2017 INTERTIDAL AND SUBTIDAL SEDIMENT CHARACTERIZATION REPORT

Penobscot River Phase III Engineering Study

Penobscot River Estuary, Maine

Prepared for:

United States District Court
District of Maine

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.
511 Congress Street, Suite 200
Portland, Maine 04101

Project No. 3616166052

Final

June 2018

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EXECUTIVE SUMMARY

In January 2016, the US District Court for the District of Maine (the Court) selected Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) to conduct the Penobscot River Phase III Engineering Study (Phase III Engineering Study), to identify and evaluate potential and cost-effective measures to remediate mercury in the Penobscot River Estuary (Estuary). The geographic area to be addressed within the Phase III Engineering Study is defined by the Court as ranging from the site of the former Veazie Dam south to upper Penobscot Bay, including Mendall Marsh and the Orland River.

As a component of the Phase III Engineering Study, and as summarized in this report, intertidal and subtidal sediment sampling in support of additional characterization of the Estuary was conducted between August 2017 and November 2017. Sampling had the following objectives:

- Measure sediment mercury concentrations in intertidal and subtidal areas that were under-characterized and/or where limited or no sediment coring had previously taken place (as described in Section 2.2);
- Assess the thickness, distribution, and chemical properties of unconsolidated sediment;
- Measure the shear strength of consolidated sediment; and
- Collect data to help reduce uncertainties in the estimation of sediment volumes, as will be required for the development and evaluation of remedial alternatives.

Data from this report (as well as other Amec Foster Wheeler reports) will be integrated as lines of evidence in support of remedial evaluation for the Estuary. The remedial evaluation will be presented in the Alternatives Evaluation Report (Amec Foster Wheeler 2018a) and the Phase III Engineering Study Report (Amec Foster Wheeler 2018b). Based on this objective, the data collection effort detailed in this report is presented with minimal interpretation.

Activities associated with this sampling program included collection of sediment grab samples, sediment cores, processing of sediment cores in the Amec Foster Wheeler Durham, North Carolina sediment laboratory, and chemical and geotechnical analyses of core intervals. Overall, the sampling program included recovery of grab samples from eight stations and sediment cores from 35 stations. Divided by sampling strategy, this program entailed:

- Eight stations at which a ponar dredge was used to collect grab samples with a penetration depth of 0.3 foot;
- 22 stations at which a 1-foot push core or box core was used to collect unconsolidated sediment;

- 21 stations at which a vibracore or manual piston core was used to collect 2-foot cores of consolidated sediment; and

- 14 stations at which a vibracore or manual piston core was used to collect 8-foot cores of consolidated sediment.

For 1-foot cores of unconsolidated sediments, analyses included total mercury, total organic carbon, organic content and total solids at five sample intervals over the length of the cores. Methyl mercury analysis was limited to the top two intervals (0.0 – 0.1 foot and 0.1 – 0.3 foot) of the cores. For 2-foot and 8-foot cores of consolidated sediments, analyses included total mercury, total organic carbon, organic content and total solids at sample intervals as defined for the length of the core. For cores collected for geotechnical evaluation (16 of the 35 stations at which consolidated cores were collected), shear strength and density were analyzed at varying depth intervals based on the composition of the sediment.

Sediment sampling presented in this report was undertaken in areas of the Estuary with limited characterization based on earlier investigations. These data, as well as data from other Amec Foster Wheeler reports, will be used to: 1) assess the spatial distribution of mercury in Estuary sediment; 2) supplement data used in estimation of sediment volumes for remedial action based on specified mercury concentration thresholds; and 3) qualitatively evaluate the feasibility of remedial capping based on sediment geotechnical properties.

Sediment cores were collected from within the footprint of the surface deposits identified through the Amec Foster Wheeler geophysical survey program (Amec Foster Wheeler 2018c). Station locations for these cores were chosen to ground-truth the sub-bottom profiling survey in locations in which the survey suggested the presence of a well-delineated surface deposit. Chemical analysis of these cores suggests that approximately 85 percent of the mixture of sediment and wood waste within the footprint of the surface deposits is characterized by a total mercury concentration greater than 500 nanograms per gram (ng/g). The overall volume of the surface deposits has been estimated as approximately 2.9 million cubic yards (Amec Foster Wheeler 2018c).

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ACRONYMS AND ABBREVIATIONS

Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
Court	US District Court for the District of Maine
EPA	(US) Environmental Protection Agency
Estuary	Penobscot River Estuary
FDRs	field data records
ng/g	nanograms per gram
Phase III Engineering Study	Penobscot River Phase III Engineering Study
psf	pounds per square foot
QAPP	Quality Assurance Project Plan
SOPs	standard operating procedures

1.0 INTRODUCTION

In January 2016, the US District Court for the District of Maine (the Court) selected Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) to conduct the Penobscot River Phase III Engineering Study (Phase III Engineering Study), to identify and evaluate potential and cost-effective measures to remediate mercury in the Penobscot River Estuary (Estuary). The geographic area to be addressed within the Phase III Engineering Study is defined by the Court as ranging from the site of the former Veazie Dam south to upper Penobscot Bay, including Mendall Marsh and the Orland River (**Figure 1-1**).

This report describes the results of sediment investigations and analyses conducted in the Estuary in 2017 in support of improving characterization and spatial delineation of mercury concentrations in intertidal and subtidal sediment. Data from this report (as well as other Amec Foster Wheeler reports) will be integrated as lines of evidence in support of remedial evaluation for the Estuary. The remedial evaluation will be presented in the Alternatives Evaluation Report (Amec Foster Wheeler 2018a) and the Phase III Engineering Study Report (Amec Foster Wheeler 2018b). Based on this objective, the data collection effort detailed in this report is presented with minimal interpretation.

The overall objectives of the work presented in this report are to:

- Measure sediment mercury concentrations in intertidal and subtidal areas that were under-characterized and/or where limited or no coring has previously taken place;
- Assess the thickness, distribution, and chemical properties of unconsolidated sediment;
- Measure the shear strength of consolidated sediment; and
- Collect data to help reduce uncertainties in the estimation of sediment volumes, as will be required for the development and evaluation of remedial alternatives.

Data from sediment cores will be used to assess the depth distribution of mercury in Estuary sediment and to estimate sediment volumes for remedial action based on specified mercury concentration thresholds. The determination of threshold mercury concentrations will be presented in the Risk Assessment Report (Amec Foster Wheeler 2018d). The estimation of sediment volumes with mercury concentrations elevated above threshold concentrations will be presented in the Alternatives Evaluation Report (Amec Foster Wheeler 2018a) and the Phase III Engineering Study Report (Amec Foster Wheeler 2018b). Geotechnical data will be used in the evaluation of remedial alternatives to be presented in the Alternatives Evaluation Report (Amec Foster Wheeler 2018a) and the Phase III Engineering Study Report (Amec Foster Wheeler 2018b).

This Report is organized as follows:

- Section 1.0 – Introduction: presents the purpose and organization of this report.
- Section 2.0 – Sediment Collection and Processing Activities: presents scope and methods and summarizes the work performed to collect and process sediment cores and grab samples.
- Section 3.0 – Data Quality Summary: summarizes the data validation processes and findings and presents qualifiers to analytical data.
- Section 4.0 – Findings: summarizes the analytical results.
- Section 5.0 – References: provides citations for documents cited in this report.

2.0 SEDIMENT COLLECTION AND PROCESSING ACTIVITIES

This section summarizes the sediment collection activities conducted under this field program. Details of sediment core collection activities are presented in **Appendix A**. Sediment coring and processing are described in **Appendix A-1**. Field data records (FDRs) and lithology for sediment cores collected at each location are provided in the sediment core station summaries in **Appendix A-2**. Analytical graphs of field data are presented in **Appendix A-3**. Sediment grab sample collection activities are presented in **Appendix B**. The collection and processing of grab samples is described in **Appendix B-1**. FDRs for sediment grab samples are provided in **Appendix B-2**. Details of geotechnical testing methods and results are presented in **Appendix C**.

2.1 TERMINOLOGY AND DEFINITIONS USED IN REPORT

The terminology used in this report for sediment sampling methodologies, sample processing techniques, and sediment classification is as follows:

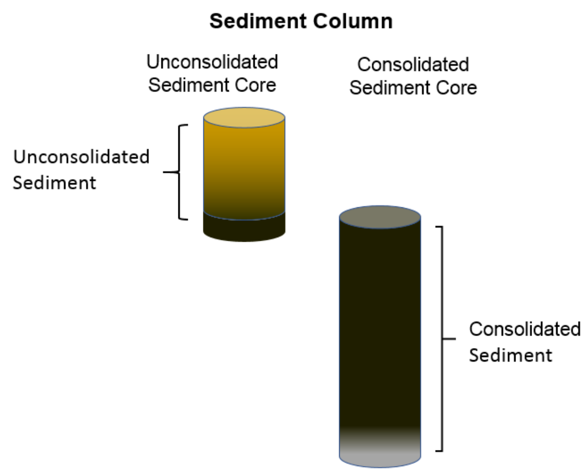
- A “station” is the general location of a sediment collection effort. Multiple deployment attempts may be conducted at a station.
- “Deployment” refers to each specific sediment collection effort. Multiple deployments can occur at a station.
- “Core” refers to a vertical column of sediment recovered from a discrete deployment. A core is sectioned into intervals at discrete depth ranges.
- “Grab” refers to sediment collected with a petite ponar dredge. A grab is a discrete sample that is not sectioned into intervals.
- “Unconsolidated” sediment is the soft material at the sediment-water interface. When unconsolidated sediment is present, it overlies more consolidated bed sediment beneath it. The interface between unconsolidated and consolidated sediment is not exact and reflects generally softer versus more firm, bedded material that may have different chemical properties (oxidation-reduction), chemical concentrations, degrees of mobility (tidal versus seasonal or annual) and geotechnical characteristics.
- “Consolidated” sediment is the bedded material that underlies the unconsolidated sediment (when present); at some sampling stations, no unconsolidated sediment is present and the more consolidated sediment is found at the sediment water interface.
- An “interval” is a measured section of a core with a specified depth increment.
- An “aliquot” is a portion of an interval that is submitted for analyses as a sample.
- “Plugging” or a “plug” is consolidated sediment recovered at the base of a sediment core. The presence of a plug of consolidated material at the base of a core allows recovery of unconsolidated material.
- “Rodding” occurs as a core barrel penetrates sediment. If wall friction inside the core barrel exceeds the bearing strength of the sediment, the barrel will behave like a solid

rod that penetrates the sediment without recovering material. This process will occur until the core barrel penetrates into a firmer layer of sediment, with a higher bearing strength, that exceeds the wall friction. As a result of this phenomenon, some unknown amount of sediment depth/thickness may be bypassed and not sampled.

- "Intact Sediment Surface" is operationally defined as the first resistance encountered when the sediment surface is lightly probed. The intact sediment surface was determined in the field by probing with a ruler. This process is outlined in **Appendix A-1**.

Early in the field program, it became apparent that use of a vibracore for sediment coring disturbed unconsolidated sediment. Push core and box core techniques were therefore used to sample this material.

For sediment recovered in cores and sectioned into discrete depth intervals, the depth interval referenced in the field sample ID (e.g., 0.7-1.0 foot) is defined relative to the surface of the recovered core. For cores targeting the unconsolidated sediment, the process of coring can result in the resuspension and/or compaction of unconsolidated material, thus the 'surface' of a core is not necessarily equivalent to the 'surface' of the in situ/intact sediment column. For cores targeting consolidated sediment, the overlying thickness of unconsolidated sediment was removed prior to sectioning the recovered core (as described above and detailed in Appendix A-1). As suggested in this illustration, it is generally reasonable to assume that the deeper depth interval(s) of unconsolidated cores overlap with the upper interval(s) of the consolidated cores. Attempts to precisely align unconsolidated and consolidated cores from the same station should be approached with caution.



2.2 DEVIATIONS FROM SCOPE OF WORK

During the course of this field program, several adjustments were made to the proposed scope of work. This section summarizes the adjustments.

1. The proposed versus sampled interval schemes are presented in the following table.

Sediment Core Type	Proposed Interval (feet)	Sampled Interval (feet)
1-foot unconsolidated core [push or box core]	0.0–0.1 0.1–0.2 0.2–0.5 0.5–1.0 1.0–1.5 1.5–2.0	0.0–0.1 0.1–0.3 0.3–0.5 0.5–0.7 0.7–1.0
2-foot consolidated core [vibracore or manual piston core] 8-foot consolidated core [vibracore or manual piston core]	0.0–0.1 0.1–0.2 0.2–0.5 0.5–1.0 1.0–1.5 1.5–2.0 2.0–3.0 3.0–4.0 4.0–5.0 5.0–6.0 6.0–7.0 7.0–8.0	0.0–0.1 0.1–0.3 0.3–0.5 0.5–0.7 0.7–1.0 Below 1.0 foot, intervals varied based on lithology and stratigraphy

These adjustments to the proposed core processing scheme were presented to the Special Master and Litigants at the July 20, 2017 quarterly status meeting in Boston, Massachusetts. For cores of unconsolidated sediment, the proposed sampling interval from 1.0 foot to 2.0 feet was dropped when it became apparent that there was generally 1 foot or less of unconsolidated sediment present in locations in which this material was sampled. For these locations, the consolidated sediment underlying the unconsolidated sediment was already scheduled to be sampled by vibracore. Because the process of determining a suitable sampling method for the unconsolidated sediment evolved during the field program, there were stations at which unconsolidated sediment was present but not successfully recovered. Thus, the absence of a core of unconsolidated sediment from a location in which a corresponding core of consolidated sediment was recovered does not necessarily mean that there was no unconsolidated sediment at that location.

2. For cores of consolidated sediment, it became apparent during sampling that sediment lithology could vary significantly with depth between more mineral sediment-rich strata and more wood waste-rich strata. Below a depth of 1 foot in these cores, sampling intervals were therefore adjusted per station to allow for more specific characterization of these distinct strata.

3. Specific additional adjustments were made to the proposed field program as follows:

- Six coring stations were relocated to locations in which the sub-bottom geophysical survey conducted as part of the 2017 Mobile Sediment Characterization identified surface deposits of material determined to be substantially composed of bedded sediment and wood waste (Amec Foster Wheeler, 2018c). Coring in these locations was focused on further characterizing the material within these deposits. Specific adjustments to station location and length of core (versus the proposed length of core) were as follows:
  - 2-foot consolidated core VN-02-02 replaced with 8-foot consolidated core ON-18-01;
  - 2-foot consolidated core WP-01-01 replaced with 8-foot consolidated core WP-06-02;
  - 2-foot consolidated core MM-06-02 replaced with 8-foot consolidated core FF-04-01;
  - 2-foot consolidated core VW-14-02 replaced with 8-foot consolidated core VW-02-01;
  - 2-foot consolidated core MM-06-01 replaced with 8-foot consolidated core VE-05-01.
  - 2-foot consolidated core ON-09-01 replaced with 2-foot consolidated core ON-18-02.
- Station WP-06-01 was abandoned due to weather and difficulty holding the vessel on station.
- No material was recovered from station VE-04-01. Sediment in this location was coarse-grained and not retained in sampling.
- Grab samples from two stations were not recovered:
  - Station WP-05-01 was mostly cobble and resulted in poor recovery; and
  - Station BH-01-01 was not collected due to station access restriction and posting.

2.3 FIELD SAMPLE COLLECTION SUMMARY

Amec Foster Wheeler implemented the 2017 intertidal and subtidal sediment characterization in accordance with the following documents:

- 2016 Draft Field Sampling Plan (Amec Foster Wheeler, 2016a)
- 2016 Draft Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016b)

- 2017 Health and Safety Plan (Amec Foster Wheeler, 2017)

During the 2017 field season, Amec Foster Wheeler developed standard operating procedures (SOPs) for guidance and quality control over sediment sampling and sample handling. The intent of these SOPs was to address sample heterogeneity resulting from the presence of wood waste in Estuary sediment. The SOPs were appended to the QAPP (Amec Foster Wheeler 2016b).

Two subcontractors assisted with sediment coring: (1) Aqua Survey, Inc. (Flemington, NJ); and (2) TG&B Marine Services (Monument Beach, MA).

Analytical laboratories, analytical methods and analytes employed in this field program included:

- Eurofins Frontier Global Sciences (Bothell, WA): total mercury by US Environmental Protection Agency (EPA) Method 1631 employing hot aqua regia digestion; methyl mercury by EPA method 1630 employing methanolic KOH extraction (Amec Foster Wheeler 2018e);
- Alpha Analytical (Mansfield, MA): total organic carbon (TOC) by the Lloyd-Kahn method; total solids by SM 2540B; and
- Amec Foster Wheeler sediments lab (Durham, NC): organic content by ASTM D2974C.

2.3.1 Types of Sediment Collection

Sediment sampling techniques included grab sampler, manual push core, box core, piston core, and vibracore (**Table 2-1**). The application of specific sampling techniques was as follows:

- For unconsolidated sediments:
  - Grab samples: petite ponar dredge; sampler penetration to 0.3 foot;
  - 1-foot cores: manual push core or box core; these locations were coincident with locations in which cores of consolidated sediment were also collected (see below).
- For consolidated sediments:
  - 2-foot cores: vibracore or manual piston core; generally recovered 2 feet of consolidated sediment with a 3-foot target penetration depth;
  - 8-foot cores: vibracore or manual piston core; generally recovered 8 feet of consolidated sediment with a 10-foot target penetration depth.

Table 2-1 summarizes the sampling program by station and river reach. Station locations are shown on **Figure 2-1**. Overall, the sediment sampling program included sample recovery at eight grab sample stations and 35 coring stations. Specifically, sample recovery included:

- Eight stations at which grab samples were collected with a sediment penetration depth of 0.3 foot;
- 22 stations at which 1-foot cores of unconsolidated sediment was collected by push core or box core;
- 21 stations at which 2-foot cores of consolidated sediment were collected by vibracore or manual piston core; and
- 14 stations at which 8-foot cores of consolidated sediment were collected by vibracore or manual piston core.

2.3.2 Sediment Grab Sample Collection

Grab samples of surface sediment were collected by petite ponar dredge. Sampling was attempted at 10 stations, of which eight yielded recoverable sediment (**Table 2-1**). Additional sampling details, including methodology and FDRs, are provided in **Appendix B.**

2.3.3 Sediment Core Collection

At each of the stations where either 2-foot or 8-foot cores of consolidated sediment were collected, the sampling goal was recovery of three 'acceptable' cores. Acceptable is defined with recovery greater than or equal to 70 percent of the target penetration depth, with allowance for sediment refusal at less than 70 percent of the target penetration depth, or for plugging and/or rodding at similar depth strata across multiple deployments at a single station. For three replicate cores at any single station, the longest was designated for chemical analyses; the second longest for geotechnical analysis; and the shortest for record/archive.

