2023 Sediment Pre-Design Investigation Report

Orrington Reach Capping Remedy

Prepared for

Greenfield Penobscot Estuary Remediation Trust LLC,
Trustee for Penobscot Estuary Mercury Remediation Trust

Prepared by

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ACRONYMS AND ABBREVIATIONS

ASTM	ASTM International
bss	below sediment surface
Greenfield	Greenfield Penobscot Estuary Remediation Trust LLC
Integral	Integral Consulting Inc.
FSP	field sampling plan
PDI	pre-design investigation
QAPP	quality assurance project plan
Remediation Trust	Penobscot Estuary Mercury Remediation Trust
TLC	thin layer cap
TOC	total organic carbon
WSP	WSP USA Environment & Infrastructure, Inc.

1 INTRODUCTION

This 2023 Sediment Pre-Design Investigation (PDI) Report (2023 Sediment PDI Report) has been prepared pursuant to the Consent Decree (Case No. 1.00-cb-00069-JAW, ECF No. 1187) between Maine People's Alliance and Natural Resources Defense Council, Inc. vs. HoltraChem Manufacturing Company, LLC, and Mallinckrodt US LLC entered by the U.S. District Court for the District of Maine on October 11, 2022, and in accordance with Paragraph 5 of the Statement of Work, Appendix A to the Consent Decree. This PDI Report was prepared by Integral Consulting Inc. (Integral) on behalf of the Greenfield Penobscot Estuary Remediation Trust LLC (Greenfield), Trustee of the Penobscot Estuary Mercury Remediation Trust (the Remediation Trust) for Work on the Penobscot River Estuary located in Hancock, Penobscot, and Waldo counties, Maine.

Paragraph I.M of the Consent Decree identifies remediation work for three reaches of the Penobscot River Estuary with the goals of reducing mercury exposure and accelerating recovery of the Estuary. As described in the Consent Decree, the Work in Orrington Reach involves capping of 130 acres of intertidal sediment, primarily on the east side of the Penobscot River Estuary between Orrington and Bucksport (Figure 1). Orrington Reach is directly south (downstream) of the former HoltraChem facility in Orrington, Maine. A thin layer cap (TLC) has been selected to reduce surface sediment concentrations and minimize potential negative impacts of thicker isolation caps to the intertidal flat ecosystems.

The TLC Design Work Plan (Integral 2023a): provides the background for Orrington Reach remediation work; identifies the objectives, requirements, and preliminary design basis to be met by the Orrington Reach remediation work based on the currently available data/understanding; describes the project approach and identifies the data collection and analyses recommended to support the design; and includes a summary of the rationale for why the information is needed and a recommended scope of data collection and analyses for the investigations.

The Sediment PDI Work Plan (Work Plan) (Integral 2023b) provides the approach to addressing the data gaps identified in the TLC Design Work Plan that require investigation of intertidal sediment in Orrington Reach and documents the scope, process, and strategy for sample collection. The Orrington Reach Sediment PDI is being conducted in the following phases:

- 2023 Sediment PDI: The first phase of investigation consists of collection of intertidal surface sediment samples for mercury and total organic carbon (TOC) analysis, and for assessment of geotechnical index properties.
- 2024 TLC Pilot Project PDI: This phase includes additional evaluation of sediment geotechnical properties, assessment of benthic habitat (including the depth of biological

activity/mixing), and completion of benthic invertebrate surveys. The scope (e.g., the number and location of samples) of the 2024 TLC Pilot Project PDI will be informed by the results of the 2023 investigation and the variability in the geotechnical index parameters across Orrington Reach.

This 2023 Sediment PDI Report presents work performed in August 2023. The work documented herein was completed in accordance with the Work Plan (Integral 2023b) except for deviations discussed below.

This 2023 Sediment PDI Report has been prepared in accordance with the Consent Decree and appendices, including Paragraph 6(b) of the Statement of Work (Appendix A to the Consent Decree), as summarized in Table 1, and includes (i) a summary of the investigations performed; (ii) a summary of the investigation results; (iii) summaries of validated data; (iv) summaries of data validation reports and laboratory data reports; (v) narrative interpretation of data and results, including how the investigation objectives and data quality objectives were satisfied; (vi) results of statistical analyses; (vii) summary of photographs documenting the work conducted; and (viii) conclusions and recommendations for the Work Design.

2 INVESTIGATION SUMMARY

The 2023 Sediment PDI consisted of collection of sediment from seven coves in Orrington Reach and analyses for mercury, TOC, and geotechnical parameters including grain size, bulk density, and Atterberg limits following the methodology described in the Penobscot Estuary Remediation Field Sampling Plan (FSP; WSP 2023a) and the Work Plan (Integral 2023b).

The schedule for the 2023 Sediment PDI was:

- Field mobilization August 14, 2023
- Sediment sample collection August 14–18, 2023
- Analytical chemistry sample processing August 18, 2023
- Field demobilization August 18, 2023
- Geotechnical sample processing September 14, 2023
- Analytical chemistry laboratory analysis September through October 2023
- Geotechnical laboratory analysis October 2023
- Data validation November 2023
- Data review and analysis November through December 2023.

The following presents details regarding sediment sample collection and processing, laboratory analysis, and data validation, and deviations from the Work Plan.

2.1 SAMPLE COLLECTION EVENT

Sediment sample collection was performed from August 14 to 18, 2023. Integral was supported by WSP USA Environment & Infrastructure, Inc. (WSP) during the August 2023 event. WSP subcontracted Aqua Survey, Inc. to provide the sampling vessel and equipment, and provided personnel to assist with sample collection.

2.1.1 Sample Locations

Surface sediment samples were collected from 34 sample locations across 7 coves in Orrington Reach. Tables 2 and 3 provide the sample locations and collection methods for the analytical chemistry and geotechnical samples, respectively. Figures 2 through 4 present the August 2023 sediment sample locations. Sample locations were adjusted from the proposed locations in the Work Plan based on the following conditions:

- Updated bathymetric and topographical surveys

- Preliminary wetland and vegetation data
- Property access granted by the property owner.

Sample locations were further adjusted during the sampling event based on field conditions (e.g., presence of roots, vegetation, rocky conditions).

Two sampling locations, OR-PDI-58 and OR-PDI-59, in the western shoreline cove area designated as "Area F" (Figure 3), were added to the study per discussions with the Remediation Trust during the August 2023 sampling event. Samples were not collected from 25 of the locations identified in the Work Plan because property owners did not grant access to collect the proposed samples (Table 4).

2.1.2 Sample Collection Methods

Surface sediment samples were collected using a Ponar dredge and/or box core device following the methodology described in the FSP and the Work Plan. Table 2 provides sample collection information for samples collected for mercury and TOC analysis (analytical chemistry samples). Table 3 provides sample collection information for samples collected for geotechnical index property analysis (geotechnical samples). The following provides additional details regarding sample collection and deviations from the Work Plan.

2.1.2.1 Analytical Chemistry Sample Collection

The Work Plan specified that sample collection for analytical chemistry analysis would be performed via Ponar dredge at all locations. Ponar dredge recovery was anticipated to be 0.5 ft below sediment surface (bss). The following deviations from the Work Plan occurred during analytical chemistry sample collection:

- The sample depth interval was less than 0.5 ft bss at three locations due to difficulty triggering the sampling device to close: East Cove 3 location OR-PDI-07, Bartlett Cove location OR-PDI-27, and Area F location OR-PDI-59 (Table 2).
- The samples from locations OR-PDI-07 and OR-PDI-27 were collected by box core after multiple attempts using the Ponar dredge did not recover sufficient sample volume as the Ponar dredge did not close fully.
- At East Cove 3 location OR-PDI-07 (Figure 2) and East Cove 7 OR-PDI-40 (Figure 4), analytical chemistry samples were collected using the box core because the Ponar dredge did not recover sediment despite multiple attempts. The soft sediment present at these locations did not trigger the pin-release mechanism of the Ponar to close.

2.1.2.2 Geotechnical Sample Collection

The Work Plan proposed collection of sediment samples via box core from 11 locations for geotechnical analysis. During the August 2023 sampling event, the box core was utilized at 12 locations for geotechnical analysis. One additional box core was collected at location OR-PDI-58, one of the two added Area F sampling locations.

The Work Plan stated that the box core would be deployed to collect samples to 1.5 ft bss to allow for observations of lithology variability with depth. However, refusal of the box core occurred at 0.5 to 0.8 ft bss—preventing sampling for lithologic characterization at greater depths at all but two locations. The following efforts were taken in an attempt to collect sediment samples for lithologic characterization to 1.5 ft bss:

- The field crew repeatedly encountered refusal of the box core at 0.5 to 0.8 ft bss and, based on previous experience, theorized that there is a denser underlying layer preventing further penetration. At East Cove 7 location OR-PDI-41, the field crew attempted to push a high-density polyethylene Lexan liner to collect a deeper sample, but could not advance the Lexan liner deeper than the box core taken at the same location, despite exerting a greater force. The Lexan liner was also attempted at East Cove 3 location OR-PDI-04 (Figure 2); however, no sediment was recovered in this attempt.
- A slam bar was used at East Cove 7 locations OR-PDI-33 and OR-PDI-34 (Figure 4) to attempt to collect sediment from a deeper depth interval than that achieved by the box core:
  - OR-PDI-33 was sampled to 1.5 ft bss with the slam bar. No difference in sample material, which was identified as silt, was observed across the 0- to 1.5-ft bss interval as compared to the 0- to 0.5-ft bss sample that was collected via Ponar dredge, and the material collected by the slam bar was not submitted for analysis.
  - OR-PDI-34 was sampled to 1.8 ft bss with the slam bar. Silt was observed from 0 to 1.5 ft bss. Very fine brown woody fibers were observed in a less than 0.25-in.-thick layer at 1.3 ft bss. A separate lithologic layer described as silty clay was identified from 1.5 to 1.8 ft bss. Because separate lithology layers were observed, two separate geotechnical samples, one from 0 to 1.5 ft bss and one from 1.5 to 1.8 ft bss, were collected from this location and submitted for analysis.
  - The slam bar method was not used again during the August 2023 event as it was determined by the field crew to potentially be unsafe.

Two samples collected from location OR-PDI-34 via slam bar were submitted for geotechnical analyses. One sample was submitted for geotechnical analysis from the other sampling locations.

2.1.2.3 Woody Debris Sample Collection

Wood waste has been observed as an ephemeral deposit on the surface of intertidal flats during past investigations at the site. Given the limited data available to quantify the extent or persistence of wood waste in Orrington Reach, the Work Plan specified that the presence or absence of wood waste on and/or in intertidal flat sediment would be recorded for all samples collected as part of the Sediment PDI. Additional samples were to be collected for mercury and TOC concentration analysis if woody debris was present as a discrete layer of sufficient thickness (greater than 0.5 in.).

Sediment from all locations was reviewed for the presence of woody debris during the August 2023 sampling event. Wood waste was observed in only one location, OR-PDI-34 in East Cove 7. The wood waste at OR-PDI-34 was noted to consist of very fine woody fibers within the sediment matrix. These materials were not present as a discrete layer of greater than 0.5 in., and a separate wood waste sample was not collected.

2.2 SAMPLE PROCESSING AND ANALYSIS

Samples were packaged and submitted to the laboratory in accordance with standard operating procedures S-19 and S-20 of the FSP (WSP 2023a). Thirty-four sediment PDI samples were sent to the following analytical laboratories:

- Eurofins Seattle for mercury analysis by CWA 1631B/E
- Eurofins Pittsburgh for TOC analysis by EPA Lloyd Kahn.

Table 5 presents the validated mercury and TOC results for these samples.

Thirty-five sediment PDI samples were sent to GeoTesting Express for the following analyses:

- Atterberg limits by ASTM International (ASTM) D4318
- Bulk density by ASTM 7263
- Moisture content by ASTM D2216
- Sediment grain size by ASTM D6913-sieve and D7928-hydrometer.

Table 6 presents the geotechnical results for these samples. Appendix C contains the Eurofins and GeoTesting Express laboratory reports.

2.3 QUALITY CONTROL AND QUALITY ASSURANCE

Quality control and quality assurance samples were collected per the project FSP and Quality Assurance Project Plan (QAPP; WSP 2023a,b). Data validation was performed by WSP in October 2023. Appendix D contains the WSP data validation report. Per the QAPP, a Stage 2B data validation was completed on all mercury and TOC sample data groups, and a Stage 3 data validation was completed on 10% of mercury and TOC samples. Per the QAPP, geotechnical data did not require data validation.

Data validation results indicated that the 2023 sediment data are useable and of acceptable quality with the addition of two data validation qualifiers: two TOC samples were qualified as being estimated values (*J*-qualified) because of low recoveries in the associated matrix spike and matrix spike duplicate. Based on the data validation, 100% of the data are considered usable for project purposes.

3 INVESTIGATION RESULTS

The following presents the August 2023 Orrington Reach sediment collection results and analysis.

3.1 ANALYTICAL CHEMISTRY DATA

August 2023 sediment mercury concentrations were consistent with historical Orrington Reach intertidal sediment mercury concentration data, as presented in the Design Work Plan (Integral 2023a):

- Mercury concentrations ranged from 160 to 2,100 ng/g and were of the same magnitude as those in the historical data set.
- The highest mercury concentration (2,100 ng/g) in the August 2023 data was observed in East Cove 2, immediately downstream of Southern Cove.
- Mean mercury concentrations decreased in each eastern shoreline cove downstream.
- Sediment mercury concentrations were generally lower in samples collected from western shoreline coves (Area F and Bald Hill Cove) compared to the eastern shoreline coves (Table 7).

Mercury and TOC data from the August 2023 samples are presented in Table 5. Table 7 presents a statistical summary of the August 2023 and historical intertidal sediment mercury data, organized by cove. Figures 5 through 7 present the August 2023 and historical intertidal sediment mercury data colorized using the same concentration bins; sediment PDI sample locations that were not sampled in August 2023 are indicated with a smaller pink symbol.

August 2023 TOC ranged from 0.67 to 13%; the median TOC was 6.9% (Table 5).

3.2 GEOTECHNICAL DATA

Table 6 presents the geotechnical data for the August 2023 sampling event. Generally, the August 2023 sediment geotechnical data set exhibited a low level of variability. The following was observed from the August 2023 samples:

- Eighty-eight percent (88%)—or 31 out of 35—samples were classified as predominantly (>60 percent) fine-grained material. The description provided by GeoTesting Express for most samples was "wet, very dark grayish brown silt," with some samples also noted as "wet, very dark grayish brown silt with sand."

- More than ninety percent (90%)—or 33 out of 35 samples—exhibited plasticity during the Atterberg Limits test.
- The three (3) East Cove 2 samples contained higher sand content than nearly all other August 2023 samples.
- Bartlett Cove samples collected from locations OR-PDI-21, OR-PDI-22, and OR-PDI-23 were roughly positioned in a transect from nearer the edge of the subtidal to nearshore (roughly west to east across the intertidal area). These samples showed little variation from one another and were all classified as elastic silt with approximately 7% to 9 % TOC.
- The sample collected from Area F on the west side of Orrington Reach at location OR-PDI-59 was an outlier in the August 2023 data set. This sample contained 71.4 % sand and was classified as silty sand and nonplastic. This sample contained the lowest TOC and mercury values in the August 2023 data set (0.67% TOC and 160 ng/g mercury). Review of available bathymetric data indicates the intertidal area is very narrow in this portion of the river, and may not be suitable for capping.
- Two geotechnical samples were collected from East Cove 7 location OR-PDI-34, based on field observations of a variance in lithology in the 0- to 1.5-ft bss and 1.5- to 1.8-ft bss intervals. Very fine brown woody fibers were observed intermixed with silt in a very thin layer of less than 0.25 in. thick at 1.3 ft bss. The 0- to 1.5-ft sample exhibited a higher moisture content and a lower density; both samples were classified by GeoTesting Express as elastic silt.

4 CONCLUSIONS

The 2023 sediment PDI work was completed as described in the Work Plan, with the deviations noted herein, and the work plan objectives were achieved. The 2023 sediment data will be used in the development of the focused scope for the 2024 TLC Pilot Project PDI, to be presented in a TLC Pilot Project PDI Work Plan (Integral, in preparation), and in the design for the TLC Pilot Project, as discussed further below.

