Peninsula Harbour Area of Concern
Jellicoe Cove Thin-Layer Cap
2017 Long-Term Monitoring Assessment

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EXECUTIVE SUMMARY

Peninsula Harbour is located on the north shore of Lake Superior and is identified as an Area of Concern due to historical inputs from the former pulp mill and chlor-alkali plant, and historical log booming within the harbour. Over time these activities resulted in impaired fish and benthic communities, as well as elevated levels of contaminants in sediment and biota – specifically mercury (Hg), methyl-mercury (MeHg), and polychlorinated biphenyls (PCBs). The most heavily impacted area within Peninsula Harbour was Jellicoe Cove, a ninety-seven hectare embayment located adjacent to the mill and chlor-alkali plant. In 2008, an environmental risk assessment (ERA) and human health risk assessment (HHRA) addressed the risks of Hg and PCBs in the sediment and biota to receptors (ENVIRON 2008). The ERA concluded that hot spot management was the preferred remedial approach to manage the risks to fish and mink from exposure to sediment in Jellicoe Cove. Hot spots were defined as sediment with concentrations of total Hg equal to or greater than 3 µg/g. Overlap in the distribution of MeHg and total PCBs with the total Hg concentrations assured the management and reduction of those contaminants as well.

To reduce the risks imposed by the contaminants, thin-layer capping was the selected sediment management option for Jellicoe Cove. The remedial action objectives of the thin-layer cap were to: reduce potential for offsite migration of Hg, MeHg, and PCBs from the hot spot area in Jellicoe Cove to the rest of Peninsula Harbour; and to reduce the potential for future exposure of MeHg and PCBs to receptors. In 2012 the thin-layer cap was constructed, and 15-20 cm of sand was placed over sediment exceeding the remedial target of 3 µg/g total Hg. In 2017, five-years post-cap, the first full long-term monitoring (LTM) assessment was completed with the goal of evaluating cap stability, cap effectiveness, and ecological recovery.

Monitoring the cap against the remediation goals was a collaborative effort. The purpose of this report is to communicate the results of the LTM program as they relate to the work completed by the Ministry of the Environment, Conservation, and Parks (MECP): surficial sediment assessment, benthic invertebrate recolonization, and the assessment of fish tissue contaminants to determine the risks to fish and wildlife. Findings from additional survey monitoring components were reported by others, including: assessment of fish contaminant trends and fish consumption by humans (Drouillard 2019); submerged aquatic vegetation, and cap movement measurements and observations (Foster and Ratcliff 2018); passive samplers and sediment cores for sediment pore water analysis and determination of Hg flux through the cap (Rao *et al*. 2018); and high resolution multibeam sonar, and RoxAnn seabed classification and underwater video documentation (ECCC TBD). The pore water passive sampling survey was described and discussed in this report as it was integrated into the MECP's survey design, and methodology was largely based on this component.

Challenges were encountered with designing a sampling plan to address the LTM goals. The medium and coarse sands used to cap Jellicoe Cove were more coarse than the initial design, and

therefore the traditional sample methods used to collect samples for the pre-cap baseline monitoring surveys were not feasible for the post-cap monitoring. Therefore, alternative technologies were employed to collect samples, and divers were used for most survey components. Divers collected sediment grabs (the surficial sediment that has deposited over the cap sand), sediment cores, deployed and retrieved passive samplers, and benthos with a benthic air lift.

The first post-cap LTM survey has demonstrated that the thin-layer sediment cap is effective and met the goals and objectives of the remedial effort. Overall, the cap is stable (Foster and Ratcliff 2018), and the results from the analysis of passive samplers and sediment cores, have demonstrated that the cap has effectively reduced the flux of Hg to the overlying waters (Rao *et al*. 2018). Natural sedimentation has, and continues to, occur since the construction of the cap in 2012, and this surficial sediment was the focus of much of the MECP survey. The total Hg spatially-weighted average concentration (SWAC) (median SWAC 0.37 µg/g) in the surficial sediment was below the remedial target of 3 µg/g in the Jellicoe Cove capped area. As expected, the cap also effectively reduced the concentrations of MeHg and PCBs, albeit not to the same extent as the Hg reduction. Concentrations of some nutrients and metals in the cap surficial sediment exceeded their respective Provincial Sediment Quality Guidelines-Lowest Effect Limits (PSQG-LELs) at some sampling stations. However, concentrations of many parameters measured on the cap were similar to concentrations detected at the Peninsula Harbour reference station in Beatty Cove (MECP unpublished data, 2011).