As described in Section 2.1, during initial attempts to vibracore, it was apparent that vibracoring disturbed the unconsolidated sediment. To minimize disturbance of this material, unconsolidated sediment was collected using a hand push core or box core. Coring of unconsolidated sediment was achieved by pushing the core barrel through the sediment until a plug of more consolidated sediment was recovered. Cores of unconsolidated sediment were frozen in a vertical orientation in the field and maintained frozen and vertically oriented at the field office. For all stations at which 1-foot cores were collected, duplicate cores were recovered for chemical analyses and visual lithologic classification.

2.4 SEDIMENT PROCESSING SUMMARY

Cores selected for chemical analyses were prepared and processed at the Amec Foster Wheeler sediments lab in Durham, NC. SOPs were developed for the preparation of samples prior to shipment for laboratory analyses. Details and supporting materials are included in **Appendix A**. The protocol for sectioning cores into intervals is detailed in **Appendix A-1;** interval-specific information, including lithology, for all cores is included in **Appendix A-2**.

For cores of consolidated sediment, samples were distributed to laboratories for chemical analysis in the following priority sequence: (1) total mercury by EPA Method 1631 (Eurofins Frontier Global Sciences); (2) TOC by Lloyd-Kahn method and total solids by Standard Method 2540B (Alpha Analytical); and (3) organic content by ASTM D2974C at 550 degrees Celsius (Amec Foster Wheeler).

For cores of unconsolidated sediment, the priority analyte in the top two depth intervals was methyl mercury by EPA Method 1630 (Eurofins Frontier Global Sciences). For the remaining analytes (and all depth intervals), the priority sequence was as described for cores of consolidated sediment. Net methylation and methyl mercury accumulation are often higher in saturated surface sediments than deeper in the sediment profile. Therefore, analysis of the top two depth intervals (0-0.1 and 0.1-0.3 ft) allows assessment of potential biological exposure to methyl mercury within surface sediment. This focus on methyl mercury analysis in the top two depth intervals of recovered sediment cores is as described in the Marsh Platform Sediment Characterization Technical Memorandum (Amec Foster Wheeler 2018f).

Geotechnical analyses were performed on cores of consolidated sediment collected at 16 of the 35 coring stations (**Table 2-1**). For geotechnical analyses, cores were sectioned into 0.33-foot (4.0-inch) intervals, with reasonable adjustment for changes in lithology as described in Section 2.2. Geotechnical analyses included density and shear strength. Shear strength was measured with a laboratory miniature vane shear apparatus in the field office on cores that had been previously refrigerated. Sample processing methodology and data sheets providing testing results are included in **Appendix C**.

3.0 DATA QUALITY SUMMARY

A Stage IIb data validation was completed for analytical results of sediment samples submitted for chemical analyses. A Stage III data validation was performed on ten percent of the analytical data. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (EPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (EPA, 2013) where applicable. Data quality evaluations were completed using quality control limits specified in the draft QAPP (Amec Foster Wheeler, 2016b).

Results were determined to be usable with general qualifications and exceptions as reported by the laboratory. A complete summary of the data validation review, qualification actions, and final sample results is included in **Appendix D**.

4.0 FINDINGS

This section presents analytical results for this sediment characterization program. Results are organized by zone (intertidal or subtidal), then by either sampling strategy (grab sample or core), or by the type of material sampled (unconsolidated or consolidated sediment). Analytical results for all samples are presented in **Table 4-1.** Sediment core lithologies and graphs of analytical results are included in **Appendix A-3.** As described in Section 2.1, cores of unconsolidated and consolidated sediment from the same station should not be interpreted as in direct alignment.

4.1 INTERTIDAL SEDIMENT CORE SAMPLING

Sampling in the intertidal zone included both unconsolidated sediment and consolidated sediment. For unconsolidated sediment, analyses included total mercury, methyl mercury, TOC, organic content and total solids. For consolidated sediment, analyses included total mercury, TOC, organic content and total solids. Results from these analyses will be used to fill data gaps where intertidal sediment characterization is lacking.

4.1.1 Unconsolidated Sediment

For the surface interval (0.0–0.1 foot) of unconsolidated intertidal sediment cores, the concentration of total mercury ranged from 536 nanograms per gram (ng/g) to 1,500 ng/g. The core with the lowest concentration of total mercury in the surface interval was from Mendall Marsh (MM-04-01-F-17_SED_00-01); the core with the highest concentration of total mercury in the surface interval was from Verona Northeast (VN-02-01-A-17_SED_00-01).

Overall, for all depth intervals, total mercury concentrations in unconsolidated intertidal sediments ranged from 272 to 2,110 ng/g. The core with the lowest concentration of total mercury was from Winterport (WP-02-01-D-17_SED_07-10; 0.7–1.0 foot); the core with the highest concentration of total mercury was from Orrington (ON-10-01-C-17_SED_01-03; 0.1–0.3 foot).

For unconsolidated sediment cores, the concentration of methyl mercury ranged from 6.4 ng/g to 55.8 ng/g. The lowest concentration of methyl mercury was from Mendall Marsh (MM-04-01-F-17_SED_00-01; 0.0–0.1 foot); the highest concentration of methyl mercury was from Verona Northeast (VN-02-04-B-17_SED_00-01; 0.0–0.1 foot).

For unconsolidated sediment cores, TOC concentrations ranged from 3.89 percent to 8.60 percent. The lowest TOC concentration was from Frankfort Flats (FF-08-02-G-17_SED_05-07; 0.5-0.7 foot); the highest TOC concentration was from Verona Northeast (VN-02-04-B-17_SED_07-10; 0.7-1.0 foot).

4.1.2 Consolidated Sediment

For the surface interval (0.0–0.1 foot) of consolidated sediment cores, the concentration of total mercury ranged from 0.08 ng/g (J-qualified) to 946 ng/g. If the qualified value is not considered, the concentration of total mercury in the surface interval of consolidated cores ranged from 512 ng/g to 946 ng/g. The core with the lowest (qualified) concentration of total mercury in the surface interval was from Verona Northeast (VN-02-03-E-17_SED_00-01). The core with the next lowest concentration (512 ng/g) was from Frankfort Flats (FF-08-01-B-17_SED_00-01). The core with the highest concentration of total mercury in the surface interval was from Bucksport (BU-01-01-C-17_SED_00-01).

Overall, for all depth intervals, total mercury concentrations ranged from 0.08 ng/g (J-qualified) to 2,570 ng/g. If the qualified value is not considered, the concentration of total mercury across all depth intervals of consolidated cores ranged from 8.1 ng/g to 946 ng/g. The core with the lowest (qualified) concentration of total mercury was from Verona Northeast (VN-02-03-E-17_SED_00-01). The core with the next lowest concentration (8.1 ng/g) was from Frankfort Flats (FF-08-01-B-17_SED_60-70; 6.0–7.0 feet). The core with the highest total mercury concentration was from Verona Northeast (VN-01-01-E-17_SED_05-07; 0.5-0.7 foot).

For intertidal consolidated sediment, TOC concentrations for all depth intervals ranged from 1.21 percent to 36.8 percent. The lowest TOC concentration was from Frankfort Flats (FF-08-01-B-17_SED_60-70; 6.0–7.0 feet); the highest TOC concentration was also from Frankfort Flats (FF-08-01-B-17_SED_00-01; 0.0–0.1 foot).

4.2 SUBTIDAL SEDIMENT CORE SAMPLING

Sampling in the subtidal zone included both unconsolidated and consolidated sediment. For unconsolidated sediment, analyses included total mercury, methyl mercury, TOC, organic content and total solids. For consolidated sediment, analyses included total mercury, TOC, organic content and total solids. Results from these analyses will be used to fill data gaps where subtidal sediment characterization is lacking.

4.2.1 Unconsolidated Sediment

For the surface interval (0.0–0.1 foot) of unconsolidated subtidal sediment cores, the concentration of total mercury ranged from 379 ng/g to 1,430 ng/g. The core with the lowest concentration in the surface interval was from Verona Northeast (VN-04-02-C-17_SED_00-01); the core with the highest concentration in the surface interval was from Orrington (ON-18-02-E-17_SED_00-01).

Overall, for all depth intervals, total mercury concentrations in unconsolidated subtidal sediments ranged from 16.2 ng/g to 1,430 ng/g. The core with the lowest concentration in subtidal unconsolidated sediment was from Verona Northeast (VN-04-02-C-17_SED_07-10; 0.7-1.0 foot); the core with the highest concentration was from Orrington (ON-18-02-E-17_SED_00-01; 0.0-0.1 foot).

For unconsolidated subtidal sediments, concentrations of methyl mercury in the top two depth intervals of collected cores ranged from 1.40 ng/g to 21.1 ng/g. The lowest concentration of methyl mercury was from Verona Northeast (VN-04-02-C-17_SED_01-03; 0.1-0.3 foot); the highest concentration of methyl mercury was from Bucksport Harbor (BH-03-01-E-17_SED_00-01; 0.0-0.1 foot).

TOC concentrations in unconsolidated subtidal sediment cores ranged from 1.57 percent to 9.43 percent. The lowest TOC concentration was from Verona Northeast (VN-04-02-C-17_SED_00-01; 0.0-0.1 foot); the highest TOC concentration was from Orrington (ON-18-02-E-17_SED_03-05; 0.3-0.5 foot).

4.2.2 Consolidated Sediment

For the surface interval (0.0–0.1 foot) of consolidated subtidal sediment cores, the concentration of total mercury ranged from 58.9 ng/g to 2,030 ng/g. The subtidal sediment core with the lowest concentration of total mercury in the surface interval was from Verona West (VW-02-01-B-17_SED_00-01); the subtidal core with the highest concentration of total mercury in the surface interval was from Verona Northeast (VN-05-01-D-17_SED_00-01).

Overall, for all depth intervals, total mercury concentrations in subtidal consolidated sediment ranged from 9.7 ng/g to 3,770 ng/g. The lowest total mercury concentration in consolidated subtidal sediment was from Verona West (VW-02-01-B-17_SED_65-70; 6.5-7.0 feet). The highest total mercury concentration in consolidated subtidal sediment was from Winterport (WP-06-02-C-17_SED_15-20; 1.5-2.0 feet).

TOC concentrations, for all depths, in subtidal consolidated sediment cores ranged from 0.29 percent (J qualified) to 44.6 percent. The sample with the lowest TOC concentration was from Orrington (ON-19-01-A-17_SED_10-15; 1.5-2.0 feet). The sample with the highest TOC concentration was from Verona East (VE-05-01-E-17_SED_01-03; 0.1-0.3 foot).

4.3 Sediment Grab Sampling

Grab samples represent an integrated sediment sample over the 0.0–0.3-foot depth interval. For sediment grab samples, analyses included total mercury, TOC, organic content and total solids.

Results from these analyses will be used to fill data gaps where grab sample sediment characterization is lacking.

For sediment grab samples collected in the intertidal zone, total mercury concentrations ranged from 598 ng/g to 728 ng/g (J-qualified). The lowest total mercury concentration in intertidal grab samples was from Bucksport (BU-08-02_091217_SED_03); the highest total mercury concentration in intertidal grab samples was from Verona Northeast (VN-10-01_08192017_SED_03).

For sediment grab samples collected in the subtidal zone, total mercury concentrations ranged from 134 ng/g (J-qualified) to 806 ng/g (J-qualified). Both the lowest (BH-05-01_08192017_SED_03) and the highest (BH-08-01_08192017_SED_03) total mercury concentrations in subtidal grab samples were from Bucksport Harbor.

TOC concentrations in all sediment grab samples ranged from 3.8 percent to 6.7 percent. Both the lowest (ON-21-01_08192017_SED_03) and the highest (ON-22-01_08192017_SED_03) TOC concentrations were from subtidal stations in Orrington.

4.4 Geotechnical Analysis

Geotechnical testing was performed on cores from 16 stations, including both 2-foot cores and 8-foot cores of consolidated sediment (**Table 4-2**). Testing included shear strength and wet density, and was performed on one of the three triplicate cores for those stations at which testing occurred. For the 16 cores for which shear strength was assessed, peak shear strength typically, but not always, increased with depth. Peak shear strength in surface intervals (0–0.33 feet) ranged from 3.4 pounds per square foot (psf) to 349.5 psf; peak shear strength only exceeded 100 psf in three of the 14 cores for which there were data for the surface interval. The lowest surface interval peak shear strength was from Verona East (VE-09-01-A), and the highest was from Verona West (VW-14-01-D). For two of the 16 cores, shear strength in the surface interval could not be measured.

Peak shear strength in the bottom interval of geotechnical cores ranged from 57.6 psf (at a core depth of 1.67–2.17 feet for Mendall Marsh core MM-04-01-D) to 839.7 psf (at a core depth of 1.83–2.08 feet for Verona East core VE-10-01-A). With the exception of Mendall Marsh core MM-04-01-D, peak shear strength in the bottom interval of the geotechnical cores was greater than 150 psf. For cores MM-04-01-D (Mendall Marsh) and VW-14-01-D (Verona West), peak shear strength was generally consistent throughout the portion of the core assessed. Geotechnical data were assessed over 2.08 feet of core for the Mendall Marsh core and over 1.67 feet of core for the Verona West core. For core intervals with significant wood waste or coarse-grained material, shear strength could not be measured. Wet density for all intervals assessed from geotechnical cores ranged from 54.4 pounds per cubic foot to 112.4 pounds per cubic foot.

4.5 SURFACE DEPOSIT CHARACTERIZATION

Data from the 8-foot cores collected within the footprint of the surface deposits were used to estimate the volume and mass of sediment in these deposits characterized by total mercury concentration greater than 500 ng/g (**Table 4-3**). Surface deposits were identified during the Amec Foster Wheeler sub-bottom geophysical survey and were determined to be substantially composed of bedded sediment and wood waste (Amec Foster Wheeler, 2018c). The distribution of surface deposits is presented in Figure A-1 of the 2017 Mobile Sediment Characterization Report (Amec Foster Wheeler, 2018c). Results of the volume estimation presented in **Table 4-3** suggest that approximately 85 percent of the sediment and wood waste volume within the footprint of the surface deposits can be characterized by a total mercury concentration greater than 500 ng/g. The overall volume of the surface deposits has been estimated as approximately 2.9 million cubic (Amec Foster Wheeler, 2018c).

Based on a classification of surface deposit type, the volume of sediment and wood waste in the Estuary characterized by total mercury concentrations greater than 500 ng/g can be categorized as follows:

- 950,000 cubic yards in layers;
- 1,170,000 cubic yards in traps; and
- 450,000 cubic yards in trenches.

Classification of surface deposits in terms of 'layers', traps' or 'trenches' and the summation of sediment volumes for each type of deposit are presented in **Table 4-3** and **Appendix A-1.** A layer is defined as a uniformly mixed deposit appearing above grade on the Estuary bed; a trap is defined as a partially exposed deposit in a bathymetric depression on the Estuary bed; and a trench is defined as a partially exposed, but laterally confined deposit that does not rise above grade on the Estuary bed. As presented in **Table 4-3**, surface deposit VE-1A in the Verona East reach is categorized as a trap, but may be a combination of a trap and a layer. This surface deposit has been identified by geophysical survey, but has not been cored. What sediment chemistry data exist for this surface deposit include grab samples from 2016 (within VE-1 and VE-1A) and 2009 (PRMSP 2013). Based on the geographic proximity of VE-1A to VE-1, this surface deposit would be categorized as a layer. However, because bathymetry and sub-bottom imaging suggest that portions of VE-1A appear as a trap, it is possible that concentrations of mercury are not uniformly elevated throughout the thickness of this surface deposit. Further evaluation of the surface deposits as potential remedial targets is presented in the Alternatives Evaluation Report (Amec Foster Wheeler 2018a) and the Phase III Engineering Study Report (Amec Foster Wheeler 2018b).

5.0 REFERENCES

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TABLES

TABLE 2-1

SEDIMENT GRAB SAMPLE AND CORE STATION SUMMARY
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

			Collection Method				
			Ponar	Push or Box Core	Vibracore or Manual Piston Core	Vibracore or Manual Piston Core	
			Unconsolidated Sediments		Consolidated Sediments		
River Reach	**Zone**	**Station ID[1]**	**0.3-foot Grab**	**1-foot Core**	**2-foot Core**	**8-foot Core**	**Analyses Conducted[2]**
Orrington	Intertidal	ON-10-01		x	x		Hg, MeHg, TOC, OC, solids
Orrington	Subtidal	ON-13-01	x				Hg, TOC, OC, solids
Orrington	Subtidal	ON-18-01		x		x	Hg, MeHg, TOC, OC, solids, Geotech
Orrington	Subtidal	ON-18-02		x	x		Hg, MeHg, TOC, OC, solids, Geotech
Orrington	Subtidal	ON-19-01			x		Hg, TOC, OC, solids
Orrington	Subtidal	ON-21-01	x				Hg, TOC, OC, solids
Orrington	Subtidal	ON-22-01	x				Hg, TOC, OC, solids
Winterport	Intertidal	WP-02-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
Winterport	Subtidal	WP-06-02		x		x	Hg, MeHg, TOC, OC, solids, Geotech
Frankfort Flats	Subtidal	FF-04-01				x	Hg, TOC, OC, solids
Frankfort Flats	Subtidal	FF-06-01			x		Hg, TOC, OC, solids
Frankfort Flats	Subtidal	FF-07-01				x	Hg, TOC, OC, solids
Frankfort Flats	Subtidal	FF-07-02				x	Hg, TOC, OC, solids
Frankfort Flats	Intertidal	FF-08-01				x	Hg, TOC, OC, solids
Frankfort Flats	Intertidal	FF-08-02		x		x	Hg, MeHg, TOC, OC, solids, Geotech
Mendall Marsh	Intertidal	MM-04-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech

TABLE 2-1

SEDIMENT GRAB SAMPLE AND CORE STATION SUMMARY
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

River Reach	Zone	Station ID[1]	Collection Method				Analyses Conducted[2]
			Ponar	Push or Box Core	Vibracore or Manual Piston Core	Vibracore or Manual Piston Core	
			Unconsolidated Sediments		Consolidated Sediments		
			0.3-foot Grab	1-foot Core	2-foot Core	8-foot Core	
Bucksport	Intertidal	BU-01-01			x		Hg, TOC, OC, solids
	Subtidal	BU-02-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		BU-05-01			x		Hg, TOC, OC, solids
	Intertidal	BU-08-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		BU-08-02	x				Hg, OC, solids
	Subtidal	BU-09-01				x	Hg, TOC, OC, solids
		BU-10-01				x	Hg, TOC, OC, solids
		BU-10-02				x	Hg, TOC, OC, solids
Bucksport Harbor	Intertidal	BH-03-01		x		x	Hg, MeHg, TOC, OC, solids
		BH-05-01	x				Hg, solids
		BH-08-01	x				Hg, TOC, OC, solids
Verona Northeast	Intertidal	VN-01-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		VN-02-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		VN-02-03		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		VN-02-04		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		VN-03-01		x	x		Hg, MeHg, TOC, OC, solids
	Subtidal	VN-04-01		x	x		Hg, MeHg, TOC, OC, solids
		VN-04-02		x	x		Hg, MeHg, TOC, OC, solids
		VN-05-01				x	Hg, TOC, OC, solids
	Intertidal	VN-08-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		VN-10-01	x				Hg, TOC, OC, solids
		VN-10-02	x				Hg, TOC, OC, solids

TABLE 2-1

SEDIMENT GRAB SAMPLE AND CORE STATION SUMMARY
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

			Collection Method				
			Ponar	Push or Box Core	Vibracore or Manual Piston Core	Vibracore or Manual Piston Core	
			Unconsolidated Sediments		Consolidated Sediments		
River Reach	**Zone**	**Station ID[1]**	**0.3-foot Grab**	**1-foot Core**	**2-foot Core**	**8-foot Core**	**Analyses Conducted[2]**
Verona East	Subtidal	VE-05-01				x	Hg, TOC, OC, solids
	Intertidal	VE-09-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
		VE-10-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
Verona West	Subtidal	VW-02-01		x		x	Hg, MeHg, TOC, OC, solids
		VW-14-01		x	x		Hg, MeHg, TOC, OC, solids, Geotech
TOTALS:			**8**	**22**	**21**	**14**	

Prepared by: DRY 1/31/2018
Checked by: MKM 1/31/2018
Revised by: KAM 5/31/2018

Notes:
1. Grab station BH-01-01 abandoned due to restricted accessibility and signage; Grab station WP-05-01 not submitted for laboratory analysis due to low sample recovery and cobble content; Core station VE-04-01 had insufficient recovery for sample analysis.
2. Methyl mercury analyses only conducted in 0–0.1-foot and 0.1–0.3-foot intervals. Geotechnical testing consisted of ex situ density and shear vane testing.