Mean sediment mercury concentrations across the sampled coves decreased from upstream to downstream. Lower sediment mercury concentrations were observed in the two coves sampled on the western shoreline, Area F and Bald Hill Cove, as compared to those on the eastern shoreline. These results support the selection of East Cove 3 as the Site of the TLC Pilot Project, an area near the upstream end of Orrington Reach.

The 2023 sediment mercury concentrations were generally of the same magnitude as the historical Orrington Reach data set. This indicates a TLC could accelerate recovery in Orrington Reach by reducing surface sediment mercury concentrations.

The 2023 sediment PDI geotechnical data exhibited a low level of variability, with no clear pattern observed from upstream to downstream or laterally across intertidal sediment in Orrington Reach. Nearly all sediment samples were described as wet, very dark grayish brown silt. Further geotechnical testing is needed to understand lithology variability with depth and to refine the design for the thickness and placement of the cap by analyzing bearing capacity, subgrade consolidation, and slope stability.

Woody debris was observed in only one location and was not present at that location in sufficient quantity to sample. These data suggest that the role of woody debris accumulation as a source of mercury redistribution to intertidal flat sediment is not likely to be significant and is unlikely to be a source of recontamination to the TLC following placement. The presence or absence of woody debris will be further observed using sediment-profile imaging and during coring in the 2024 TLC Pilot Project PDI.

5 REFERENCES

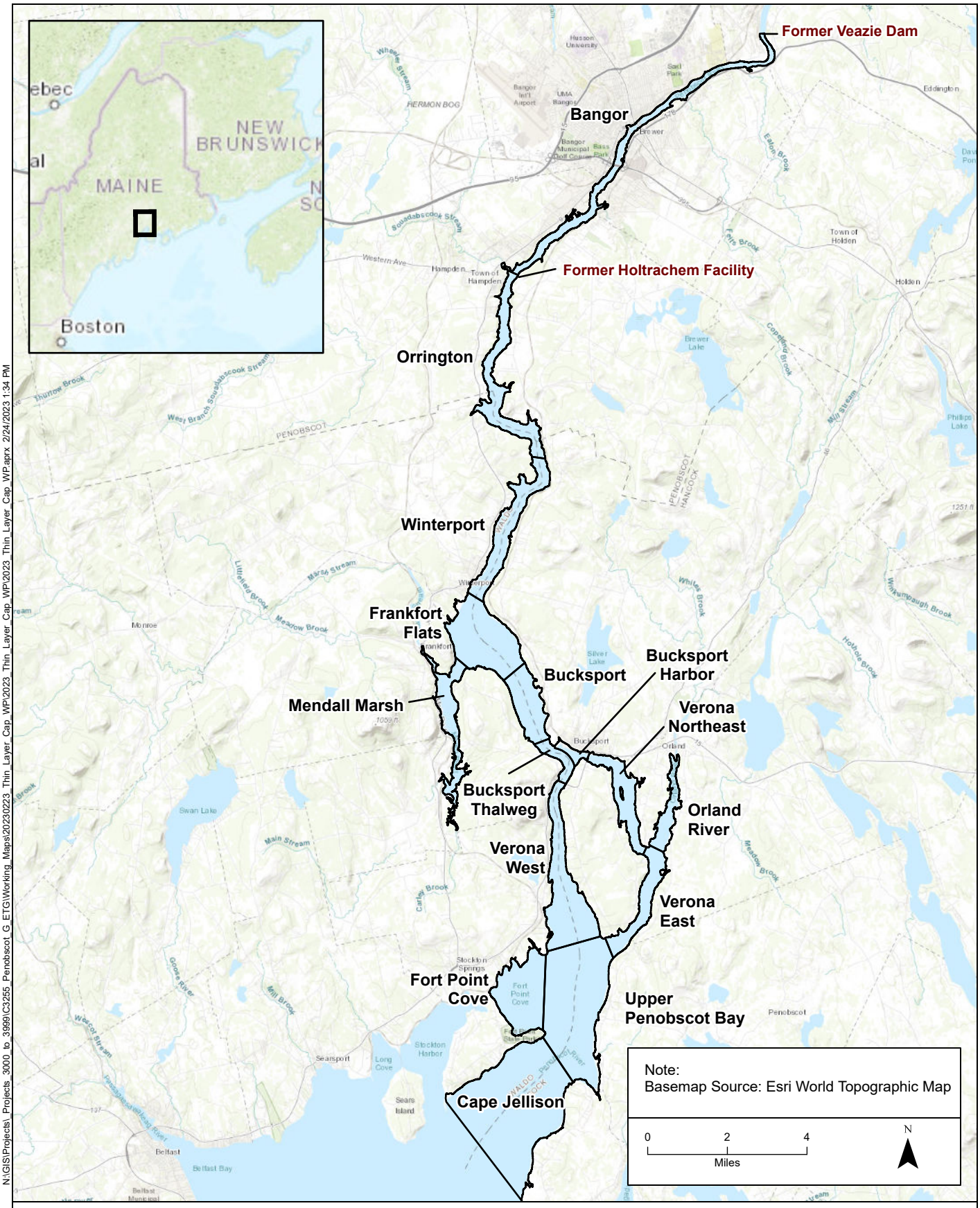
Integral. 2023a. TLC design work plan, Orrington Reach. Prepared for the Penobscot Remediation Trust. Integral Consulting Inc. July 2023.

Integral. 2023b. Sediment pre-design investigation work plan, Orrington Reach. Prepared for the Penobscot Remediation Trust. Integral Consulting Inc. August 2023.

WSP. 2023a. Field sampling plan, Penobscot Estuary remediation. Greenfield Penobscot Estuary Remediation Trust LLC. WSP USA Environment & Infrastructure, Inc. March 10.

WSP. 2023b. Quality assurance project plan, Penobscot Estuary remediation. Greenfield Penobscot Estuary Remediation Trust LLC. WSP USA Environment & Infrastructure, Inc. March 10.

Figures



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Trustee of the Penobscot Estuary Mercury Remediation Trust

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Figure 1.
Penobscot River Reaches
2023 Sediment PDI Report
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March 2024

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Figure 2.
August 2023 Sediment Sample Collection – Southern Cove, East Cove 2, and East Cove 3
2023 Sediment PDI Report
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March 2024

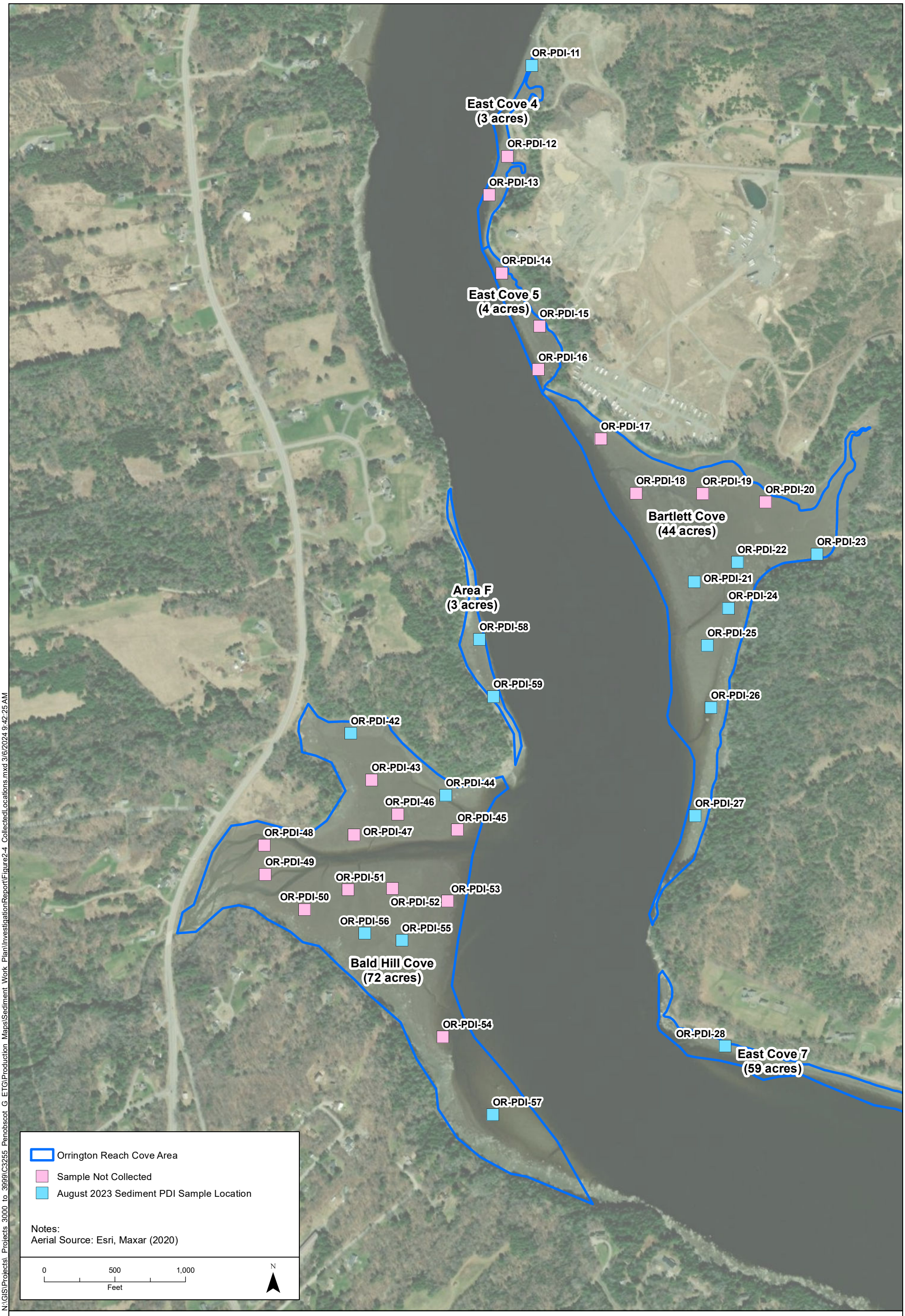

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Figure 3.
August 2023 Sediment Sample Collection – East Cove 4, East Cove 5, Bartlett Cove, Area F, and Bald Hill Cove
2023 Sediment PDI Report
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March 2024

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Figure 4.
August 2023 Sediment Sample Collection – East Cove 7
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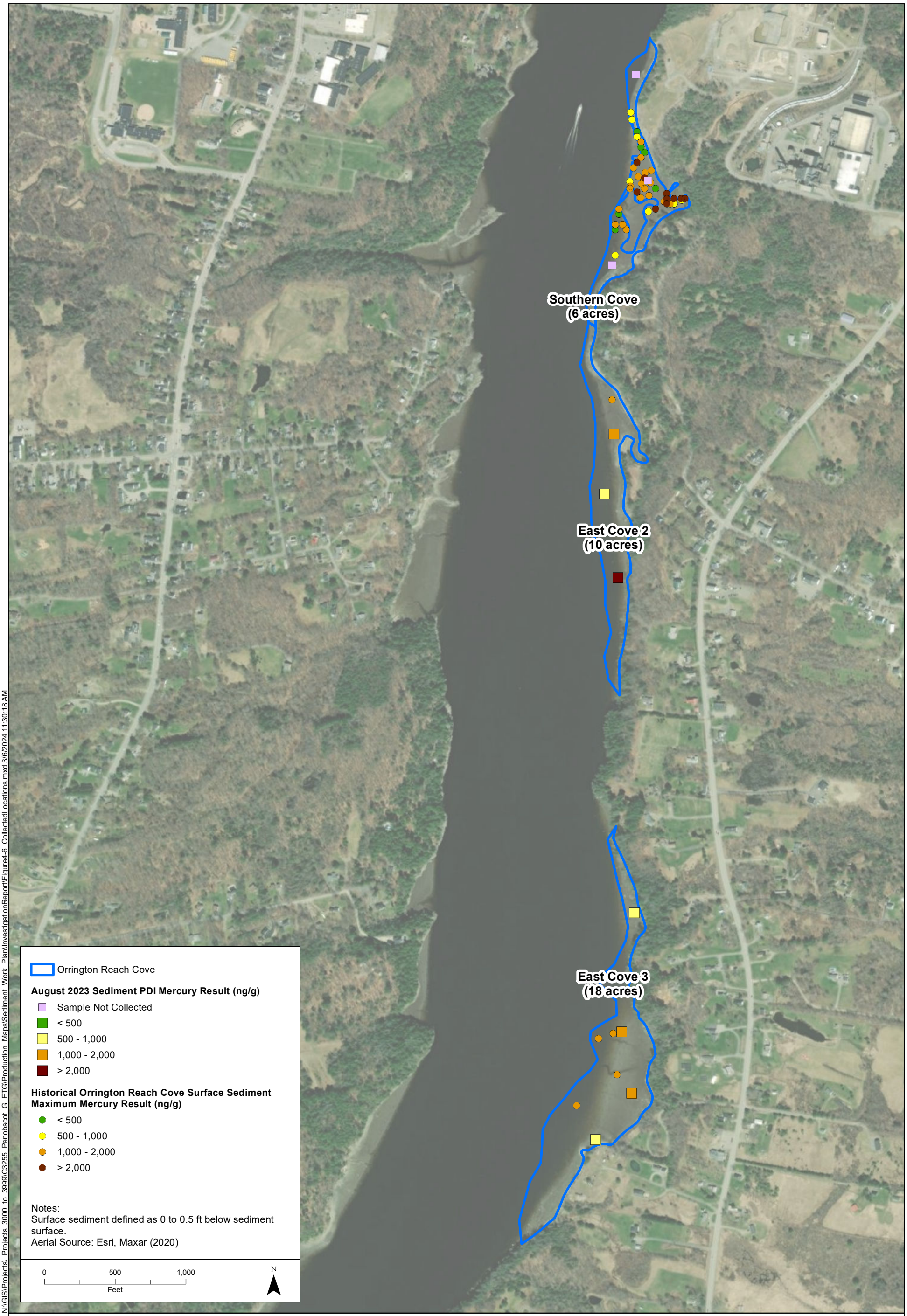

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Figure 5.
Orrington Reach Cove Area Sediment Mercury Data –
Southern Cove, East Cove 2, and East Cove 3
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March 2024

