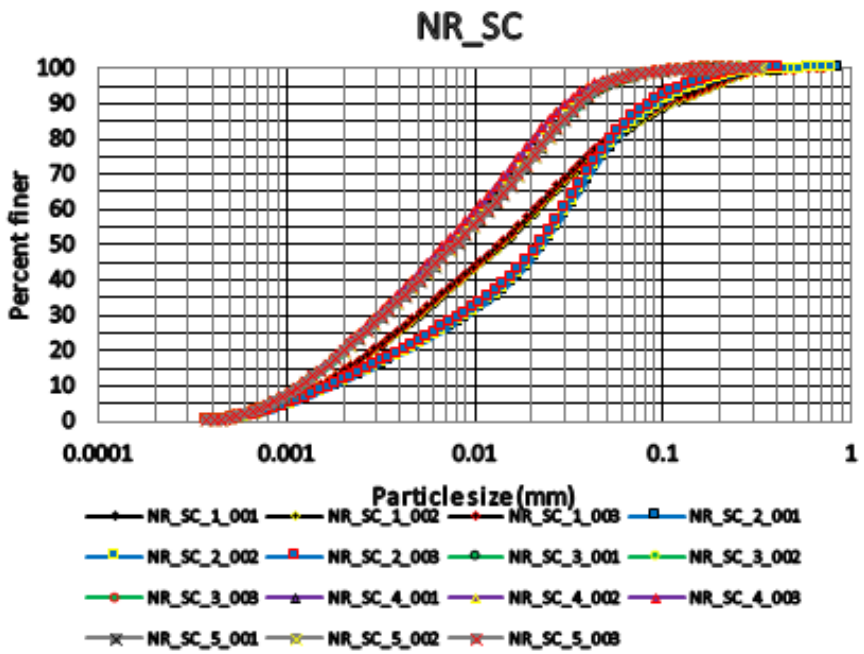


Neosho River – Grand Lake

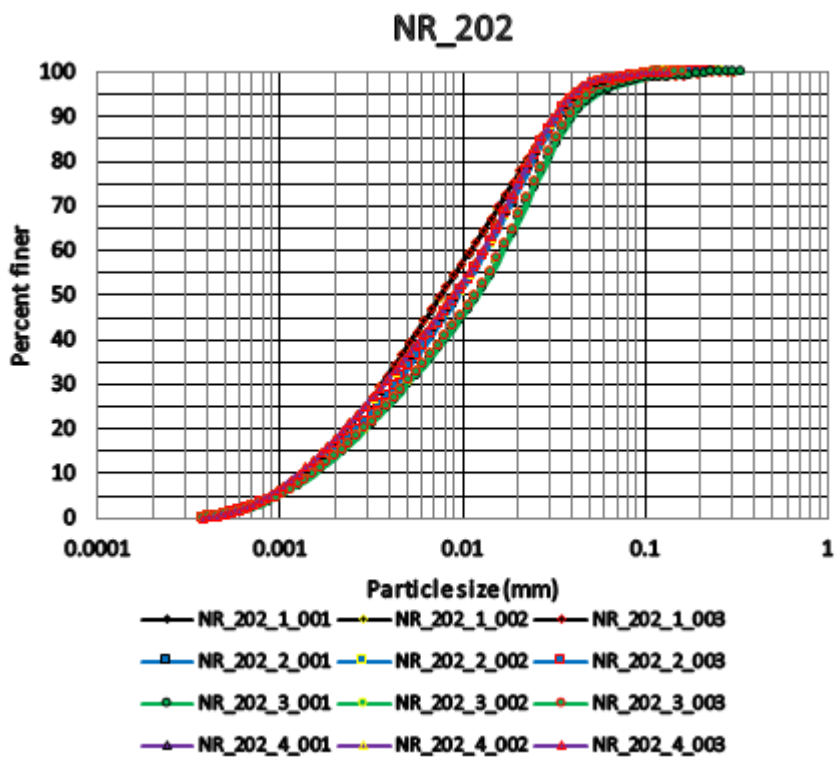
River Mile 120.43



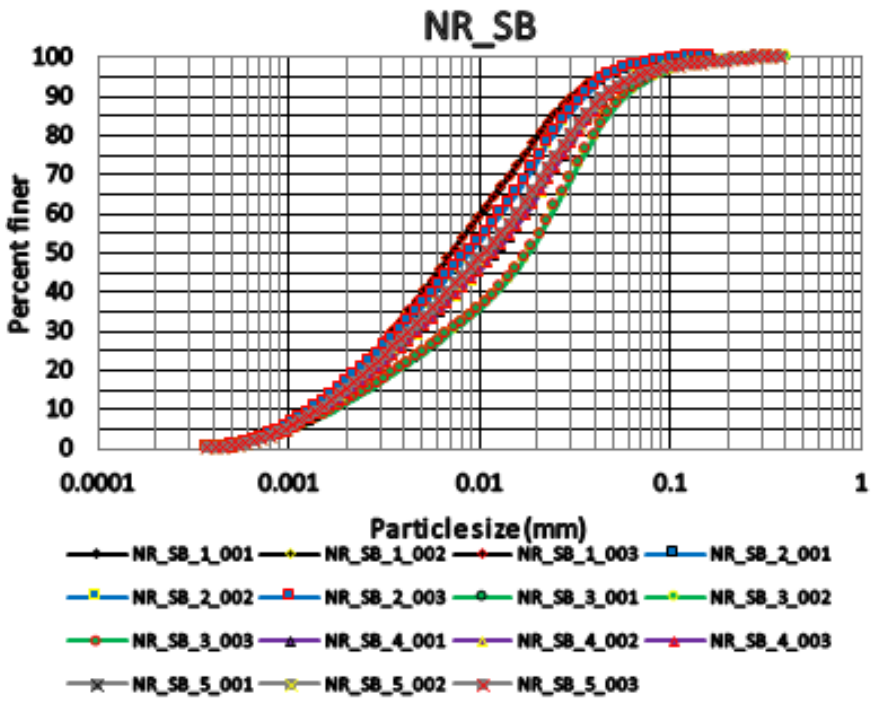
River Mile 115.81



River Mile 112.69

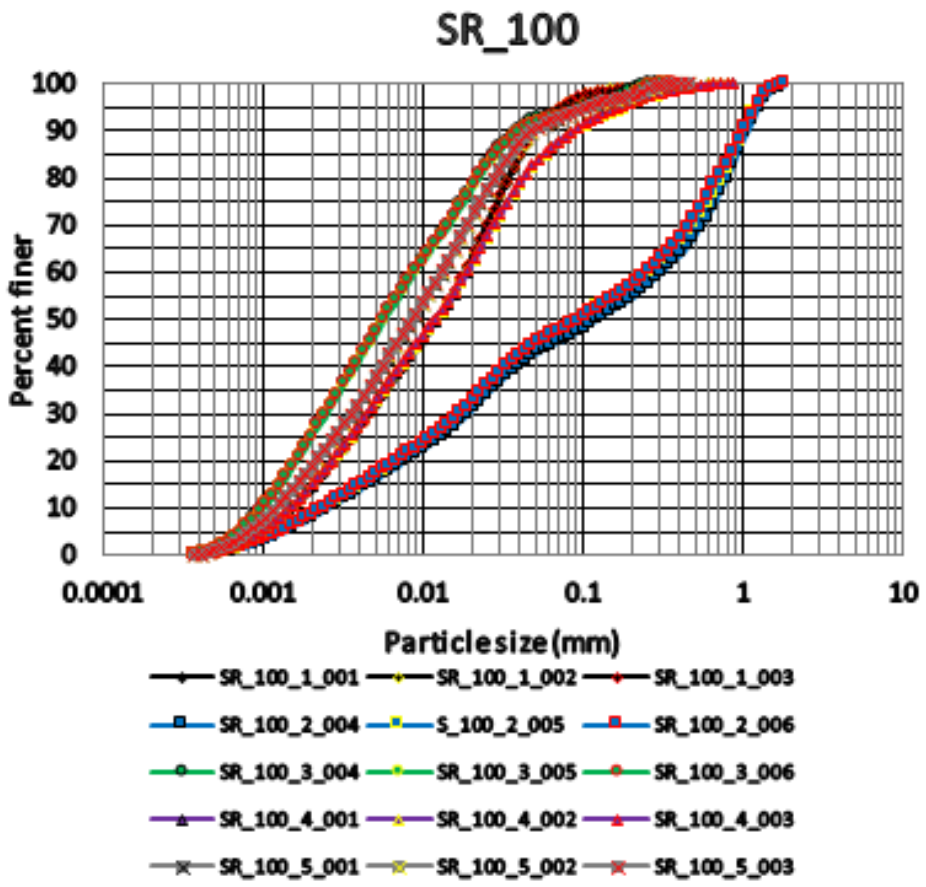


River Station 109.65

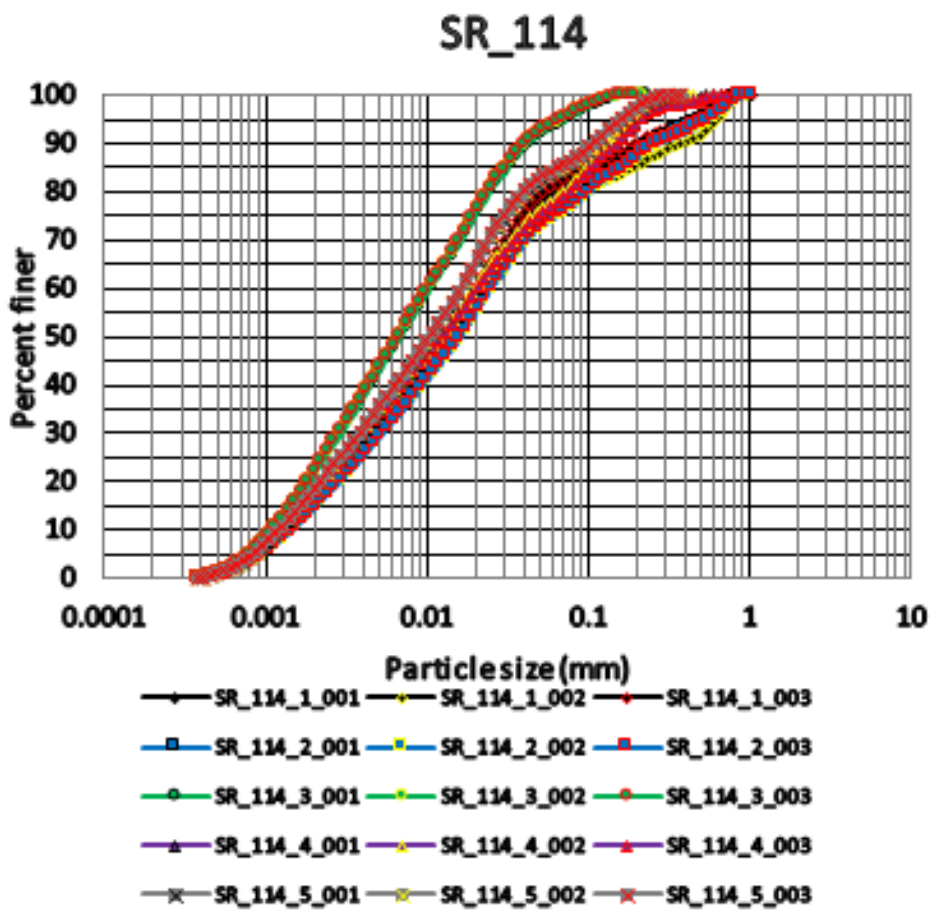


Spring River

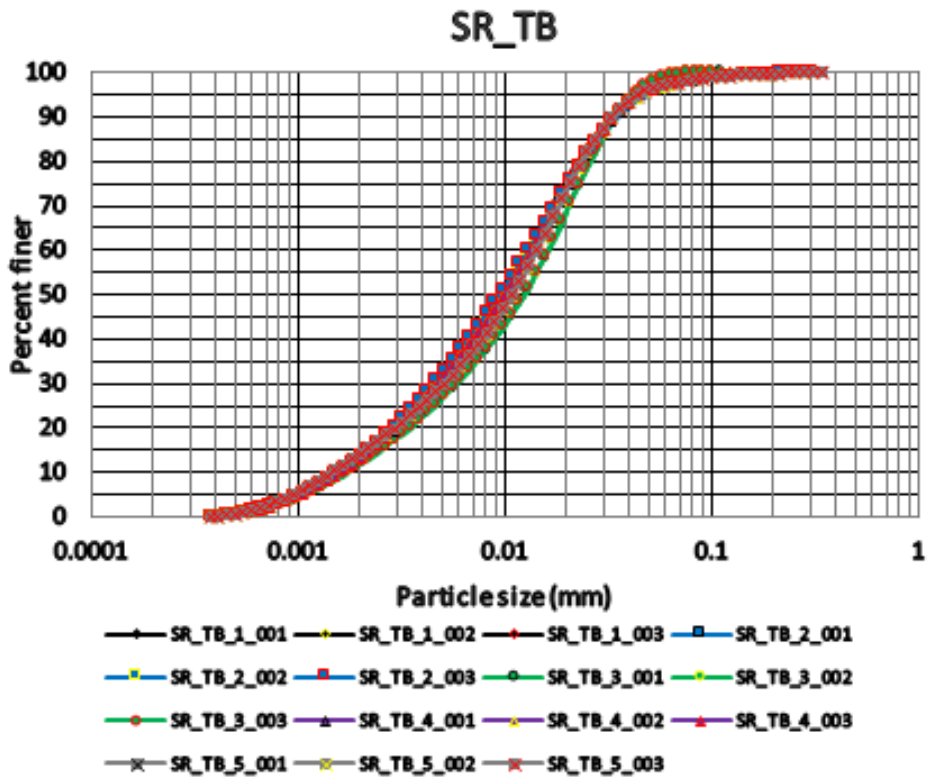
River Mile 7.5



River Mile 4.82

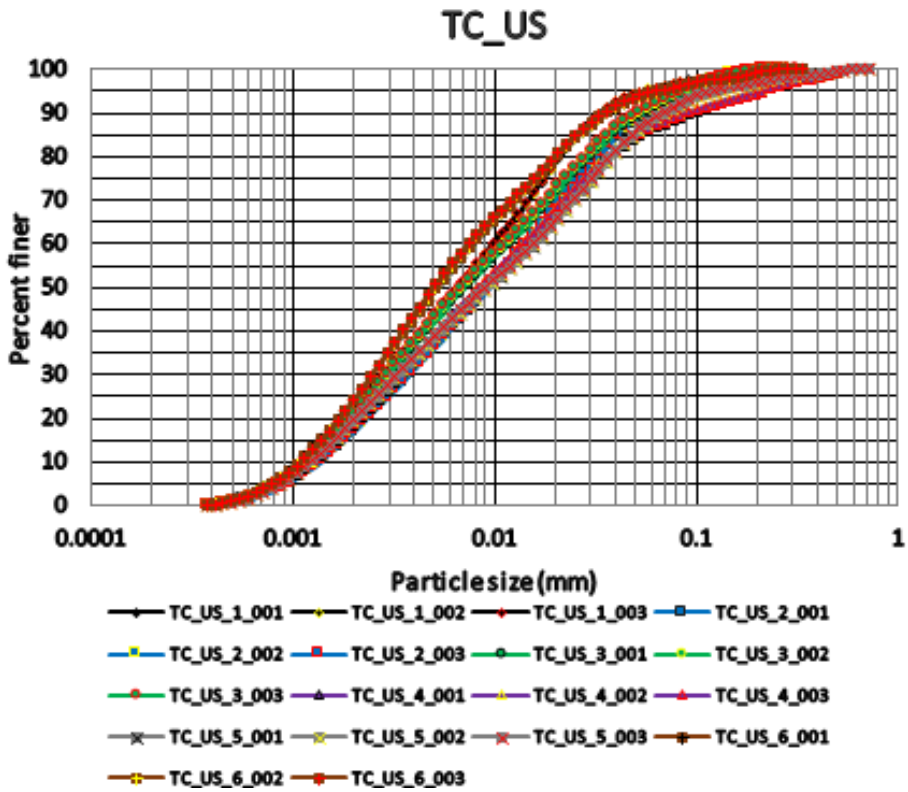


River Mile 0.79

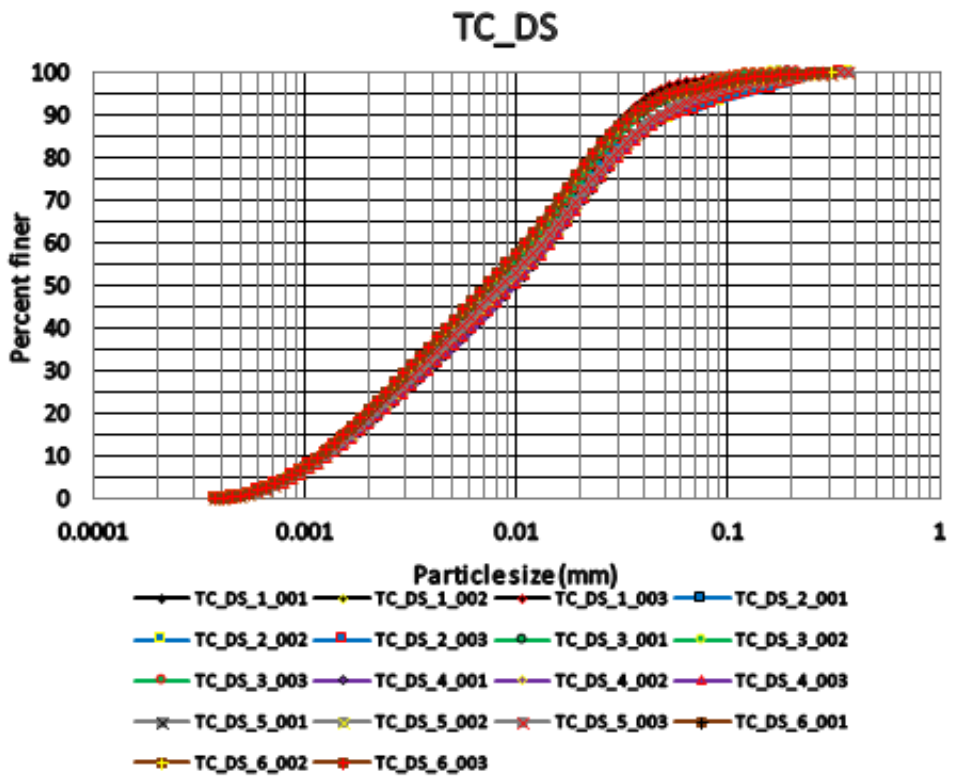


Tar Creek

Downstream of River Mile 1.6

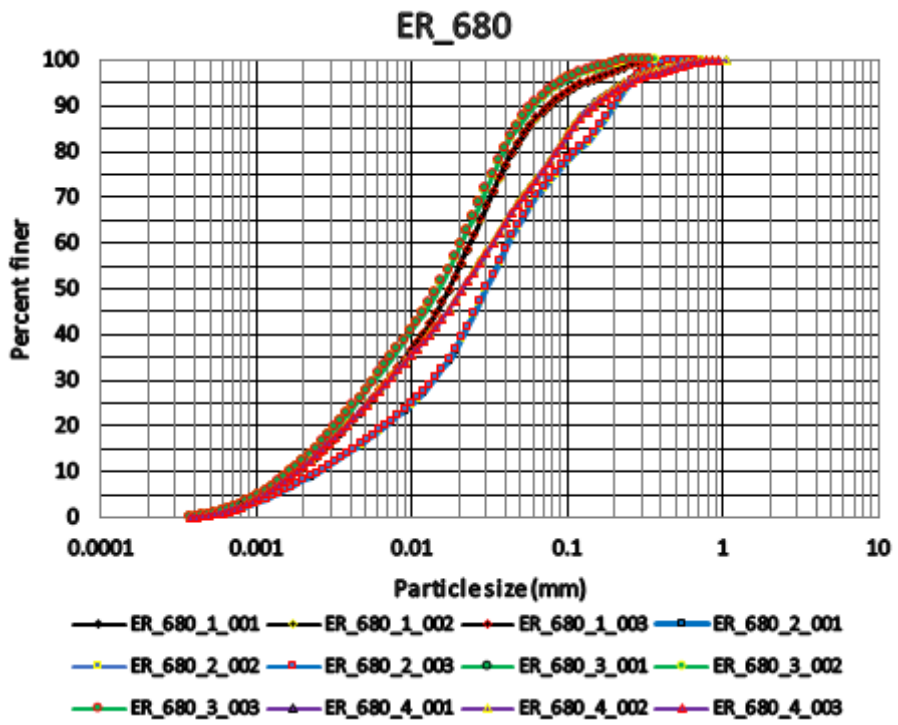


Downstream of River Mile 1.6

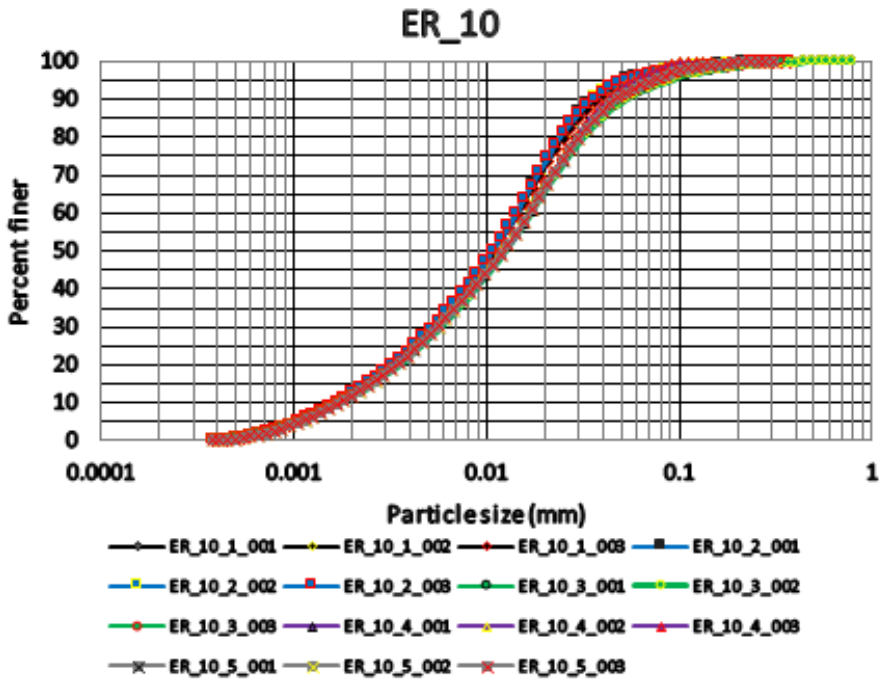


Elk River

River Mile 8.41



River Mile 4.67



Appendix D
Suspended Sediment Concentration Measurements

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226001

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO R
Project No:
Collection End: 5/29/2019 3:30:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD CONFLUENCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	137	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226001

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226002

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: TAR CREEK
Project No:
Collection End: 5/29/2019 1:15:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	12.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226002