Abbreviations:
Geotech - geotechnical
Hg - total mercury
MeHg - methyl mercury
OC - organic content
solids - total solids
TOC - total organic carbon

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	**Zone**	**Core Designation[2]**	**Station ID**	**Sample ID**	**Sample Date**	**Depth Units**	**Top Depth**	**Bottom Depth**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Result**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Major**	**Minor**
Orrington	Intertidal Sediment	Unconsolidated	ON-10-01-C	ON-10-01-C-17_SED_00-01	10/27/17	ft	0.0	0.1	901		23.9		2.65	7.34		14.5		29.8	J	Clay/Silt	(-)
				ON-10-01-C-17_SED_01-03	10/27/17	ft	0.1	0.3	2110		37.4		1.77	5.94		14.7		15.1	J	Clay/Silt	(-)
				ON-10-01-C-17_SED_03-05	10/27/17	ft	0.3	0.5	767		(-)		N/A	6.34		12.1		38.0	J	Clay/Silt	(-)
		Consolidated	ON-10-01-B	ON-10-01-B-17_SED_00-01	11/14/17	ft	0.0	0.1	561		(-)		N/A	5.45	J	13.6		39.9	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_01-03	11/14/17	ft	0.1	0.3	598		(-)		N/A	6.05	J	13.9		39.9	J	Clay/Silt	Sand
				ON-10-01-B-17_SED_03-05	11/14/17	ft	0.3	0.5	687		(-)		N/A	6.08	J	13.8		42.4	J	Clay/Silt	Sand
				ON-10-01-B-17_SED_05-07	11/14/17	ft	0.5	0.7	696		(-)		N/A	5.17	J	13.1		45.5	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_07-09	11/14/17	ft	0.7	0.9	122		(-)		N/A	4.01	J	7.26		53.7	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_09-11	11/14/17	ft	0.9	1.1	44.3		(-)		N/A	2.94	J	7.37		59.2	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_11-15	11/14/17	ft	1.1	1.5	17.1		(-)		N/A	3.06	J	7.84		60.3	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_15-20	11/14/17	ft	1.5	2.0	19.9		(-)		N/A	2.90	J	6.99		61.6	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_20-25	11/14/17	ft	2.0	2.5	19.1		(-)		N/A	2.61	J	6.90		63.4	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_25-28	11/14/17	ft	2.5	2.8	17.4		(-)		N/A	2.34	J	6.18		64.6	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_28-30	11/14/17	ft	2.8	3.0	17.0		(-)		N/A	2.15	J	5.53		67.2	J	Clay/Silt	(-)
				ON-10-01-B-17_SED_30-37	11/14/17	ft	3.0	3.7	18.5		(-)		N/A	2.56	J	6.05		62.2	J	Clay/Silt	(-)
	Subtidal Sediment	Grab	ON-13-01	ON-13-01_08192017_SED_03	08/19/17	ft	0.0	0.3	476	J	(-)		N/A	5.95		8.93		40.8	J	Silt/Sand	(-)
		Unconsolidated	ON-18-01-F	ON-18-01-F-17_SED_00-01	10/26/17	ft	0.0	0.1	710		10.2		1.44	3.96		13.3		38.5	J	Clay/Silt	Wood Chips
				ON-18-01-F-17_SED_01-03	10/26/17	ft	0.1	0.3	844		11.6		1.37	5.64		14.3		35.6	J	Clay/Silt	(-)
				ON-18-01-F-17_SED_03-05	10/26/17	ft	0.3	0.5	606		(-)		N/A	3.83		11.8		46.4	J	Clay/Silt	(-)
				ON-18-01-F-17_SED_05-07	10/26/17	ft	0.5	0.7	823		(-)		N/A	4.76		15.2		41.4	J	Clay/Silt	(-)
				ON-18-01-F-17_SED_07-10	10/26/17	ft	0.7	1.0	773		(-)		N/A	5.71		14.7		33.7	J	Clay/Silt	(-)
		Consolidated	ON-18-01-C	ON-18-01-C-17_SED_00-01	11/16/17	ft	0.0	0.1	880		(-)		N/A	7.79		16.4		38.6	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_01-03	11/16/17	ft	0.1	0.3	748		(-)		N/A	5.58		13.9		41.7	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_03-05	11/16/17	ft	0.3	0.5	630		(-)		N/A	4.55		11.8		45.8	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_05-07	11/16/17	ft	0.5	0.7	858		(-)		N/A	4.66		12.2		42.8	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_07-10	11/16/17	ft	0.7	1.0	726		(-)		N/A	5.42		13.2		40.4	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_10-13	11/16/17	ft	1.0	1.3	863		(-)		N/A	5.63		19.7		40.9	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_13-16	11/16/17	ft	1.3	1.6	779		(-)		N/A	6.63		15.5		42.1	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_16-18	11/16/17	ft	1.6	1.8	816		(-)		N/A	6.34		14.6		44.5	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_18-20	11/16/17	ft	1.8	2.0	1430		(-)		N/A	7.83		12.8		36.0	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_20-25	11/16/17	ft	2.0	2.5	1550		(-)		N/A	6.53		16.0		40.6	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_25-30	11/16/17	ft	2.5	3.0	1900		(-)		N/A	8.43		18.5		35.0	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_30-35	11/16/17	ft	3.0	3.5	2580		(-)		N/A	9.42		17.4		35.4	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_35-40	11/16/17	ft	3.5	4.0	2390		(-)		N/A	9.06		18.5		36.4	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_40-45	11/16/17	ft	4.0	4.5	510		(-)		N/A	9.43		18.3		36.8	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_45-50	11/16/17	ft	4.5	5.0	395		(-)		N/A	8.95		19.2		38.0	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_50-55	11/16/17	ft	5.0	5.5	376		(-)		N/A	9.14		20.1		37.2	J	Clay/Silt	Wood Chips
				ON-18-01-C-17_SED_55-60	11/16/17	ft	5.5	6.0	428		(-)		N/A	9.62		14.7		37.8	J	Clay/Silt	(-)
				ON-18-01-C-17_SED_60-63	11/16/17	ft	6.0	6.3	944		(-)		N/A	9.93		18.6		38.3	J	Clay/Silt	Wood Chips
				ON-18-01-C-17_SED_63-67	11/16/17	ft	6.3	6.7	373		(-)		N/A	11.50		26.2		33.7	J	Clay/Silt	(-)
		Unconsolidated	ON-18-02-E	ON-18-02-E-17_SED_00-01	10/26/17	ft	0.0	0.1	1430		4.90	J	0.34	8.43		19.4		21.7	J	Clay/Silt	Wood Chips
				ON-18-02-E-17_SED_01-03	10/26/17	ft	0.1	0.3	1350		13.1		0.97	8.24		19.0		23.0	J	Clay/Silt	Wood Chips
				ON-18-02-E-17_SED_03-05	10/26/17	ft	0.3	0.5	1010		(-)		N/A	9.43		21.9		27.9	J	Clay/Silt	Wood Chips
				ON-18-02-E-17_SED_05-07	10/26/17	ft	0.5	0.7	871		(-)		N/A	7.29		19.5		41.3	J	Clay/Silt	(-)
				ON-18-02-E-17_SED_07-10	10/26/17	ft	0.7	1.0	877		(-)		N/A	8.50		18.4		30.7	J	Clay/Silt	(-)
		Consolidated	ON-18-02-C	ON-18-02-C-17_SED_00-01	11/27/17	ft	0.0	0.1	1150		(-)		N/A	8.13		16.1		27.1	J	Clay/Silt	(-)
				ON-18-02-C-17_SED_01-03	11/27/17	ft	0.1	0.3	1200		(-)		N/A	7.74		17.2		29.0	J	Clay/Silt	(-)
				ON-18-02-C-17_SED_03-05	11/27/17	ft	0.3	0.5	1120		(-)		N/A	8.16		16.1		27.8	J	Clay/Silt	Sand
				ON-18-02-C-17_SED_05-07	11/27/17	ft	0.5	0.7	886		(-)		N/A	7.74		18.2		27.9	J	Clay/Silt	Sand
				ON-18-02-C-17_SED_07-10	11/27/17	ft	0.7	1.0	974		(-)		N/A	8.30		19.3		27.4	J	Clay/Silt	Sand
				ON-18-02-C-17_SED_10-15	11/27/17	ft	1.0	1.5	693		(-)		N/A	7.98		16.6		33.6	J	Clay/Silt	Sand
				ON-18-02-C-17_SED_15-17	11/27/17	ft	1.5	1.7	862		(-)		N/A	8.35		17.5		33.7	J	Not Recorded	(-)
				ON-18-02-C-17_SED_17-20	11/27/17	ft	1.7	2.0	888		(-)		N/A	7.89		16.1		33.0	J	Clay/Silt	Gravel
				ON-18-02-C-17_SED_20-22	11/27/17	ft	2.0	2.2	112		(-)		N/A	3.31		3.04		76.0	J	Gravel	Clay/Silt/Sand
		Consolidated	ON-19-01-A	ON-19-01-A-17_SED_00-01	09/19/17	ft	0.0	0.1	264		(-)		N/A	8.79		16.1		41.0	J	Wood Chips	Clay/Silt
				ON-19-01-A-17_SED_01-03	09/19/17	ft	0.1	0.3	74.3		(-)		N/A	6.91		15.9		52.0	J	Wood Chips	Clay/Silt
				ON-19-01-A-17_SED_03-05	09/19/17	ft	0.3	0.5	53.3		(-)		N/A	22.9		47.8		21.8	J	Wood Chips	Clay/Silt
				ON-19-01-A-17_SED_05-07	09/19/17	ft	0.5	0.7	18.1		(-)		N/A	8.58		24.1		40.6	J	Wood Chips	Clay/Silt
				ON-19-01-A-17_SED_07-10	09/19/17	ft	0.7	1.0	14.3		(-)		N/A	1.22		6.96		65.2	J	Clay/Silt	Sand/Wood Chips
				ON-19-01-A-17_SED_10-15	09/19/17	ft	1.0	1.5	11.5		(-)		N/A	0.285	J	2.08		79.4	J	Sand	Clay/Silt/Wood Chips
		Grab	ON-21-01	ON-21-01_08192017_SED_03	08/19/17	ft	0.0	0.3	659	J	(-)		N/A	3.79		7.19		49.9	J	Silt/Sand	(-)
		Grab	ON-22-01	ON-22-01_08192017_SED_03	08/19/17	ft	0.0	0.3	703	J	(-)		N/A	6.70		13.2		34.2	J	Silt/Sand	(-)

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	Zone	Core Designation[2]	Station ID	Sample ID	Sample Date	Depth Units	Top Depth	Bottom Depth	Result	Qual[1]	Result	Qual[1]	Result	Result	Qual[1]	Result	Qual[1]	Result	Qual[1]	Major	Minor
Winterport	Intertidal Sediment	Unconsolidated	WP-02-01-D	WP-02-01-D-17_SED_00-01	10/26/17	ft	0.0	0.1	648		16.4		2.53	5.84		31.2		35.0	J	Clay/Silt	(-)
				WP-02-01-D-17_SED_01-03	10/26/17	ft	0.1	0.3	696		9.70		1.39	6.89		14.9		42.3	J	Clay/Silt	(-)
				WP-02-01-D-17_SED_03-05	10/26/17	ft	0.3	0.5	500		(-)		N/A	8.03		17.1		40.6	J	Clay/Silt	(-)
				WP-02-01-D-17_SED_05-07	10/26/17	ft	0.5	0.7	446		(-)		N/A	8.33		8.98		43.5	J	Clay/Silt	(-)
				WP-02-01-D-17_SED_07-10	10/26/17	ft	0.7	1.0	272		(-)		N/A	7.37		12.6		47.2	J	Clay/Silt	(-)
		Consolidated	WP-02-01-B	WP-02-01-B-17_SED_00-01	10/05/17	ft	0.0	0.1	652		(-)		N/A	5.58		13.0		36.4	J	Clay/Silt	(-)
				WP-02-01-B-17_SED_01-03	10/05/17	ft	0.1	0.3	663		(-)		N/A	6.20		15.0		38.5	J	Clay/Silt	(-)
				WP-02-01-B-17_SED_03-05	10/05/17	ft	0.3	0.5	476		(-)		N/A	7.72		14.4		41.4	J	Clay/Silt	(-)
				WP-02-01-B-17_SED_05-07	10/05/17	ft	0.5	0.7	401		(-)		N/A	9.16		15.2		39.1	J	Clay/Silt	(-)
				WP-02-01-B-17_SED_07-10	10/05/17	ft	0.7	1.0	351		(-)		N/A	7.48		17.4		41.2	J	Clay/Silt	(-)
				WP-02-01-B-17_SED_10-15	10/05/17	ft	1.0	1.5	139		(-)		N/A	4.76		12.1		53.5	J	Clay/Silt	Wood Chips
				WP-02-01-B-17_SED_15-20	10/05/17	ft	1.5	2.0	40.1		(-)		N/A	2.94		7.15		60.5	J	Clay/Silt	(-)
				WP-02-01-B-17_SED_20-30	10/05/17	ft	2.0	3.0	32.3		(-)		N/A	2.29		6.17		62.6	J	Clay/Silt	(-)
	Subtidal Sediment	Unconsolidated	WP-06-02-F	WP-06-02-F-17_SED_00-01	10/27/17	ft	0.0	0.1	992		8.40		0.847	6.36		15.6		33.1	J	Clay/Silt	(-)
				WP-06-02-F-17_SED_01-03	10/27/17	ft	0.1	0.3	838		6.20		0.740	6.39		12.0		34.8	J	Clay/Silt	(-)
				WP-06-02-F-17_SED_03-05	10/27/17	ft	0.3	0.5	792	J	(-)		N/A	6.33		15.5		36.9	J	Clay/Silt	(-)
		Consolidated	WP-06-02-C	WP-06-02-C-17_SED_00-01	10/05/17	ft	0.0	0.1	983		(-)		N/A	8.32		16.87		33.6	J	Clay/Silt	(-)
				WP-06-02-C-17_SED_01-03	10/05/17	ft	0.1	0.3	838		(-)		N/A	7.63		19.68		36.4	J	Clay/Silt	(-)
				WP-06-02-C-17_SED_03-05	10/05/17	ft	0.3	0.5	884		(-)		N/A	7.41		18.16		32.6	J	Clay/Silt	(-)
				WP-06-02-C-17_SED_05-07	10/05/17	ft	0.5	0.7	904		(-)		N/A	7.05		19.39		32.5	J	Clay/Silt	(-)
				WP-06-02-C-17_SED_07-10	10/05/17	ft	0.7	1.0	907		(-)		N/A	7.28		21.92		30.5	J	Clay/Silt	(-)
				WP-06-02-C-17_SED_10-15	10/05/17	ft	1.0	1.5	1160		(-)		N/A	7.01		17.95		32.4	J	Not recorded	(-)
				WP-06-02-C-17_SED_15-20	10/05/17	ft	1.5	2.0	3770		(-)		N/A	9.66		23.44		30.9	J	Clay/Silt	Sand
				WP-06-02-C-17_SED_20-30	10/05/17	ft	2.0	3.0	242		(-)		N/A	5.42		8.10		56.4	J	Clay/Silt	Sand/Wood Chips
				WP-06-02-C-17_SED_30-40	10/05/17	ft	3.0	4.0	40		(-)		N/A	3.55		12.28		50.1	J	Clay/Silt	Sand
				WP-06-02-C-17_SED_40-50	10/05/17	ft	4.0	5.0	26		(-)		N/A	3.29		10.21		45.2	J	Clay/Silt	Sand
				WP-06-02-C-17_SED_50-60	10/05/17	ft	5.0	6.0	14		(-)		N/A	1.73		4.87		64.6	J	Clay/Silt	Sand
Frankfort Flats	Subtidal Sediment	Consolidated	FF-04-01-D	FF-04-01-D-17_SED_00-01	10/04/17	ft	0.0	0.1	993		(-)		N/A	41.1		71.1		13.0	J	Wood Chips	Clay/Silt
				FF-04-01-D-17_SED_01-03	10/04/17	ft	0.1	0.3	1160		(-)		N/A	40.6		69.2		15.7	J	Wood Chips	Clay/Silt
				FF-04-01-D-17_SED_03-05	10/04/17	ft	0.3	0.5	1030		(-)		N/A	38.3		60.1		15.9	J	Wood Chips	Clay/Silt
				FF-04-01-D-17_SED_05-07	10/04/17	ft	0.5	0.7	1150		(-)		N/A	34.0		58.6		16.5	J	Wood Chips	Clay/Silt
				FF-04-01-D-17_SED_07-10	10/04/17	ft	0.7	1.0	1010		(-)		N/A	16.8	J	40.0		25.1	J	Wood Chips	Clay/Silt
				FF-04-01-D-17_SED_10-15	10/04/17	ft	1.0	1.5	1090		(-)		N/A	15.6		37.4		28.8	J	Wood Chips	Clay/Silt
				FF-04-01-D-17_SED_15-20	10/04/17	ft	1.5	2.0	806		(-)		N/A	7.74		31.0		30.5	J	Clay/Silt	Wood Chips
				FF-04-01-D-17_SED_20-30	10/04/17	ft	2.0	3.0	1030		(-)		N/A	11.4		32.2		24.5	J	Clay/Silt	Wood Chips
				FF-04-01-D-17_SED_30-40	10/04/17	ft	3.0	4.0	411		(-)		N/A	8.62		11.3		47.9	J	Clay/Silt	Wood Chips/Sand/Gravel
				FF-04-01-D-17_SED_40-50	10/04/17	ft	4.0	5.0	311		(-)		N/A	1.33		5.68		68.3	J	Clay/Silt	Wood Chips/Sand/Gravel
		Consolidated	FF-06-01-A	FF-06-01-A-17_SED_00-01	09/19/17	ft	0.0	0.1	1010		(-)		N/A	6.68		12.4		36.8	J	Clay/Silt	Wood Chips
				FF-06-01-A-17_SED_01-03	09/19/17	ft	0.1	0.3	251		(-)		N/A	2.46		6.28		56.7	J	Clay/Silt	Shells/Gravel
				FF-06-01-A-17_SED_03-05	09/19/17	ft	0.3	0.5	78.5		(-)		N/A	1.30		4.26		72.3	J	Clay/Silt	Sand/Gravel/Shells
				FF-06-01-A-17_SED_05-07	09/19/17	ft	0.5	0.7	37.0		(-)		N/A	1.64		3.57		69.6	J	Clay/Silt	Sand/Gravel/Shells/Wood Chips
				FF-06-01-A-17_SED_07-10	09/19/17	ft	0.7	1.0	34.8		(-)		N/A	1.78		4.59		63.8	J	Clay/Silt	Sand/Gravel/Shells/Wood Chips
				FF-06-01-A-17_SED_10-15	09/19/17	ft	1.0	1.5	27.7		(-)		N/A	2.24		5.34		56.9	J	Clay/Silt	Sand/Gravel/Shells
				FF-06-01-A-17_SED_15-20	09/19/17	ft	1.5	2.0	24.8		(-)		N/A	2.44		5.30		66.1	J	Clay/Silt	Sand/Gravel/Shells
		Consolidated	FF-07-01-E	FF-07-01-E-17_SED_00-01	11/15/17	ft	0.0	0.1	142		(-)		N/A	2.41	J	6.39		57.1	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_01-03	11/15/17	ft	0.1	0.3	80.1		(-)		N/A	2.01	J	11.4		62.4	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_03-05	11/15/17	ft	0.3	0.5	33.1		(-)		N/A	1.93	J	8.44		63.0	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_05-07	11/15/17	ft	0.5	0.7	21.1		(-)		N/A	1.95	J	4.95		64.3	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_07-10	11/15/17	ft	0.7	1.0	19.8		(-)		N/A	1.73	J	5.11		63.2	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_10-15	11/15/17	ft	1.0	1.5	17.9		(-)		N/A	1.71	J	4.05		62.7	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_15-20	11/15/17	ft	1.5	2.0	21.6		(-)		N/A	2.31	J	6.58		57.7	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_20-25	11/15/17	ft	2.0	2.5	19.8		(-)		N/A	2.32	J	5.92		60.0	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_25-27	11/15/17	ft	2.5	2.7	19.0		(-)		N/A	3.14	J	7.04		57.7	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_27-30	11/15/17	ft	2.7	3.0	19.2		(-)		N/A	2.18	J	4.74		59.6	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_30-40	11/15/17	ft	3.0	4.0	20.7		(-)		N/A	2.48	J	5.78		57.5	J	Clay/Silt	(-)
				FF-07-01-E-17_SED_40-45	11/15/17	ft	4.0	4.5	20.1		(-)		N/A	2.33	J	6.00		58.9	J	Clay/Silt	Shells
				FF-07-01-E-17_SED_45-49	11/15/17	ft	4.5	4.9	18.4		(-)		N/A	2.79	J	6.58		59.3	J	Clay/Silt	Shells