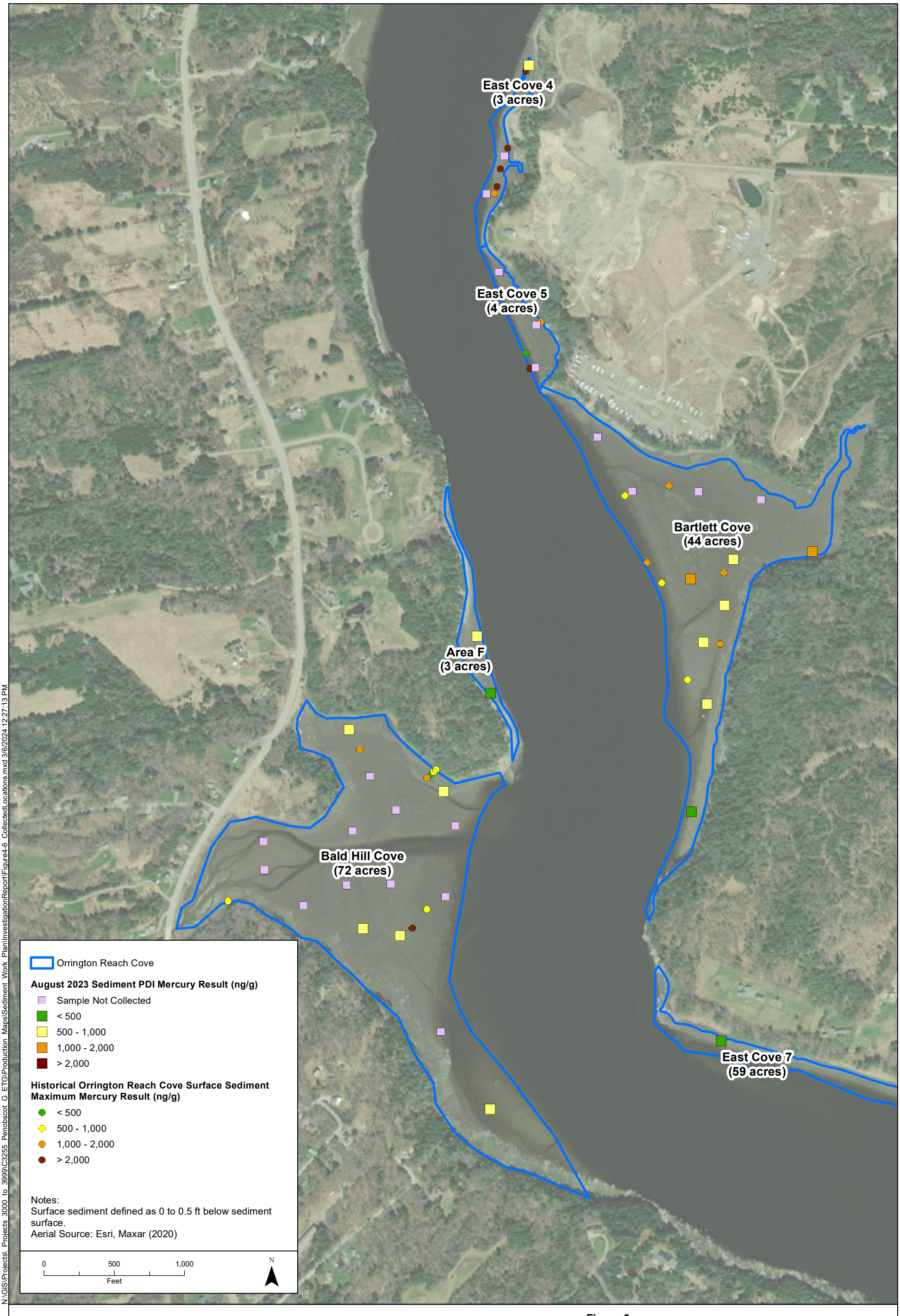

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Figure 6.
Orrington Reach Cove Area Sediment Mercury Data –
East Cove 4, East Cove 5, Bartlett Cove, Area F, and Bald Hill Cove
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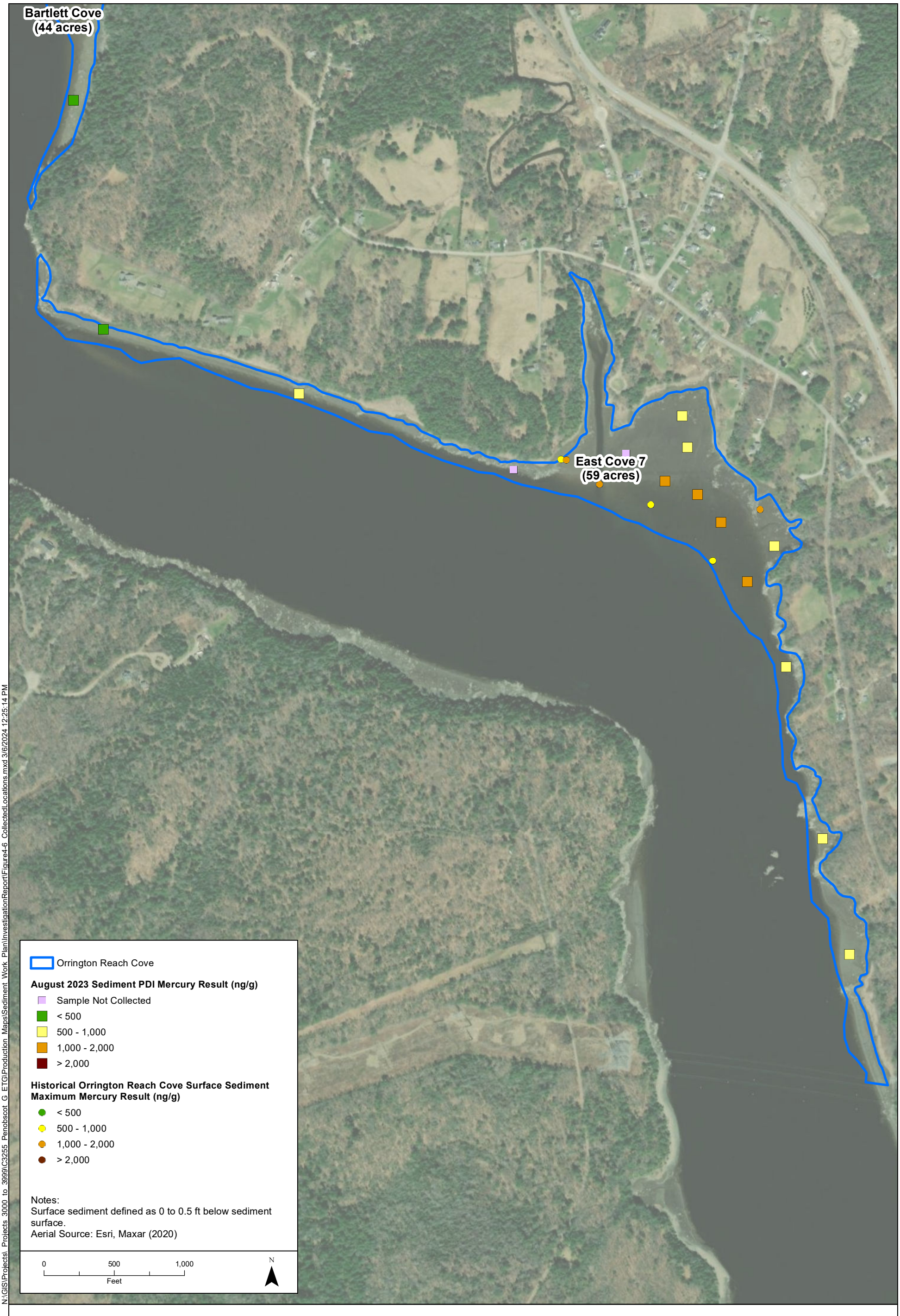

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Figure 7.
Orrington Reach Cove Area Sediment Mercury Data – East Cove 7
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Tables

Table 1. Statement of Work Compliance

Statement of Work Requirement		Investigation Report Section
¶ 6(b)(i) A summary of the investigations performed	✓	Section 2
¶ 6(b)(ii) A summary of the investigation results	✓	Section 3
¶ 6(b)(iii) Summaries of validated data (i.e., tables and graphics)	✓	Section 3, Tables, Figures
¶ 6(b)(iv) Summaries of data validation reports and laboratory data reports	✓	Appendices C and D
¶ 6(b)(v) Narrative interpretation of data and results, including how Investigation objectives and DQOs were satisfied	✓	Sections 3 and 4
¶ 6(b)(vi) Results of statistical and modeling analyses	✓	Section 3, Table 7
¶ 6(b)(vii) Summary photographs documenting the work conducted	✓	Appendix B
¶ 6(b)(viii) Conclusions and recommendations for Work Design, including any resulting modifications to design parameters and criteria provided for in the Basis of Design or other Deliverables	✓	Section 4

Notes:
DQO = data quality objective

Table 2. August 2023 Orrington Reach Sediment PDI Analytical Chemistry Sample Collection Summary

Cove Name	Location ID	Sample ID	Collection Date	Coordinates		Collection Method			Notes
				Easting (ft)	Northing (ft)	Sample Depth (ft bss)	Ponar Dredge	Box Core	
Eastern Bank of Orrington Reach									
East Cove 2	OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	8/16/2023	898564.27	388845.12	0.0-0.5	X		
East Cove 2	OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_C	8/16/2023	898493.58	388421.88	0.0-0.5		X	Sample collected with box core due to poor Ponar recovery.
East Cove 2	OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	8/16/2023	898585.24	387829.23	0.0-0.5	X		
East Cove 3	OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	8/16/2023	898687.34	385455.91	0.0-0.4		X	Sample collected with box core as Ponar would not close on soft sediment.
East Cove 3	OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.5_C	8/16/2023	898592.33	384614.25	0.0-0.5	X		
East Cove 3	OR-PDI-09	OR-PDI-09_081623_SED_0.0-0.5_C	8/16/2023	898658.96	384179.79	0.0-0.5	X		
East Cove 3	OR-PDI-10	OR-PDI-10_081623_SED_0.0-0.5_C	8/16/2023	898403.15	383852.29	0.0-0.5	X		
East Cove 4	OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.5_C	8/17/2023	896408.91	381010.88	0.0-0.5		X	Sample collected with box core as Ponar would not close on soft sediment.
Bartlett Cove	OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C	8/17/2023	897538.39	377344.47	0.0-0.5	X		
Bartlett Cove	OR-PDI-22	OR-PDI-22_081723_SED_0.0-0.5_C	8/17/2023	897844.49	377481.60	0.0-0.5	X		
Bartlett Cove	OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C	8/17/2023	898408.50	377535.53	0.0-0.5	X		
Bartlett Cove	OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	8/16/2023	897780.29	377155.57	0.0-0.5	X		
Bartlett Cove	OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.5_C	8/16/2023	897627.26	376894.63	0.0-0.5	X		
Bartlett Cove	OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C	8/16/2023	897650.76	376451.53	0.0-0.5	X		
Bartlett Cove	OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C	8/16/2023	897533.47	375687.02	0.0-0.3		X	Sample collected using box core due to presence of gravel.
East Cove 7	OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	8/15/2023	897736.45	374052.22	0.0-0.5	X		
East Cove 7	OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	8/15/2023	899127.71	373587.16	0.0-0.5	X		
East Cove 7	OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C	8/18/2023	901858.42	373410.38	0.0-0.5	X		
East Cove 7	OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C	8/18/2023	901895.72	373186.76	0.0-0.5	X		
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_0.0-0.5_C	8/18/2023	901733.98	372947.73	0.0-0.5	X		
East Cove 7	OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	8/18/2023	901965.30	372850.23	0.0-0.5	X		
East Cove 7	OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C	8/18/2023	902131.73	372650.27	0.0-0.5	X		
East Cove 7	OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C	8/15/2023	902511.34	372479.45	0.0-0.5	X		
East Cove 7	OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	8/15/2023	902316.81	372228.53	0.0-0.5	X		
East Cove 7	OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	8/15/2023	902589.60	371619.76	0.0-0.5	X		
East Cove 7	OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C	8/15/2023	902841.82	370392.32	0.0-0.5		X	Sample collected with box core as Ponar would not close on soft sediment.
East Cove 7	OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.5_C	8/15/2023	903029.62	369568.38	0.0-0.5	X		
Western Bank of Orrington Reach									
Bald Hill Cove	OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	8/17/2023	895095.80	376286.98	0.0-0.5	X		Sample required three Ponar drops due to Ponar recovering vegetation and roots at each drop.
Bald Hill Cove	OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C	8/17/2023	895767.34	375842.43	0.0-0.5	X		
Bald Hill Cove	OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C	8/17/2023	895449.89	374815.19	0.0-0.5	X		
Bald Hill Cove	OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.5_C	8/17/2023	895186.60	374867.56	0.0-0.5	X		
Bald Hill Cove	OR-PDI-57	OR-PDI-57_081723_SED_0.0-0.5_C	8/17/2023	896085.81	373577.46	0.0-0.5	X		
Area F	OR-PDI-58	OR-PDI-58_081623_SED_0.0-0.5_C	8/16/2023	896011.80	376945.45	0.0-0.5	X		Sample not proposed in Sediment PDI Work Plan; added during investigation.
Area F	OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_C	8/17/2023	896110.05	376540.05	0.0-0.3	X		Sample not proposed in Sediment PDI Work Plan; added during investigation.

Notes:
Coordinates are provided in Maine State Plane, North American Datum 1983, ft

bss = below sediment surface
PDI = pre-design investigation

Table 3. August 2023 Orrington Reach Sediment PDI Geotechnical Sample Collection Summary

Cove Name	Station ID	Sample ID	Collection Date	Coordinates		Sample Depth (ft bss)	Collection Method			Notes
				Easting (ft)	Northing (ft)		Ponar Dredge	Box Core	Slam Bar	
Eastern Bank of Orrington Reach										
East Cove 2	OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	8/16/2023	898564.27	388845.12	0.0-0.5	X			
East Cove 2	OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_G	8/16/2023	898493.58	388421.88	0.0-0.5		X		
East Cove 2	OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	8/16/2023	898585.24	387829.23	0.0-0.5	X			
East Cove 3	OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	8/16/2023	898687.34	385455.91	0.0-0.4		X		
East Cove 3	OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.8_G	8/16/2023	898592.33	384614.25	0.0-0.8		X		
East Cove 3	OR-PDI-09	OR-PDI-09_081623-SED_0.0-0.8_G	8/16/2023	898658.96	384179.79	0.0-0.8		X		
East Cove 3	OR-PDI-10	OR-PDI-10_081623-SED_0.0-0.5_C	8/16/2023	898403.15	383852.29	0.0-0.5	X			Sample collected on ninth deployment due to presence of gravel.
East Cove 4	OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.6_G	8/17/2023	896408.91	381010.88	0.0-0.6		X		
Bartlett Cove	OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C	8/17/2023	897538.39	377344.47	0.0-0.5	X			
Bartlett Cove	OR-PDI-22	OR-PDI-22_081723_SED_0.0-1.0_G	8/17/2023	897844.49	377481.60	0.0-1.0	X			
Bartlett Cove	OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C	8/17/2023	898408.50	377535.53	0.0-0.5	X			
Bartlett Cove	OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	8/16/2023	897780.29	377155.57	0.0-0.5	X			
Bartlett Cove	OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.7_G	8/16/2023	897627.26	376894.63	0.0-0.7		X		
Bartlett Cove	OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C	8/16/2023	897650.76	376451.53	0.0-0.5	X			
Bartlett Cove	OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C	8/16/2023	897533.47	375687.02	0.0-0.3		X		Sample collected on third deployment using box core due to presence of gravel.
East Cove 7	OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	8/15/2023	897736.45	374052.22	0.0-0.5	X			
East Cove 7	OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	8/15/2023	899127.71	373587.16	0.0-0.5	X			
East Cove 7	OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C	8/18/2023	901858.42	373410.38	0.0-0.5	X			
East Cove 7	OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C	8/18/2023	901895.72	373186.76	0.0-0.5	X			Slam bar collected material to 1.5 ft bss; Ponar dredge material submitted for geotechnical analysis.
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_0.0-1.5_G	8/18/2023	901733.98	372947.73	0.0-1.5			X	Very fine woody debris observed intermixed with silt at 1.3 ft bss.
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_1.5-1.8_G	8/18/2023	901733.98	372947.73	1.5-1.8			X	Distinct lithologic layer with greater clay content than overlying material identified.
East Cove 7	OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	8/18/2023	901965.30	372850.23	0.0-0.5	X			
East Cove 7	OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C	8/18/2023	902131.73	372650.27	0.0-0.5	X			
East Cove 7	OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C	8/15/2023	902511.34	372479.45	0.0-0.5	X			
East Cove 7	OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	8/15/2023	902316.81	372228.53	0.0-0.5	X			
East Cove 7	OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	8/15/2023	902589.60	371619.76	0.0-0.5	X			
East Cove 7	OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C	8/15/2023	902841.82	370392.32	0.0-0.5		X		Sample collected with box core as Ponar would not close on soft sediment.
East Cove 7	OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.8_G	8/15/2023	903029.62	369568.38	0.0-0.8		X		
Western Bank of Orrington Reach										
Bald Hill Cove	OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	8/17/2023	895095.80	376286.98	0.0-0.5	X			Sample required three Ponar drops due to Ponar recovering vegetation and roots at each drop.
Bald Hill Cove	OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C	8/17/2023	895767.34	375842.43	0.0-0.5	X			
Bald Hill Cove	OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C	8/17/2023	895449.89	374815.19	0.0-0.5	X			
Bald Hill Cove	OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.4_G	8/17/2023	895186.60	374867.56	0.0-0.4	X			
Bald Hill Cove	OR-PDI-57	OR-PDI-57_081723_SED_0.0-0.4_G	8/17/2023	896085.81	373577.46	0.0-0.4		X		
Area F	OR-PDI-58	OR-PDI-58_081623_ESD_0.0-0.3_G	8/16/2023	896011.80	376945.45	0.0-0.3		X		Sample not proposed in Sediment PDI Work Plan; added during investigation.
Area F	OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_G	8/17/2023	896110.05	376540.05	0.0-0.3	X			Sample not proposed in Sediment PDI Work Plan; added during investigation.