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226003

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO R @ COMMERCE
Project No:
Collection End: 5/29/2019 12:30:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	135	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226003

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226004

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING R @ E 57 RD
Project No:
Collection End: 5/29/2019 2:30:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: SPRING ROAD AT E 57 ROAD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	58.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226004

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226005

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO R @ COMMERCE
Project No:
Collection End: 5/2/2019 10:45:00 AM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Analyzed past the 40 days holding time: Method ASTM D3977-97B analyzed on 06/20/19 0000

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
Comments: Analyzed past the 40 days holding time.					
SUSPENDED SEDIMENT	ASTM D3977-97B	213	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226005

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226006

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING R @ E 57 RD
Project No:
Collection End: 5/2/2019 12:40:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: SPRING ROAD AT EAST 57 ROAD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Analyzed past the 40 days holding time: Method ASTM D3977-97B analyzed on 06/20/19 0000

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
Comments: Analyzed past the 40 days holding time.					
SUSPENDED SEDIMENT	ASTM D3977-97B	215	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226006

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226007

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO R MIAMI EAST ST
Project No:
Collection End: 5/2/2019 10:10:00 AM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD MIAMI EAST ST SW BRIDGE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Analyzed past the 40 days holding time: Method ASTM D3977-97B analyzed on 06/20/19 0000

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
Comments: Analyzed past the 40 days holding time.					
SUSPENDED SEDIMENT	ASTM D3977-97B	203	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226007

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226008

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO D/S CONFLUENCE
Project No:
Collection End: 5/2/2019 2:15:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO D/S CONFLUENCE E 157 ROAD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Analyzed past the 40 days holding time: Method ASTM D3977-97B analyzed on 06/20/19 0000