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	Zone	Core Designation[2]	Station ID	Sample ID	Sample Date	Depth Units	Top Depth	Bottom Depth	Result	Qual[1]	Result	Qual[1]	Result	Result	Qual[1]	Result	Qual[1]	Result	Qual[1]	Major	Minor
Frankfort Flats	Subtidal Sediment	Consolidated	FF-07-02-B[3]	FF-07-02-B-17_SED_30-33	10/18/17	ft	3.0	3.3	23.3		(-)		N/A	2.19		6.29		65.6	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_33-35	10/18/17	ft	3.3	3.5	20.6		(-)		N/A	1.93		5.57		65.7	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_35-38	10/18/17	ft	3.5	3.8	22.8		(-)		N/A	2.20		6.70		63.6	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_38-40	10/18/17	ft	3.8	4.0	23.0		(-)		N/A	1.93		5.80		65.2	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_40-43	10/18/17	ft	4.0	4.3	18.0		(-)		N/A	1.84		5.32		66.9	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_43-45	10/18/17	ft	4.3	4.5	20.9		(-)		N/A	1.88		6.26		64.2	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_45-48	10/18/17	ft	4.5	4.8	23.5		(-)		N/A	2.69		7.24		60.3	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_48-50	10/18/17	ft	4.8	5.0	25.1		(-)		N/A	2.70		7.46		58.9	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_50-53	10/18/17	ft	5.0	5.3	22.6		(-)		N/A	2.69		7.44		59.6	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_53-55	10/18/17	ft	5.3	5.5	22.5		(-)		N/A	2.42		7.26		59.9	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_55-58	10/18/17	ft	5.5	5.8	20.8		(-)		N/A	2.10		27.0		61.3	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_58-60	10/18/17	ft	5.8	6.0	13.6		(-)		N/A	2.23		6.53		52.0	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_60-63	10/18/17	ft	6.0	6.3	19.7		(-)		N/A	2.09		6.25		62.4	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_63-65	10/18/17	ft	6.3	6.5	21.7		(-)		N/A	2.72		7.34		57.5	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_65-68	10/18/17	ft	6.5	6.8	21.9		(-)		N/A	3.03		8.70		54.9	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_68-70	10/18/17	ft	6.8	7.0	21.1		(-)		N/A	2.49		7.27		59.9	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_70-73	10/18/17	ft	7.0	7.3	21.5		(-)		N/A	2.63		7.44		53.9	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_73-75	10/18/17	ft	7.3	7.5	22.3		(-)		N/A	2.49		7.40		59.3	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_75-78	10/18/17	ft	7.5	7.8	24.2		(-)		N/A	2.86	J	7.60		57.7	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_78-80	10/18/17	ft	7.8	8.0	20.5		(-)		N/A	2.49		6.67		60.4	J	Clay/Silt	(-)
				FF-07-02-B-17_SED_80-83	10/18/17	ft	8.0	8.3	19.2		(-)		N/A	2.47		6.45		62.6	J	Clay/Silt	(-)
	Intertidal Sediment	Consolidated	FF-08-01-B	FF-08-01-B-17_SED_00-01	10/04/17	ft	0.0	0.1	512		(-)		N/A	36.8		44.4		13.1	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_01-03	10/04/17	ft	0.1	0.3	524		(-)		N/A	33.3		32.2		13.8	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_03-05	10/04/17	ft	0.3	0.5	1150		(-)		N/A	24.9		35.2		21.7	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_05-07	10/04/17	ft	0.5	0.7	588		(-)		N/A	25.1		44.7		21.9	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_07-10	10/04/17	ft	0.7	1.0	381		(-)		N/A	18.0		47.8		18.1	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_10-15	10/04/17	ft	1.0	1.5	319		(-)		N/A	10.8		31.2		28.0	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_15-20	10/04/17	ft	1.5	2.0	274		(-)		N/A	22.2	J	27.9		20.6	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_20-30	10/04/17	ft	2.0	3.0	376		(-)		N/A	5.75		21.1		28.8	J	Wood Chips	Clay/Silt
				FF-08-01-B-17_SED_30-40	10/04/17	ft	3.0	4.0	170		(-)		N/A	9.50		23.8		28.5	J	Clay/Silt	Wood Chips
				FF-08-01-B-17_SED_40-50	10/04/17	ft	4.0	5.0	93.8		(-)		N/A	5.61		19.6		40.1	J	Clay/Silt	Wood Chips
				FF-08-01-B-17_SED_50-60	10/04/17	ft	5.0	6.0	17.2		(-)		N/A	1.61		4.12		73.0	J	Clay/Silt	Wood Chips/Gravel/Sand
				FF-08-01-B-17_SED_60-70	10/04/17	ft	6.0	7.0	8.10		(-)		N/A	1.21		2.18		81.4	J	Not Recorded	(-)
		Unconsolidated	FF-08-02-G	FF-08-02-G-17_SED_00-01	10/26/17	ft	0.0	0.1	715		15.8		2.21	5.17		14.0		37.6	J	Clay/Silt	(-)
				FF-08-02-G-17_SED_01-03	10/26/17	ft	0.1	0.3	622		12.2		1.96	4.93		12.1		42.0	J	Clay/Silt	(-)
				FF-08-02-G-17_SED_03-05	10/26/17	ft	0.3	0.5	614		(-)		N/A	5.21	J	12.3		50.8	J	Clay/Silt	(-)
				FF-08-02-G-17_SED_05-07	10/26/17	ft	0.5	0.7	577		(-)		N/A	3.89		11.0		51.6	J	Clay/Silt	(-)
		Consolidated	FF-08-02-J	FF-08-02-J-17_SED_00-01	11/20/17	ft	0.0	0.1	701	J	(-)		N/A	5.45	J	13.7		41.1	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_01-03	11/20/17	ft	0.1	0.3	694		(-)		N/A	4.74	J	10.6		42.5	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_03-05	11/20/17	ft	0.3	0.5	1670		(-)		N/A	6.95	J	11.4		37.8	J	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_05-07	11/20/17	ft	0.5	0.7	1970		(-)		N/A	6.96	J	14.7		39.7	J	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_07-10	11/20/17	ft	0.7	1.0	2143	z	(-)		N/A	6.33	Jz	15.4	z	40.4	Jz	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_10-13	11/20/17	ft	1.0	1.3	1280		(-)		N/A	4.23	J	16.6		39.6	J	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_13-16	11/20/17	ft	1.3	1.6	294	z	(-)		N/A	5.36	Jz	14.6	z	40.1	Jz	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_16-19	11/20/17	ft	1.6	1.9	219		(-)		N/A	4.30	J	12.3		47.3	J	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_19-22	11/20/17	ft	1.9	2.2	225	z	(-)		N/A	3.72	Jz	11.7	z	47.4	Jz	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_22-25	11/20/17	ft	2.2	2.5	80.1		(-)		N/A	2.16	J	7.96		57.1	J	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_25-28	11/20/17	ft	2.5	2.8	51.0	z	(-)		N/A	1.59	Jz	4.83	z	63.4	Jz	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_28-31	11/20/17	ft	2.8	3.1	40.3		(-)		N/A	1.80	J	4.94		63.6	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_31-34	11/20/17	ft	3.1	3.4	54.5		(-)		N/A	2.61	J	6.15		58.8	J	Clay/Silt	Wood Chips
				FF-08-02-J-17_SED_34-37	11/20/17	ft	3.4	3.7	60.7		(-)		N/A	2.92	J	7.00		55.6	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_37-40	11/20/17	ft	3.7	4.0	28.9		(-)		N/A	1.83	J	5.65		57.1	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_40-45	11/20/17	ft	4.0	4.5	31.5		(-)		N/A	2.12	J	5.39		62.9	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_45-50	11/20/17	ft	4.5	5.0	36.3		(-)		N/A	1.96	J	5.65		62.7	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_50-55	11/20/17	ft	5.0	5.5	33.1		(-)		N/A	2.24	J	5.56		63.2	J	Clay/Silt	(-)
				FF-08-02-J-17_SED_55-62	11/20/17	ft	5.5	6.2	29.1		(-)		N/A	2.37	J	6.28		61.2	J	Clay/Silt	(-)
Mendall Marsh	Intertidal Sediment	Unconsolidated	MM-04-01-F	MM-04-01-F-17_SED_00-01	10/26/17	ft	0.0	0.1	536		6.40		1.19	6.30		16.6		42.1	J	Clay/Silt	Sand
				MM-04-01-F-17_SED_01-03	10/26/17	ft	0.1	0.3	784		12.6		1.61	6.77		16.6		35.7	J	Clay/Silt	Sand
				MM-04-01-F-17_SED_03-05	10/26/17	ft	0.3	0.5	838		(-)		N/A	7.04		13.7		34.3	J	Clay/Silt	(-)
				MM-04-01-F-17_SED_05-07	10/26/17	ft	0.5	0.7	830		(-)		N/A	6.41		14.8		40.1	J	Clay/Silt	(-)

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	**Zone**	**Core Designation[2]**	**Station ID**	**Sample ID**	**Sample Date**	**Depth Units**	**Top Depth**	**Bottom Depth**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Result**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Major**	**Minor**
Mendall Marsh	Intertidal Sediment	Consolidated	MM-04-01-C	MM-04-01-C-17_SED_00-01	10/05/17	ft	0.0	0.1	721		(-)		N/A	7.15		13.7		33.0	J	Clay/Silt	(-)
				MM-04-01-C-17_SED_01-03	10/05/17	ft	0.1	0.3	780		(-)		N/A	7.63		20.5		35.7	J	Clay/Silt	(-)
				MM-04-01-C-17_SED_03-05	10/05/17	ft	0.3	0.5	717		(-)		N/A	7.67		18.9		37.2	J	Clay/Silt	(-)
				MM-04-01-C-17_SED_05-07	10/05/17	ft	0.5	0.7	792		(-)		N/A	6.35		13.6		40.7	J	Clay/Silt	(-)
				MM-04-01-C-17_SED_07-10	10/05/17	ft	0.7	1.0	1090		(-)		N/A	6.99		17.3		43.4	J	Clay/Silt	Shells
				MM-04-01-C-17_SED_10-15	10/05/17	ft	1.0	1.5	1350		(-)		N/A	8.50		16.3		36.8	J	Clay/Silt	(-)
				MM-04-01-C-17_SED_15-20	10/05/17	ft	1.5	2.0	2130		(-)		N/A	5.89		16.7		38.7	J	Clay/Silt	(-)
				MM-04-01-C-17_SED_20-30	10/05/17	ft	2.0	3.0	43.3		(-)		N/A	3.81		8.94		55.5	J	Clay/Silt	Sand
Bucksport	Intertidal Sediment	Consolidated	BU-01-01-C	BU-01-01-C-17_SED_00-01	09/19/17	ft	0.0	0.1	946		(-)		N/A	9.23		19.2		32.8	J	Clay/Silt	Wood Chips
				BU-01-01-C-17_SED_01-03	09/19/17	ft	0.1	0.3	834		(-)		N/A	6.94		14.4		40.6	J	Clay/Silt	Wood Chips
				BU-01-01-C-17_SED_03-05	09/19/17	ft	0.3	0.5	876		(-)		N/A	8.28		15.3		37.8	J	Clay/Silt	Wood Chips
				BU-01-01-C-17_SED_05-07	09/19/17	ft	0.5	0.7	1030		(-)		N/A	6.90		13.7		37.5	J	Clay/Silt	Wood Chips
				BU-01-01-C-17_SED_07-10	09/19/17	ft	0.7	1.0	1040		(-)		N/A	7.49		12.0		39.1	J	Clay/Silt	Wood Chips
				BU-01-01-C-17_SED_10-15	09/19/17	ft	1.0	1.5	1260		(-)		N/A	7.26		16.0		38.5	J	Clay/Silt	Wood Chips
				BU-01-01-C-17_SED_15-20	09/19/17	ft	1.5	2.0	926		(-)		N/A	10.8		15.2		42.1	J	Clay/Silt	Wood Chips
	Subtidal Sediment	Unconsolidated	BU-02-01-E	BU-02-01-E-17_SED_00-01	10/25/17	ft	0.0	0.1	414		4.30		1.04	8.17		7.57		65.3	J	Clay/Silt	(-)
				BU-02-01-E-17_SED_01-03	10/25/17	ft	0.1	0.3	743		2.70	J	0.36	3.54		15.4		49.6	J	Clay/Silt	(-)
				BU-02-01-E-17_SED_03-05	10/25/17	ft	0.3	0.5	705		(-)		N/A	4.57	J	11.5		51.5	J	Clay/Silt	(-)
		Consolidated	BU-02-01-D	BU-02-01-D-17_SED_00-01	10/05/17	ft	0.0	0.1	1090		(-)		N/A	8.60	J	16.8		32.3	J	Clay/Silt	Wood Chips
				BU-02-01-D-17_SED_01-03	10/05/17	ft	0.1	0.3	418		(-)		N/A	4.94		12.6		43.2	J	Clay/Silt	Wood Chips
				BU-02-01-D-17_SED_03-05	10/05/17	ft	0.3	0.5	440		(-)		N/A	7.82		18.0		34.5	J	Clay/Silt	Wood Chips
				BU-02-01-D-17_SED_05-07	10/05/17	ft	0.5	0.7	399		(-)		N/A	8.13		19.7		35.5	J	Clay/Silt	Wood Chips
				BU-02-01-D-17_SED_07-10	10/05/17	ft	0.7	1.0	328		(-)		N/A	4.09		13.2		47.4	J	Clay/Silt	Wood Chips
				BU-02-01-D-17_SED_10-15	10/05/17	ft	1.0	1.5	239		(-)		N/A	6.87		16.0		43.4	J	Clay/Silt	Wood Chips
				BU-02-01-D-17_SED_15-20	10/05/17	ft	1.5	2.0	135		(-)		N/A	6.13		27.3		37.4	J	Wood Chips	Clay/Silt
				BU-02-01-D-17_SED_20-30	10/05/17	ft	2.0	3.0	69.4		(-)		N/A	6.47		13.0		52.6	J	Wood Chips	Clay/Silt/Sand
		Consolidated	BU-05-01-A	BU-05-01-A-17_SED_00-01	09/19/17	ft	0.0	0.1	516		(-)		N/A	5.67		13.1		44.9	J	Clay/Silt	(-)
				BU-05-01-A-17_SED_01-03	09/19/17	ft	0.1	0.3	534		(-)		N/A	7.12		14.1		46.3	J	Clay/Silt	Wood Chips
				BU-05-01-A-17_SED_03-05	09/19/17	ft	0.3	0.5	875		(-)		N/A	7.31		15.6		38.5	J	Clay/Silt	Wood Chips/Sand
				BU-05-01-A-17_SED_05-07	09/19/17	ft	0.5	0.7	810		(-)		N/A	8.36	J	14.1		46.2	J	Clay/Silt	Wood Chips/Sand
				BU-05-01-A-17_SED_07-10	09/19/17	ft	0.7	1.0	59.1		(-)		N/A	0.545		1.73		77.1	J	Sand	Clay/Silt
				BU-05-01-A-17_SED_10-15	09/19/17	ft	1.0	1.5	22.9		(-)		N/A	0.746		1.95		82.4	J	Sand	Clay/Silt
				BU-05-01-A-17_SED_15-20	09/19/17	ft	1.5	2.0	15.7		(-)		N/A	0.827		1.77		75.0	J	Sand	Clay/Silt
	Intertidal Sediment	Unconsolidated	BU-08-01-E	BU-08-01-E-17_SED_00-01	10/25/17	ft	0.0	0.1	792		16.0		2.02	4.42		12.1		31.0	J	Clay/Silt	(-)
				BU-08-01-E-17_SED_01-03	10/25/17	ft	0.1	0.3	509		13.4		2.63	4.38		11.9		45.7	J	Clay/Silt	(-)
				BU-08-01-E-17_SED_03-05	10/25/17	ft	0.3	0.5	593		(-)		N/A	4.53		10.3		53.6	J	Clay/Silt	(-)
				BU-08-01-E-17_SED_05-07	10/25/17	ft	0.5	0.7	379		(-)		N/A	5.14		13.5		50.7	J	Clay/Silt	(-)
				BU-08-01-E-17_SED_07-10	10/25/17	ft	0.7	1.0	858		(-)		N/A	4.60		34.8		49.0	J	Clay/Silt	(-)
		Consolidated	BU-08-01-A	BU-08-01-A-17_SED_00-01	10/05/17	ft	0.0	0.1	673		(-)		N/A	4.86	J	12.2		43.5	J	Clay/Silt	Shells,
				BU-08-01-A-17_SED_01-03	10/05/17	ft	0.1	0.3	603		(-)		N/A	4.79		10.9		45.5	J	Clay/Silt	Wood Chips
				BU-08-01-A-17_SED_03-05	10/05/17	ft	0.3	0.5	663		(-)		N/A	5.73		10.4		53.2	J	Clay/Silt	(-)
				BU-08-01-A-17_SED_05-07	10/05/17	ft	0.5	0.7	1070		(-)		N/A	6.70		13.6		49.9	J	Clay/Silt	(-)
				BU-08-01-A-17_SED_07-10	10/05/17	ft	0.7	1.0	363		(-)		N/A	6.15		15.2		49.7	J	Clay/Silt	Wood Chips
				BU-08-01-A-17_SED_10-15	10/05/17	ft	1.0	1.5	111		(-)		N/A	4.30		13.1		52.1	J	Clay/Silt	Wood Chips
				BU-08-01-A-17_SED_15-20	10/05/17	ft	1.5	2.0	30.1		(-)		N/A	2.59		7.17		64.6	J	Clay/Silt	Wood Chips
		Grab	BU-08-02	BU-08-02_091217_SED_03	09/12/17	ft	0.0	0.3	598		(-)		N/A	4.23	J	(-)		39.7	J	Silt/Sand	(-)
	Subtidal Sediment	Consolidated	BU-09-01-C	BU-09-01-C-17_SED_00-01	09/19/17	ft	0.0	0.1	1400		(-)		N/A	39.4		68.4		16.3	J	Wood Chips	Clay/Silt
				BU-09-01-C-17_SED_01-03	09/19/17	ft	0.1	0.3	1630		(-)		N/A	35.9		65.0		19.1	J	Wood Chips	Clay/Silt
				BU-09-01-C-17_SED_03-05	09/19/17	ft	0.3	0.5	1030		(-)		N/A	15.4	J	22.6		32.7	J	Wood Chips	Clay/Silt
				BU-09-01-C-17_SED_05-07	09/19/17	ft	0.5	0.7	784		(-)		N/A	7.18	J	12.6		36.4	J	Clay/Silt	Wood Chips
				BU-09-01-C-17_SED_07-10	09/19/17	ft	0.7	1.0	293		(-)		N/A	2.56	J	7.59		63.1	J	Sand	Clay/Silt/Wood chips
				BU-09-01-C-17_SED_10-15	09/19/17	ft	1.0	1.5	550		(-)		N/A	5.04		13.3		59.4	J	Clay/Silt	Sand/Wood Chips
				BU-09-01-C-17_SED_15-20	09/19/17	ft	1.5	2.0	519		(-)		N/A	6.79		17.9		53.3	J	Clay/Silt	Wood Chips
				BU-09-01-C-17_SED_20-30	09/19/17	ft	2.0	3.0	279		(-)		N/A	3.71	J	11.3		61.2	J	Clay/Silt	Wood Chips
				BU-09-01-C-17_SED_30-40	09/19/17	ft	3.0	4.0	173		(-)		N/A	7.84		11.4		47.9	J	Clay/Silt	Wood Chips
				BU-09-01-C-17_SED_40-50	09/19/17	ft	4.0	5.0	34.4		(-)		N/A	1.25		6.07		69.2	J	Not Recorded	Not Recorded