Notes:
Coordinates are provided in Maine State Plane, North American Datum 1983, ft

bss = below sediment surface
PDI = pre-design investigation

Table 4. Sediment PDI Sample Locations That Were Not Sampled in August 2023

Cove Name	Location ID
Eastern Bank of Orrington Reach	
Southern Cove	OR-PDI-01
Southern Cove	OR-PDI-02
Southern Cove	OR-PDI-03
East Cove 4	OR-PDI-12
East Cove 4	OR-PDI-13
East Cove 5	OR-PDI-14
East Cove 5	OR-PDI-15
East Cove 5	OR-PDI-16
Bartlett Cove	OR-PDI-17
Bartlett Cove	OR-PDI-18
Bartlett Cove	OR-PDI-19
Bartlett Cove	OR-PDI-20
East Cove 7	OR-PDI-30
East Cove 7	OR-PDI-31
Western Bank of Orrington Reach	
Bald Hill Cove	OR-PDI-43
Bald Hill Cove	OR-PDI-45
Bald Hill Cove	OR-PDI-46
Bald Hill Cove	OR-PDI-47
Bald Hill Cove	OR-PDI-48
Bald Hill Cove	OR-PDI-49
Bald Hill Cove	OR-PDI-50
Bald Hill Cove	OR-PDI-51
Bald Hill Cove	OR-PDI-52
Bald Hill Cove	OR-PDI-53
Bald Hill Cove	OR-PDI-54

Notes:
PDI = pre-design investigation

Table 5. August 2023 Orrington Reach Sediment PDI Analytical Chemistry Data

Cove Name	Location ID	Sample ID	Collection Date	Analytical Result: Mercury (ng/g)	Analytical Result: Total Organic Carbon (mg/kg)		Analytical Result: Total Organic Carbon
Eastern Bank of Orrington Reach							
East Cove 2	OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	8/16/2023	1,500	37,000		3.7%
East Cove 2	OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_C	8/16/2023	750	33,000		3.3%
East Cove 2	OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	8/16/2023	2,100	74,000		7.4%
East Cove 3	OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	8/16/2023	630	68,000	*J*	6.8%
East Cove 3	OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.5_C	8/16/2023	1,600	110,000		11%
East Cove 3	OR-PDI-09	OR-PDI-09_081623_SED_0.0-0.5_C	8/16/2023	1,700	120,000		12%
East Cove 3	OR-PDI-10	OR-PDI-10_081623_SED_0.0-0.5_C	8/16/2023	520	53,000		5.3%
East Cove 4	OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.5_C	8/17/2023	980	130,000		13%
Bartlett Cove	OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C	8/17/2023	1,000	87,000		8.7%
Bartlett Cove	OR-PDI-22	OR-PDI-22_081723_SED_0.0-0.5_C	8/17/2023	780	68,000		6.8%
Bartlett Cove	OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C	8/17/2023	1,400	89,000		8.9%
Bartlett Cove	OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	8/16/2023	920	89,000		8.9%
Bartlett Cove	OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.5_C	8/16/2023	770	75,000		7.5%
Bartlett Cove	OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C	8/16/2023	940	80,000		8%
Bartlett Cove	OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C	8/16/2023	430	37,000		3.7%
East Cove 7	OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	8/15/2023	460	57,000		5.7%
East Cove 7	OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	8/15/2023	550	46,000		4.6%
East Cove 7	OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C	8/18/2023	790	68,000		6.8%
East Cove 7	OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C	8/18/2023	850	62,000		6.2%
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_0.0-0.5_C	8/18/2023	1,100	76,000		7.6%
East Cove 7	OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	8/18/2023	1,100	74,000		7.4%
East Cove 7	OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C	8/18/2023	1,300	71,000		7.1%
East Cove 7	OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C	8/15/2023	730	73,000		7.3%
East Cove 7	OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	8/15/2023	1,100	49,000		4.9%
East Cove 7	OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	8/15/2023	820	52,000		5.2%
East Cove 7	OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C	8/15/2023	850	64,000		6.4%
East Cove 7	OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.5_C	8/15/2023	780	13,000		1.3%
Western Bank of Orrington Reach							
Bald Hill Cove	OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	8/17/2023	570	46,000		4.6%
Bald Hill Cove	OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C	8/17/2023	740	74,000		7.4%
Bald Hill Cove	OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C	8/17/2023	740	75,000		7.5%
Bald Hill Cove	OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.5_C	8/17/2023	730	60,000	*J*	6%
Bald Hill Cove	OR-PDI-57	OR-PDI-57_081723_SED_0.0-0.5_C	8/17/2023	800	70,000		7%
Area F	OR-PDI-58	OR-PDI-58_081623_SED_0.0-0.5_C	8/16/2023	850	84,000		8.4%
Area F	OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_C	8/17/2023	160	6,700		0.67%
			Minimum	160	6,700		0.67%
			Maximum	2,100	130,000		13%
			Mean	913	66,785		6.7%
			Median	810	69,000		6.9%

Notes:
PDI = pre-design investigation

Data Qualifier:
J = estimated result

Table 6. August 2023 Orrington Reach Sediment PDI Geotechnical Data

Cove Name	Station ID	Sample ID	Collection Date	Geotechnical Lab Description	Moisture Content (%) by Method ASTM D2216	Density by Method ASTM D7263		Particle Size Distribution by Method ASTM D6913			
						Bulk Density (PCF)	Dry Density (PCF)	Cobble (%)	Gravel (%)	Sand (%)	Fines (%)
Eastern Bank of Orrington Reach											
East Cove 2	OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	8/16/2023	Wet, very dark grayish brown sandy silt	94.8	82.3	42.2	0	0.9	39.4	59.7
East Cove 2	OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_G	8/16/2023	Moist, very dark grayish brown silty sand	62.6	98.3	60.4	0	1.7	75.5	22.8
East Cove 2	OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	8/16/2023	Wet, very dark grayish brown sandy silt	153.8	80.7	31.8	0	3.7	34.1	32.2
East Cove 3	OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	8/16/2023	Wet, very dark grayish brown silt with sand	134.5	80.8	34.4	0	0.7	29.1	70.2
East Cove 3	OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.8_G	8/16/2023	Wet, very dark grayish brown silt	228.2	71.4	21.8	0	0	4.6	95.4
East Cove 3	OR-PDI-09	OR-PDI-09_081623-SED_0.0-0.8_G	8/16/2023	Moist, very dark grayish brown silt	192.2	72.0	24.6	0	0	3	97
East Cove 3	OR-PDI-10	OR-PDI-10_081623-SED_0.0-0.5_C	8/16/2023	Wet, very dark grayish brown silt with sand	112.5	86.0	40.5	0	2.3	25.6	72.1
East Cove 4	OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.6_G	8/17/2023	Wet, very dark grayish brown silt	219	71.2	22.3	0	0	6.4	93.6
Bartlett Cove	OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C	8/17/2023	Wet, very dark grayish brown silt	186.3	75.5	26.4	0	0	8	92
Bartlett Cove	OR-PDI-22	OR-PDI-22_081723_SED_0.0-1.0_G	8/17/2023	Wet, very dark grayish brown silt	252.5	75.8	21.5	0	0.2	2	97.8
Bartlett Cove	OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C	8/17/2023	Wet, very dark grayish brown silt	210.7	76.0	24.5	0	0	4.4	95.6
Bartlett Cove	OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	8/16/2023	Wet, very dark grayish brown silt	190.2	76.7	26.4	0	1.5	4	94.5
Bartlett Cove	OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.7_G	8/16/2023	Wet, very dark grayish brown silt	167.5	76.0	28.4	0	0	4.9	95.1
Bartlett Cove	OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C	8/16/2023	Wet, very dark grayish brown silt	185.1	76.8	26.9	0	0	8.8	91.2
Bartlett Cove	OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C	8/16/2023	Wet, very dark grayish brown silt with sand	97.1	90.9	46.1	0	0	29.3	70.7
East Cove 7	OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	8/15/2023	Wet, very dark grayish brown silt	168.8	76.6	28.5	0	1.1	13.4	85.5
East Cove 7	OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	8/15/2023	Wet, very dark grayish brown silt with sand	122.8	85.1	38.2	0	5.2	11.7	83.1
East Cove 7	OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C	8/18/2023	Wet, very dark grayish brown silt	224.2	75.2	23.2	0	0	4.5	95.5
East Cove 7	OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C	8/18/2023	Wet, very dark grayish brown silt	140.6	74.8	31.1	0	0.1	8.3	91.6
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_0.0-1.5_G	8/18/2023	Wet, very dark grayish brown silt	131.7	79.6	34.4	0	3.4	7.1	89.5
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_1.5-1.8_G	8/18/2023	Moist, very dark grayish brown silt	71.1	92.5	54.0	0	0	3.1	96.9
East Cove 7	OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	8/18/2023	Wet, very dark grayish brown silt	178.5	78.4	28.2	0	1	6.8	92.2
East Cove 7	OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C	8/18/2023	Wet, very dark grayish brown silt with sand	143.9	80.3	32.9	0	0	16.6	83.4
East Cove 7	OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C	8/15/2023	Wet, very dark grayish brown silt	200.6	77.6	25.8	0	0	3.4	96.6
East Cove 7	OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	8/15/2023	Wet, very dark grayish brown silt with sand	108.3	84.6	40.6	0	7.4	18.7	73.9
East Cove 7	OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	8/15/2023	Wet, very dark grayish brown sandy silt	121.1	86.3	39.0	0	8.1	25.4	66.5
East Cove 7	OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C	8/15/2023	Wet, very dark grayish brown silt	150.4	81.6	32.6	0	0	6.6	93.4
East Cove 7	OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.8_G	8/15/2023	Wet, very dark grayish brown silt	114.6	83.3	38.8	0	0	3.9	96.1
Western Bank of Orrington Reach											
Bald Hill Cove	OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	8/17/2023	Wet, very dark grayish brown silt with sand	165.5	81.0	30.5	0	2.5	19.4	78.1
Bald Hill Cove	OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C	8/17/2023	Wet, very dark grayish brown silt	166.1	79.4	29.8	0	0.1	5.6	94.3
Bald Hill Cove	OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C	8/17/2023	Wet, very dark grayish brown silt	164.6	80.0	30.3	0	0	2.5	97.5
Bald Hill Cove	OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.4_G	8/17/2023	Wet, very dark grayish brown silt	175.8	78.5	28.5	0	0.1	0.7	99.2
Bald Hill Cove	OR-PDI-57	OR-PDI-57_ 081723_SED _0.0-0.4_G	8/17/2023	Wet, very dark grayish brown silt	169.5	80.0	29.7	0	0	8.5	91.5
Area F	OR-PDI-58	OR-PDI-58_081623_ESD_0.0-0.3_G	8/16/2023	Wet, very dark grayish brown silt	172.8	79.2	29.1	0	2.1	3.5	94.4
Area F	OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_G	8/17/2023	Moist, very dark grayish brown silty sand	32.2	119	89.7	0	1.9	71.4	26.7

Table 6. August 2023 Orrington Reach Sediment PDI Geotechnical Data

			Particle Size Distribution by Method ASTM D6913, Percent Passing Sieve Size									Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis Method ASTM D7928, Percent Passing							
Cove Name	Station ID	Sample ID	9.5 mm	4.75 mm	2.00 mm	0.85 mm	0.42 mm	0.25 mm	0.15 mm	0.11 mm	0.075 mm	Hydro-meter 1	Hydro-meter 2	Hydro-meter 3	Hydro-meter 4	Hydro-meter 5	Hydro-meter 6	Hydro-meter 7	Hydro-meter 8
Eastern Bank of Orrington Reach																			
East Cove 2	OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	100	99	95	91	87	82	73	66	60	49	38	31	23	20	16	12	7
East Cove 2	OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_G	100	98	98	95	89	75	37	27	23	22	20	15	13	10	8	6	4
East Cove 2	OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	100	96	94	91	88	85	74	66	62	55	44	34	27	23	19	16	9
East Cove 3	OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	100	99	92	88	84	81	77	75	70	51	36	29	23	20	17	14	11
East Cove 3	OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.8_G		100	100	98	98	97	97	96	95	75	51	45	33	26	20	14	8
East Cove 3	OR-PDI-09	OR-PDI-09_081623-SED_0.0-0.8_G		100	99	98	98	97	97	97	97	80	59	54	49	44	33	28	23
East Cove 3	OR-PDI-10	OR-PDI-10_081623-SED_0.0-0.5_C	100	98	91	88	85	81	78	75	72	51	41	28	21	18	15	13	11
East Cove 4	OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.6_G		100	99	97	96	96	95	94	94	70	46	36	31	26	21	16	12
Bartlett Cove	OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C		100	96	94	94	93	93	93	92	78	68	42	32	27	22	17	12
Bartlett Cove	OR-PDI-22	OR-PDI-22_081723_SED_0.0-1.0_G		100	100	99	99	99	99	98	98	94	74	65	50	46	41	36	26
Bartlett Cove	OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C		100	98	97	97	97	96	96	96	94	80	62	48	43	34	30	25
Bartlett Cove	OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	100	99	98	97	96	96	95	95	94	82	54	42	31	25	19	14	8
Bartlett Cove	OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.7_G		100	99	98	98	97	97	96	95	77	65	52	44	35	31	27	19
Bartlett Cove	OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C		100	96	95	94	93	93	92	91	89	68	53	43	38	33	28	23
Bartlett Cove	OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C		100	95	92	89	85	81	76	71	51	35	28	22	20	17	14	12
East Cove 7	OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	100	99	96	95	94	93	92	89	86	68	51	39	35	31	27	22	14
East Cove 7	OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	100	95	92	90	89	88	87	85	83	67	43	35	30	26	22	18	14
East Cove 7	OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C		100	97	96	96	96	96	96	96	83	68	49	40	30	26	21	16
East Cove 7	OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C		100	98	96	95	94	93	92	92	87	75	56	48	40	36	33	25
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_0.0-1.5_G	100	97	93	92	92	91	91	90	90	75	57	48	39	34	29	25	20
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_1.5-1.8_G		100	100	99	99	98	98	98	97	68	49	43	33	30	27	24	20
East Cove 7	OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	100	99	97	96	95	95	94	93	92	70	54	49	39	33	28	23	18
East Cove 7	OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C		100	95	93	91	89	87	86	83	54	46	31	24	20	16	13	9
East Cove 7	OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C		100	99	99	98	97	97	97	97	86	66	50	42	38	34	30	26
East Cove 7	OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	100	93	87	83	81	79	76	75	74	60	47	37	31	24	21	18	14
East Cove 7	OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	100	92	87	82	78	74	70	68	66	52	39	32	28	22	15	11	8
East Cove 7	OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C		100	97	96	96	95	95	94	93	69	53	41	37	33	29	25	21
East Cove 7	OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.8_G		100	99	99	98	98	98	97	96	67	56	41	34	30	27	23	16
Western Bank of Orrington Reach																			
Bald Hill Cove	OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	100	98	96	95	94	92	87	82	78	63	48	32	28	21	17	13	5
Bald Hill Cove	OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C		100	98	98	97	96	96	95	94	84	69	53	45	37	33	29	25
Bald Hill Cove	OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C		100	99	99	98	98	98	98	97	87	68	49	45	40	35	30	21
Bald Hill Cove	OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.4_G		100	100	100	99	99	99	99	99	93	78	60	56	45	42	34	27
Bald Hill Cove	OR-PDI-57	OR-PDI-57_ 081723_SED _0.0-0.4_G		100	97	96	96	96	95	93	92	76	64	47	43	39	35	31	22
Area F	OR-PDI-58	OR-PDI-58_081623_ESD_0.0-0.3_G	100	98	97	96	96	96	95	95	94	80	64	51	43	39	35	31	27
Area F	OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_G	100	98	90	70	52	42	34	30	27	18	12	10	9	7	5	4	4