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
Comments: Analyzed past the 40 days holding time.					
SUSPENDED SEDIMENT	ASTM D3977-97B	262	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226008

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226009

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING R @ HWY 10
Project No:
Collection End: 5/2/2019 1:00:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: SPRING ROAD AT HWY 10
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Analyzed past the 40 days holding time: Method ASTM D3977-97B analyzed on 06/20/19 0000

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
Comments: Analyzed past the 40 days holding time.					
SUSPENDED SEDIMENT	ASTM D3977-97B	55.1	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226009

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226010

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: TAR CREEK @ HWY 10
Project No:
Collection End: 5/2/2019 12:00:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 10
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Analyzed past the 40 days holding time: Method ASTM D3977-97B analyzed on 06/20/19 0000

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/20/19 00:00	Analysis Date: 06/20/19 00:00				
Comments: Analyzed past the 40 days holding time.					
SUSPENDED SEDIMENT	ASTM D3977-97B	38.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226010

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226011

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO R MIAMI E ST SW
Project No:
Collection End: 5/28/2019 8:25:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD MIAMI E ST SW
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/26/19 00:00	Analysis Date: 06/26/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	86.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226011

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226012

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING R @ HWY 10
Project No:
Collection End: 5/28/2019 7:30:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: SPRING ROAD AT HWY 10
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/26/19 00:00	Analysis Date: 06/26/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	34.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226012

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226013

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING AT E 57 RD
Project No:
Collection End: 5/28/2019 7:10:00 PM
Collection Start:
Collected By: LAURA ROZUNALSKI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: SPRING AT E 57 ROAD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/26/19 00:00	Analysis Date: 06/26/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	83.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226013

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226014

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO R @ COMMERCE
Project No:
Collection End: 5/28/2019 8:05:00 PM
Collection Start:
Collected By: LAURA ROZUNALKSI
Date Received: 6/18/2019
Date Reported: 6/28/2019
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

NON-WSLH BOTTLES USED. RESULTS APPROXIMATE

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/26/19 00:00	Analysis Date: 06/26/19 00:00				
SUSPENDED SEDIMENT	ASTM D3977-97B	182	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 452226014

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic chemistry: Graham Anderson 608-224-6281
Metals: Graham Anderson 608-224-6280
Organics: Erin Mani 608-224-6269
Environmental Toxicology: David Webb 608-224-6230
Water microbiology: Martin Collins 608-224-6239
Radiochemistry: David Webb 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352001

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO RIVER@COMMERCE
Project No:
Collection End: 8/14/2019 4:28:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 364.5A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	140	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352001

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352002

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 117A&B
Project No:
Collection End: 8/15/2019 3:24:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 117A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	12.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352002

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352003

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 4:17:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 315.9A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	143	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352003

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352004

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 143A&B
Project No:
Collection End: 8/15/2019 3:34:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 143A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	19.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352004

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352005

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 4:05:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 267.3A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	164	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352005

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352006

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 195A&B
Project No:
Collection End: 8/15/2019 3:48:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 195A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	12.9	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352006

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352007

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 91A&B
Project No:
Collection End: 8/15/2019 3:12:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 91A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	15.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352007

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352008

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 3:39:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 170.1A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	161	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352008

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352009

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 3:51:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 218.7A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	157	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352009

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352010

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 36A&B
Project No:
Collection End: 8/15/2019 9:51:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 36A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	35.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352010

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352011

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 12A&B
Project No:
Collection End: 8/15/2019 9:45:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 12A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	10.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352011

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352012

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 60A&B
Project No:
Collection End: 8/15/2019 9:57:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 60A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	7.90	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352012

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352013

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 39A&B
Project No:
Collection End: 8/15/2019 2:57:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 39A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	13.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352013

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352014

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 286A&B
Project No:
Collection End: 8/15/2019 10:57:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 286A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	3.97	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352014

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352015

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 3:06:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 24.3A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	164	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352015

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352016

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 3:23:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 72.9A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	167	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352016

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352017

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 65A&B
Project No:
Collection End: 8/15/2019 3:04:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 65A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	48.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352017

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352018

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 3:31:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 121.5A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	136	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352018

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352019

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 247A&B
Project No:
Collection End: 8/15/2019 4:02:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 247A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	11.9	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352019

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352020

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 169A&B247A
Project No:
Collection End: 8/15/2019 3:43:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 169A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	15.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352020

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352021

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 221A&B
Project No:
Collection End: 8/15/2019 3:55:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 221A
Sample Location: SPRING RIVER AT E 57 RD QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	11.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352021

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352022

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: SPRING RIVER 13A&B
Project No:
Collection End: 8/15/2019 2:48:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 13A
Sample Location: SPRING RIVER AT E 57 RD NEAR QUAPAW, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	14.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352022

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352023

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 180A&B
Project No:
Collection End: 8/15/2019 10:40:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 180A
Sample Location: ELK RIVER AT HWY 43 BRDIGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	ND	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352023

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352024

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 262A&B
Project No:
Collection End: 8/15/2019 10:50:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 262A`
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	ND	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352024

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352025

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: TAR CREEK 69A&B
Project No:
Collection End: 8/16/2019 2:51:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: A
Sample Location: TAR CREEK AT HWY 69 NEAR COMMERCE, OK
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	43.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352025

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352026

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 4:48:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 413.1A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	158	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352026

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352027

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 4:48:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 461.7A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	910	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352027

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352028

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 84A&B
Project No:
Collection End: 8/15/2019 10:03:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 84A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	8.75	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352028

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352029

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: NEOSHO
Project No:
Collection End: 8/14/2019 5:03:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 520.3A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	370	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352029

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352030

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 108A&B
Project No:
Collection End: 8/15/2019 10:10:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 108A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	3.58	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352030

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352031

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 132A&B
Project No:
Collection End: 8/15/2019 10:20:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 132A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	6.25	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352031

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352032

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711
Customer ID: 349767

Field #: ELK RIVER 156A&B
Project No:
Collection End: 8/15/2019 10:28:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/28/2019
Date Reported: 9/25/2019
Sample Reason:

ID#: 156A
Sample Location: ELK RIVER AT HWY 43 BRIDGE NEAR TIFF, MO
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Sample Comments

ICE MELTED/NOT ICED. RESULTS APPROXIMATE.

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 09/18/19 14:25	Analysis Date: 09/18/19 14:25				
SUSPENDED SEDIMENT	ASTM D3977-97B	2.54	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

Environmental Health Division

WDNR LAB ID: 113133790 NELAP LAB ID: 2091 EPA LAB ID: WI00007, WI00008 WI DATCP ID: 105-415

WSLH Sample: 466352032

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753001

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 40A
Project No:
Collection End: 5/17/2020 5:02:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	91.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753001

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753003

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 70A
Project No:
Collection End: 5/17/2020 5:16:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	136	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753003

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753005

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 100A
Project No:
Collection End: 6/17/2020 5:25:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	35.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753005

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753007

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 130A
Project No:
Collection End: 6/17/2020 5:39:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	26.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753007

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753009

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 160A
Project No:
Collection End: 5/17/2020 5:46:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	22.9	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753009

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753011

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 190A
Project No:
Collection End: 5/17/2020 5:51:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	26.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753011

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753013

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 220A
Project No:
Collection End: 5/17/2020 6:00:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	23.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753013

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753015

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 250A
Project No:
Collection End: 5/17/2020 6:09:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	23.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753015

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753017

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 280A
Project No:
Collection End: 5/17/2020 6:19:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	25.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753017

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753019

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: ELK RIVER AT HWY 43 310A
Project No:
Collection End: 5/17/2020 6:28:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	24.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753019

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753021

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 11:34:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	259	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753021

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753023

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 12:12:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	307	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753023

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753025

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 12:28:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	304	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753025

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753027

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 12:44:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	277	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753027

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753029

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 1:00:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	240	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753029

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753031

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 1:14:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	223	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753031

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753033

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 1:30:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	237	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753033

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753035

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 1:44:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	239	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753035

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753037

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 2:14:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	226	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753037

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753039

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 5/17/2020 2:25:00 PM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	208	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753039

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753041

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 14A
Project No:
Collection End: 5/18/2020 10:30:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	45.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753041

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753043

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 42A
Project No:
Collection End: 5/18/2020 10:40:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	41.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753043

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753045

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 70A
Project No:
Collection End: 5/18/2020 10:48:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	40.8	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753045