Biological surveys have indicated that the cap has been colonized with benthic invertebrates, the coverage of submerged aquatic vegetation continues to increase over time (Ratcliff and Foster 2018), and contaminant levels in fish tissue have decreased (Drouillard 2019). The abundance of benthos on the cap was low, but the diversity was fairly high and the taxa identified were similar to what was observed in the 2009 pre-cap baseline survey. It is expected that over time, as the sediment continues to deposit over the cap, the abundance of benthic invertebrates, as well as the abundance and distribution of macrophytes on the cap will continue to increase. The cap appears to have been effective in reducing the levels of Hg and PCBs in the fish tissue of Lake Trout and Lake Whitefish. A short-term temporal comparison (2012 to 2017) of contaminants in the fillet tissue of Lake Whitefish (50 – 55 cm) Lake Trout (45 – 55 cm) showed a decline of ≥ 26% in Hg and ≥84% in PCBs (Drouillard 2019). The assessment of estimated hazard quotients showed that the reproductive success of individual Longnose Sucker is predicted to be at risk from Hg exposure; however, the hazard quotients was 1 and should be assessed further. There was no potential for fish reproductive adverse effects from PCBs predicted at both the individual or population level. Current estimated concentrations of Hg in fish at specified consumption lengths were not at a level that was predicted to pose a risk to exposed bald eagles and mink. Likewise, the risk of mink consuming the estimated current levels of PCBs in 15 cm whole-bodied fish was no longer predicted to be at risk.

Recommendations for the next LTM survey (in 2022) are provided based on the sampling efforts and results of the MECP survey, as well as the aforementioned surveys. Generally, the next

LTM survey should continue with the primary monitoring components (surficial sediment, benthic invertebrate collection, and fish and benthos tissue collection). Additionally, sediment traps should be deployed to further investigate the quality of sediment depositing on the cap, and the depositional patterns on the cap. The sampling effort should be increased over the coarse sand cap, where concentrations of total organic carbon (TOC) and many metals, including Hg and MeHg, are elevated, as well as in the north-east portion of the cap where PCB concentrations are elevated.

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1. BACKGROUND

Peninsula Harbour is located on the north shore of Lake Superior, adjacent to the town of Marathon, Ontario (Figure 1). The Harbour is identified as an Area of Concern (AOC) due to historical inputs from the pulp mill and chlor-alkali plant, and historical log booming. Over several decades, these activities resulted in impaired fish and benthic communities, elevated levels of contaminants in sediment and biota, and degraded aesthetics (Peninsula Harbour RAP Team, 1991). There have been efforts over time to reduce contaminant loads through regulatory change, upgrades to effluent treatment facilities, and cessation of logging practices etc.; however, contamination of the sediment continued to be a concern, specifically with regard to mercury (Hg) and polychlorinated biphenyls (PCBs).

In 2008, an environmental risk assessment (ERA) and human health risk assessment (HHRA) were conducted to estimate the potential risks of Hg and PCBs in the sediment and biota to AOC receptors (ENVIRON 2008a). Results of the risk assessments were:

- Hg was predicted to cause impaired reproduction in Lake Trout, Walleye, Lake Whitefish, and Longnose Suckers;
- Reproductive success was predicted to be reduced in individual Bald Eagles (and other raptors) exposed to Hg in fish;
- Longnose Suckers exposed to the PCBs in the assessed area were predicted to reproductively impaired;
- The concentration of PCBs in the fish tissue was predicted to reduce the reproductive success in mink and other piscivorous mammals; and
- The HHRA showed only PCBs in fish tissue were predicted to present a significant risk to both adult anglers and more sensitive consumers such as children and adolescents.

The most heavily impacted area within Peninsula Harbour was Jellicoe Cove, a ninety-seven hectare embayment located adjacent to the mill site (Figure 1). The risk assessment calculated spatially weighted average concentrations (SWAC) of methyl-Hg (MeHg) and PCBs in both Jellicoe Cove and in Peninsula Harbour as a whole. The SWAC for MeHg in Peninsula Harbour and Jellicoe Cove were 1.9 ng/g and 5.1 ng/g, respectively. The PCB contamination was not as widespread as Hg concentrations, but the areas of contamination did overlap. The SWAC for PCBs in Peninsula Harbour and Jellicoe Cove were 120 ng/g and 140 ng/g, respectively (ENVIRON 2008a).

Hot spot management was the preferred remedial approach to manage the risks to fish and mink from exposure to contaminated sediment in Jellicoe Cove (ENVIRON 2008). The risk assessment identified other management approaches (i.e., guideline based, background based, and risk based); however, there were cost and feasibility constraints to considering the additional options. Hot spots were defined as sediment with concentrations of total Hg equal to or greater than 3 µg/g. Total Hg was selected as the remedial parameter as it is a source of MeHg, and it is more cost effective to measure than MeHg. In addition, the overlap in the distribution of MeHg and total PCBs with the total Hg concentrations assured the management and reduction of those contaminants as well.

Thin-layer capping was the selected sediment management option for the hot spot in Jellicoe Cove. This decision was based on an informative assessment of the risks, benefits, costs, and community acceptance. The average net deposition rate in Jellicoe Cove is very low (1 to 2 mm of sediment being deposited per year), and as such, it was calculated that the placement of a 15-20 cm sand cap would be equivalent to seventy-five years of sedimentation, thereby enhancing the natural recovery of the site (ENVIRON 2008b). The remedial action objectives of the thin-layer cap were to:

- reduce potential for offsite migration of Hg, MeHg, and PCBs from the hot spot area in Jellicoe Cove to the rest of Peninsula Harbour; and
- reduce the potential for future exposure of MeHg and PCBs to receptors (ENVIRON 2008b).