Table 6. August 2023 Orrington Reach Sediment PDI Geotechnical Data

			Atterberg Limits by Method ASTM 4318				
Cove Name	Station ID	Sample ID	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	Soil Classification
Eastern Bank of Orrington Reach							
East Cove 2	OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	63	45	18	2.8	Sandy Elastic SILT (MH)
East Cove 2	OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_G	NP	NP	NP	NP	Silty SAND (SM)
East Cove 2	OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	84	62	22	4.2	Sandy Elastic SILT (MH)
East Cove 3	OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	92	55	37	2.1	Elastic SILT with Sand (MH)
East Cove 3	OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.8_G	150	108	42	2.9	Elastic SILT (MH)
East Cove 3	OR-PDI-09	OR-PDI-09_081623-SED_0.0-0.8_G	190	111	79	1	Elastic SILT (MH)
East Cove 3	OR-PDI-10	OR-PDI-10_081623-SED_0.0-0.5_C	78	49	29	2.2	Elastic SILT with Sand (MH)
East Cove 4	OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.6_G	134	101	33	3.6	Elastic SILT (MH)
Bartlett Cove	OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C	117	75	42	2.7	Elastic SILT (MH)
Bartlett Cove	OR-PDI-22	OR-PDI-22_081723_SED_0.0-1.0_G	144	73	71	2.5	Elastic SILT (MH)
Bartlett Cove	OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C	138	75	63	2.2	Elastic SILT (MH)
Bartlett Cove	OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	122	86	36	2.9	Elastic SILT (MH)
Bartlett Cove	OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.7_G	117	70	47	2.1	Elastic SILT (MH)
Bartlett Cove	OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C	138	75	63	1.7	Elastic SILT (MH)
Bartlett Cove	OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C	66	41	25	2.2	Elastic SILT with Sand (MH)
East Cove 7	OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	121	73	48	2	Elastic SILT (MH)
East Cove 7	OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	107	65	42	1.4	Elastic SILT with Sand (MH)
East Cove 7	OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C	149	81	68	2.1	Elastic SILT (MH)
East Cove 7	OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C	97	55	42	2	Elastic SILT (MH)
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_0.0-1.5_G	108	74	34	1.7	Elastic SILT (MH)
East Cove 7	OR-PDI-34	OR-PDI-34_081823_SED_1.5-1.8_G	81	46	35	0.7	Elastic SILT (MH)
East Cove 7	OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	124	75	49	2.1	Elastic SILT (MH)
East Cove 7	OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C	96	65	31	2.5	Elastic SILT with Sand (MH)
East Cove 7	OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C	130	76	54	2.3	Elastic SILT (MH)
East Cove 7	OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	94	58	36	1.4	Elastic SILT with Sand (MH)
East Cove 7	OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	81	55	26	2.5	Sandy Elastic SILT (MH)
East Cove 7	OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C	113	99	14	3.7	Elastic SILT (MH)
East Cove 7	OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.8_G	93	76	17	2.3	Elastic SILT (MH)
Western Bank of Orrington Reach							
Bald Hill Cove	OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	120	61	59	1.8	Elastic SILT with Sand (MH)
Bald Hill Cove	OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C	133	75	58	1.6	Elastic SILT (MH)
Bald Hill Cove	OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C	117	74	43	2.1	Elastic SILT (MH)
Bald Hill Cove	OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.4_G	137	72	65	1.6	Elastic SILT (MH)
Bald Hill Cove	OR-PDI-57	OR-PDI-57_ 081723_SED _0.0-0.4_G	118	77	41	2.3	Elastic SILT (MH)
Area F	OR-PDI-58	OR-PDI-58_081623_ESD_0.0-0.3_G	120	76	44	2.2	Elastic SILT (MH)
Area F	OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_G	NP	NP	NP	NP	Silty SAND (SM)

Notes:
Coordinates are provided in Maine State Plane, North American Datum 1983, ft
ASTM = ASTM International
MH = elastic silt
NP = non-plastic
PCF = pound per cubic foot
PDI = pre-design investigation
SM = silty sand

Table 7. Orrington Reach Mercury Data Summary Statistics

		August 2023 Sediment Phase Ia PDI Data Set							Historical Data Set											
										All (1995–2021) Sediment Samples Collected at any Interval within 0-0.5 ft bss							Recent (2016–2021) Sediment Samples Collected at any Interval within 0-0.5 ft bss					
		Counts			Total Mercury Concentration (ng/g)					Counts		Total Mercury Concentration (ng/g)					Counts		Total Mercury Concentration (ng/g)			
Cove Name	Acres[a]	Proposed # of Sample Locations[b]	August 2023 # of Sample Locations	# of Sample Results	Minimum	Median	Maximum	Mean	Most Recent Year Sampled	# of Sample Locations	# of Sample Results	Minimum	Median	Maximum	Mean	# of Sample Locations	# of Sample Results	Minimum	Median	Maximum	Mean
Eastern Bank of Orrington Reach																					
Southern Cove	6.3	3	nc	nc	nc	nc	nc	nc	2017	44	87	50	1,200	6,400	1,396	9	9	595	1,321	2,223	1,283
East Cove 2	10	3	3	3	750	1,500	2,100	1,450	2000	1	3	570	1,200	1,300	1,023	--	--	--	--	--	--
East Cove 3	18	4	4	4	520	1,115	1,700	1,113	2011	4	4	1,100	1,330	1,500	1,315	--	--	--	--	--	--
East Cove 4	2.9	3	1	1	980	980	980	980	2017	5	56	643	1,527	3,050	1,665	3	23	962	1,280	2,189	1,431
East Cove 5	3.8	3	nc	nc	nc	nc	nc	nc	2017	3	75	63	1,169	2,072	1,170	1	8	550	767	1,080	820
Bartlett Cove	44	11	7	7	430	920	1,400	891	2007	7	21	690	1,200	1,580	1,160	--	--	--	--	--	--
East Cove 7	59	14	12	12	460	835	1,300	869	2007	6	7	569	1,000	1,270	1,023	--	--	--	--	--	--
Western Bank of Orrington Reach																					
Area F	3	0	2	2	160	505	850	505	--	--	--	--	--	--	--	--	--	--	--	--	--
Bald Hill Cove	72	18	5	5	570	740	800	716	2017	9	77	82	721	2,110	682	4	21	82	688	2,110	722

Notes:

The historical data set includes samples from varying depth intervals, and at many locations, multiple depth intervals were sampled between 0 and 0.5 ft bss. This table includes data for any sample depth interval that is between 0 and 0.5 ft bss, resulting in a higher sample count than sample locations.

Historical data are shaded gray.

-- = no data during indicated time period
bss = below sediment surface
nc = not collected
PDI = pre-design investigation
TLC = thin layer cap

[a] As estimated in ArcGIS. Acreages to be revised following bathymetric/LiDAR data analysis.

[b] Number of samples proposed in Sediment PDI Work Plan.

Appendix A

Field Forms

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

04

General

Date	08/16/2023	Time	09:08
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.73294
Longitude	-68.829743	Plan Volume	0.5
Sampling Station	OR-PDI-04	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	5.8

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	10:15	1	90	SILT. Very fine, wet, soft, low plasticity, cohesive, slight decay odor, very dark gray. GRAVEL at very bottom (0.5'). Subrounded and smooth with trace larger cobbles (3").	OR-PDI-04_081623_SED and OR-PDI-04_081623_SED (For Hg and TOC)

Containers

Date	08/16/2023	Time	10:15
Number of containers and estimated amount	2 x 4 oz PETG (Hg), 2 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	SILT ON TOP OF GRAVEL		

Analysis

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	10:15	Hg	1631E	Freeze	Eurofins G.S.
08/16/23	10:15	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	10:15	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	10:15	Bulk Density	ASTM D7263	N/A	GeoTesting Express
08/16/23	10:15	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	10:15	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

05

General

Date	08/16/2023	Time	10:26
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.731778
Longitude	-68.830008	Plan Volume	1.5
Sampling Station	OR-PDI-05	Deploy No.	1,2,3
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Slight tidal chop
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Box core and hand push
Capacity	1.5	Measured Water Depth [NAVD88]	10.1

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	10:30	123	80	SILTY SAND. Fine grained, poorly graded, no plasticity, non cohesive, wet, soft, very dark gray, no odor, trace organics (rootlets, twigs, leaves acorns), trace shell fragments, few gravels at very bottom (0.5').	OR-PDI-05_081623_SED

Containers

Date	08/16/2023	Time	10:30
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Tried box corer and still only 0.5' recovery #2 and 0.25' #3 with gravel at blottom.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	10:30	Hg	1631E	Freeze	Eurofins G.S.
08/16/23	10:30	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	10:30	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	10:30	Bulk Density	ASTM D7263	N/A	GeoTesting Express
08/16/23	10:30	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	10:30	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

06

General

Date	08/16/2023	Time	11:03
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.730154
Longitude	-68.829646	Plan Volume	0.5
Sampling Station	OR-PDI-06	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Tidal current
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	9.5

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	11:25	12	100	SILT. Very fine, wet, soft, low plasticity, cohesive, no odor, dark gray. Small gravels and cobble at very bottom (0,5').	OR-PDI-06_081623_SED

Containers

Date	08/16/2023	Time	11:25
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	First ponar no recovery due to rocky cliff, moved further offshore and 0.5'		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	11:25	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	11:25	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	11:25	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	11:25	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	11:25	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	11:25	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

07

General

Date	08/16/2023	Time	11:32
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontooñ	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.723645
Longitude	-68.829216	Plan Volume	0.5
Sampling Station	OR-PDI-07	Deploy No.	1,2,3,4,5,6
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	0.5	Measured Water Depth [NAVD88]	8.7

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	12:05	123456	90	SILT. Very fine, very soft, wet, no plasticity, non cohesive, dark gray, trace organics (rootlets and leaves), Slight musty odor. GRAVEL AND COBBLE at very bottom.	OR-PDI-07_081623_SED and MS/MSD set for Hg and TOC

Containers

Date	08/16/2023	Time	12:05
Number of containers and estimated amount	3 x 4 oz PETG (Hg), 3 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	First ponar wouldn,t trip (too soft). Second ponar no recovery due to rock. Third ponar all gravel. Finally moved farther west/offshore and used box core. 0.4'recovery		

Analysis

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	12:05	Hg	1631E	Freeze	Eurofins G.S.
08/16/23	12:05	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	12:05	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	12:05	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	12:05	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	12:05	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

08

General

Date	08/16/2023	Time	12:16
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.721335
Longitude	-68.829569	Plan Volume	1.5
Sampling Station	OR-PDI-08	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm. Outgoing tide.
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	9.6

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	12:19	1	53	SILT. Very fine, soft, wet, low plasticity, cohesive, trace small gravel, dark gray, homogenous, no odor, no layering or distinct stratigraphic contacts.	OR-PDI-08_081623_SED

Containers

Date	08/16/2023	Time	12:30
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks			

Analysis

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	12:30	Hg	1631E	Freeze	Eurofins G.S.
08/16/23	12:30	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	12:30	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	12:30	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	12:30	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	12:30	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

09

General

Date	08/16/2023	Time	12:59
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.720144
Longitude	-68.829306	Plan Volume	1.5
Sampling Station	OR-PDI-09	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	8

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	13:01	1	53	SILT. Very fine, soft, wet, low plasticity, cohesive, no odor, dark gray, homogeneous, no stratagraphic change or contact.	OR-PDI-09_081623_SED

Containers

Date	08/16/2023	Time	13:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	All fine silt		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	13:00	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	13:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	13:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	13:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	13:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	13:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/16/2023	Time	13:16
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.719243
Longitude	-68.830285	Plan Volume	0.5
Sampling Station	OR-PDI-10	Deploy No.	1,2,3,4,5,6,7,8,9
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5 and 0.5	Measured Water Depth [NAVD88]	7.3

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	13:18	123456789	60	SILT. Very soft, wet, very fine, low plasticity, cohesive, some organics (grass), few gravels and 1 large cobble at bottom, very dark gray, no odor.	OR-PDI-10_081623_SED

Containers

Date	08/16/2023	Time	14:10
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	First depolyment large gravel. 2nd few gravels. Change back to ponar.3rd try no recovery with ponar. Few gravels. 4th and 5th no recovery. 6th half a handful of silt and gravel. 7th two large gravels. 8th no recovery on rock. 9th silt on top of gravel and cobble.		

Analysis

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	14:10	Hg	1631E	Freeze	Eurofins G.S.
08/16/23	14:10	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	14:10	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	14:10	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	14:10	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	14:10	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	09:06
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.711426
Longitude	-68.837912	Plan Volume	1.5
Sampling Station	OR-PDI-11	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Incoming tide
Traffic	Few boats	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	1.5

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	09:08	12	40	SILT. Very fine, very soft, wet, low plasticity, cohesive, black, trace organics (rootlets and leaves), musty odor.	OR-PDI-11_081723_SED

Containers

Date	08/17/2023	Time	10:15
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous. Box and ponar. Too soft to trigger ponar. Sample taken from box.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	10:15	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	10:15	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	10:15	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	10:15	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	10:15	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	10:15	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	10:40
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.701382
Longitude	-68.833509	Plan Volume	0.5
Sampling Station	OR-PDI-21	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	4.4

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	10:42	12	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, dark gray, no odor, trace shell fragments.	OR-PDI-21_081723_SED and OR-PDI-21_081723_SED for Hg and TOC

Containers

Date	08/17/2023	Time	11:00
Number of containers and estimated amount	2 x 4 oz PETG (Hg), 2 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	1st ponar not triggering. 2nd ponar worked.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	11:00	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	11:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	11:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	11:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	11:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	11:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	11:15
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.701761
Longitude	-68.832334	Plan Volume	1.5
Sampling Station	OR-PDI-22	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	6.0

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	11:17	12	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, very dark gray, slight musty odor, trace organics (rootlets), trace broken shells.	OR-PDI-22_081723_SED

Containers

Date	08/17/2023	Time	11:25
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous. No layering in box core (same silt).		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	11:25	Hg	1631E	Freeze	Eurofins G.S.
08/17/23	11:25	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	11:25	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	11:25	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	11:25	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	11:25	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	11:52
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.701916
Longitude	-68.830166	Plan Volume	0.5
Sampling Station	OR-PDI-23	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	6.5

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	11:54	1	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, very dark gray, swampy odor, trace shell fragments, few organics (rootlets).	OR-PDI-23_081723_SED

Containers

Date	08/17/2023	Time	12:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	12:00	Hg	1631E	Freeze	Eurofins G.S.
08/17/23	12:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	12:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	12:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	12:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	12:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

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General

Date	08/16/2023	Time	14:23
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.700866
Longitude	-68.832576	Plan Volume	1.5
Sampling Station	OR-PDI-24	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Choppy
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	6.2

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	14:25	1	53	SILT. Very soft, very fine, wet, low plasticity, cohesive, very dark gray, musty odor, trace organics (twigs).	OR-PDI-24_081623_SED

Containers

Date	08/16/2023	Time	14:45
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	14:45	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	14:45	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	14:45	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	14:45	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	14:45	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	14:45	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/16/2023	Time	14:50
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.700149
Longitude	-68.83316	Plan Volume	1.5
Sampling Station	OR-PDI-25	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Fast current
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	5.0

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	14:52	1	47	CLAYEY SILT. Very fine, soft, wet, low plasticity, cohesive, no odor, dark gray, one shell, and one small gravel.	OR-PDI-25_081623_SED

Containers

Date	08/16/2023	Time	15:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	15:00	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	15:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	15:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	15:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	15:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	15:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/16/2023	Time	15:06
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.698934
Longitude	-68.833063	Plan Volume	0.5
Sampling Station	OR-PDI-26	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Strong	Waters	Some current
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	6.0

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	15:08	1	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, slight musty odor, dark gray.	OR-PDI-26_081623_SED

Containers

Date	08/16/2023	Time	15:15
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	13:15	Hg	1631E	Freeze	Eurofins G.S.
08/16/23	15:15	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	15:15	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	15:15	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	15:15	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	15:15	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/16/2023	Time	15:26
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.696835
Longitude	-68.833502	Plan Volume	1.5
Sampling Station	OR-PDI-27	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Strong	Waters	Slight current
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	4.8