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753047

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 98A
Project No:
Collection End: 5/18/2020 10:55:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	39.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753047

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753049

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 126A
Project No:
Collection End: 5/18/2020 11:04:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	41.9	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753049

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753051

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 154A
Project No:
Collection End: 5/18/2020 11:13:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	40.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753051

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753053

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 182A
Project No:
Collection End: 5/18/2020 11:21:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	40.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753053

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753055

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 210A
Project No:
Collection End: 5/18/2020 11:28:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	40.8	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753055

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753057

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 238A
Project No:
Collection End: 5/18/2020 11:35:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	36.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753057

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753059

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57RD 266A
Project No:
Collection End: 5/18/2020 11:44:00 AM
Collection Start:
Collected By:
Date Received: 6/22/2020
Date Reported: 6/24/2020
Sample Reason:

ID#:
Sample Location:
Sample Description:
Sample Type:
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/23/20 13:24	Analysis Date: 06/23/20 13:24				
SUSPENDED SEDIMENT	ASTM D3977-97B	29.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 510753059

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356001

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 5:15:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 10A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	148	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356001

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356003

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 5:30:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 63A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	245	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356003

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356005

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 5:39:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 116A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	197	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356005

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356007

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 5:52:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 169A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	211	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356007

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356009

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 6:05:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 222A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	183	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356009

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356011

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 6:23:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 275A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	230	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356011

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356013

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 6:34:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 313A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	170	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356013

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356015

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 6:47:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 381A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	182	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356015

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356017

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 6:56:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 424A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	179	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356017

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356019

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: NEOSHO RIVER AT COMMERCE
Project No:
Collection End: 7/31/2020 7:10:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 519A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	172	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356019

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356021

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD 10A
Project No:
Collection End: 7/31/2020 11:45:00 AM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 10A
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	55.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356021

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356023

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD 28A
Project No:
Collection End: 7/31/2020 12:05:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 28A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	54.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356023

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356025

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD 56A
Project No:
Collection End: 7/31/2020 12:18:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 56A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	52.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356025

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356027

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD 84A
Project No:
Collection End: 7/31/2020 12:28:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 84A
Sample Location: SPRING RIVER E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	47.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356027

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356029

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD
Project No:
Collection End: 7/31/2020 12:40:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 112A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	51.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356029

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356031

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD
Project No:
Collection End: 7/31/2020 1:28:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 140A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	50.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356031

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356033

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD
Project No:
Collection End: 7/31/2020 1:42:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 168A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	45.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356033

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356035

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD
Project No:
Collection End: 7/31/2020 1:49:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 196A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	45.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356035

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356037

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD
Project No:
Collection End: 7/31/2020 2:00:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 224A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	53.1	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356037

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356039

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: SPRING RIVER AT E 57 ROAD
Project No:
Collection End: 7/31/2020 2:15:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 252A
Sample Location: SPRING RIVER AT E 57 RD
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	52.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356039

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356041

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: TAR CREEK AT HWY 69 9A
Project No:
Collection End: 7/31/2020 3:20:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 8/21/2020
Date Reported: 9/4/2020
Sample Reason:

ID#: 9A
Sample Location: TAR CREEK AT HWY 69
Sample Description:
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 08/25/20 12:16	Analysis Date: 08/25/20 12:16				
SUSPENDED SEDIMENT	ASTM D3977-97B	ND	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

D.F. Kurtycz, M.D., Medical Director - Prof. James J. Schauer, Ph.D., Director

WSLH Sample: 521356041

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944001

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 350B
Project No:
Collection End: 4/30/2021 4:52:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: 350B
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:18	Analysis Date: 06/15/21 11:18				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944001

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944002

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 350A
Project No:
Collection End: 4/30/2021 4:49:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: 350A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	118	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944002

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944003

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 300B
Project No:
Collection End: 4/30/2021 4:38:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: 300B
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:19	Analysis Date: 06/15/21 11:19				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944003

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944004

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 300A
Project No:
Collection End: 4/30/2021 4:35:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: 300A
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	139	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944004

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944005

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 250B
Project No:
Collection End: 4/30/2021 4:28:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:20	Analysis Date: 06/15/21 11:20				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944005

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944006

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 250A
Project No:
Collection End: 4/30/2021 4:25:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	104	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944006

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944007

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 200B
Project No:
Collection End: 4/30/2021 4:20:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:20	Analysis Date: 06/15/21 11:20				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944007

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944008

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 200A
Project No:
Collection End: 4/30/2021 4:17:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	104	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944008

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944009

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 150B
Project No:
Collection End: 4/30/2021 4:13:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:21	Analysis Date: 06/15/21 11:21				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944009

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944010

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 150A
Project No:
Collection End: 4/30/2021 4:10:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	98.5	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944010

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944011

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 100B
Project No:
Collection End: 4/30/2021 4:03:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:22	Analysis Date: 06/15/21 11:22				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944011

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944012

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 100A
Project No:
Collection End: 4/30/2021 4:00:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	98.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944012

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944013

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 230B
Project No:
Collection End: 4/30/2021 1:15:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:22	Analysis Date: 06/15/21 11:22				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944013

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944014

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 230A
Project No:
Collection End: 4/30/2021 1:12:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	21.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944014

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944015

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 203A
Project No:
Collection End: 4/30/2021 1:02:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	18.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944015

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944016

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 203B
Project No:
Collection End: 4/30/2021 1:08:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:23	Analysis Date: 06/15/21 11:23				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944016

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944017

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 68B
Project No:
Collection End: 4/30/2021 12:26:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:23	Analysis Date: 06/15/21 11:23				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944017

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944018

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 68A
Project No:
Collection End: 4/30/2021 12:23:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	20.1	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944018

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944019

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 41B
Project No:
Collection End: 4/30/2021 12:18:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:29	Analysis Date: 06/15/21 11:29				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944019

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944020

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 41A
Project No:
Collection End: 4/30/2021 12:14:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	22.2	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944020

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944021

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 450B
Project No:
Collection End: 4/30/2021 5:09:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:30	Analysis Date: 06/15/21 11:30				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944021

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944022

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 450A
Project No:
Collection End: 4/30/2021 5:06:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	112	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944022

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944023

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 400B
Project No:
Collection End: 4/30/2021 5:01:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:30	Analysis Date: 06/15/21 11:30				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944023

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944024

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 400A
Project No:
Collection End: 4/30/2021 4:58:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	114	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944024

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944025

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 176A
Project No:
Collection End: 4/30/2021 12:55:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	21.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944025

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944026

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 176B
Project No:
Collection End: 4/30/2021 12:59:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:31	Analysis Date: 06/15/21 11:31				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944026

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944027

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 149B
Project No:
Collection End: 4/30/2021 12:49:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:31	Analysis Date: 06/15/21 11:31				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944027

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944028

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 149A
Project No:
Collection End: 4/30/2021 12:46:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	18.8	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944028

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944029

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 122A
Project No:
Collection End: 4/30/2021 12:40:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	20.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944029

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944030

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 122B
Project No:
Collection End: 4/30/2021 12:43:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:32	Analysis Date: 06/15/21 11:32				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944030

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944031

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 95B
Project No:
Collection End: 4/30/2021 12:35:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:33	Analysis Date: 06/15/21 11:33				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944031

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944032

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 95A
Project No:
Collection End: 4/30/2021 12:32:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	19.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944032

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944033

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 14B
Project No:
Collection End: 4/30/2021 12:03:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:33	Analysis Date: 06/15/21 11:33				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944033

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944034

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 14A
Project No:
Collection End: 4/30/2021 12:00:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	35.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944034

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944035

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 257A
Project No:
Collection End: 4/30/2021 1:21:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	31.0	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944035

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944036

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 257B
Project No:
Collection End: 4/30/2021 1:25:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:34	Analysis Date: 06/15/21 11:34				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944036

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944037

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 50B
Project No:
Collection End: 4/30/2021 3:57:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:34	Analysis Date: 06/15/21 11:34				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944037

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944038

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 50A
Project No:
Collection End: 4/30/2021 3:55:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	99.1	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944038

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944039

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 0B
Project No:
Collection End: 4/30/2021 3:48:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

No Charge

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 06/15/21 11:34	Analysis Date: 06/15/21 11:34				
No Analysis	IC CA Analysis	SSC <63um results pending.			