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	Zone	Core Designation[2]	Station ID	Sample ID	Sample Date	Depth Units	Top Depth	Bottom Depth	Result	Qual[1]	Result	Qual[1]	Result	Result	Qual[1]	Result	Qual[1]	Result	Qual[1]	Major	Minor
Bucksport	Subtidal Sediment	Consolidated	BU-10-01-A	BU-10-01-A-17_SED_00-01	09/20/17	ft	0.0	0.1	1080		(-)		N/A	15.8		21.7		27.9	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_01-03	09/20/17	ft	0.1	0.3	890		(-)		N/A	10.8		21.8		35.3	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_03-05	09/20/17	ft	0.3	0.5	792		(-)		N/A	8.50		12.6		37.3	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_05-07	09/20/17	ft	0.5	0.7	1020		(-)		N/A	8.41		20.3		31.8	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_07-10	09/20/17	ft	0.7	1.0	811		(-)		N/A	8.05		17.3		35.2	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_10-15	09/20/17	ft	1.0	1.5	1090		(-)		N/A	9.31		16.9		34.2	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_15-20	09/20/17	ft	1.5	2.0	1130		(-)		N/A	8.98		13.7		36.0	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_20-30	09/20/17	ft	2.0	3.0	1860		(-)		N/A	23.4		26.7		29.5	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_30-40	09/20/17	ft	3.0	4.0	1310		(-)		N/A	15.4		32.3		30.4	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_40-50	09/20/17	ft	4.0	5.0	1790		(-)		N/A	25.3		29.3		24.2	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_50-60	09/20/17	ft	5.0	6.0	1510		(-)		N/A	21.9		24.7		27.9	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_60-70	09/20/17	ft	6.0	7.0	289		(-)		N/A	5.49		12.1		46.7	J	Clay/Silt	Wood Chips
				BU-10-01-A-17_SED_70-80	09/20/17	ft	7.0	8.0	45.9		(-)		N/A	3.30		6.90		48.4	J	Clay/Silt	Wood Chips
		Consolidated	BU-10-02-C	BU-10-02-C-17_SED_00-01	11/29/17	ft	0.0	0.1	965		(-)		N/A	35.4	z	(-)		18.0	Jz	Wood Chips	Clay/Silt
				BU-10-02-C-17_SED_01-03	11/29/17	ft	0.1	0.3	980	z	(-)		N/A	29.0	z	51.7	z	25.3	Jz	Wood Chips	Clay/Silt
				BU-10-02-C-17_SED_03-04	11/29/17	ft	0.3	0.4	844		(-)		N/A	12.7		22.1		36.5	J	Clay/Silt	Sand/Wood Chips
				BU-10-02-C-17_SED_04-06	11/29/17	ft	0.4	0.6	718	z	(-)		N/A	17.8	z	33.5	z	34.2	Jz	Wood Chips	Clay/Silt/Sand
				BU-10-02-C-17_SED_06-09	11/29/17	ft	0.6	0.9	561		(-)		N/A	7.87		11.6		46.9	J	Not Recorded	Not Recorded
				BU-10-02-C-17_SED_09-11	11/29/17	ft	0.9	1.1	753		(-)		N/A	4.75		13.7		47.8	J	Clay/Silt	Sand
				BU-10-02-C-17_SED_11-12	11/29/17	ft	1.1	1.2	885	z	(-)		N/A	12.9	z	29.5	z	38.4	Jz	Wood Chips	Clay/Silt/Sand
				BU-10-02-C-17_SED_12-13	11/29/17	ft	1.2	1.3	163		(-)		N/A	1.13	J	4.66		73.6	J	Sand	(-)
				BU-10-02-C-17_SED_13-14	11/29/17	ft	1.3	1.4	251		(-)		N/A	1.79	J	(+)		66.7	J	Sand	Clay/Silt/Wood Chips
				BU-10-02-C-17_SED_14-17	11/29/17	ft	1.4	1.7	736		(-)		N/A	5.67		12.2		49.7	J	Clay/Silt	Wood Chips/Sand
				BU-10-02-C-17_SED_17-20	11/29/17	ft	1.7	2.0	753	z	(-)		N/A	5.12	Jz	13.2	z	48.8	Jz	Clay/Silt	Sand
				BU-10-02-C-17_SED_20-21	11/29/17	ft	2.0	2.1	791		(-)		N/A	3.81		12.6		49.2	J	Clay/Silt	Wood Chips/Sand
				BU-10-02-C-17_SED_21-25	11/29/17	ft	2.1	2.5	1153	z	(-)		N/A	6.89	z	12.7	z	43.6	Jz	Clay/Silt	Wood Chips/Sand
				BU-10-02-C-17_SED_25-31	11/29/17	ft	2.5	3.1	1223	z	(-)		N/A	5.62	z	15.1	z	47.2	Jz	Clay/Silt	(-)
				BU-10-02-C-17_SED_31-35	11/29/17	ft	3.1	3.5	261		(-)		N/A	1.05		4.77		73.5	J	Sand	Clay/Silt
				BU-10-02-C-17_SED_35-38	11/29/17	ft	3.5	3.8	841	z	(-)		N/A	15.8	z	18.2	z	36.2	Jz	Wood Chips	Clay/Silt/Sand
				BU-10-02-C-17_SED_38-39	11/29/17	ft	3.8	3.9	2870		(-)		N/A	8.80		24.5		38.5	J	Clay/Silt	Wood Chips/Sand
				BU-10-02-C-17_SED_39-42	11/29/17	ft	3.9	4.2	2320		(-)		N/A	10.8		14.9		38.0	J	Clay/Silt	Wood Chips
				BU-10-02-C-17_SED_42-44	11/29/17	ft	4.2	4.4	2050	z	(-)		N/A	13.0	z	14.1	z	39.1	Jz	Clay/Silt	Wood Chips/Sand
				BU-10-02-C-17_SED_44-49	11/29/17	ft	4.4	4.9	1970	z	(-)		N/A	19.4	z	38.3	z	31.0	Jz	Wood Chips	(-)
				BU-10-02-C-17_SED_49-52	11/29/17	ft	4.9	5.2	2230		(-)		N/A	11.8		28.4		36.9	J	Clay/Silt	Wood Chips
				BU-10-02-C-17_SED_52-54	11/29/17	ft	5.2	5.4	2280		(-)		N/A	11.0		19.4		39.1	J	Clay/Silt	Wood Chips/Sand
				BU-10-02-C-17_SED_54-55	11/29/17	ft	5.4	5.5	1513	Jz	(-)		N/A	25.4	z	33.4	z	25.9	Jz	Wood Chips	Clay/Silt/Sand
Bucksport Harbor	Subtidal Sediment	Unconsolidated	BH-03-01-E	BH-03-01-E-17_SED_00-01	10/25/17	ft	0.0	0.1	640	J	21.1		3.30	5.33		13.9		38.2	J	Clay/Silt	Wood Chips
				BH-03-01-E-17_SED_01-03	10/25/17	ft	0.1	0.3	539		15.6		2.89	4.11		12.8		52.7	J	Clay/Silt	(-)
				BH-03-01-E-17_SED_03-05	10/25/17	ft	0.3	0.5	503		(-)		N/A	2.68		7.66		55.9	J	Clay/Silt	(-)
				BH-03-01-E-17_SED_05-07	10/25/17	ft	0.5	0.7	696		(-)		N/A	3.73		10.5		45.3	J	Clay/Silt	(-)
		Consolidated	BH-03-01-A	BH-03-01-A-17_SED_00-01	11/13/17	ft	0.0	0.1	387		(-)		N/A	2.33		9.71		57.8	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_01-03	11/13/17	ft	0.1	0.3	371		(-)		N/A	2.48		7.84		57.6	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_03-05	11/13/17	ft	0.3	0.5	413		(-)		N/A	3.89		8.31		54.0	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_05-07	11/13/17	ft	0.5	0.7	499		(-)		N/A	2.48		8.54		54.4	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_07-10	11/13/17	ft	0.7	1.0	501		(-)		N/A	3.47		9.24		55.0	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_10-13	11/13/17	ft	1.0	1.3	1820		(-)		N/A	2.97		6.88		57.0	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_13-17	11/13/17	ft	1.3	1.7	418		(-)		N/A	2.93		8.30		55.9	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_17-20	11/13/17	ft	1.7	2.0	614		(-)		N/A	4.49		9.57		54.6	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_20-25	11/13/17	ft	2.0	2.5	803		(-)		N/A	4.85	J	10.5		52.6	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_25-30	11/13/17	ft	2.5	3.0	1030		(-)		N/A	3.17	J	11.3		55.8	J	Clay/Silt	Wood Chips
				BH-03-01-A-17_SED_30-35	11/13/17	ft	3.0	3.5	1010		(-)		N/A	2.61		9.83		58.2	J	Wood Chips	Wood Chips/Clay/Silt
				BH-03-01-A-17_SED_35-39	11/13/17	ft	3.5	3.9	857		(-)		N/A	2.72	J	10.7		53.8	J	Clay/Silt	Wood Chips/Sand
				BH-03-01-A-17_SED_39-43	11/13/17	ft	3.9	4.3	338		(-)		N/A	2.61	J	8.16		67.3	J	Clay/Silt	Wood Chips/Sand
		Grab	BH-05-01	BH-05-01_08192017_SED_03	08/19/17	ft	0.0	0.3	134	J	(-)		N/A	(-)		(-)		73.5	J	Sand/Gravel	(-)
		Grab	BH-08-01	BH-08-01_08192017_SED_03	08/19/17	ft	0.0	0.3	806	J	(-)		N/A	5.34		12.6		32.9	J	Silt/Sand	(-)
Verona Northeast	Intertidal Sediment	Unconsolidated	VN-01-01-B	VN-01-01-B-17_SED_00-01	10/26/17	ft	0.0	0.1	856		7.30		0.85	6.16		13.1		39.6	J	Clay/Silt	(-)
				VN-01-01-B-17_SED_01-03	10/26/17	ft	0.1	0.3	852		14.4		1.69	5.16	J	15.0		41.7	J	Clay/Silt	(-)
				VN-01-01-B-17_SED_03-05	10/26/17	ft	0.3	0.5	1220		(-)		N/A	5.65		15.6		45.4	J	Clay/Silt	(-)
				VN-01-01-B-17_SED_05-07	10/26/17	ft	0.5	0.7	1280		(-)		N/A	6.85		12.4		43.6	J	Clay/Silt	(-)
				VN-01-01-B-17_SED_07-10	10/26/17	ft	0.7	1.0	833		(-)		N/A	7.54		10.9		45.6	J	Clay/Silt	(-)