In 2012, a 15-20 cm thin-layer cap – at a cost of $7.3 million – was placed over Jellicoe Cove. The cap was constructed from two different sand types: medium-grade and coarse-grade. The coarse-grade sand, which was sourced from Manitoulin Island, was placed on the south side, nearshore area of the delineated contaminated area; ultimately making up 33% of the total cap. Since energy was higher in the nearshore areas, it was anticipated that the course sand would be able to withstand storm events and prevailing currents. The medium-grade sand was sourced from a local quarry and was used over the remainder of the cap footprint.

A long-term monitoring (LTM) plan was developed by AECOM (2011) to assess the success of the cap over a twenty-year time frame. The first full assessment – presented in this report – was completed five years post-cap construction. Initially, the intention of the LTM was to follow the methodology used to collect samples in the pre-cap baselines studies conducted in 2009 and 2011 by AECOM and ECCC, respectively (ECCC unpublished data). However, the sand used to cap was more coarse than the initial design specification, and therefore collecting and analyzing samples from the cap could not be completed using the pre-cap survey methodologies. In addition, there were concerns over the ability to penetrate the coarse cap, particularly due to the high limestone content in the Manitoulin Island sourced material (J. Biberhofer *per comm*. 2013). These challenges were addressed by introducing secondary sampling strategies, such as the use of passive samplers to measure Hg levels in porewater, a benthic airlift to collect benthos, and divers to collect surficial sediment.

2. SURVEY GOALS AND OBJECTIVES

The LTM program outlined three main goals: performance monitoring, remedial goal monitoring, and assessment of ecological recovery (AECOM 2011). Table 1 outlines the LTM goals and objectives, with the associated primary and secondary monitoring components. The primary monitoring components are those that were reflected in the original LTM plan (AECOM 2011). Secondary monitoring components were elements added to this LTM survey to address the challenges with monitoring the more course sand cap; these secondary components may not necessarily be repeated in future LTM surveys. The question that each goal and objective was intended to address were also included in Table 1.

The purpose of this report is to communicate the results of the LTM program as they relate to the work completed by the Ministry of the Environment, Conservation, and Parks (MECP): surficial sediment assessment and benthic invertebrate recolonization. Findings from additional survey monitoring components were reported by others, including: fish contaminant levels (Drouillard 2019), submerged aquatic vegetation, and cap movement measurements and observations (Foster and Ratcliff 2018); passive samplers for sediment pore water analysis (Rao *et al*. 2018); and high resolution multibeam sonar, and RoxAnn seabed classification and underwater video documentation (TBD). To some extent the pore water passive sampling survey will be described and discussed here as it was integrated into the MECP's surveys and was largely considered in survey design and methodology. Additionally, the risk of fish contaminant levels to avian and mammalian receptors was assessed in this report.

3. METHODOLOGY

This LTM survey – to assess the Jellicoe Cove thin-layer cap – was split into two sampling efforts to accommodate the time the passive samplers needed to be deployed in/on the sediment, and then retrieved once they reached equilibrium. The first sampling effort, herein known as the deployment survey, corresponded to the deployment of the passive samplers on July 12 – 14, 2017. The second sampling effort, herein known as the retrieval survey, was completed August 10 – 13, 2017 and corresponded with the retrieval of the passive samplers.

The methodology will be presented according to the matrix investigated during the surveys.

3.1. Station Locations

Information on the sampling stations and the samples collected at each station is shown in Table 2. A 100 m x 100 m grid over the cap footprint, as depicted in Figure 2, was used as the basis of selecting station locations. The grid captured a gradient of water depth and total Hg concentrations in native sediment, while capturing adequate spatial coverage of the cap. As a starting point, a sampling station was placed in the centre of each square on the grid. Where historical sampling stations were within 50 m of the sampling station placed in the centre of the grid, the historical station location was selected as a surrogate so that pre-cap/historical comparisons could be made. Ultimately, sampling locations were selected and distributed on the cap according to substrate types (course or medium-grade sand) and water depth (<5m, 5-12 m, and >12 m).

Eighteen (18) stations were identified in total for this survey; twelve (12) on the medium sand cap, four (4) on the course sand cap, and two (2) reference stations located off the cap (Table 2, Figure 3). Reference stations were selected mainly for the passive sampling pore water assessment and were selected primarily based on lower total Hg concentrations and approximate water depth. Consideration was also given to physical characteristics of the sediment (i.e., attempting to match native capped sediment characteristics with reference sediment characteristics); however, this proved to be difficult.

3.2. Passive Samplers

Texas Tech University (TTU) was engaged to advise on the use of passive samplers on the cap to assess pore water Hg concentrations, assist with construction, deployment, and retrieval of the samplers, analyze the collected samples, and provide interpretation of analytical results. A full report of the passive sampler survey was provided by Rao *et al*. (2018), and a brief overview is provided in this report.

Passive samplers were used to determine the migration of total Hg from the underlying contaminated sediment through the thin-layer cap. Two types of passive samplers were used: vertical diffusion samplers (peepers) (Figure 4), and horizontal surface flux chambers (Figure 5). For the vertical peeper, the ECCC Machine Shop fabricated a unique stainless steel casing so that the peeper could withstand the force required to insert it into the sand cap. Environment and Climate Change, in consultation with TTU designed the horizontal flux chambers, and the ECCC Machine Shop fabricated them. Details of design of both the vertical peepers and the horizontal flux chambers are provided in Rao *et al*. (2018).