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944039

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944040

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
616 CRANDALL ST
MADISON, WI 53711

Customer ID: 349767

Field #: 0A
Project No:
Collection End: 4/30/2021 3:45:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 5/11/2021
Date Reported: 6/15/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO ROAD AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 05/12/21 13:57	Analysis Date: 05/12/21 13:57				
SUSPENDED SEDIMENT	ASTM D3977-97B	125	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 560944040

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634001

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 32
Project No:
Collection End: 7/1/2021 4:54:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	102	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634001

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634002

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 95.5
Project No:
Collection End: 7/1/2021 5:01:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	109	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634002

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634003

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 159
Project No:
Collection End: 7/1/2021 5:07:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	135	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634003

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634004

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 222.5
Project No:
Collection End: 7/1/2021 5:14:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	141	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634004

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634005

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 286
Project No:
Collection End: 7/1/2021 5:18:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	130	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634005

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634006

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 349.5
Project No:
Collection End: 7/1/2021 5:27:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	109	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634006

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634007

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 413
Project No:
Collection End: 7/1/2021 5:34:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	90.1	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634007

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634008

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 476.5
Project No:
Collection End: 7/1/2021 5:43:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	95.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634008

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634009

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 540
Project No:
Collection End: 7/1/2021 5:48:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	81.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634009

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634010

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: NEOSHO 572
Project No:
Collection End: 7/1/2021 5:55:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: NEOSHO RIVER AT COMMERCE
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	81.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634010

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634011

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 14
Project No:
Collection End: 7/1/2021 7:26:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	113	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634011

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634012

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 42
Project No:
Collection End: 7/1/2021 7:36:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	115	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634012

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634013

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 70
Project No:
Collection End: 7/1/2021 7:42:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	114	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634013

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634014

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 98
Project No:
Collection End: 7/1/2021 7:46:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	119	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634014

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634015

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 126
Project No:
Collection End: 7/1/2021 7:52:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	116	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634015

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634016

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 154
Project No:
Collection End: 7/1/2021 7:57:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	116	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634016

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634017

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 182
Project No:
Collection End: 7/1/2021 8:04:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	118	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634017

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634018

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 210
Project No:
Collection End: 7/1/2021 8:07:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	116	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634018

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634019

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 238
Project No:
Collection End: 7/1/2021 8:12:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	112	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634019

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634020

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: SPRING 266
Project No:
Collection End: 7/1/2021 8:18:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: SPRING RIVER AT E 57 ROAD
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	113	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634020

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634021

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 23
Project No:
Collection End: 7/1/2021 12:11:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	33.1	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634021

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634022

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 68.5
Project No:
Collection End: 7/1/2021 12:22:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	31.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634022

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634023

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 114
Project No:
Collection End: 7/1/2021 12:29:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	31.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634023

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634024

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 159.5
Project No:
Collection End: 7/1/2021 12:35:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	31.9	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634024

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634025

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 205
Project No:
Collection End: 7/1/2021 12:40:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	30.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634025

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634026

Report To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:
LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 250.5
Project No:
Collection End: 7/1/2021 12:46:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	31.6	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634026

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634027

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 296
Project No:
Collection End: 7/1/2021 12:51:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	29.3	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634027

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634028

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 341.5
Project No:
Collection End: 7/1/2021 12:56:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	29.4	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634028

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634029

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 387
Project No:
Collection End: 7/1/2021 1:02:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	27.7	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634029

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634030

Report To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Invoice To:

LAURA ROZUMALSKI
FRESHWATER ENGINEERING LLC
30 W MIFFLIN ST SUITE 801
MADISON, WI 53703

Customer ID: 349767

Field #: TAR 410
Project No:
Collection End: 7/1/2021 1:07:00 PM
Collection Start:
Collected By: LAURA ROZUMALSKI
Date Received: 7/15/2021
Date Reported: 8/3/2021
Sample Reason:

ID#: NA
Sample Location: TAR CREEK AT HWY 69
Sample Description: D-74, SUSPENDED SEDIMENT SAMPLER
Sample Type: SU-SURFACE WATER
Waterbody:
Point or Outfall:
Sample Depth:
Program Code:
Region Code:
County:

Inorganic Chemistry

Analyte	Analysis Method	Result	Units	LOD	LOQ
Prep Date: 07/20/21 15:09	Analysis Date: 07/20/21 15:09				
SUSPENDED SEDIMENT	ASTM D3977-97B	27.8	mg/L	2.0	2.0

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 - FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

Environmental Health Division

WSLH Sample: 572634030

WDNR LAB ID:113133790 NELAP LAB ID:2091 EPA LAB ID:WI00007, WI00008 WI DATCP ID:105-415

List of Abbreviations:

LOD = Level of detection
LOQ = Level of quantification (for PFAS the LOQ = MRL)
ND = None detected. Results are less than the LOD
F next to result = Result is between LOD and LOQ
Z next to result = Result is between 0 (zero) and LOD
if LOD=LOQ, Limits were not statistically derived

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes
see http://www.slh.wisc.edu/about/compliance/nelac-laboratory-accreditation
Results, LOD and LOQ values have been adjusted for analytical dilutions and percent moisture where applicable.
Results relate only to the items tested.
This Laboratory Report shall not be reproduced except in full, without written approval of the laboratory.
The water microbiology unit analyzes samples as received and not all samples are tested for preservation before analysis is performed.

Responsible Party

Inorganic Chemistry: Graham Anderson, Supervisor 608-224-6281
Metals: Graham Anderson, Supervisor 608-224-6281
Organics: Erin Mani, Supervisor 608-224-6269
Environmental Toxicology: Dawn Perkins, Supervisor 608-224-6230
Water Microbiology: Martin Collins, Supervisor 608-224-6239
Radiochemistry: David Webb, Division Director 608-224-6227

Wisconsin State Laboratroy of Hygiene
Environmental Health Division
Inorganic Health

SUSPENDED SEDIMENTS WORKLIST <63 nm

ANALYST: NXK

Acode:

ESS INO Method 350.1 In Oven: 7/30/2021 13:47

DATE: 7/30/2021

QC Audit: [signature]

Date 8/12/21

Rev. 3 ASTM 3977-97 Out Oven: 8/3/2021 6:18

Oven #: 88

Batch No. Filter Code: R2-59-30

Balance No. IC54

DISH	SAMPLE		BOTTLE WT	BOTTLE TARE	BOTTLE NET	TARE WT	TOT WT	SAMP WT	MG/L	Collection Site
37	572634001		254.3000	72.5000	181.8000	6.7821	6.7899	0.0078	42.9043	
38	572634002		420.3000	72.9000	347.4000	6.7852	6.8190	0.0338	97.2942	
39	572634003		420.1000	72.8000	347.3000	6.7749	6.8126	0.0377	108.5517	
40	572634004		599.7000	72.8000	526.9000	6.7413	6.7993	0.0580	110.0778	
41	572634005		568.5000	71.8000	496.7000	6.7858	6.8396	0.0538	108.3149	
42	572634006		601.7000	72.8000	528.9000	6.7881	6.8437	0.0556	105.1238	
43	572634007		697.9000	71.5000	626.4000	6.7322	6.7891	0.0569	90.8365	
44	572634008		560.6000	72.3000	488.3000	6.7620	6.7972	0.0352	72.0868	
45	572634009		569.2000	72.7000	496.5000	6.7841	6.8165	0.0324	65.2568	
46	572634010		409.5000	72.9000	336.6000	6.7171	6.7387	0.0216	64.1711	
47	572634011		422.5000	74.2000	348.3000	6.7479	6.7825	0.0346	99.3397	
48	572634012		667.1000	75.4000	591.7000	6.7408	6.8009	0.0601	101.5717	
49	572634013		364.4000	74.1000	290.3000	5.5934	5.6208	0.0274	94.3851	
50	572634014		873.2000	74.5000	798.7000	5.3916	5.4707	0.0791	99.0359	
51	572634015		665.1000	74.5000	590.6000	5.4311	5.4916	0.0605	102.4382	
52	572634016		556.9000	74.3000	482.6000	6.7299	6.7788	0.0489	101.3262	
53	572634017		545.4000	71.8000	473.6000	6.7764	6.8257	0.0493	104.0963	
54	572634018		534.1000	75.3000	458.8000	6.7243	6.7725	0.0482	105.0567	
55	572634019		510.6000	75.7000	434.9000	6.7674	6.8119	0.0445	102.3224	
56	572634020		376.3000	75.2000	301.1000	6.7347	6.7641	0.0294	97.6420	
57	572634021		528.1000	72.8000	455.3000	6.7731	6.7830	0.0099	21.7439	
58	572634022		573.6000	71.9000	501.7000	6.7015	6.7132	0.0117	23.3207	
59	572634023		648.0000	73.4000	574.6000	6.7494	6.7623	0.0129	22.4504	
60	572634024		715.8000	71.5000	644.3000	6.7027	6.7193	0.0166	25.7644	
85	572634025		595.4000	71.9000	523.5000	6.7527	6.7653	0.0126	24.0688	
86	572634026		596.2000	73.4000	522.8000	6.7792	6.7908	0.0116	22.1882	
87	572634027		503.1000	72.6000	430.5000	6.7239	6.7340	0.0101	23.4611	