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	15:28	12	20	SILT. Very fine, very soft, wet, low plasticity, cohesive, no odor, brownish gray, trace small gravels.	OR-PDI-27_081623_SED

Containers

Date	08/16/2023	Time	15:40
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	1st try no recovery. One gravel kept the ponar open. Try box core. Enough recovery to sample.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	15:40	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	15:40	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	15:40	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	15:40	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	15:40	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	15:40	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/15/2023	Time	14:28
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.692353
Longitude	-68.832696	Plan Volume	0.5
Sampling Station	OR-PDI-28	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	14:40	1	100	CLAYEY SILT. Very soft, wet, low plasticity, cohesive, trace gravel and shell, decay odor, dark gray.	OR-PDI-28_081523_SED

Containers

Date	08/15/2023	Time	14:40
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Swampy odor		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	14:40	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	14:40	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/15/23	14:40	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/15/23	14:40	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	14:40	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/15/23	14:40	Bulk Density	ASTM D7263	N/A	GeoTesting Express

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General

Date	08/15/2023	Time	14:46
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.691093
Longitude	-68.827339	Plan Volume	0.5
Sampling Station	OR-PDI-29	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	15:00	1	50	CLAYEY SILT. Very fine, wet, soft, low plasticity, cohesive, decay odor, trace organics (rootlets), dark gray.	OR-PDI-29_081523_SED

Containers

Date	08/15/2023	Time	15:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Swamp odor.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	15:00	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	15:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/15/23	15:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/15/23	15:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	15:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/15/23	15:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

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General

Date	08/18/2023	Time	11:42
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.690638
Longitude	-68.816835	Plan Volume	0.5
Sampling Station	OR-PDI-32	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Incoming tide
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	7

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/18/23	11:43	1	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, very dark gray, musty odor, trace gravel, trace shells.	OR-PDI-32_081823_SED

Containers

Date	08/18/2023	Time	11:50
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart Ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	11:50	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	11:50	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/18/23	11:50	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/18/23	11:50	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/18/23	11:50	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/18/23	11:50	Bulk Density	ASTM D7263	N/A	GeoTesting Express

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General

Date	08/18/2023	Time	11:00
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.690025
Longitude	-68.816688	Plan Volume	1.5
Sampling Station	OR-PDI-33	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and slam bar
Capacity	1.5	Measured Water Depth [NAVD88]	5.5

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/18/23	11:03	12	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, musty odor, very dark gray. Same to 1.5' with slam bar sample. Clayier at very bottom. No woody debris.	OR-PDI-33_081823_SED and OR-PDI-33_081823_SED for Hg and TOC

Containers

Date	08/18/2023	Time	11:10
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff moore
Remarks	Silt		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	11:10	Hg	1631E	Freeze	Eurofins G.S.
08/18/23	11:10	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/18/23	11:10	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/18/23	11:10	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/18/23	11:10	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/18/23	11:10	Bulk Density	ASTM D7263	N/A	GeoTesting Express

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General

Date	08/18/2023	Time	10:11
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.689367
Longitude	-68.817307	Plan Volume	1.5
Sampling Station	OR-PDI-34	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and slam bar
Capacity	1.5	Measured Water Depth [NAVD88]	4.3

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/18/23	10:15	12	100	SILT (0-1.5').Very fine, soft, wet to moist, low plasticity, cohesive, musty decay odor, trace organics, dark gray, very thin layer of very fine brown woody fibers at 1.3' grading rapidly to SILTY CLAY at 1.5' to bottom (1.8'). Very fine, firmer, moist, low plasticity, cohesive, dark gray, musty odor.	OR-PDI-34_081623_SED OR-PDI-34_081623_SED

Containers

Date	08/18/2023	Time	10:20
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	Yes	Prepared By	Jeff Moore

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

Remarks: Recovered 1.8' with slam bar. Thin leyer of brown organics, decayed woody fibers at 1.3'. Ponar grab 0.5' of same SILT.

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	10:20	Hg	1631E	Freeze	Eurofins G.S.
08/18/23	10:20	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/18/23	10:20	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/18/23	10:20	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/18/23	10:20	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/18/23	10:20	Bulk Density	ASTM D7263	N/A	GeoTesting Express

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General

Date	08/18/2023	Time	11:58
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	ASI	Latitude	44.689102
Longitude	-68.816416	Plan Volume	0.5
Sampling Station	OR-PDI-35	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	10

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/18/23	12:00	1	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, very dark gray, no odor, trace gravels.	OR-PDI-35_081823_SED

Containers

Date	08/18/2023	Time	12:05
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	12:05	Hg	1631E	Freeze	Eurofins G.S.
08/18/23	12:05	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	12:05	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/18/23	12:05	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/18/23	12:05	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/18/23	12:05	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

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General

Date	08/18/2023	Time	12:13
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	ASI	Latitude	44.688555
Longitude	-68.815773	Plan Volume	0.5
Sampling Station	OR-PDI-36	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	11

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/18/23	12:15	1	80	CLAYEY SILT. Very fine, soft, wet, low plasticity, cohesive, dark gray, strong musty odor. Few gravels.	OR-PDI-36_081823_SED

Containers

Date	08/18/2023	Time	12:20
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	12:20	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/18/23	12:20	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/18/23	12:20	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/18/23	12:20	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/18/23	12:20	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/18/23	12:20	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/15/2023	Time	11:32
Logger	Jeff Moore	Crew	Aqua Survey
Vessel	Pontooñ	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.688091
Longitude	-68.814311	Plan Volume	0.5
Sampling Station	OR-PDI-37	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Cakm	Waters	Calm
Traffic		Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity		Measured Water Depth [NAVD88]	9.1

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	11:30	1	100	SILT. Very fine, wet,very soft, trace shells, low plasticity, cohesive, no odor,dark gray .	OR-PDI-37_081523_SED

Containers

Date	08/15/2023	Time	11:30
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	11:30	Hg	1631E	Freeze	Eurofins G.S.
08/15/23	11:30	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	11:30	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/15/23	11:30	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	11:30	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/15/23	11:30	Bulk Density	ASTM D7263	N/A	GeoTesting Express

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General

Date	08/15/2023	Time	12:08
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	ASI	Latitude	44.687401
Longitude	-68.815055	Plan Volume	0.5
Sampling Station	OR-PDI-38	Deploy No.	1
Sub-tidal Location?	No	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	11.7

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	12:11	1	100	SILT. Very fine, wet, trace rounded gravel, 4 cobbles, low plasticity, cohesive, dark brownish gray, no odor.	Not retained

Containers

Date	08/15/2023	Time	12:14
Number of containers and estimated amount	0	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab

Photos

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General

Date	08/15/2023	Time	12:40
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.68736
Longitude	-68.814916	Plan Volume	0.5
Sampling Station	OR-PDI-38 B	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	11

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	12:45	1	100	CLAYEY SILT. Very fine, very soft, wet, low plasticity, còhesive, few rounded gravels, brownish gray.	OR-PDI-38_081523_SED

Containers

Date	08/15/2023	Time	12:45
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	12:45	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	12:45	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/15/23	12:45	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/15/23	12:45	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	12:45	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/15/23	12:45	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/15/2023	Time	12:18
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.685734
Longitude	-68.813997	Plan Volume	0.5
Sampling Station	OR-PDI-39	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	10.9

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	12:25	1	100	SANDY SILT, wet, very dark grayish brown.	OR-PDI-39_081523_SED

Containers

Date	08/15/2023	Time	12:25
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	12:25	Hg	1631E	Freeze	Eurofins G.S.
08/15/23	12:25	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/15/23	12:25	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	12:25	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	12:25	Moisture Content	ASTM D2216	N/A	GetTesting Express
08/15/23	12:25	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/15/2023	Time	12:57
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.682369
Longitude	-68.813009	Plan Volume	0.5
Sampling Station	OR-PDI-40	Deploy No.	10 (sampler not engaging)
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Box core. Ponar not triggering in soft silt.
Capacity	0.5	Measured Water Depth [NAVD88]	6.7

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	13:25	10	40	SILT. Very fine, wet, trace gravels, very soft, low plasticity, cohesive, no odor, dark gray.	OR-PDI-40_081523_SED

Containers

Date	08/15/2023	Time	13:25
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Too soft to trigger the ponar		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	13:25	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	13:25	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/15/23	13:25	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/15/23	13:25	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	13:25	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/15/23	13:25	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

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General

Date	08/15/2023	Time	13:42
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.68736
Longitude	-68.814916	Plan Volume	1.5
Sampling Station	OR-PDI-41	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Calm	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Box core and hand push
Capacity	1.5	Measured Water Depth [NAVD88]	5.1

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/15/23	13:45	2	40	SILTY CLAY. Very fine, wet, soft, medium plasticity, cohesive, no odor, very dark gray.	OR-PDI-41_081523_SED grab and composite from deeper.

Containers

Date	08/15/2023	Time	13:45
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Used the box corer and hard hand push in clay to 8 inches.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	13:45	Hg	1631E	Freeze	Eurofins G.S.
08/15/23	13:45	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/15/23	13:45	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/15/23	13:45	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/15/23	13:45	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/15/23	13:45	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	12:40
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.698453
Longitude	-68.842923	Plan Volume	0.5
Sampling Station	OR-PDI-42	Deploy No.	1,2,3,4
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	4.9

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	12:42	1234	30	SILT. Very soft, very fine, wet, loose and soupy, no plasticity, non cohesive, dark brownish gray, no odor, highly organic with grass and grass roots.	OR-PDI-42_081723_SED

Containers

Date	08/17/2023	Time	13:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	1st try just grass and roots. 2nd 3rd and 4th enough recovery to sample.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	13:00	Hg	1631E	Freeze	Eurofins G.S.
08/17/23	13:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	13:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	13:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	13:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	13:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	13:09
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.697241
Longitude	-68.840297	Plan Volume	0.5
Sampling Station	OR-PDI-44	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	8.0

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	13:10	1	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, very dark gray, musty odor.	OR-PDI-44_081723_SED

Containers

Date	08/17/2023	Time	13:15
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	13:15	Hg	1631E	Freeze	Eurofins G.S.
08/17/23	13:15	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	13:15	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	13:15	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	13:15	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	13:15	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	13:54
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.69442
Longitude	-68.841501	Plan Volume	0.5
Sampling Station	OR-PDI-55	Deploy No.	1
Sub-tidal Location?	Yes	Weather	
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	7.2

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	13:56	1	100	SILT. Very fine, soft, wet, low plasticity, cohesive, dark gray, musty odor.	OR-PDI-55_081723_SED

Containers

Date	08/17/2023	Time	14:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	14:00	Hg	1631E	Freeze	Eurofins G.S.
08/17/23	14:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	14:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	14:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	14:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	14:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	13:21
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.694561
Longitude	-68.842515	Plan Volume	0.5
Sampling Station	OR-PDI-56	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	0.5	Measured Water Depth [NAVD88]	7.0

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	13:23	12	100	SILT. Very fine, soft, wet, low plasticity, cohesive, very dark gray, musty odor, one small gravel, one broken shell.	OR-PDI-56_081723_SED and a MS/MSD set was collected for Hg and TOC

Containers

Date	08/17/2023	Time	13:30
Number of containers and estimated amount	3 x 4 oz PETG (Hg), 1 x 3 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	13:30	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	13:30	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	13:30	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	13:30	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	13:30	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	13:30	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/17/2023	Time	14:14
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.691032
Longitude	-68.839036	Plan Volume	0.5
Sampling Station	OR-PDI-57	Deploy No.	1,2
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	0.5	Measured Water Depth [NAVD88]	8.4

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	14:16	12	100	SILT. Very fine, very soft, wet, low plasticity, cohesive, dark gray, musty odor, trace gravel.	OR-PDI-57_081723_SED

Containers

Date	08/17/2023	Time	14:25
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart Ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous. Same silt in the box core. No layering or stratagraphic change.		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	14:25	Hg	1631E	Freeze	Eurofins G.S.
08/17/23	14:25	TOC	Lloyd Kahn	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	14:25	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	14:25	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	14:25	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	14:25	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

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General

Date	08/16/2023	Time	15:49
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.70027
Longitude	-68.839374	Plan Volume	1.5
Sampling Station	OR-PDI-58	Deploy No.	1
Sub-tidal Location?	NA	Weather	N/A
Winds	Breezy	Waters	Slight current
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar and box core
Capacity	1.5	Measured Water Depth [NAVD88]	2.4

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/16/23	15:51	1	20	SILT. Very fine, very soft, wet, low plasticity, cohesive, very dark gray, musty odor, trace small gravels.	OR-PDI-58_081623_SED and OR-PDI-58_081623_SED for Hg and TOC

Containers

Date	08/16/2023	Time	16:00
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	Yes	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks	Homogenous		

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	16:00	Hg	1631E	Freeze	Eurofins G.S.

Date	Time	Analyte	Method	Preservative	Lab
08/16/23	16:00	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/16/23	16:00	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/16/23	16:00	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/16/23	16:00	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/16/23	16:00	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Project No: 3617237573

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General

Date	08/17/2023	Time	12:20
Logger	Jeff Moore	Crew	Aqua survey
Vessel	Pontoon	Sub	Aqua Survey, INC.
GPS	R1	Latitude	44.699159
Longitude	-68.83899	Plan Volume	0.5
Sampling Station	OR-PDI-59	Deploy No.	1
Sub-tidal Location?	Yes	Weather	N/A
Winds	Breezy	Waters	Calm
Traffic	None	Water Temp	N/A
Grab Equipment		Sampler Type	Ponar
Capacity	0.5	Measured Water Depth [NAVD88]	8.5

Logging

Date	Time	Deployment #	Recovery (percentage)	Description	Sample Id #
08/17/23	12:21	1	40	SILTY SAND. Fine grained, soft, loose, wet, no plasticity, non cohesive, few gravels, no odor, poorly graded.	OR-PDI-59_081723_SED

Containers

Date	08/17/2023	Time	12:30
Number of containers and estimated amount	1 x 4 oz PETG (Hg), 1 x 4 oz glass jar (TOC), and 1 x quart ziploc bag (Geotech)	Type of container	N/A
Live Organisms present	No	Oil-Like Present	No
Odor Present	No	Debris Present	No
Woody Debris Present	No	Prepared By	Jeff Moore
Remarks			

Analysis

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	12:30	Hg	1631E	Freeze	Eurofins G.S.