Every station had at least one (1) passive sampler deployed. Vertical peepers were placed in the medium sand cap at twelve (12) sites, one (1) in the course sand cap, and one (1) at each of the two (2) reference stations. The horizontal surface flux chambers were designed to accommodate the coarse sand area of the cap and were placed at four (4) sites. The horizontal surface flux chambers were also co-located at three (3) vertical peeper sites, as well as one (1) of the reference locations (Table 2).

The passive samplers were assembled on-shore, transported out to the divers, and deployed within one hour of assembly. The vertical peepers were inserted in the cap, ensuring that one chamber penetrated the native sediment, and one chamber was above the surface water-sediment (cap) interface (Figure 4). The horizontal flux chamber was placed directly over the surface sediment (Figure 5). The passive samplers were deployed for 28 days.

3.3. Surficial Sediment

Surficial sediment was collected during both the passive sampler deployment and retrieval surveys to assess the effectiveness of the cap to meet the remedial goal of an area average of < 3 μg/g total Hg. The surficial sediment that overlaid the medium and coarse sand cap was the target substrate. Given the low quantities of the surficial sediment (generally 1 mm to 3 cm thick), the number of sediment sample replicates varied between stations. For each parameter measured, one to three replicates were collected at select stations. Surficial sediment was not collected from all stations.

Due to the challenges associated with the cap grain size and the limited amount of surficial sediment overlying the cap, sediment was collected by ECCC divers by use of a stainless steel spatula or wafting the fine surficial sediment into the sampling jar. Each replicate for each specified parameter(s) was collected in a separate jar. The parameter allocation was as such:

- PET jar: particle size, total organic carbon (TOC), metals, Hg, total nitrogen (TN);
- 5P jar: PCBs; and
- 250 ml polyethylene jar: MeHg (and subsequently Hg and TOC)

At stations 9 and 17, where it was not possible to collect the minimal mass of sediment required for analysis for multiple replicates, substrate from replicate jars were combined and homogenized to create a single sample.

Sampling jars were brought to the surface by the divers and placed upright until the overlying water was clear of suspended particulates and could be decanted. All sampling jars were kept cool, in a dark location, until submitted for chemical analysis. Sediment that was collected for MeHg analysis was frozen.

3.4. Sediment Cores

The purpose of the sediment core collection was twofold: (1) to determine the thickness of the cap prior to the vertical peeper deployment; and (2) to measure Hg concentrations in different horizons within the cap and native sediment. During the deployment survey, sediment cores were collected from ten (10) selected stations, which included one (1) reference station, one (1) coarse sand cap station, and eight (8) medium sand cap stations.

Sediment cores were collected using cellulose acetate butyrate core tubes (1 m long, with a 10 cm internal diameter). The tubes were hand pushed into the top layer of the cap and driven through the remainder of the cap and into the native sediment with a 3 lb sledge hammer by the divers. Once collected, the core tubes were put on ice until they could be processed. On shore, water was decanted from the core tubes, and the tubes were split with a circular saw. Several sediment samples were collected from the core for analysis, including: top surficial sediment overlying the cap; top portion of the sand cap (approximate top 3 cm); bottom portion of the sand cap (approximate the bottom 3 cm); and top 3 cm of native sediment, as well as other definitive horizons in the native sediment (Rao *et al*. 2018) (Figure 6). Samples were collected from the centre of the core to limit the effect of smearing and handling. Each sample was placed in a separate 40 ml autosampling vial and stored in a dark cool location.

3.5. Benthic Invertebrates

Benthic invertebrates were collected using a benthic airlift provided by ECCC. The benthic airlift was a 1.1 m long aluminum tube with a 37.5 mm inside diameter. The air used to ‘vacuum’ up the samples was supplied by an eighty cubic foot dive tank regulated to airflow rates of 120-130 psi. Airflow rate, which was controlled by the diver operated ball valve, dictated suction/water flow rates for sample collection. Once an acceptable airflow rate was established on the first station, all subsequent stations were set to the same flowrate. A 243 µm mesh drawstring closure bag on the airlift allowed the air and water to pass through, while retaining benthic invertebrates ≥ 243 µm for enumeration.

The divers collected benthos samples from an area defined by a 50 cm x 50 cm (0.25 m^2 area) quadrat at eight selected stations (Table 2). Sampling locations at each site were randomly selected within a specified target area (described in section 3.7). Triplicate replicate samples were collected within 5 m of each other and no less than 1 m apart.

Once sieved, each sample was placed in 500 ml polyethylene jar and preserved with 10% formalin buffered with sodium borate until they were identified and enumerated.

3.6. Fish Tissue Contaminants

Longnose Suckers, Lake Trout, and Lake Whitefish were collected from the Peninsula Harbour AOC by the Ministry of Natural Resources and Forestry, Upper Great Lakes Management Unit as part of the fish community index program. The species type, weight, length, and sex of each fish was recorded prior to obtaining boneless skinless dorsal tissue. The fillets were processed and stored according to the methods outlined in the MECP's protocol for collecting sport fish samples (MOE 2014).