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	Zone	Core Designation[2]	Station ID	Sample ID	Sample Date	Depth Units	Top Depth	Bottom Depth	Result	Qual[1]	Result	Qual[1]	Result	Result	Qual[1]	Result	Qual[1]	Result	Qual[1]	Major	Minor
Verona Northeast	Intertidal Sediment	Consolidated	VN-01-01-E	VN-01-01-E-17_SED_00-01	10/06/17	ft	0.0	0.1	687		(-)		N/A	5.11		12.3		44.0	J	Clay/Silt	Clay/Silt
				VN-01-01-E-17_SED_01-03	10/06/17	ft	0.1	0.3	979		(-)		N/A	5.62		13.2		42.4	J	Clay/Silt	Clay/Silt
				VN-01-01-E-17_SED_03-05	10/06/17	ft	0.3	0.5	863		(-)		N/A	5.07		12.3		44.6	J	Clay/Silt	Clay/Silt
				VN-01-01-E-17_SED_05-07	10/06/17	ft	0.5	0.7	2570		(-)		N/A	5.93	J	12.2		44.0	J	Clay/Silt	Clay/Silt
				VN-01-01-E-17_SED_07-10	10/06/17	ft	0.7	1.0	1620		(-)		N/A	6.62		15.0		46.3	J	Clay/Silt	Clay/Silt
				VN-01-01-E-17_SED_10-15	10/06/17	ft	1.0	1.5	407		(-)		N/A	8.74		0.00		43.5	J	Clay/Silt	Clay/Silt
				VN-01-01-E-17_SED_15-17	10/06/17	ft	1.5	1.7	336		(-)		N/A	7.71		12.7		42.0	J	Not Recorded	(-)
				VN-01-01-E-17_SED_17-18	10/06/17	ft	1.7	1.8	222		(-)		N/A	4.07	J	10.5		49.2	J	Clay/Silt	Wood Chips/Sand
				VN-01-01-E-17_SED_18-20	10/06/17	ft	1.8	2.0	164		(-)		N/A	4.31	J	12.1		53.3	J	Clay/Silt	Wood Chips/Sand
				VN-01-01-E-17_SED_20-23	10/06/17	ft	2.0	2.3	91.0		(-)		N/A	5.28		16.1		45.2	J	Clay/Silt	Wood Chips/Sand
		Unconsolidated	VN-02-01-A	VN-02-01-A-17_SED_00-01	10/25/17	ft	0.0	0.1	1500		25.2		1.68	6.47		14.2		18.3	J	Clay/Silt	(-)
				VN-02-01-A-17_SED_01-03	10/25/17	ft	0.1	0.3	772		12.2		1.58	5.02		12.8		39.8	J	Clay/Silt	(-)
				VN-02-01-A-17_SED_03-05	10/25/17	ft	0.3	0.5	831		(-)		N/A	5.22		9.14		45.8	J	Clay/Silt	(-)
				VN-02-01-A-17_SED_05-07	10/25/17	ft	0.5	0.7	1120		(-)		N/A	5.52		11.8		48.6	J	Clay/Silt	(-)
				VN-02-01-A-17_SED_07-10	10/25/17	ft	0.7	1.0	1510		(-)		N/A	5.15		12.5		48.5	J	Clay/Silt	(-)
		Consolidated	VN-02-01-D	VN-02-01-D-17_SED_00-01	11/10/17	ft	0.0	0.1	817		(-)		N/A	5.91	J	9.59		45.6	J	Clay/Silt	(-)
				VN-02-01-D-17_SED_01-03	11/10/17	ft	0.1	0.3	879		(-)		N/A	5.46	J	9.18		45.8	J	Clay/Silt	Shells
				VN-02-01-D-17_SED_03-05	11/10/17	ft	0.3	0.5	1010		(-)		N/A	5.70	J	7.31		46.2	J	Clay/Silt	(-)
				VN-02-01-D-17_SED_05-07	11/10/17	ft	0.5	0.7	1810		(-)		N/A	6.13	J	13.5		44.5	J	Clay/Silt	(-)
				VN-02-01-D-17_SED_07-10	11/10/17	ft	0.7	1.0	944		(-)		N/A	7.06	J	11.1		44.2	J	Clay/Silt	(-)
				VN-02-01-D-17_SED_10-15	11/10/17	ft	1.0	1.5	236		(-)		N/A	5.42	J	10.6		47.3	J	Clay/Silt	(-)
				VN-02-01-D-17_SED_15-17	11/10/17	ft	1.5	1.7	102		(-)		N/A	4.24	J	11.3		51.9	J	Clay/Silt	Wood Chips
				VN-02-01-D-17_SED_17-22	11/10/17	ft	1.7	2.2	39.2		(-)		N/A	2.46	J	5.01		61.0	J	Clay/Silt	Shells
		Unconsolidated	VN-02-03-A	VN-02-03-A-17_SED_00-01	10/25/17	ft	0.0	0.1	1100		19.2		1.75	5.58		29.4		24.5	J	Clay/Silt	(-)
				VN-02-03-A-17_SED_01-03	10/25/17	ft	0.1	0.3	916		14.5		1.58	6.54		16.1		36.9	J	Clay/Silt	(-)
				VN-02-03-A-17_SED_03-05	10/25/17	ft	0.3	0.5	831		(-)		N/A	6.33		15.7		44.6	J	Clay/Silt	(-)
				VN-02-03-A-17_SED_05-07	10/25/17	ft	0.5	0.7	912		(-)		N/A	5.75		14.7		44.1	J	Clay/Silt	(-)
				VN-02-03-A-17_SED_07-10	10/25/17	ft	0.7	1.0	1290		(-)		N/A	6.75		15.6		43.8	J	Clay/Silt	(-)
		Consolidated	VN-02-03-E	VN-02-03-E-17_SED_00-01	11/09/17	ft	0.0	0.1	0.08	J	(-)		N/A	6.73	J	16.4		39.2	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_01-03	11/09/17	ft	0.1	0.3	837		(-)		N/A	6.85	J	12.4		37.9	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_03-05	11/09/17	ft	0.3	0.5	804		(-)		N/A	6.58	J	12.0		41.0	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_05-07	11/09/17	ft	0.5	0.7	945		(-)		N/A	5.51	J	14.0		42.6	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_07-10	11/09/17	ft	0.7	1.0	1210		(-)		N/A	6.37	J	15.1		44.1	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_10-15	11/09/17	ft	1.0	1.5	1400		(-)		N/A	6.11	J	13.0		43.7	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_15-19	11/09/17	ft	1.5	1.9	94.2		(-)		N/A	5.18	J	13.6		47.4	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_19-22	11/09/17	ft	1.9	2.2	61.1		(-)		N/A	4.23	J	12.1		51.5	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_22-25	11/09/17	ft	2.2	2.5	27.0		(-)		N/A	2.42	J	6.76		58.9	J	Clay/Silt	(-)
				VN-02-03-E-17_SED_25-27	11/09/17	ft	2.5	2.7	22.4		(-)		N/A	2.28	J	7.35		60.4	J	Clay/Silt	(-)
		Unconsolidated	VN-02-04-B	VN-02-04-B-17_SED_00-01	10/25/17	ft	0.0	0.1	1050		55.8		5.31	6.26		16.9		24.1	J	Clay/Silt	(-)
				VN-02-04-B-17_SED_01-03	10/25/17	ft	0.1	0.3	759		10.9		1.44	5.97		13.5		40.7	J	Clay/Silt	(-)
				VN-02-04-B-17_SED_03-05	10/25/17	ft	0.3	0.5	892		(-)		N/A	5.92		15.3		40.9	J	Clay/Silt	(-)
				VN-02-04-B-17_SED_05-07	10/25/17	ft	0.5	0.7	1330		(-)		N/A	6.64		15.5		43.1	J	Clay/Silt	(-)
				VN-02-04-B-17_SED_07-10	10/25/17	ft	0.7	1.0	754		(-)		N/A	8.60		17.8		41.8	J	Clay/Silt	(-)
		Consolidated	VN-02-04-C	VN-02-04-C-17_SED_00-01	11/10/17	ft	0.0	0.1	756		(-)		N/A	5.30	J	10.2		41.9	J	Clay/Silt	(-)
				VN-02-04-C-17_SED_01-03	11/10/17	ft	0.1	0.3	1220		(-)		N/A	5.88	J	13.8		43.7	J	Clay/Silt	(-)
				VN-02-04-C-17_SED_03-05	11/10/17	ft	0.3	0.5	1630		(-)		N/A	7.08	J	13.4		41.5	J	Clay/Silt	(-)
				VN-02-04-C-17_SED_05-07	11/10/17	ft	0.5	0.7	419		(-)		N/A	7.97	J	22.4		42.5	J	Clay/Silt	(-)
				VN-02-04-C-17_SED_07-10	11/10/17	ft	0.7	1.0	385		(-)		N/A	9.81	J	15.4		38.5	J	Clay/Silt	(-)
				VN-02-04-C-17_SED_10-15	11/10/17	ft	1.0	1.5	351		(-)		N/A	7.74	J	4.26		44.6	J	Clay/Silt	Wood Chips
				VN-02-04-C-17_SED_15-20	11/10/17	ft	1.5	2.0	160		(-)		N/A	7.03	J	8.13		46.7	J	Clay/Silt	Wood Chips
				VN-02-04-C-17_SED_20-24	11/10/17	ft	2.0	2.4	21.6		(-)		N/A	2.29	J	6.14		65.8	J	Clay/Silt	Wood Chips
				VN-02-04-C-17_SED_24-29	11/10/17	ft	2.4	2.9	23.7		(-)		N/A	2.07	J	4.44		66.6	J	Clay/Silt	Wood Chips
		Unconsolidated	VN-03-01-D	VN-03-01-D-17_SED_00-01	10/26/17	ft	0.0	0.1	715		20.3		2.84	5.06		12.4		35.6	J	Clay/Silt	Sand
				VN-03-01-D-17_SED_01-03	10/26/17	ft	0.1	0.3	756		11.8		1.56	4.58		8.98		45.6	J	Clay/Silt	Sand
				VN-03-01-D-17_SED_03-05	10/26/17	ft	0.3	0.5	693		(-)		N/A	5.01		12.5		47.7	J	Clay/Silt	Sand
				VN-03-01-D-17_SED_05-07	10/26/17	ft	0.5	0.7	836		(-)		N/A	4.26		11.5		48.0	J	Clay/Silt	Sand
				VN-03-01-D-17_SED_07-10	10/26/17	ft	0.7	1.0	1170		(-)		N/A	5.87		13.1		46.5	J	Clay/Silt	Sand
		Consolidated	VN-03-01-B	VN-03-01-B-17_SED_00-01	11/10/17	ft	0.0	0.1	679		(-)		N/A	5.28	J	10.2		46.3	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_01-03	11/10/17	ft	0.1	0.3	673		(-)		N/A	5.18	J	8.98		47.5	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_03-05	11/10/17	ft	0.3	0.5	779		(-)		N/A	5.32	J	12.4		45.9	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_05-07	11/10/17	ft	0.5	0.7	805		(-)		N/A	4.10	J	9.62		49.2	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_07-10	11/10/17	ft	0.7	1.0	1170		(-)		N/A	6.08	J	11.1		49.0	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_10-15	11/10/17	ft	1.0	1.5	1780		(-)		N/A	7.00	J	14.7		48.2	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_15-21	11/10/17	ft	1.5	2.1	312		(-)		N/A	7.14	J	9.77		48.3	J	Clay/Silt	(-)
				VN-03-01-B-17_SED_21-27	11/10/17	ft	2.1	2.7	78.0		(-)		N/A	1.78	J	4.78		68.9	J	Clay/Silt	Shells

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

River Reach	Zone	Core Designation[2]	Station ID	Sample ID	Sample Date	Depth Units	Top Depth	Bottom Depth	Mercury (EPA 1631, ng/g) Result	Mercury Qual[1]	Methyl Mercury (EPA 1630, ng/g) Result	Methyl Mercury Qual[1]	Percent Methyl Mercury (N/A (Calculated), Percent) Result	Total Organic Carbon (Lloyd Khan, Percent) Result	Total Organic Carbon Qual[1]	Organic Content (ASTM D2974C @ 550 C, Percent) Result	Organic Content Qual[1]	Total Solids (SM 2540B, Percent) Result	Total Solids Qual[1]	Lithology Major	Lithology Minor
Verona Northeast	Subtidal Sediment	Unconsolidated	VN-04-01-E	VN-04-01-E-17_SED_00-01	10/26/17	ft	0.0	0.1	393		6.40		1.63	3.84		10.95		64.9	J	Clay/Silt	Wood Chips
				VN-04-01-E-17_SED_01-03	10/26/17	ft	0.1	0.3	650		11.4		1.75	4.92		12.51		43.0	J	Clay/Silt	(-)
				VN-04-01-E-17_SED_03-05	10/26/17	ft	0.3	0.5	889		(-)		N/A	6.10		12.36		45.2	J	Clay/Silt	(-)
				VN-04-01-E-17_SED_05-07	10/26/17	ft	0.5	0.7	907		(-)		N/A	5.72		11.90		48.1	J	Clay/Silt	(-)
				VN-04-01-E-17_SED_07-10	10/26/17	ft	0.7	1.0	1370		(-)		N/A	5.31		11.51		52.6	J	Clay/Silt	(-)
		Consolidated	VN-04-01-D	VN-04-01-D-17_SED_00-01	11/13/17	ft	0.0	0.1	610		(-)		N/A	3.36	J	10.10		46.3	J	Clay/Silt	(-)
				VN-04-01-D-17_SED_01-03	11/13/17	ft	0.1	0.3	681		(-)		N/A	4.30	J	13.18		47.3	J	Clay/Silt	(-)
				VN-04-01-D-17_SED_03-05	11/13/17	ft	0.3	0.5	782		(-)		N/A	5.74	J	18.12		36.0	J	Wood Chips	(-)
				VN-04-01-D-17_SED_05-07	11/13/17	ft	0.5	0.7	775		(-)		N/A	5.73	J	11.27		44.5	J	Wood Chips	(-)
				VN-04-01-D-17_SED_07-10	11/13/17	ft	0.7	1.0	1410		(-)		N/A	6.72	J	15.84		37.2	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_10-15	11/13/17	ft	1.0	1.5	1430		(-)		N/A	5.49	J	12.88		47.5	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_15-17	11/13/17	ft	1.5	1.7	751		(-)		N/A	10.51	J	14.28		35.0	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_17-20	11/13/17	ft	1.7	2.0	203		(-)		N/A	7.41	J	16.61		38.7	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_20-22	11/13/17	ft	2.0	2.2	157		(-)		N/A	6.80	J	15.63		41.5	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_22-23	11/13/17	ft	2.2	2.3	75.7		(-)		N/A	2.51	J	12.16		45.5	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_23-25	11/13/17	ft	2.3	2.5	45.5		(-)		N/A	2.74	J	6.18		55.9	J	Clay/Silt	Wood Chips
				VN-04-01-D-17_SED_25-27	11/13/17	ft	2.5	2.7	15.7		(-)		N/A	1.51	J	4.93		65.9	J	Clay/Silt	(-)
				VN-04-01-D-17_SED_27-30	11/13/17	ft	2.7	3.0	16.0		(-)		N/A	2.15	J	6.55		55.7	J	Clay/Silt	(-)
				VN-04-01-D-17_SED_30-36	11/13/17	ft	3.0	3.6	18.1		(-)		N/A	2.41	J	6.46		56.8	J	Clay/Silt	(-)
		Unconsolidated	VN-04-02-C	VN-04-02-C-17_SED_00-01	10/27/17	ft	0.0	0.1	379		5.90		1.56	1.57		4.77		36.8	J	Clay/Silt	Sand/Shells
				VN-04-02-C-17_SED_01-03	10/27/17	ft	0.1	0.3	112		1.40	J	1.25	1.67		4.70		74.6	J	Clay/Silt	Sand
				VN-04-02-C-17_SED_03-05	10/20/17	ft	0.3	0.5	27.1		(-)		N/A	2.04		6.13		60.8	J	Clay/Silt	Shells
				VN-04-02-C-17_SED_05-07	10/20/17	ft	0.5	0.7	22.3		(-)		N/A	2.22		6.44		59.3	J	Clay/Silt	Shells
				VN-04-02-C-17_SED_07-10	10/20/17	ft	0.7	1.0	16.2		(-)		N/A	1.87		5.94		60.7	J	Clay/Silt	Shells
		Consolidated	VN-04-02-A	VN-04-02-A-17_SED_00-01	11/10/17	ft	0.0	0.1	229		(-)		N/A	1.93	J	5.64		72.0	J	Clay/Silt	Sand/ Gravel/ Shells
				VN-04-02-A-17_SED_01-03	11/10/17	ft	0.1	0.3	113		(-)		N/A	2.14	J	5.36		66.5	J	Clay/Silt	Sand/ Shells
				VN-04-02-A-17_SED_03-05	11/10/17	ft	0.3	0.5	33.8		(-)		N/A	2.46	J	5.74		59.2	J	Clay/Silt	Shells
				VN-04-02-A-17_SED_05-07	11/10/17	ft	0.5	0.7	25.0		(-)		N/A	2.70	J	6.91		61.0	J	Clay/Silt	Shells
				VN-04-02-A-17_SED_07-10	11/10/17	ft	0.7	1.0	21.0		(-)		N/A	2.25	J	5.83		61.6	J	Clay/Silt	(-)
				VN-04-02-A-17_SED_10-15	11/10/17	ft	1.0	1.5	19.2		(-)		N/A	2.67	J	6.21		62.7	J	Clay/Silt	Shells
				VN-04-02-A-17_SED_15-20	11/10/17	ft	1.5	2.0	15.1		(-)		N/A	1.46	J	5.04		64.9	J	Clay/Silt	Shells
				VN-04-02-A-17_SED_20-25	11/10/17	ft	2.0	2.5	17.1		(-)		N/A	1.96	J	5.51		63.6	J	Clay/Silt	(-)
				VN-04-02-A-17_SED_25-31	11/10/17	ft	2.5	3.1	19.8		(-)		N/A	2.51	J	5.46		54.6	J	Clay/Silt	(-)
		Consolidated	VN-05-01-D	VN-05-01-D-17_SED_00-01	11/28/17	ft	0.0	0.1	2030		(-)		N/A	6.76	J	21.5		39.5	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_01-02	11/28/17	ft	0.1	0.2	1300		(-)		N/A	3.45	J	13.5		47.4	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_02-03	11/28/17	ft	0.2	0.3	405		(-)		N/A	2.67	J	7.56		53.7	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_03-05	11/28/17	ft	0.3	0.5	143		(-)		N/A	2.45	J	7.19		54.0	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_05-07	11/28/17	ft	0.5	0.7	474		(-)		N/A	2.29	J	7.52		45.1	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_07-10	11/28/17	ft	0.7	1.0	109		(-)		N/A	2.03	J	6.74		58.8	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_10-11	11/28/17	ft	1.0	1.1	57.4		(-)		N/A	2.41	J	8.07		57.0	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_11-15	11/28/17	ft	1.1	1.5	64.3		(-)		N/A	2.20	J	7.30		56.6	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_15-17	11/28/17	ft	1.5	1.7	42.9	J	(-)		N/A	2.47	J	7.04		55.2	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_17-20	11/28/17	ft	1.7	2.0	31.3		(-)		N/A	2.59	J	8.07		52.9	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_20-25	11/28/17	ft	2.0	2.5	36.0		(-)		N/A	2.44	J	7.58		55.1	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_25-30	11/28/17	ft	2.5	3.0	34.3		(-)		N/A	2.32	J	7.34		55.4	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_30-35	11/28/17	ft	3.0	3.5	43.2		(-)		N/A	2.37	J	6.94		56.5	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_35-40	11/28/17	ft	3.5	4.0	17.7		(-)		N/A	2.40	J	7.04		55.6	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_40-45	11/28/17	ft	4.0	4.5	17.9		(-)		N/A	1.49	J	5.46		64.0	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_45-50	11/28/17	ft	4.5	5.0	15.0		(-)		N/A	1.57	J	4.44		66.0	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_50-52	11/28/17	ft	5.0	5.2	17.1		(-)		N/A	1.55	J	4.65		65.8	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_52-60	11/28/17	ft	5.2	6.0	17.6		(-)		N/A	1.98	J	6.15		61.3	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_60-65	11/28/17	ft	6.0	6.5	17.1		(-)		N/A	2.34	J	6.49		58.2	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_65-70	11/28/17	ft	6.5	7.0	20.4		(-)		N/A	2.39	J	7.33		56.9	J	Clay/Silt	(-)
				VN-05-01-D-17_SED_70-75	11/28/17	ft	7.0	7.5	17.8		(-)		N/A	2.17	J	6.51		60.2	J	Clay/Silt	(-)
	Intertidal Sediment	Unconsolidated	VN-08-01-E	VN-08-01-E-17_SED_00-01	10/26/17	ft	0.0	0.1	856		18.0		2.10	5.60		13.1		32.7	J	Clay/Silt	(-)
				VN-08-01-E-17_SED_01-03	10/26/17	ft	0.1	0.3	715		11.2		1.57	5.05		9.37		45.3	J	Clay/Silt	(-)
				VN-08-01-E-17_SED_03-05	10/26/17	ft	0.3	0.5	1030		(-)		N/A	6.06		14.0		46.7	J	Clay/Silt	(-)
				VN-08-01-E-17_SED_05-07	10/26/17	ft	0.5	0.7	1500		(-)		N/A	6.44		10.1		41.9	J	Clay/Silt	(-)