88	572634028		474.9000	72.8000	402.1000	6.7297	6.7393	0.0096	23.8747	
89	572634029		410.3000	73.0000	337.3000	6.7180	6.7251	0.0071	21.0495	
90	572634030		348.0000	73.5000	274.5000	5.4372	5.4428	0.0056	20.4007	
97	QCS		1000.0000	0.0000	1000.0000	5.4940	5.5256	0.0316	31.6000	
98	MB		1000.0000	0.0000	1000.0000	5.5491	5.5486	-0.0005	-0.5000	
99					0.0000	5.7253	5.7252	-0.0001	#DIV/0!	
100					0.0000	5.5713	5.5711	-0.0002	#DIV/0!	
101					0.0000	5.5697	5.5696	-0.0001	#DIV/0!	

Table D-1
Suspended Sediment Concentrations (July 8, 2018)

Sample	Location (Stream, Station in feet)	Concentration (mg/L) Total	< 63 µm	% < 63 µm
452226001	Neosho River Confluence	137.0	125.31	91%
452226002	***Tar Creek at HWY 69***	***12.2***	***77.45***	***635%***
452226003	***Neosho River at Commerce***	***135.0***	***153.19***	***113%***
452226004	Spring River at E 57 Road	58.0	27.18	47%
452226005	***Neosho River at Commerce***	***213.0***	***225.93***	***106%***
452226006	***Spring River at E 57 Road***	***215.0***	***250.00***	***116%***
452226007	Neosho River at Miami E St SW Bridge	203.0	156.64	77%
452226008	***Neosho D/S Confluence E 157 Road***	***262.0***	***264.09***	***101%***
452226009	Spring River at HWY 10	55.1	45.08	82%
452226010	Tar Creek at HWY 10	38.3	15.87	41%
452226011	Neosho River at Miami E St SW	86.2	73.01	85%
452226012	Spring River at HWY 10	34.0	21.17	62%
452226013	Spring River at E 57 Road	83.7	28.78	34%
452226014	Neosho River at Commerce	182.0	134.80	74%
		Average sheet		66%
		Average all samples		81%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-2
Suspended Sediment Concentrations (September 27, 2019)

Sample	Location (Stream, Station in feet)	Concentration (mg/L) Total	< 63 µm	% < 63 µm
466352011	***Elk River 012***	***10.6***	***155.04***	***1463%***
466352010	Elk River 036	35.6	33.72	95%
466352012	***Elk River 060***	***7.9***	***18.92***	***239%***
466352028	***Elk River 084***	***8.8***	***45.41***	***519%***
466352030	***Elk River 108***	***3.6***	***13.20***	***369%***
466352031	Elk River 132	6.3	2.99	48%
466352032	Elk River 156	2.5	2.08	82%
466352023	Elk River 180	ND	2.10	N/A
466352024	Elk River 262	ND	3.38	N/A
466352014	Elk River 286	4.0	2.82	71%
466352015	Neosho River 024.3	164.0	131.40	80%
466352016	Neosho River 072.9	167.0	153.14	92%
466352018	Neosho River 121.5	136.0	118.41	87%
466352008	Neosho River 170.1	161.0	150.63	94%
466352005	Neosho River 267.3	164.0	150.86	92%
466352003	Neosho River 315.9	143.0	130.51	91%
466352001	Neosho River 364.5	140.0	111.92	80%
466352026	Neosho River 413.1	158.0	142.63	90%
466352027	Neosho River 461.7	910.0	289.83	32%
466352029	Neosho River 520.3	370.0	164.14	44%
466352009	Noesho River 218.7	157.0	143.11	91%
466352022	Spring River 013	14.5	10.26	71%
466352013	Spring River 039	13.6	11.98	88%
466352017	Spring River 065	48.5	11.56	24%
466352007	Spring River 091	15.7	10.24	65%
466352002	Spring River 117	12.5	9.42	75%
466352004	Spring River 143	19.2	14.12	74%
466352020	Spring River 169	15.7	10.73	68%
466352006	Spring River 195	12.9	8.97	70%
466352021	***Spring River 221***	***11.5***	***12.50***	***109%***
466352019	***Spring River 247***	***11.9***	***14.46***	***122%***
466352025	Tar Creek 069	43.0	21.69	50%
		Average sheet		73%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-3
Suspended Sediment Concentrations (May 17, 2020)

Sample	Location (Stream, Station in feet)	Concentration (mg/L) Total	< 63 µm	% < 63 µm
510753002	***Elk River 40***	***91.6***	***132.99***	***145%***
510753004	Elk River 70	136.0	45.81	34%
510753006	Elk River 100	35.4	24.30	69%
510753008	Elk River 130	26.4	17.02	64%
510753010	Elk River 160	22.9	22.20	97%
510753012	Elk River 190	26.4	15.53	59%
510753014	Elk River 220	23.6	19.10	81%
510753016	Elk River 250	23.3	18.67	80%
510753018	Elk River 280	25.0		N/A
510753020	Elk River 310	24.5		N/A
510753022	Neosho River 30	259.0	257.75	100%
510753024	Neosho River 90	307.0	276.34	90%
510753026	Neosho River 150	304.0	274.69	90%
510753028	Neosho River 210	277.0	236.98	86%
510753030	Neosho River 270	240.0	237.15	99%
510753032	Neosho River 330	223.0	216.38	97%
510753034	Neosho River 390	237.0	230.83	97%
510753036	Neosho River 450	239.0	215.52	90%
510753038	Neosho River 510	226.0	224.02	99%
510753040	Neosho River 570	208.0	190.90	92%
510753042	***Spring River 14***	***45.7***	***45.95***	***101%***
510753044	Spring River 42	41.4	41.29	100%
510753046	Spring River 70	40.8	38.52	94%
510753048	Spring River 98	39.4	38.52	98%
510753050	***Spring River 126***	***41.9***	***44.04***	***105%***
510753052	Spring River 154	40.2	38.61	96%
510753054	Spring River 182	40.4	39.86	99%
510753056	***Spring River 210***	***40.8***	***40.91***	***100%***
510753058	***Spring River 238***	***36.5***	***40.73***	***112%***
510753060	***Spring River 266***	***29.3***	***41.49***	***142%***
		Average sheet		87%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-4
Suspended Sediment Concentrations (July 31, 2020)

Sample	Location (Stream, Station in feet)	Concentration (mg/L)		% < 63 µm
		Total	< 63 µm	
521356002	***Neosho River 10***	***148.0***	***188.05***	***127%***
521356004	Neosho River 63	245.0	165.83	68%
521356006	***Neosho River 116***	***197.0***	***211.20***	***107%***
521356008	Neosho River 169	211.0	175.31	83%
521356010	Neosho Rivver 222	183.0	164.07	90%
521356012	Neosho River 275	230.0	177.06	77%
521356014	Neosho River 313	170.0	153.32	90%
521356016	Neosho River 381	182.0	140.34	77%
521356018	Neosho River 424	179.0	164.66	92%
521356020	Neosho River 519	172.0	158.16	92%
521356022	Spring River 10	55.3	44.96	81%
521356024	Spring River 28	54.2	35.76	66%
521356026	Spring River 56	52.7	46.06	87%
521356028	Spring River 84	47.6	45.78	96%
521356030	***Spring River 112***	***51.4***	***47.89***	***93%***
521356032	Spring River 140	50.2	41.32	82%
521356034	Spring River 168	45.4	40.36	89%
521356036	Spring River 196	45.5	45.17	99%
521356038	***Spring River 224***	***53.1***	***51.23***	***96%***
521356040	Spring River 252	52.3	42.99	82%
521356042	***Tar Creek 9***	***ND***	***1.08***	***N/A***
QCS		***ND***	***33.90***	***N/A***
BLANK		***ND***	***-0.20***	***N/A***
		Average sheet		85%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-5
Suspended Sediment Concentrations (April 30, 2021)