Young-of-the-year (YOY) Round Whitefish were collected from the boat launch in Jellicoe Cove by MECP-Biomonitoring Unit field staff in the fall of 2017. Fish were captured by seine nets, measured for weight and length, and frozen on dry ice in the field. Each sample (four in total) was a composite of whole-bodied fish equalling to a combined weight of approximately 10g (requirement for routine monitoring) (MECP, unpublished methods).

3.7. Other Sampling Components

3.7.1. Imaging

Environment and Climate Change Canada conducted a high resolution multibeam sonar, and RoxAnn seabed classification; both of which were supported by an underwater video. The data generated from these initiatives will be reported separately.

3.7.2. Cap Movement and Submergent Aquatic Vegetation

A cap movement and submergent aquatic vegetation survey was conducted and reported on by an external consultant, Northern Bioscience (Foster and Ratcliff 2018).

3.8. Order of Operation

The divers were instructed to collect the various samples according to spacing depicted in Figure 7. The final coordinates for the station were defined by the placement of the passive sampler during deployment.

Prior to deploying the passive samplers, the top sediment layer was collected within a 5 m radius from the centre point, defined by the location of the passive sampler. Next, at approximately 5 to 10 m from the passive sampler centre point, a sediment core was collected and used to determine depth of the cap to inform and guide the placement of the vertical peeper, and to provide sediment samples for TTU. Following the collection of the sediment and cores, the passive samplers were deployed at the centre point location. If the station had both a horizontal surface flux chamber and a peeper, the flux chamber was placed approximately 50 cm from the vertical peeper. The main objective of this collection and deployment strategy was to minimize disturbance of both samplers.

Upon retrieval, the passive samplers were removed, ensuring that the area outside the 5 m radius passive sampler footprint was not disturbed. Within the area of target substrate, but away from previously disturbed core site, a footprint of 5 m x 5 m was established to air lift the benthos. Benthic invertebrate samples were collected according to the methodology described in section 3.5. Outside of all the disturbed areas, but not to exceed a 20 m x 20 m footprint, surficial sediment was collected.

3.9. Laboratory Analysis

3.9.1. Surficial Sediment

Surficial sediment samples were analysed according to established methods by the Ontario MECP's Laboratory Services Branch (LSB), Etobicoke, ON. Sediment samples were analysed for: metals by method E3470 (including Al, Sb, As, Ba, Be, B, Ca, Cd, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, P, Se, Ag, Na, Sr, S, Tl, Sn, Ti, V, and Zn); particle size by method E3328A; total organic carbon (TOC) by method CARB3529; total nitrogen (TN) by method TN3529, polychlorinated biphenyls (PCBs) by method E3487; and total mercury (Hg) by method E3059A.

Value qualifier factors (VQF) were assigned to the sediment data provided by MECP-LSB (and shown in the raw data appendices). The qualifier 'W' is the standard deviation of replicate measurements of low-level spiked blank matrix samples, rounded down to the nearest 1, 2, or 5. This value indicates the baseline response of the instrument and the smallest amount of the analyte that can be measured by the procedure. A qualifier of '≤W' is interpreted as no measurable response. The qualifier 'T' is a factor of 'W'; the factor is dependent upon the parameter measured. Results quantified by '<T' indicate that the analyte was confirmed, but it was at a trace concentration and should be reported with caution. The qualifier '< MDL' indicates that the value was less than the method of detection. The MDL is commonly defined as the minimal concentration of the analyte that can be measured and reported with 99% confidence that the concentration is greater than zero (USEPA 1997). The method detection limit is calculated using the same standard deviation calculated for 'W', but is not rounded and is multiplied by 3. Results of <MDL were analysed as non-detects (ND) = 1, meaning that where the analyte was flagged as <MDL, the MDL value was used as concentration of that analyte for a given sample.

Surficial sediment samples that were collected for MeHg anlaysis were analysed by the University of Western Biotron Laboratory, London, ON. The following, provided by Biotron Laboratory, describes the method used: '*Wet sediment samples weighed, freeze-dried and reweighted for water content determination. Freeze-dried subsamples were microwave digested using a state-of-the-science Milestone® Ethos UP system. Digestate were transferred to a closed vessel, ethylated, purged with ultrapure nitrogen, trapped on Tenax® TA, thermally desorbed, speciated by gas chromatography, and detected by atomic fluorescence. All sample analyses were accompanied by method blanks, digestion duplicates, certified reference materials (CRM), spiked reagent blank, matrix spikes and spike duplicates for 10% of all analyzed samples. The analytical equipment was calibrated using traceable methyl-mercury standards. Calibrations were all validated against secondary standards, as well as CRM*.'

The remainder of the sediment from the polyethylene jar that was analyzed for MeHg was sent to MECP-LSB and was analyzed for total Hg and TOC.

3.9.2. Porewater and Sediment Cores

Porewater collected from the passive samplers and sediment collected from the sediment cores were analysed by TTU. The porewater samples were analysed for total Hg, as well as anions which were used to aid in interpretation. Core sediment was also analysed by TTU for total Hg. Methods are described in Rao *et al*. (2018).