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	**Zone**	**Core Designation[2]**	**Station ID**	**Sample ID**	**Sample Date**	**Depth Units**	**Top Depth**	**Bottom Depth**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Result**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Result**	**Qual[1]**	**Major**	**Minor**
Verona Northeast	Intertidal Sediment	Consolidated	VN-08-01-B	VN-08-01-B-17_SED_00-01	11/10/17	ft	0.0	0.1	779		(-)		N/A	6.50		13.3		37.5	J	Clay/Silt	(-)
				VN-08-01-B-17_SED_01-03	11/10/17	ft	0.1	0.3	856		(-)		N/A	6.10		11.7		40.5	J	Clay/Silt	Shells
				VN-08-01-B-17_SED_03-05	11/10/17	ft	0.3	0.5	995		(-)		N/A	6.27	J	9.73		42.5	J	Clay/Silt	(-)
				VN-08-01-B-17_SED_05-07	11/10/17	ft	0.5	0.7	1050		(-)		N/A	5.66	J	18.7		45.7	J	Clay/Silt	(-)
				VN-08-01-B-17_SED_07-10	11/10/17	ft	0.7	1.0	1230		(-)		N/A	7.65	J	10.3		43.6	J	Clay/Silt	(-)
				VN-08-01-B-17_SED_10-13	11/10/17	ft	1.0	1.3	284		(-)		N/A	7.02	J	12.8		45.7	J	Clay/Silt	(-)
				VN-08-01-B-17_SED_13-18	11/10/17	ft	1.3	1.8	274		(-)		N/A	8.03	J	16.2		44.9	J	Clay/Silt	(-)
				VN-08-01-B-17_SED_18-21	11/10/17	ft	1.8	2.1	126		(-)		N/A	4.64	J	8.92		51.1	J	Clay/Silt	Wood Chips
		Grab	VN-10-01	VN-10-01_08192017_SED_03	08/19/17	ft	0.0	0.3	728	J	(-)		N/A	5.33		11.9		36.3	J	Silt	(-)
		Grab	VN-10-02	VN-10-02_08192017_SED_03	08/19/17	ft	0.0	0.3	710	J	(-)		N/A	4.92		11.6		39.0	J	Silt	(-)
Verona East	Subtidal Sediment	Consolidated	VE-05-01-E	VE-05-01-E-17_SED_00-01	11/17/17	ft	0.0	0.1	1553	z	(-)		N/A	43.90	z	(-)		17.8	Jz	Not Recorded	(-)
				VE-05-01-E-17_SED_01-03	11/17/17	ft	0.1	0.3	1347	z	(-)		N/A	44.60	z	61.7	z	15.7	Jz	Wood Chips	(-)
				VE-05-01-E-17_SED_03-05	11/17/17	ft	0.3	0.5	1620	z	(-)		N/A	42.90	z	58.2	z	16.8	Jz	Wood Chips	(-)
				VE-05-01-E-17_SED_05-07	11/17/17	ft	0.5	0.7	1773	z	(-)		N/A	41.60	z	74.9	z	18.2	Jz	Wood Chips	(-)
				VE-05-01-E-17_SED_07-10	11/17/17	ft	0.7	1.0	1397	z	(-)		N/A	39.80	z	53.1	z	16.6	Jz	Wood Chips	(-)
				VE-05-01-E-17_SED_10-15	11/17/17	ft	1.0	1.5	1330		(-)		N/A	41.85		56.4		15.0	J	Wood Chips	(-)
				VE-05-01-E-17_SED_15-20	11/17/17	ft	1.5	2.0	1290		(-)		N/A	39.40		51.9		15.7	J	Wood Chips	(-)
				VE-05-01-E-17_SED_20-25	11/17/17	ft	2.0	2.5	1320		(-)		N/A	30.90		75.6		15.8	J	Wood Chips	(-)
				VE-05-01-E-17_SED_25-30	11/17/17	ft	2.5	3.0	1340		(-)		N/A	39.50		57.0		15.2	J	Wood Chips	(-)
				VE-05-01-E-17_SED_30-35	11/17/17	ft	3.0	3.5	1390		(-)		N/A	39.20		49.8		16.1	J	Wood Chips	(-)
				VE-05-01-E-17_SED_35-38	11/17/17	ft	3.5	3.8	1250		(-)		N/A	28.40		47.5		17.8	J	Wood Chips	(-)
				VE-05-01-E-17_SED_38-39	11/17/17	ft	3.8	3.9	311	z	(-)		N/A	1.32	Jz	10.5	z	61.9	Jz	Sand	Clay/Silt/Wood Chips
				VE-05-01-E-17_SED_39-40	11/17/17	ft	3.9	4.0	1323	z	(-)		N/A	11.30	Jz	34.9	z	32.2	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_40-42	11/17/17	ft	4.0	4.2	1014	z	(-)		N/A	21.00	Jz	33.5	z	28.5	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_42-43	11/17/17	ft	4.2	4.3	289		(-)		N/A	1.33		9.04		65.3	J	Sand	Clay/Silt
				VE-05-01-E-17_SED_43-44	11/17/17	ft	4.3	4.4	976	z	(-)		N/A	6.84	z	23.2	z	42.9	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_44-45	11/17/17	ft	4.4	4.5	287		(-)		N/A	0.71	J	5.02		70.9	J	Sand	Clay/Silt
				VE-05-01-E-17_SED_45-46	11/17/17	ft	4.5	4.6	903	z	(-)		N/A	5.89	Jz	(-)	z	42.5	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_46-48	11/17/17	ft	4.6	4.8	446		(-)		N/A	1.71	J	3.81		68.7	J	Sand	Clay/Silt/Wood Chips
				VE-05-01-E-17_SED_48-49	11/17/17	ft	4.8	4.9	661	z	(-)		N/A	2.01	Jz	10.7	z	53.8	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_49-52	11/17/17	ft	4.9	5.2	240		(-)		N/A	1.22		6.29		63.0	J	Sand	Clay/Silt/Wood Chips
				VE-05-01-E-17_SED_52-54	11/17/17	ft	5.2	5.4	182	z	(-)		N/A	3.49	z	16.2	z	45.7	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_54-55	11/17/17	ft	5.4	5.5	186	z	(-)		N/A	4.54	Jz	16.0	z	46.7	Jz	Sand	Clay/Silt/Sand
				VE-05-01-E-17_SED_55-57	11/17/17	ft	5.5	5.7	126		(-)		N/A	2.57		10.5		59.9	J	Wood Chips	Sand/Wood Chips
				VE-05-01-E-17_SED_57-58	11/17/17	ft	5.7	5.8	157	z	(-)		N/A	7.16	Jz	24.9	z	37.9	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_58-59	11/17/17	ft	5.8	5.9	149		(-)		N/A	3.26		7.92		54.1	J	Clay/Silt	Sand/Wood Chips
				VE-05-01-E-17_SED_59-60	11/17/17	ft	5.9	6.0	186	z	(-)		N/A	13.40	Jz	29.4	z	28.7	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_60-61	11/17/17	ft	6.0	6.1	162	z	(-)		N/A	4.82	Jz	(-)	z	42.0	Jz	Not Recorded	(-)
				VE-05-01-E-17_SED_61-62	11/17/17	ft	6.1	6.2	158	z	(-)		N/A	9.79	Jz	26.8	z	29.8	Jz	Wood Chips	Clay/Silt/Sand
				VE-05-01-E-17_SED_62-64	11/17/17	ft	6.2	6.4	197	z	(-)		N/A	7.04	z	14.5	z	42.2	Jz	Clay/Silt	Sand/Wood Chips
	Intertidal Sediment	Unconsolidated	VE-09-01-E	VE-09-01-E-17_SED_00-01	10/26/17	ft	0.0	0.1	575		12.6		2.19	5.28		15.2		36.6	J	Clay/Silt	Wood Chips
				VE-09-01-E-17_SED_01-03	10/26/17	ft	0.1	0.3	692		13.5		1.95	5.49		14.3		39.9	J	Clay/Silt	(-)
				VE-09-01-E-17_SED_03-05	10/26/17	ft	0.3	0.5	850		(-)		N/A	5.80		14.4		41.0	J	Clay/Silt	(-)
				VE-09-01-E-17_SED_05-07	10/26/17	ft	0.5	0.7	1060		(-)		N/A	6.19		15.2		42.0	J	Clay/Silt	(-)
				VE-09-01-E-17_SED_07-10	10/26/17	ft	0.7	1.0	1310		(-)		N/A	8.20		16.5		40.1	J	Clay/Silt	(-)
		Consolidated	VE-09-01-B	VE-09-01-B-17_SED_00-01	11/10/17	ft	0.0	0.1	631		(-)		N/A	5.77	J	13.9		35.4	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_01-03	11/10/17	ft	0.1	0.3	753		(-)		N/A	5.99	J	16.2		37.3	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_03-05	11/10/17	ft	0.3	0.5	792		(-)		N/A	5.99	J	11.3		41.1	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_05-07	11/10/17	ft	0.5	0.7	1110		(-)		N/A	6.32	J	11.3		39.4	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_07-10	11/10/17	ft	0.7	1.0	1030		(-)		N/A	6.47	J	15.4		42.1	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_10-13	11/10/17	ft	1.0	1.3	1850		(-)		N/A	9.01	J	18.4		42.2	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_13-16	11/10/17	ft	1.3	1.6	421		(-)		N/A	8.49	J	13.5		42.4	J	Clay/Silt	Wood Chips
				VE-09-01-B-17_SED_16-20	11/10/17	ft	1.6	2.0	114		(-)		N/A	6.05	J	2.28		55.1	J	Clay/Silt	(-)
				VE-09-01-B-17_SED_20-23	11/10/17	ft	2.0	2.3	45.4		(-)		N/A	3.36	J	11.7		56.0	J	Clay/Silt	(-)
		Unconsolidated	VE-10-01-E	VE-10-01-E-17_SED_00-01	10/26/17	ft	0.0	0.1	943		28.7		3.04	5.48		18.4		30.1	J	Clay/Silt	Wood Chips
				VE-10-01-E-17_SED_01-03	10/26/17	ft	0.1	0.3	796		22.5		2.83	7.52		13.4		39.6	J	Clay/Silt	Wood Chips/Sand
				VE-10-01-E-17_SED_03-05	10/26/17	ft	0.3	0.5	645		(-)		N/A	4.06		13.6		46.1	J	Clay/Silt	Wood Chips/Sand
				VE-10-01-E-17_SED_05-07	10/26/17	ft	0.5	0.7	1320		(-)		N/A	6.84		17.6		43.6	J	Clay/Silt	Wood Chips/Sand
				VE-10-01-E-17_SED_07-10	10/26/17	ft	0.7	1.0	1650		(-)		N/A	6.18	J	19.5		41.0	J	Clay/Silt	Wood Chips

TABLE 4-1

SEDIMENT ANALYTICAL RESULTS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

								Parameter	Mercury		Methyl Mercury		Percent Methyl Mercury	Total Organic Carbon		Organic Content		Total Solids		Lithology	
								Method	EPA 1631		EPA 1630		N/A (Calculated)	Lloyd Khan		ASTM D2974C @ 550 C		SM 2540B			
								Units	ng/g		ng/g		Percent	Percent		Percent		Percent			
River Reach	Zone	Core Designation[2]	Station ID	Sample ID	Sample Date	Depth Units	Top Depth	Bottom Depth	Result	Qual[1]	Result	Qual[1]	Result	Result	Qual[1]	Result	Qual[1]	Result	Qual[1]	Major	Minor
Verona East	Intertidal Sediment	Consolidated	VE-10-01-C	VE-10-01-C-17_SED_00-01	11/08/17	ft	0.0	0.1	715		(-)		N/A	7.32	J	16.1		45.4	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_01-02	11/08/17	ft	0.1	0.2	851		(-)		N/A	7.51	J	18.0		44.7	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_02-03	11/08/17	ft	0.2	0.3	858		(-)		N/A	5.59	J	16.5		48.7	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_03-05	11/08/17	ft	0.3	0.5	790		(-)		N/A	5.07	J	12.8		50.3	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_05-07	11/08/17	ft	0.5	0.7	1100		(-)		N/A	6.83	J	13.7		46.5	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_07-10	11/08/17	ft	0.7	1.0	1510		(-)		N/A	7.54	J	17.5		43.2	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_10-13	11/08/17	ft	1.0	1.3	933		(-)		N/A	6.09	J	34.6		44.4	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_13-16	11/08/17	ft	1.3	1.6	214		(-)		N/A	5.85	J	14.9		44.5	J	Clay/Silt	Wood Chips
				VE-10-01-C-17_SED_16-20	11/08/17	ft	1.6	2.0	87.1		(-)		N/A	3.72	J	11.0		55.3	J	Clay/Silt	Wood Chips
Verona West	Subtidal Sediment	Unconsolidated	VW-02-01-E	VW-02-01-E-17_SED_00-01	10/27/17	ft	0.0	0.1	409		3.70	J	0.90	1.81		7.24		45.2	J	Clay/Silt	(-)
				VW-02-01-E-17_SED_01-03	10/27/17	ft	0.1	0.3	120		2.60	J	2.17	2.23		6.76		30.4	J	Clay/Silt	(-)
				VW-02-01-E-17_SED_03-05	10/27/17	ft	0.3	0.5	111		(-)		N/A	2.15		6.16		49.9	J	Clay/Silt	(-)
		Consolidated	VW-02-01-B	VW-02-01-B-17_SED_00-01	11/14/17	ft	0.0	0.1	58.9		(-)		N/A	1.96		6.51		54.7	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_01-03	11/14/17	ft	0.1	0.3	33.5		(-)		N/A	1.85		6.36		51.9	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_03-05	11/14/17	ft	0.3	0.5	41.7		(-)		N/A	1.77		5.50		53.9	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_05-07	11/14/17	ft	0.5	0.7	31.3		(-)		N/A	2.04		6.54		51.9	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_07-09	11/14/17	ft	0.7	0.9	18.7		(-)		N/A	1.87		5.84		53.1	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_09-11	11/14/17	ft	0.9	1.1	20.9		(-)		N/A	1.91		6.63		52.9	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_11-13	11/14/17	ft	1.1	1.3	21.6		(-)		N/A	2.02		6.80		54.1	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_13-15	11/14/17	ft	1.3	1.5	19.7		(-)		N/A	2.02		5.39		51.5	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_15-20	11/14/17	ft	1.5	2.0	23.3		(-)		N/A	2.01		5.81		51.8	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_20-25	11/14/17	ft	2.0	2.5	29.0		(-)		N/A	1.96		6.24		52.5	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_25-30	11/14/17	ft	2.5	3.0	26.3		(-)		N/A	1.93		5.04		52.4	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_30-35	11/14/17	ft	3.0	3.5	13.4		(-)		N/A	1.66		6.50		55.0	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_35-40	11/14/17	ft	3.5	4.0	18.8		(-)		N/A	1.64		6.25		55.6	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_40-45	11/14/17	ft	4.0	4.5	12.5		(-)		N/A	1.72		6.53		55.5	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_45-50	11/14/17	ft	4.5	5.0	13.0		(-)		N/A	1.76		6.81		55.5	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_50-55	11/14/17	ft	5.0	5.5	12.6		(-)		N/A	1.83		6.68		55.9	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_55-60	11/14/17	ft	5.5	6.0	10.8		(-)		N/A	1.62		6.38		59.3	J	Clay/Silt	Shells
				VW-02-01-B-17_SED_60-65	11/14/17	ft	6.0	6.5	10.0		(-)		N/A	1.55		5.89		58.9	J	Clay/Silt	Shells
				VW-02-01-B-17_SED_65-70	11/14/17	ft	6.5	7.0	9.7		(-)		N/A	1.53		5.76		58.7	J	Clay/Silt	Shells
				VW-02-01-B-17_SED_70-75	11/14/17	ft	7.0	7.5	18.8		(-)		N/A	1.91	J	6.59		56.8	J	Clay/Silt	(-)
				VW-02-01-B-17_SED_75-80	11/14/17	ft	7.5	8.0	11.6		(-)		N/A	1.84		6.41		57.6	J	Clay/Silt	Shells
		Unconsolidated	VW-14-01-F	VW-14-01-F-17_SED_00-01	10/27/17	ft	0.0	0.1	1140		9.40	J	0.82	4.67		15.2		16.9	J	Clay/Silt	(-)
				VW-14-01-F-17_SED_01-03	10/27/17	ft	0.1	0.3	635		14.5		2.28	5.40		12.2		39.0	J	Clay/Silt	(-)
				VW-14-01-F-17_SED_03-05	10/27/17	ft	0.3	0.5	644		(-)		N/A	5.27		12.6		41.2	J	Clay/Silt	(-)
				VW-14-01-F-17_SED_05-07	10/27/17	ft	0.5	0.7	813		(-)		N/A	6.97		13.1		33.7	J	Clay/Silt	(-)
				VW-14-01-F-17_SED_07-10	10/27/17	ft	0.7	1.0	707		(-)		N/A	5.45		11.5		39.6	J	Clay/Silt	(-)
		Consolidated	VW-14-01-E	VW-14-01-E-17_SED_00-01	11/15/17	ft	0.0	0.1	515		(-)		N/A	3.53		9.82		50.7	J	Clay/Silt	Wood Chips
				VW-14-01-E-17_SED_01-03	11/15/17	ft	0.1	0.3	514		(-)		N/A	4.46		10.7		48.7	J	Clay/Silt	Wood Chips
				VW-14-01-E-17_SED_03-05	11/15/17	ft	0.3	0.5	468		(-)		N/A	2.99	J	10.9		48.6	J	Clay/Silt	Sand/Wood Chips
				VW-14-01-E-17_SED_05-07	11/15/17	ft	0.5	0.7	360		(-)		N/A	3.43		8.72		55.8	J	Clay/Silt	Sand/Wood Chips
				VW-14-01-E-17_SED_07-10	11/15/17	ft	0.7	1.0	372		(-)		N/A	1.67		6.06		61.2	J	Clay/Silt	Sand/Wood Chips
				VW-14-01-E-17_SED_10-12	11/15/17	ft	1.0	1.2	78.1		(-)		N/A	2.79		8.44		57.8	J	Clay/Silt	Sand/Wood Chips
				VW-14-01-E-17_SED_12-14	11/15/17	ft	1.2	1.4	67.1		(-)		N/A	2.62		6.29		54.3	J	Clay/Silt	Sand
				VW-14-01-E-17_SED_14-16	11/15/17	ft	1.4	1.6	60.0		(-)		N/A	3.07		9.64		52.4	J	Clay/Silt	Sand/Wood Chips
				VW-14-01-E-17_SED_16-18	11/15/17	ft	1.6	1.8	43.4		(-)		N/A	1.78		9.62		60.7	J	Clay/Silt	Sand/Wood Chips
				VW-14-01-E-17_SED_18-20	11/15/17	ft	1.8	2.0	43.1		(-)		N/A	2.39	J	6.95		57.1	J	Clay/Silt	Sand

Notes:
(-) = Interval not sampled for selected parameter
1. Data qualifiers:
   J = Reported value is estimated
   U = Reported value is non-detect
   z = average result of three replicate sample concentrations
2. Core Designation:
   Consolidated= 8 foot and 2 foot cores, refrigerated, no methyl mercury analysis
   Unconsolidated= 1 foot core, frozen, methyl mercury analysis
   Grab= ponar grab sample
3. The top half of core FF-07-02-B is core FF-MU7-GC-1-B presented in the 2017 Thin Interval Core Sampling Report (Amec Foster Wheeler 2018x)