Sample	Location (Stream, Station in feet)	Concentration (mg/L)		% < 63 µm
		Total	< 63 µm	
560944001/2	Neosho River 350	118.0	108.31	92%
560944003/4	Neosho River 300	139.0	86.64	62%
560944005/6	Neosho River 250	104.0	85.42	82%
560944007/8	Neosho River 200	104.0	91.92	88%
560944009/10	Neosho River 150	98.5	87.21	89%
560944011/12	Neosho River 100	98.0	83.78	85%
560944013/14	Spring River 230	21.0	16.27	77%
560944015/16	Spring River 203	18.7	15.21	81%
560944017/18	Spring River 68	20.1	17.50	87%
560944019/20	Spring River 41	22.2	17.33	78%
560944021/22	Neosho River 450	112.0	103.40	92%
560944023/24	Neosho River 400	114.0	105.73	93%
560944025/26	Spring River 176	21.3	15.23	71%
560944027/28	Spring River 149	18.8	15.90	85%
560944029/30	Spring River 122	20.0	16.28	81%
560944031/32	Spring River 95	19.0	15.55	82%
560944033/34	Spring River 14	35.0	16.54	47%
560944035/36	Spring River 257	31.0	22.98	74%
560944037/38	Neosho River 50	99.1	86.94	88%
560944039/40	Neosho River 0	125.0	95.74	77%
		Average sheet		81%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-6
Suspended Sediment Concentrations (May 28, 2021)

Sample	Location (Stream, Station in feet)	Concentration (mg/L) Total	< 63 µm	% < 63 µm	Sample Comments
565116001	Spring River 14	176.0	163.1	93%	14
565116002	Spring River 25	190.0	178.3	94%	25
565116003	Spring River 68	182.0	169.5	93%	68
565116004	Spring River 95	188.0	177.3	94%	95
565116005	Spring River 122	188.0	177.1	94%	122
565116006	Spring River 149	189.0	177.7	94%	149
565116007	Spring River 176	178.0	160.9	90%	176
565116008	Spring River 203	181.0	168.6	93%	203
565116009	Spring River 230	172.0	169.3	98%	230
565116010	Spring River 257	167.0	149.7	90%	257
565116011	Spring River 25	274.0	259.4	95%	25
565116012	Spring River 50	296.0	250.1	84%	50
565116013	Spring River 100	297.0	268.9	91%	100
565116014	***Spring River 125***	***236.0***	***384.1***	***163%***	***125***
565116015	Spring River 150	324.0	166.6	51%	150
565116016	Spring River 175	267.0	238.5	89%	175
565116017	Spring River 200	255.0	222.5	87%	200
565116018	Spring River 225	242.0	206.1	85%	225
565116019	Spring River 250	251.0	216.3	86%	250
565116020	Spring River 275	225.0	216.0	96%	275
565116021	***Neosho River 58***	***301.0***	***434.9***	***144%***	***58***
565116022	Neosho River 116	424.0	360.8	85%	116
565116023	Neosho River 174	367.0	346.3	94%	174
565116024	Neosho River 232	367.0	349.6	95%	232
565116025	Neosho River 290	351.0	341.0	97%	290
565116026	Neosho River 348	334.0	331.7	99%	348
565116027	Neosho River 406	321.0	312.0	97%	406
565116028	Neosho River 464	347.0	341.2	98%	464
565116029	Neosho River 522	344.0	333.0	97%	522
565116030	Neosho River 580	313.0	290.7	93%	580
565116031	Tar Creek 22	32.9	26.7	81%	22
565116032	Tar Creek 29	36.7	15.8	43%	29
565116033	***Tar Creek 44***	***16.0***	***-3.0***	***-19%***	***44***
565116034	Tar Creek 59	23.2	22.2	96%	59
565116035	Tar Creek 74	28.3	25.4	90%	74
565116036	Tar Creek 89	31.7	27.4	86%	89
565116037	Tar Creek 104	30.0	27.1	90%	104
565116038	***Tar Creek 119***	***23.1***	***26.1***	***113%***	***119***
565116039	Tar Creek 134	23.1	12.5	54%	134
565116040	***Tar Creek 149***	***9.4***	***-9.9***	***-105%***	***149***
		Average sheet			88%

Table D-6
Suspended Sediment Concentrations (May 28, 2021)

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-7
Suspended Sediment Concentrations (June 15, 2021)

Sample	Location (Stream, Station in feet)	Concentration (mg/L)		% < 63 µm
		Total	< 63 µm	
560944001/2	Neosho River 350	118.0	108.31	92%
560944003/4	Neosho River 300	139.0	86.64	62%
560944005/6	Neosho River 250	104.0	85.42	82%
560944007/8	Neosho River 200	104.0	91.92	88%
560944009/10	Neosho River 150	98.5	87.21	89%
560944011/12	Neosho River 100	98.0	83.78	85%
560944013/14	Spring River 230	21.0	16.27	77%
560944015/16	Spring River 203	18.7	15.21	81%
560944017/18	Spring River 68	20.1	17.50	87%
560944019/20	Spring River 41	22.2	17.33	78%
560944021/22	Neosho River 450	112.0	103.40	92%
560944023/24	Neosho River 400	114.0	105.73	93%
560944025/26	Spring River 176	21.3	15.23	71%
560944027/28	Spring River 149	18.8	15.90	85%
560944029/30	Spring River 122	20.0	16.28	81%
560944031/32	Spring River 95	19.0	15.55	82%
560944033/34	Spring River 14	35.0	16.54	47%
560944035/36	Spring River 257	31.0	22.98	74%
560944037/38	Neosho River 50	99.1	86.94	88%
560944039/40	Neosho River 0	125.0	95.74	77%
560944041/42	Tar Creek 9			
		Average sheet		81%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer

Table D-8
Suspended Sediment Concentrations (July 1, 2021)

Sample	Location (Stream, Station in feet)	Concentration (mg/L) Total	< 63 µm	% < 63 µm
572634001	Neosho River 32	102.0	42.90	42%
572634002	Neosho River 95.5	109.0	97.29	89%
572634003	Neosho River 159	135.0	108.55	80%
572634004	Neosho River 222.5	141.0	110.08	78%
572634005	Neosho River 286	130.0	108.31	83%
572634006	Neosho River 349.5	109.0	105.12	96%
572634007	***Neosho River 413***	***90.1***	***90.84***	***101%***
572634008	Neosho River 476.5	95.4	72.09	76%
572634009	Neosho River 540	81.7	65.26	80%
572634010	Neosho River 572	81.4	64.17	79%
572634011	Spring River 14	113.0	99.34	88%
572634012	Spring River 42	115.0	101.57	88%
572634013	Spring River 70	114.0	94.39	83%
572634014	Spring River 98	119.0	99.04	83%
572634015	Spring River 126	116.0	102.44	88%
572634016	Spring River 154	116.0	101.33	87%
572634017	Spring River 182	118.0	104.10	88%
572634018	Spring River 210	116.0	105.06	91%
572634019	Spring River 238	112.0	102.32	91%
572634020	Spring River 266	113.0	97.64	86%
572634021	Tar Creek 23	33.1	21.74	66%
572634022	Tar Creek 68.5	31.3	23.32	75%
572634023	Tar Creek 114	31.6	22.45	71%
572634024	Tar Creek 159.5	31.9	25.76	81%
572634025	Tar Creek 205	30.6	24.07	79%
572634026	Tar Creek 250.5	31.6	22.19	70%
572634027	Tar Creek 296	29.3	23.46	80%
572634028	Tar Creek 341.5	29.4	23.87	81%
572634029	Tar Creek 387	27.7	21.05	76%
572634030	Tar Creek 410	27.8	20.40	73%
		Average sheet		80%

Sampling Locations:

Neosho River near Commerce, OK; E 60 Rd Bridge - USGS 07185000

Tar Creek near Commerce, OK; HWY 69 Bridge - USGS 07185090

Spring River near Quapaw, OK; E 57 Rd Bridge - USGS 07188000

Elk River near Tiff City, MO; HWY 43 Bridge - USGS 07189000

Notes:

Bold indicates data are invalid and were not used in analysis.

mg/L: milligram per liter

µm: micrometer