3.9.3. Benthic Invertebrates

The benthic invertebrates collected from select stations were identified and enumerated by Craig Logan Consulting in Guelph, ON. Mr. Logan is NABS certified and has over thirty year of experience in taxonomy.

3.9.4. Fish Tissue Contaminants

MECP-Biomonitoring Unit processed and prepared the fish, as necessary, for analysis. Tissue was analysed according to established methods by Ontario MECP-LSB, Etobicoke, ON.

3.10. Statistical Analysis and Data Interpretation

3.10.1. Surficial Sediment

The median and range concentrations were derived for each parameter where replicates were taken. Median and range concentrations for each station were calculated for each deployment and retrieval survey, and by combining all data. Discussion of results was mainly based on the combination of all survey results, unless otherwise specified. The within-station variability in the sediment samples collected during both surveys was calculated and expressed as a coefficient of variation (CV). In the case of total PCBs, variability among replicates and surveys was considered too great to provide medians (or means) and therefore data was presented as a range.

Total Hg results were a combination of data derived from both the metals PET jar and the MeHg polyethylene jar. Any comparisons made between MeHg and Hg was conducted using data derived from the sediment collected in the MeHg polyethylene jar only.

The concentrations of certain parameters can be strongly correlated to particle size or organic content. Therefore, sediment data were assessed as measured in the environment (bulk sediment chemistry), and, where possible, normalized to particle size or total organic carbon. The purpose of the normalization was to diminish the influence of the depositional environment, where particle size may be smaller or organic content higher. Aluminum is an element that is believed to not be locally enriched and the ratio of other metals to aluminum should remain constant across a gradient of particle sizes, unless there is enrichment of the other metal (Forstner 1990). As such, metal data were adjusted to corresponding aluminum concentrations and examined. Organic contaminant data were normalized to the TOC concentration for each station.

Bulk and normalized sediment chemistry data were assessed and compared using a Kruskal-Wallis one-way ANOVA on ranks, followed by a Dunn's test for multiple pairwise comparisons. Data often failed the normality test, but when a parametric test was suitable, a one-way ANOVA followed by a Tukey test for multiple pairwise comparisons was used. A linear regression was used to assess the relationship between two variables. Where normality test failed, variables were log-transformed. All tests were performed with $\alpha = 0.05$, using SigmaPlot 12 (Systat Software Inc.).

3.10.1.1. Spatially-Weighted Average Concentrations

Spatially-weight average concentrations (SWACs) were calculated for Hg, MeHg, PCBs, and TOC using an inverse distance weighting (IDW) interpolation technique. The IDW tool in ArcGIS was used with the power parameter set to p=2 (ESRI 2011).

The SWACs for Hg, MeHg, and TOC were calculated using the minimum concentration detected at each station, the maximum concentration detected at each station, and the median concentration of all replicates at a given station. For PCBs, only the minimum and maximum value SWACs were calculated. Data from both surveys were combined when calculating the minimum, maximum, and median concentrations

Single samples were collected from each station in the pre-cap baseline surveys in 2009 and 2011, and therefore SWACs were derived from single values from stations that were located on the cap footprint.

3.10.1.2. Data Comparison

Where applicable, sediment data were compared to the Provincial Sediment Quality Guidelines (PSQG) Lowest Effect Level (LEL) and Severe Effect Level (SEL) criteria (Fletcher *et al*. 2008). The PSQG-LEL indicates the level of contamination that can be tolerated by the majority of benthic organisms. The PSQG-SEL is the level of contamination at which a pronounced disturbance of the sediment-dwelling community is expected.

Concentrations of Hg, MeHg, and PCBs were compared to the risk-based and/or remedial goals outlined in the Peninsula Harbour ERA (ENVIRON 2008a).

Post-cap comparisons were made to baseline surveys conducted in 2009 (ECCC unpublished – survey conducted by AECOM) and 2011 (ECCC unpublished). Additionally, where appropriate and possible, historical surveys conducted in 2000 (Milani and Grapentine 2005) and 2002 (Grapentine *et al*. 2005) were used for historical comparisons.

Comparisons were made to sediment data collected in 2011 from an index station and reference station that were established as part of MECP's Great Lakes Nearshore Index Station Network. The reference station for Peninsula Harbour, station 289 Beatty Cove located in the northern portion of the Harbour, approximately 3 km from Jellicoe Cove. This reference location is not considered to be impacted; however, it was accepted that diffuse influences of past operations at the Marathon pulp mill may be detected. Index station 1346, McKellar Harbour, is located approximately 25 km west of Jellicoe Cove, and for the purposes of this comparison is considered unimpacted.

3.10.2. Benthic Invertebrates

Density and percent dominant taxa results were presented according to Class: Insecta, Oligochaeta, Gastropoda, Malacostraca, Bivalvia, Arachnida, and other (Hirudinea, Trepaxonemata, and Hydrozoa). Oligochaeta included immature Tubificinae (with and without hairs). Brachiopoda, Copepoda, Ostracoda, and Nematoda were identified and counted, but were not included in the analysis.