Abbreviations:
ng/g = nanograms per gram
ft= feet
MeHg = methyl mercury
N/A = Not Available

Prepared by: JPP 1/18/2018
Checked by: BPW 1/23/2018
Revised by: KAM 5/31/2018

TABLE 4-2

GEOTECHNICAL DATA
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

Station ID	Reach	Core Collection Data		Geotechnical Data: Shear Strength Data				Geotechnical Data: Wet Density Data			
		Length Retained (ft)	Percent Recovery (%)	Min. Shear Strength (psf)	Depth of Min. Shear Strength[1] (ft)	Max. Shear Strength (psf)	Depth of Max. Shear Strength[1] (ft)	Min. Density (pcf)	Depth of Min. Density[1] (ft)	Max. Density (pcf)	Depth of Max. Density[1] (ft)
ON-18-01	Orrington	8.9	89	35.8	0.3	398.8	7	58.0	5.0	62.8	3.0
ON-18-02	Orrington	NA	NA	NA due to abundant coarse content				NA due to abundant coarse content			
WP-02-01	Winterport	2.3	77	73.9	0.3	439.0	1.7	89.3	0.7	112.4	2.1
WP-06-02	Winterport	5.2	87	36.9	1.7	249.7	4.0	54.4	1.0	86.7	4.0
FF-08-02	Frankfort Flats	6.2	68	24.6	0.3	608.6	5.7	59.8	0.3	82.7	3.0
MM-04-01	Mendall Marsh	2.3	78	29.1	1.2	122.5	1.0	82.8	0.3	97.3	2.2
BU-02-01	Bucksport	3.2	91	86.4	0.3	249.7	2.3	61.4	1.3	67.3	0.3
BU-08-01	Bucksport	1.9	80	333.6	0.3	1141.4	1.7	88.3	0.3	101.9	1.3
VN-01-01	Verona Northeast	2.4	80	39.1	0.3	232.7	1.7	82.5	0.3	92.0	1.3
VN-02-01	Verona Northeast	2.4	78	44.7	0.3	408.3	2.1	83.8	0.3	107.5	2.1
VN-02-03	Verona Northeast	2.9	97	41.9	0.3	358.0	2.5	85.6	0.3	108.1	2.5
VN-02-04	Verona Northeast	2.9	97	30.8	0.3	338.0	2.0	83.3	0.3	103.2	2.4
VN-08-01	Verona Northeast	2.2	72	11.2	1.0	245.8	2.0	87.5	1.0	91.7	2.0
VE-09-01	Verona East	2.3	77	3.4	0.3	381.0	2.0	76.8	0.3	101.2	2.0
VE-10-01	Verona East	2.2	80	NA due to abundant wood waste				84.6	0.3	102.8	1.8
VW-14-01	Verona West	3.3	70	205.2	1.0	349.5	0.7	65.9	0.3	82.5	1.0
Average				**71.2**	**0.6**	**394.5**	**2.6**	**76.3**	**0.8**	**93.3**	**2.1**

Notes:
1. Depths presented for shear strength and wet density represent the bottom of depth intervals analyzed.

Prepared by: DRY 1/31/2018
Checked by: BJW 1/31/2018
Revised by: KAM 5/31/2018

Abbreviations:
% = percent
ft = feet
psf = pounds per square foot
pcf = pounds per cubic foot
NA = not available

TABLE 4-3

CHARACTERIZATION OF SURFACE DEPOSITS
Penobscot River Phase III Engineering Study
Penobscot River Estuary, Maine

Reach	Surface Deposit Unit	Surface Deposit Sub-Unit	Surface Deposit Unit Type	Primary Material	Wet Density[1]	Dry Density[1]	Approximate Water Depth	Unit Area[1]	Average Unit Thickness[1]	Sub-bottom Volume[1]		Thickness with Mercury > 500 ng/g	Volume with Mercury > 500 ng/g		Mass with Mercury > 500 ng/g	
					(kg/m^3)	(kg/m^3)	(ft MLLW)	Square Feet (ft^2)	Feet (ft)	Cubic Feet (ft^3)	Cubic Yards (yds^3)	Feet (ft)	Cubic Feet (ft^3)	Cubic Yards (yds^3)	Wet Weight (Tons)	Dry Weight (Tons)
Orrington	ON-1	NA	Trap	Silt	1,229	722	30	324,344	2.0	648,687	24,025	2.0	648,687	24,025	23,630	11,460
	ON-2	NA	Trap	Silt	1,229	722	20-50	2,022,346	3.5	6,541,862	242,291	3.5	7,078,211	262,156	257,835	125,051
	ON-3	NA	Trap	Silt	1,229	722	25	265,488	3.0	796,465	29,499	3.0	796,465	29,499	29,013	14,071
Winterport	WP-1	NA	Trap	Silt	1,099	523	30	956,515	3.5	3,175,562	117,613	3.0	2,869,545	106,279	104,528	50,696
	WP-2	NA	Trap	Silt	1,099	523	35	1,599,082	3.0	5,026,716	186,174	3.0	4,797,246	177,676	174,748	84,753
	WP-3	NA	Trap	Silt	1,099	523	30	1,877,275	4.0	6,879,576	254,799	3.0	5,631,825	208,586	205,148	99,498
Frankfort Flats	FF-1	NA	Layer	Wood Waste	1,193	697	10-30	4,481,867	4.0	17,481,244	647,453	4.0	17,927,468	663,980	653,037	316,726
Bucksport	BU-1	BU-1A	Trench	Wood Waste	1,322	679	30	790,166	3.5	2,887,005	106,926	2.0	1,580,332	58,531	57,566	27,920
		BU-1B	Trap	Wood Waste	1,322	679	40-70	1,257,879	3.0	4,441,843	164,513	2.0	2,515,758	93,176	91,641	44,446
	BU-2	BU-2A	Trench	Wood Waste	1,322	679	25	1,527,733	3.0	5,021,428	185,979	7.0	10,694,131	396,079	389,551	188,934
		BU-2B	Trap	Wood Waste	1,322	679	35	741,375	5.0	3,722,961	137,887	3.0	2,224,125	82,375	81,017	39,294
		BU-2C	Trap	Wood Waste	1,322	679	45-80	665,292	5.0	3,504,887	129,810	3.0	1,995,876	73,921	72,703	35,261
Verona Northeast	VN-1	NA	Trap	Silt	1,331	772	15	784,482	1.0	1,280,081	47,410	0.5	392,241	14,527	14,288	6,930
Orland River	OR-1[2]	NA	Layer	Wood Waste	929[(3)]	171[(3)]	3	288,438	3.0	865,315	32,049	3.0	865,315	32,049	31,521	15,288
Verona East	VE-1	NA	Layer	Wood Waste	929	171	30	1,276,719	6.0	5,450,574	201,873	5.0	6,383,595	236,429	232,533	112,779
	VE-1A	NA	Trap[4]	Wood Waste	929	171	30	2,086,719	5.0	10,283,766	380,880	5.0	10,283,766[(6)]	380,880[(6)]	374,603[(6)]	181,684[(6)]
	VE-2	NA	Layer	Wood Waste	929	171	10	192,284	3.0	576,852	21,365	1.0	192,284	7,122	7,004	3,397
	VE-3	NA	Layer	Wood Waste	929	171	30	265,382	5.0	1,326,910	49,145	1.0	265,382	9,829	9,667	4,689
Total								21,403,386	NA	79,911,735	2,959,691	NA	69,429,429	2,571,458	2,529,081	1,226,615
Rounded Total[5]								**21,400,000**	**NA**	**79,910,000**	**2,960,000**	**NA**	**69,430,000**	**2,570,000**	**2,530,000**	**1,230,000**

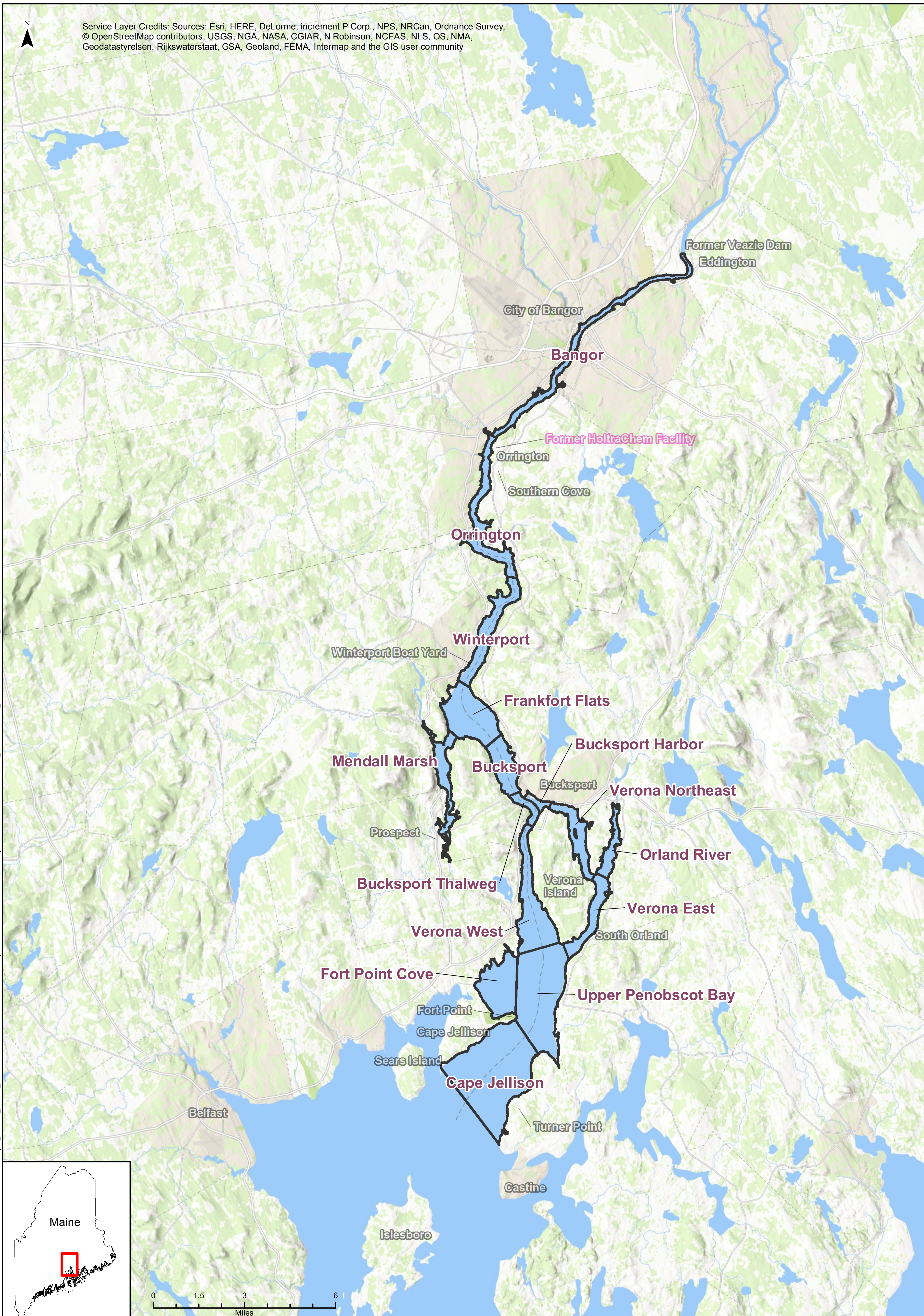
Deep Water Dredging	FF-1, VE-1, VE-2, VE-3		Layer	Wood Waste	995	303	23	6,216,252	5	24,835,580	919,835	3	24,768,729	917,359	902,242	437,591
Rounded Deep Water Dredging Total[5]	**FF-1, VE-1, VE-2, VE-3**		**Layer**	**Wood Waste**	**995**	**303**	**23**	**6,220,000**	**5**	**24,840,000**	**920,000**	**3**	**24,770,000**	**920,000**	**900,000**	**440,000**
Shallow Water Dredging	OR-1		Layer	Wood Waste	929[(3)]	171[(3)]	3	288,438	3	865,315	32,049	3	865,315	32,049	31,521	15,288
Rounded Shallow Water Dredging Total[5]	**OR-1**		**Layer**	**Wood Waste**	**929**	**171**	**3**	**290,000**	**3**	**870,000**	**30,000**	**3**	**870,000**	**30,000**	**30,000**	**20,000**

Notes:
1. Determined from work presented in Table 3-1 and Table A-3 of the 2017 Mobile Sediment Characterization Report (Amec Foster Wheeler 2018c).
2. Ground-truthed from core OR-T3-C3 presented in 2017 Thin Interval Core Sampling Report (Amec Foster Wheeler 2018g).
3. Value used from nearest core (VE-05-01) included in Table 3-1 of the 2017 Mobile Sediment Characterization Report (Amec Foster Wheeler 2018c).
4. See Section 4.5 for further discussion of the unit type for this surface deposit.
5. Presented totals are mathematical calculations and do not represent the accuracy of source data; the bolded values are rounded to the nearest 10,000 and are recommended for use.
6. Totals include 25% of VE-1A estimates.
Layer = Uniformly mixed deposit extending above grade compared to the river bottom.
Trap = Partially exposed in topographic depression of the river bottom.
Trench = Partially exposed, but laterally confined and extending below grade compared to river bottom.
Gray cells indicate average values

Prepared by: DRY 4/25/2018
Checked by: BJW 4/25/2018
Revised by: KAM 5/31/2018

Abbreviations:
ft = feet
ft^2 = square feet
ft^3 = cubic feet
kg/m^3 = kilograms per cubic meter
MLLW = Mean Low Low Water
NA = Not Applicable
ng/g = nanograms per gram
Tons = US standard

FIGURES



Legend
Boundary of River Reach

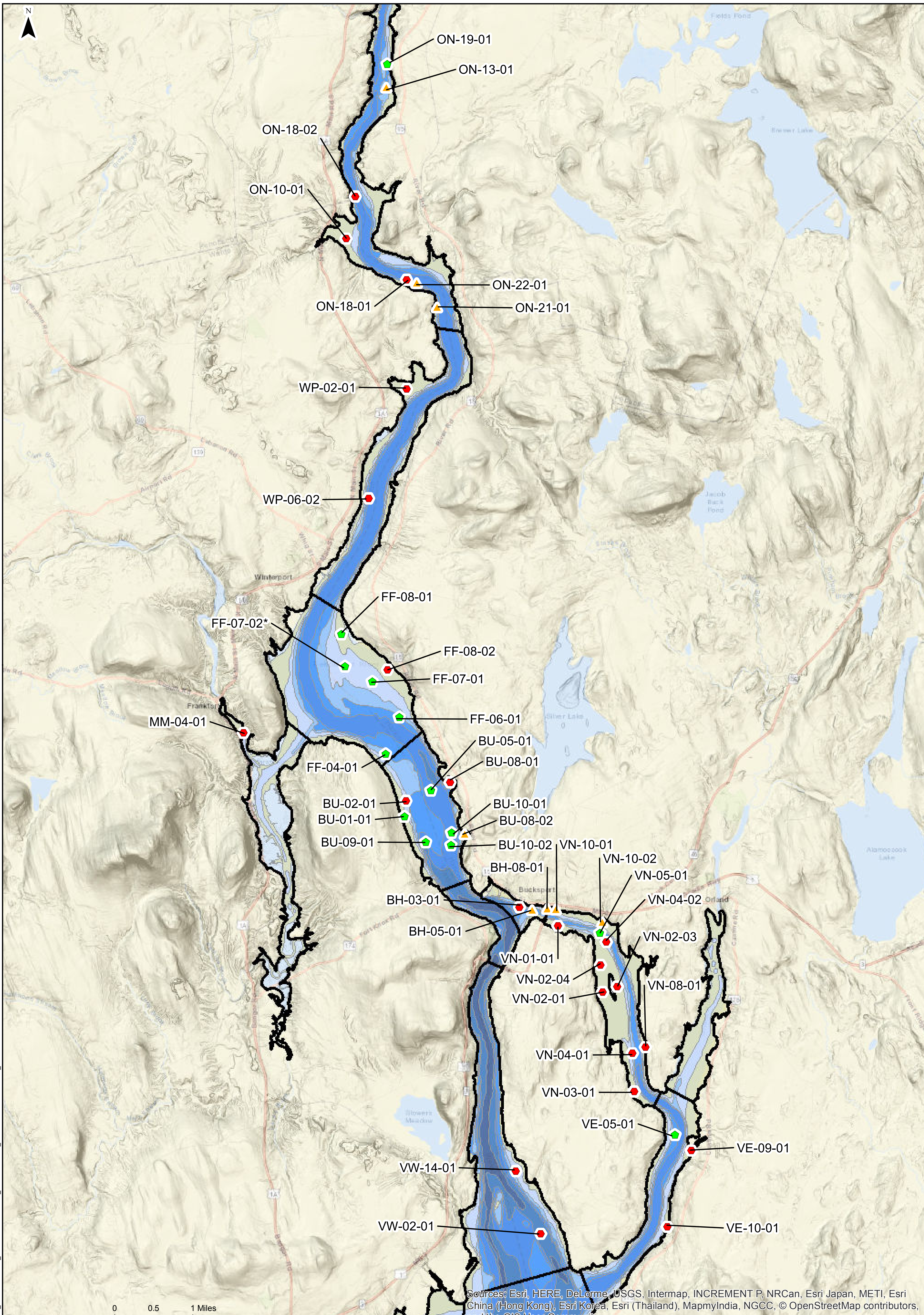
amec foster wheeler

Figure 1-1
Site Location and River Reaches

2017 Intertidal and Subtidal Characterization Report
Penobscot River Phase III Engineering Study

Project: 3616166052	Prepared: ICD 12/8/2017	Checked: BPW 12/8/2017

Document:P:\Projects\USDC- Penobscot GIS Control\8 - AER WORKSPACE\WO-4A\WO-4A033\MXDs\Project_Location_11x17P_Index1.mxd 12/8/2017 11:27:27 AM ian.desjarlais PDF: \\PLD2-FS1\Project\Projects\USDC - Penobscot River\4.0_Deliverables\4.5_Databases\GIS\EXPORT_HUB\8 - AER WORKSPACE\WO-4A\WO-4A033\PDFs_BETA\vF



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*The top half of core FF-07-02 is Work Order 4A-080 Core FF-MU7-GC-1

Symbol Key

- Surface Grab
- Consolidated Core
- Unconsolidated and Consolidated Core
- Boundary of River Reach

Bathymetry

Water Depth feet (MLLW)

0 6 12 18 30 60 120 600

Figure 2-1
Station Locations

2017 Intertidal and Subtidal Sediment Characterization Report
Penobscot River Phase III Engineering Study

Project: 3616166052	Prepared: MKM 2018-02-01	Checked: DRY 2018-02-01