Penobscot Sediment Grab Log

Site: Penobscot Estuary Remediation
511 Congress St, Portland, Maine 04101

Date	Time	Analyte	Method	Preservative	Lab
08/17/23	12:30	TOC	Lloyd Kahn	Freeze	Eurofins G.S.
08/17/23	12:30	Atterberg Limits	ASTM D4318	N/A	GeoTesting Express
08/17/23	12:30	Sediment Grain Size	ASTM D6913/7928	N/A	GeoTesting Express
08/17/23	12:30	Moisture Content	ASTM D2216	N/A	GeoTesting Express
08/17/23	12:30	Bulk Density	ASTM D7263	N/A	GeoTesting Express

Photos

Appendix B

Photograph Log

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 2

Photograph 1. East Cove 2 OR-PDI-04 (August 16, 2023)

Photograph 2. East Cove 2 OR-PDI-05 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 2

Photograph 3. East Cove 2 OR-PDI-06 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 3

Photograph 4. East Cove 3 OR-PDI-07 (August 16, 2023)

Photograph 5. East Cove 3 OR-PDI-08 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 3

Photograph 6. East Cove 3 OR-PDI-09 (August 16, 2023)

Photograph 7. East Cove 3 OR-PDI-10 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 4

Photograph 8. East Cove 4 OR-PDI-11 (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bartlett Cove

Photograph 9. Bartlett Cove OR-PDI-21 (August 17, 2023)

Photograph 10. Bartlett Cove OR-PDI-22 (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bartlett Cove

Photograph 11. Bartlett Cove OR-PDI-23 (August 17, 2023)

Photograph 12. Bartlett Cove OR-PDI-24 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bartlett Cove

Photograph 13. Bartlett Cove OR-PDI-25 (August 16, 2023)

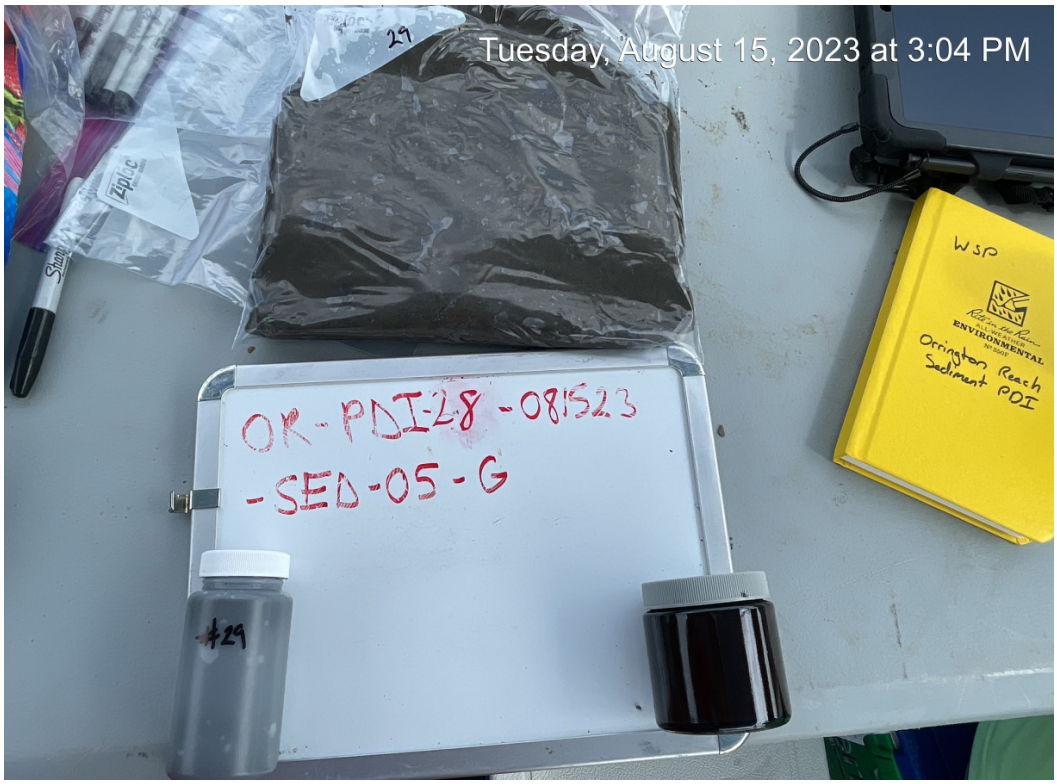
Photograph 14. Bartlett Cove OR-PDI-26 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bartlett Cove

Photograph 15. Bartlett Cove OR-PDI-27 (August 16, 2023)

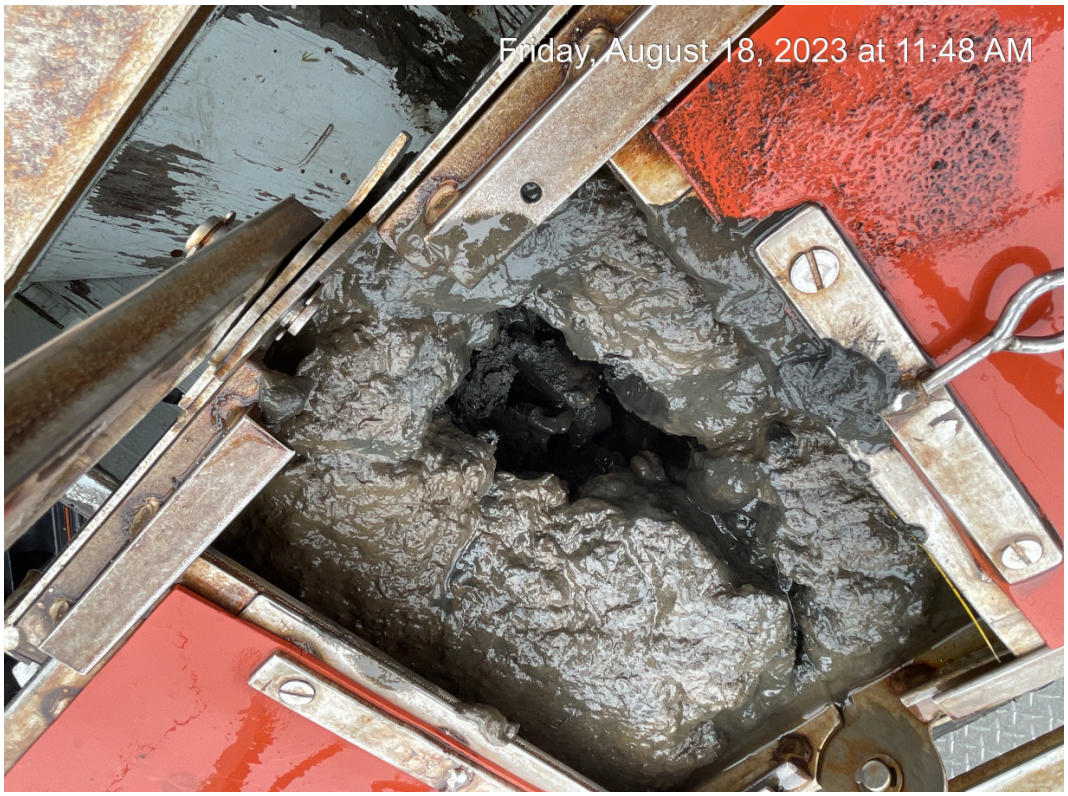
Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7

Photograph 16. East Cove 7 OR-PDI-28 (August 15, 2023)



Photograph 17. East Cove 7 OR-PDI-29 (August 15, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7



Photograph 18. East Cove 7 OR-PDI-32 (August 18, 2023)

Photograph 19. East Cove 7 OR-PDI-33 (August 18, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7

Photograph 20. East Cove 7 OR-PDI-34 (August 18, 2023)

Photograph 21. East Cove 7 OR-PDI-34 Woody Fibers (August 18, 2023)

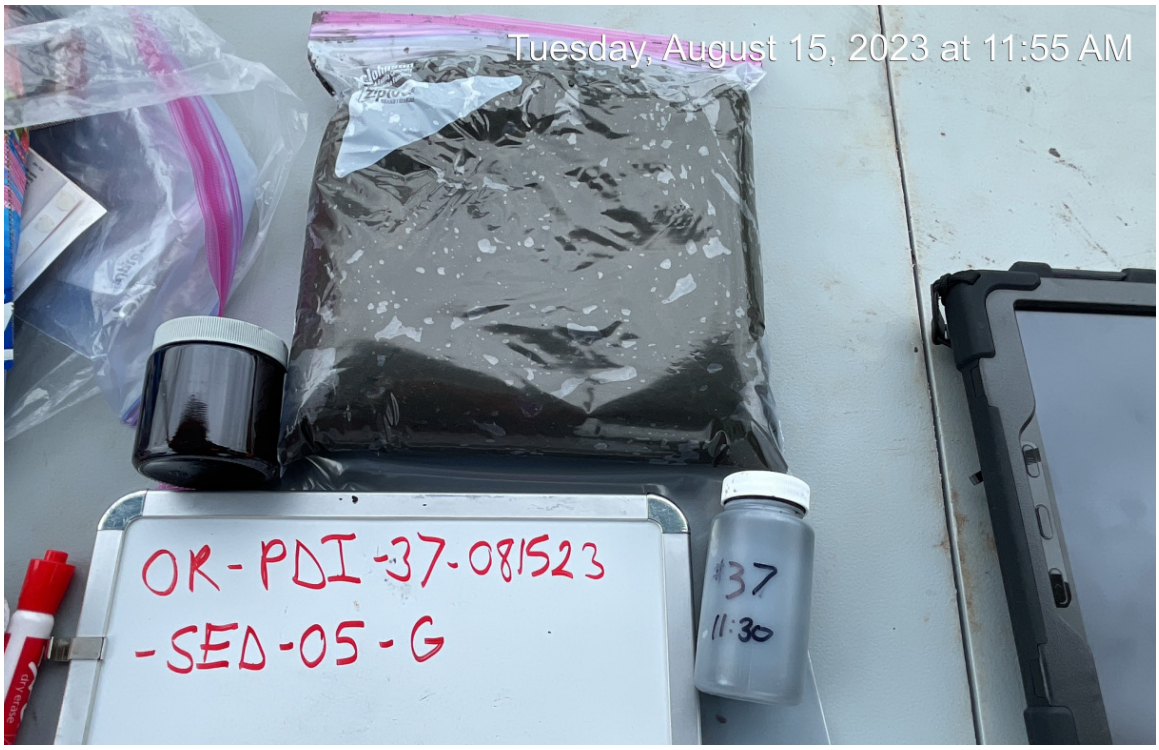
Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7

Photograph 22. East Cove 7 OR-PDI-34 (August 18, 2023)

Photograph 23. East Cove 7 OR-PDI-35 (August 18, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7

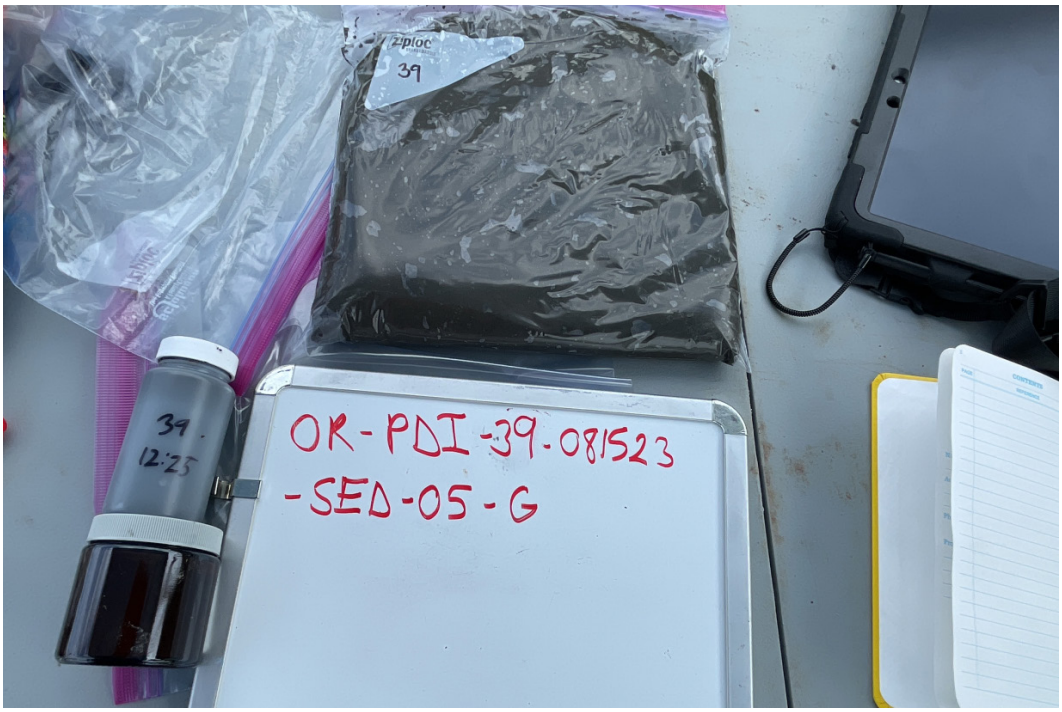
Photograph 24. East Cove 7 OR-PDI-36 (August 18, 2023)



Photograph 25. East Cove 7 OR-PDI-37 (August 15, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7

Photograph 26. East Cove 7 OR-PDI-38 (August 15, 2023)



Photograph 27. East Cove 7 OR-PDI-39 (August 15, 2023)

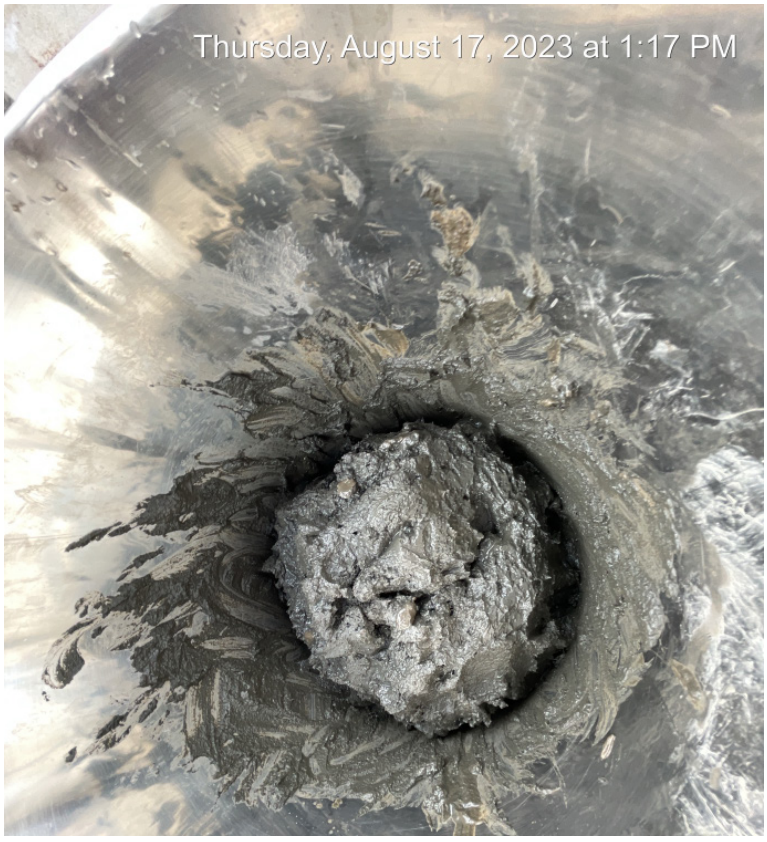
Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—East Cove 7

Photograph 28. East Cove 7 OR-PDI-40 (August 15, 2023)

Photograph 29. East Cove 7 OR-PDI-41 (August 15, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bald Hill Cove

Photograph 30. Bald Hill Cove OR-PDI-42 (August 17, 2023)



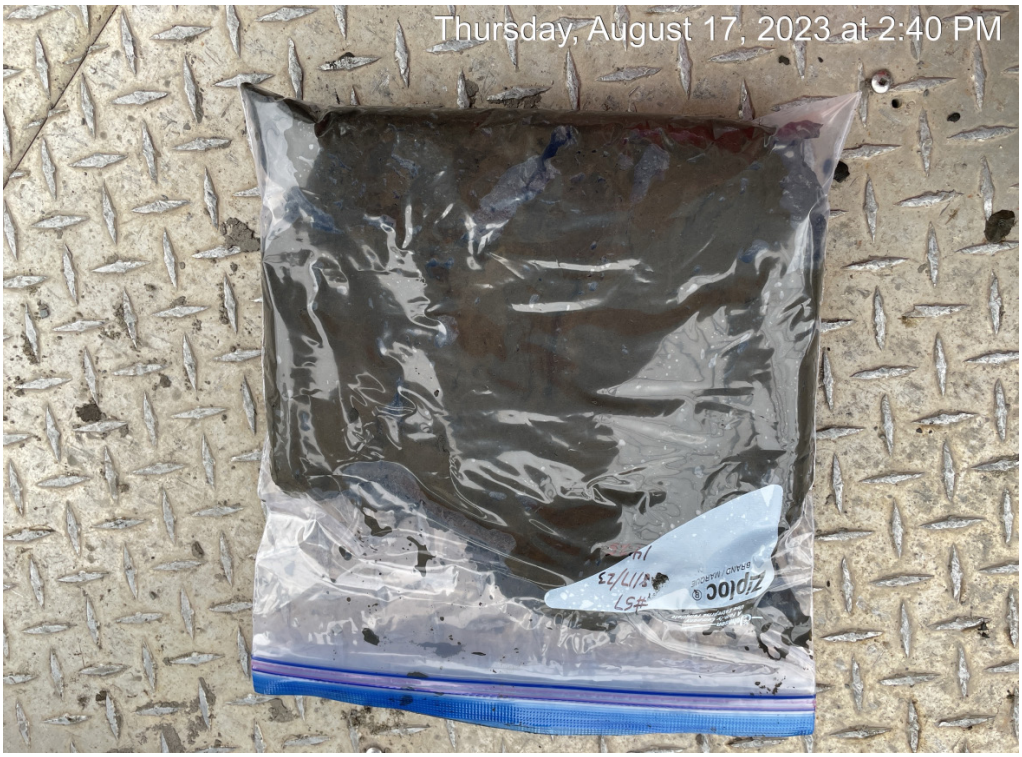
Photograph 31. Bald Hill Cove OR-PDI-44 (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bald Hill Cove