Indices were calculated using Paleontological Statistics (PAST) Version 3.20 software (Hammer *et al*. 2018). Benthos were identified down to genus and species, and therefore the diversity indices were based on this level of detail. To avoid the immature Tubificinae appearing to be a separate taxon, the immatures were added to counts for *Limnodrilus hoffmeisteri*, as this was the only genus identified at the site that belonged to the sub-family Tubificinae. Shannon-Weiner Diversity Index (a measure of the number of species present and the number of individuals per species), Margalef's Richness Index (measure of biodiversity; the number of species or taxa in a given area), and Equitablity (measure of evenness; which individuals are divided among the taxa present) were the taxon indices used to describe the data.

Pre-cap comparisons were made to baseline survey conducted in 2009 (ECCC unpublished – survey conducted by AECOM). Taxa were assessed as described previously, with the "other" taxa category consisting only of Hirudinea counts. In addition, diversity indices were based on family, as this was a level of detail that satisfied both the 2009 and 2017 dataset.

3.10.3. Fish Tissue Contaminants

The University of Windsor was contracted by ECCC to analyze the fish tissue contaminant data and report findings (Drouillard 2019). The scope of Drouillard's report included the assessment of trends over time and the risk of eating fish caught in Peninsula Harbour to humans; it did not address the risk to the exposed fish wildlife in the Harbour. As such, an assessment was included in this report to determine if the fish captured post-cap were at risk from Hg and PCB exposure. In addition, wildlife exposed Peninsula Harbour fish were assessed to determine if bald eagles and mink continued to be at risk from Hg and PCBs, respectively. For ease of comparison to pre-cap results, methods and input variables used in the pre-cap ERA (ENVIRON 2008a) were used to determine the potential risk for the exposed receptors post-cap. It is noted that was assumed that Hg in tissue was in the form of MeHg.

To estimate the potential for risk, hazard quotients (HQ) were calculated by comparing estimated exposure levels to effect levels, which in this case were toxicity reference values (TRV), for whole-bodied fish.

HQ = [contaminant in whole-bodied fish] / TRV

Fillet contaminant concentrations in adult sport fish were converted to whole-body tissue concentrations using one of the following equations (depending on the contaminant):

- For Hg, a linear regression model provided by Peterson *et al*. (2005) was used:
    - $\log_{10}$[whole-body Hg] = -0.2712 + $\log_{10}$[fillet tissue Hg]
    - specific y-intercepts were provided for different species. The y-intercept of -0.3203 was provided for White Sucker, and therefore was used in the conversion equations for Longnose Sucker in this survey.

- For PCBs, conversion factors provided by Amrhein *et al*. (1999) were used:
    - [whole-body total PCB] = [fillet total PCB] x conversion factor
    - conversion factors:
        - Rainbow Trout = 1.47
        - Coho Salmon = 1.7
    - as per the method used in the ERA (ENVIRON 2008a), a conversion factor of 1.47 was used for Lake Trout, and an average of salmon and trout conversion factors (1.59) for Lake Whitefish and Longnose Suckers.

Young-of-year Round Whitefish were analysed as whole-bodied composites.

3.10.3.1 Fish

To assess the potential risk to fish, the mean and 95th percentile for the whole-body contaminant concentrations, and the mean and 95% upper confidence limit HQs were calculated. To avoid skewed results, the large Lake Trout (90.3 cm; the remaining fish had a mean length of 56.4 cm) was excluded. Generally, a HQ > 1 indicates that estimated exposures exceeds effect levels, while a HQ < 1 indicates the exposures are less than effect levels. As described by ENVIRON's ERA (ENVIRON 2008a), the mean HQ is a central tendency estimate and therefore a mean HQ > 1 suggests that adverse effects in that fish species may propagate to population-level effects. The

95^{th} percentile HQ is used to predict risks to individuals, as it is based on the most highly exposed fish.

3.10.3.2 Wildlife

To calculate the HQs for mammalian and avian piscivorous receptors, dietary intakes (DI) were calculated for use as the effect parameter (HQ = DI / TRV). The DI variable was based on whole-bodied fish at a length that would be consumed by the receptor of interest. The fish collected in 2017 had lengths ranging from 46 – 90 cm for Lake Trout, 34 – 55 cm for Lake Whitefish, and 31 – 49 cm for Longnose Suckers. As such, whole-bodied fish concentrations (as calculated above) were size-normalized to the median length of fish the avian or mammalian receptor would consume. Young-of-year Round Whitefish were not size-normalized, as they were less than the target lengths for each receptor. The ERA (ENVIRON 2008a) provided exponential power regressions for both PCB and Hg to model the relationship between fish length and whole-bodied fish concentration for each fish species. The regression equations were used to predict the concentration of Hg and PCB in whole-bodied fish at 15 cm (for mink assessment) and 30 cm (for bald eagle assessment) in length. The average and 95% upper confidence limit of the predicted concentrations for each target length were used to calculate the DIs, and subsequently the HQs.