Photograph 32. Bald Hill Cove OR-PDI-55 (August 17, 2023)

Photograph 33. Bald Hill Cove OR-PDI-56 (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bald Hill Cove



Photograph 34. Bald Hill Cove OR-PDI-57 (August 17, 2023)

Photograph 35. Bald Hill Cove OR-PDI-58 (August 16, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Bald Hill Cove

Photograph 36. Bald Hill Cove OR-PDI-59 (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Sediment Sampling Equipment

Photograph 37. Box Corer (August 16, 2023)

Photograph 38. Box Corer (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Sediment Sampling Equipment

Photograph 39. Ponar Dredge (August 17, 2023)

Photograph 40. Ponar Dredge (August 17, 2023)

Orrington Reach Capping Remedy
2023 Sediment PDI Report
Site Photographs from August 2023—Sediment Sampling Equipment

Photograph 41. Slam Bar in Use at OR-PDI-34 (August 18, 2023)

Photograph 42. Material Recovered with Slam Bar at OR-PDI-34 (August 18, 2023)

Appendix C

Laboratory Reports

Provided as separate file

Appendix D

Data Validation Report

DATA VALIDATION SUMMARY

AUGUST 2023 SEDIMENT SAMPLING

PENOBSCOT ESTUARY 2023 ORRINGTON REACH

PENOBSCOT RIVER, MAINE

SIGNATURES

PREPARED BY

Davis, Gabrielle (USGD714939) Digitally signed by Davis, Gabrielle (USGD714939) Date: 2023.11.13 14:32:07 -05'00'

Gabrielle Davis
Data Validator

REVIEWED BY

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Denise King
Senior Reviewer

1 INTRODUCTION

Sediment samples were collected in August 2023 for Orrington Reach monitoring in the Penobscot Estuary located in Maine. Samples were analyzed by Eurofins Seattle (Eurofins) located in Tacoma, Washington, and Eurofins Pittsburgh (Pittsburgh) located in Pittsburgh, Pennsylvania. Samples were analyzed by the Clean Water Act (CWA, 2012):

LABORATORY	SAMPLE DELIVERY GROUP (SDG)	PARAMETER	ANALYTICAL METHOD	VALIDATION LEVEL
Eurofins Pittsburgh	580-130690-1	TOC	EPA Lloyd Kahn	10% Stage 3/ 90% Stage 2B
Eurofins Seattle	580-130690-2	Mercury, total	CWA 1631B/E	10% Stage 3/ 90% Stage 2B

A Stage 2B data validation was completed on all SDGs. A Stage 3 data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the Quality Assurance Project Plan (QAPP) Penobscot Estuary Remediation [WSP, 2023]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed, if necessary, in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J- = The reported concentration is considered an estimated value with low bias

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions, and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

MSL = Matrix spike and/or matrix spike duplicate percent recovery was less than the QC limit

A complete summary of final sample results is provided in Table 3.

2 MERCURY – 1631

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
* Blanks
* Initial Calibration
* Continuing Calibration/Ongoing Precision Recovery
* LCS/LCSD
* MS/MSD
* Detection Limits
* Sample Result Verification/EDD

* = indicates that criteria were met and/or no impact to data quality for this parameter

Results were determined to be usable as reported by the laboratory.

3 TOC – LLOYD KAHN

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
* Blanks
* Initial Calibration
* Continuing Calibration/Ongoing Precision Recovery
* LCS/LCSD

  MS/MSD
* Detection Limits
* Sample Result Verification/EDD

* = indicates that criteria were met and/or no impact to data quality for this parameter

MS/MSD

Samples OR-PDI-07_081623_SED-0.0-0.4_C and OR-PDI-56_081723_SED_0.0-0.5_C were submitted as the source for the MS/MSD. The MSs and MSDs associated with samples OR-PDI-07_081623_SED-0.0-0.4_C (62%/58%) and OR-PDI-56_081723_SED_0.0-0.5_C (59%/65%) recovered outside of the acceptance criteria for TOC. WSP J- qualified the TOC results in samples OR-PDI-07_081623_SED-0.0-0.4_C and OR-PDI-56_081723_SED_0.0-0.5_C due to the potential low bias. (J-, MSL)

4 DATA USABILITY SUMMARY

The data generated are usable and of acceptable quality with the addition of qualifiers presented in Table 2. Qualified data are summarized below.

WSP evaluated a total of 76 data records from field samples during validation and applied the following qualifiers:

- J-: 2 records (3%) were qualified as being estimated values with potential low bias because of low recoveries in the associated MS/MSD.

Based on the data validation, 100% of the data should be considered usable for project purposes.

REFERENCES:

- WSP, 2023. “Quality Assurance Project Plan Penobscot Estuary Remediation”, May 16, 2023.
- U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use”; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.
- U.S. Environmental Protection Agency (USEPA), 2020. "National Functional Guidelines for Inorganic Superfund Methods Data Review”; Office of Superfund Remediation and Technology Innovation; EPA-542-R-20-006; November 2020.
- U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures”; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Table 1
Data Validation Summary
August 2023 Sediment Sampling
Penobscot River 2023 Orrington Reach
Penobscot River, Maine

				SDG	580-130690-2	580-130690-1
				Method Class	Mercury	TOC
				Analysis Method	E1631	Lloyd Kahn
				Fraction	Total	Normal
Location ID	Sample ID	Sample Date	Media	QC Code	Count	Count
QC	EB-Ponar_081523_SED_QC	8/15/2023	BW	EB	1	
QC	EB-Ponar_081623_SED_QC	8/16/2023	BW	EB	1	
OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-04	OR-PDI-04_081623_SED_0.0-0.5_C_DUP	8/16/2023	SED	FD	1	1
OR-PDI-05	OR-PDI-05_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-06	OR-PDI-06_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-07	OR-PDI-07_081623_SED_0.0-0.4_C	8/16/2023	SED	FS	1	1
OR-PDI-08	OR-PDI-08_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-09	OR-PDI-09_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-10	OR-PDI-10_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-11	OR-PDI-11_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-21	OR-PDI-21_081723_SED_0.0-0.5_C_DUP	8/17/2023	SED	FD	1	1
OR-PDI-22	OR-PDI-22_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-23	OR-PDI-23_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-24	OR-PDI-24_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-25	OR-PDI-25_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-26	OR-PDI-26_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-27	OR-PDI-27_081623_SED_0.0-0.3_C	8/16/2023	SED	FS	1	1
OR-PDI-28	OR-PDI-28_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-29	OR-PDI-29_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-32	OR-PDI-32_081823_SED_0.0-0.5_C	8/18/2023	SED	FS	1	1
OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C	8/18/2023	SED	FS	1	1
OR-PDI-33	OR-PDI-33_081823_SED_0.0-0.5_C_DUP	8/18/2023	SED	FD	1	1
OR-PDI-34	OR-PDI-34_081823_SED_0.0-0.5_C	8/18/2023	SED	FS	1	1
OR-PDI-35	OR-PDI-35_081823_SED_0.0-0.5_C	8/18/2023	SED	FS	1	1
OR-PDI-36	OR-PDI-36_081823_SED_0.0-0.5_C	8/18/2023	SED	FS	1	1
OR-PDI-37	OR-PDI-37_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-38	OR-PDI-38_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-39	OR-PDI-39_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-40	OR-PDI-40_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-41	OR-PDI-41_081523_SED_0.0-0.5_C	8/15/2023	SED	FS	1	1
OR-PDI-42	OR-PDI-42_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-44	OR-PDI-44_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-55	OR-PDI-55_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-56	OR-PDI-56_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1
OR-PDI-57	OR-PDI-57_081723_SED_0.0-0.5_C	8/17/2023	SED	FS	1	1

Table 1
Data Validation Summary
August 2023 Sediment Sampling
Penobscot River 2023 Orrington Reach
Penobscot River, Maine

				SDG	580-130690-2	580-130690-1
				Method Class	Mercury	TOC
				Analysis Method	E1631	Lloyd Kahn
				Fraction	Total	Normal
Location ID	Sample ID	Sample Date	Media	QC Code	Count	Count
OR-PDI-58	OR-PDI-58_081623_SED_0.0-0.5_C	8/16/2023	SED	FS	1	1
OR-PDI-58	OR-PDI-58_081623_SED_0.0-0.5_C_DUP	8/16/2023	SED	FD	1	1
OR-PDI-59	OR-PDI-59_081723_SED_0.0-0.3_C	8/17/2023	SED	FS	1	1

Media

BW = Blank Water
SED = Sediment

QC Code

EB = Equipment Blank
FS = Field Sample
FD = Field Duplicate

Created by: KLD 10/19/2023
Checked by: GTD 10/19/2023

Table 2
Data Validation Summary
August 2023 Sediment Sampling
Penobscot River 2023 Orrington Reach
Penobscot River, Maine

Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validated Qualifier	Val Reason Code	Result Units
Lloyd Kahn	580-130690-13	OR-PDI-07_081623_SED_0.0-0.4_C	Normal	Total Organic Carbon	68000	F1	68000	J-	MSL	MG/KG
Lloyd Kahn	580-130690-31	OR-PDI-56_081723_SED_0.0-0.5_C	Normal	Total Organic Carbon	60000	F1	60000	J-	MSL	MG/KG

Units

MG/KG = Milligrams per kilogram

Validation Reason Codes

MSL = MS and/or MSD %R less than QC limit

Validation Qualifier

J- = Value is estimated; biased low

Created by: KLD 10/30/2023
Checked by: GTD 10/30/2023

Table 3
Data Validation Summary
August 2023 Sediment Sampling
Penobscot River 2023 Orrington Reach
Penobscot River, Maine

			Method	E1631		E1631		Lloyd Kahn	
			Parameter	Mercury		Mercury		Total Organic Carbon	
			Fraction	T		T		N	
			Units	NG/G		NG/L		MG/KG	
SDG	**Sample Date**	**Sample ID**	**QC Code**	Result	Qualifier	Result	Qualifier	Result	Qualifier
580-130690-1/2	8/16/2023	OR-PDI-04_081623_SED_0.0-0.5_C	FS	1,500				37,000	
580-130690-1/2	8/16/2023	OR-PDI-04_081623_SED_0.0-0.5_C_DUP	FD	1,500				23,000	
580-130690-1/2	8/16/2023	OR-PDI-05_081623_SED_0.0-0.5_C	FS	750				33,000	
580-130690-1/2	8/16/2023	OR-PDI-06_081623_SED_0.0-0.5_C	FS	2,100				74,000	
580-130690-1/2	8/16/2023	OR-PDI-07_081623_SED_0.0-0.4_C	FS	630				68,000	J-
580-130690-1/2	8/16/2023	OR-PDI-08_081623_SED_0.0-0.5_C	FS	1,600				110,000	
580-130690-1/2	8/16/2023	OR-PDI-09_081623_SED_0.0-0.5_C	FS	1,700				120,000	
580-130690-1/2	8/16/2023	OR-PDI-10_081623_SED_0.0-0.5_C	FS	520				53,000	
580-130690-1/2	8/17/2023	OR-PDI-11_081723_SED_0.0-0.5_C	FS	980				130,000	
580-130690-1/2	8/17/2023	OR-PDI-21_081723_SED_0.0-0.5_C	FS	1,000				87,000	
580-130690-1/2	8/17/2023	OR-PDI-21_081723_SED_0.0-0.5_C_DUP	FD	920				86,000	
580-130690-1/2	8/17/2023	OR-PDI-22_081723_SED_0.0-0.5_C	FS	780				68,000	
580-130690-1/2	8/17/2023	OR-PDI-23_081723_SED_0.0-0.5_C	FS	1,400				89,000	
580-130690-1/2	8/16/2023	OR-PDI-24_081623_SED_0.0-0.5_C	FS	920				89,000	
580-130690-1/2	8/16/2023	OR-PDI-25_081623_SED_0.0-0.5_C	FS	770				75,000	
580-130690-1/2	8/16/2023	OR-PDI-26_081623_SED_0.0-0.5_C	FS	940				80,000	
580-130690-1/2	8/16/2023	OR-PDI-27_081623_SED_0.0-0.3_C	FS	430				37,000	
580-130690-1/2	8/15/2023	OR-PDI-28_081523_SED_0.0-0.5_C	FS	460				57,000	
580-130690-1/2	8/15/2023	OR-PDI-29_081523_SED_0.0-0.5_C	FS	550				46,000	
580-130690-1/2	8/18/2023	OR-PDI-32_081823_SED_0.0-0.5_C	FS	790				68,000	
580-130690-1/2	8/18/2023	OR-PDI-33_081823_SED_0.0-0.5_C	FS	850				62,000	
580-130690-1/2	8/18/2023	OR-PDI-33_081823_SED_0.0-0.5_C_DUP	FD	820				70,000	
580-130690-1/2	8/18/2023	OR-PDI-34_081823_SED_0.0-0.5_C	FS	1,100				76,000	
580-130690-1/2	8/18/2023	OR-PDI-35_081823_SED_0.0-0.5_C	FS	1,100				74,000	
580-130690-1/2	8/18/2023	OR-PDI-36_081823_SED_0.0-0.5_C	FS	1,300				71,000	
580-130690-1/2	8/15/2023	OR-PDI-37_081523_SED_0.0-0.5_C	FS	730				73,000	
580-130690-1/2	8/15/2023	OR-PDI-38_081523_SED_0.0-0.5_C	FS	1,100				49,000	
580-130690-1/2	8/15/2023	OR-PDI-39_081523_SED_0.0-0.5_C	FS	820				52,000	
580-130690-1/2	8/15/2023	OR-PDI-40_081523_SED_0.0-0.5_C	FS	850				64,000	
580-130690-1/2	8/15/2023	OR-PDI-41_081523_SED_0.0-0.5_C	FS	780				13,000	
580-130690-1/2	8/17/2023	OR-PDI-42_081723_SED_0.0-0.5_C	FS	570				46,000	
580-130690-1/2	8/17/2023	OR-PDI-44_081723_SED_0.0-0.5_C	FS	740				74,000	
580-130690-1/2	8/17/2023	OR-PDI-55_081723_SED_0.0-0.5_C	FS	740				75,000	
580-130690-1/2	8/17/2023	OR-PDI-56_081723_SED_0.0-0.5_C	FS	730				60,000	J-
580-130690-1/2	8/17/2023	OR-PDI-57_081723_SED_0.0-0.5_C	FS	800				70,000	
580-130690-1/2	8/16/2023	OR-PDI-58_081623_SED_0.0-0.5_C	FS	850				84,000	
580-130690-1/2	8/16/2023	OR-PDI-58_081623_SED_0.0-0.5_C_DUP	FD	760				80,000	

Table 3
Data Validation Summary
August 2023 Sediment Sampling
Penobscot River 2023 Orrington Reach
Penobscot River, Maine

			Method	E1631		E1631		Lloyd Kahn	
			Parameter	Mercury		Mercury		Total Organic Carbon	
			Fraction	T		T		N	
			Units	NG/G		NG/L		MG/KG	
SDG	**Sample Date**	**Sample ID**	**QC Code**	Result	Qualifier	Result	Qualifier	Result	Qualifier
580-130690-1/2	8/17/2023	OR-PDI-59_081723_SED_0.0-0.3_C	FS	160				6,700	
580-130690-2	8/15/2023	EB-Ponar_081523_SED_QC	EB			2.9			
580-130690-2	8/16/2023	EB-Ponar_081623_SED_QC	EB			8.7			

QC Code
FS = Field Sample
FD = Field Duplicate
EB = Equipment Blank

Units
NG/G = nanogram per gram
NG/L = nanogram per liter

Qualifiers
U = Value is non-detect
J = Value is estimated
J- = Value is estimated; biased low