4. RESULTS

4.1. Surficial Sediment

4.1.1. Characteristics

A fine layer of surficial sediment overlaying the sediment cap was observed both by the divers, and in the cores that were collected for TTU. The divers described this layer of surficial sediment to have a depth that ranged from 1 mm to 3 cm, and at some stations the surficial sediment appeared to have a wavy-like pattern, with the formation of troughs.

As expected, the particle size of the surficial sediment overlying the cap was sandy; the majority of stations were >54% sand in the 62-2000 µm range (Table 3). With the exception of stations 15 and 16 (which had CVs of 43% and 45%, respectively), the variability both within and between surveys for particle size (% sand) was <20%. A one-way ANOVA indicated that there were statistical ($p<0.001$) differences between stations for particle size; however, the variability in replicates at stations 15 and 16 did not allow for a post-hoc test to indicate the differences. By removing stations 15 and 16 from the statistical test (which had the lowest median % sand on the cap), statistically significant ($p<0.05$) differences were noted between the stations with the most sand content in the sediment (23, 17, 14, and 9) from stations 10 and 12, with the least amount of sand.

4.1.2. Nutrients

4.1.2.1. Total Organic Carbon

The median SWAC for TOC in the surficial sediment on the cap was 21.2 mg/g (min: 14.7 mg/g, max: 26.2 mg/g), which exceeded the PSQG-LEL (10 mg/g) (Table 4, Figure 8). Individually, the only stations that did not exceed the PSQG-LEL were stations 17 and 23 in the northwest area of the cap. The highest median concentrations, ranging from 31 mg/g to 45 mg/g, were measured at the course sand cap stations 19, 16, and 21. Statistically the TOC concentration at the coarse cap stations differed ($p<0.05$) from the remainder of the medium cap stations, which had median TOC concentrations ranging from 5.7 mg/g to 28 mg/g. Comparatively, the index station in McKellar Harbour and the reference station in Beatty Cove – which had mostly silty sediment – had median TOC concentrations in 2011 of 21 mg/g and 20 mg/g, respectively.

There was no relationship between TOC and particle size (% sand) ($r^2 = 0.03$, $p = 0.275$, power = 0.19) on the cap; log-transforming the data did not strengthen the relationship.

4.1.2.2. Total Phosphorus

The median TP concentrations in the surficial sediment on the cap ranged from 270 µg/g to 665 µg/g (Table 4). The highest and lowest median concentrations detected were at the reference station 25 and the coarse cap stations (19, 16, 21), respectively. As a point of comparison, the TP concentrations at the more silty index station in McKellar Harbour and the reference station in Beatty Cove were 800 µg/g and 700 µg/g, respectively. Concentrations of TP were evenly distributed across the remainder of the cap ($p<0.05$), with only slight elevations above the PSQG-LEL (600 µg/g) at cap stations 9, 20, 12, 10, and 23. There was little variability between measurements taken at each station during the two surveys (CV <24%).

4.1.2.3. Total Nitrogen

The median TN concentrations in the surficial sediment on the cap ranged from 0.10 mg/g to 1.31 mg/g (based on one replicate) (Table 4). Comparatively, the TN concentrations measured at the index station in McKellar Harbour and the reference station in Beatty Cove were 1.1 mg/g and 0.9 mg/g, respectively. When the TN cap data from the two surveys were combined, the CVs ranged from 55 – 153%, which was due to significant ($p<0.001$) differences observed in concentrations measured between the deployment and retrieval surveys. Generally, samples collected during the deployment survey had higher TN concentrations (ranging from 0.93 to 1.63 mg/g) than samples collected during the retrieval survey (ranging from 0.05 to 0.46 mg/g). With the exception of station 19, the median concentrations of TN in surficial sediment collected from all the cap stations during the deployment survey exceeded the PSQG-LEL (0.55 mg/g). In the retrieval survey, station 10 was the only station with a median concentration that exceeded the PSQG-LEL. Due to the differences observed between the surveys, data was assessed as separate surveys, with results showing no significant ($p<0.05$) differences in concentrations across the cap.

4.1.2.4. Historical Comparisons

Prior to conducting historical comparisons, regression analyses were conducted to establish if a relationship existed between TP and TN with TOC, and whether the TP and TN cap data could be TOC-normalized. There was a significant negative ($r^2 = 0.59$, $p<0.001$, power = 1.0) relationship between TOC and TP when all the 2017 cap data was considered. Given this unusual relationship, the TOC-normalized TP data was not assessed. There did not appear to be a relationship ($r^2 = 0.037$, $p = 0.194$, power = 0.25) between TN and TOC concentrations in the surficial sediment on the cap; TN-normalized data was also not assessed.

The SWAC determined for the pre-cap baseline 2009 and 2011 measurements for TOC over the cap footprint was 27.1 mg/g and 30.2 mg/g, respectively (Figure 9). These pre-cap values were comparable to the 2017 maximum SWAC (26.2 mg/g). Given the results of the 2017 study, and the differences noted between the coarse and medium sand cap areas, the current and historic data were separated into two groups: one that reflected that area over the coarse sand cap, and one which encompassed the remainder of the cap over the medium sand. Over the coarse sand cap footprint there was no change in TOC concentrations over time. However, poor replication, as well as variability in the historic data, resulted in a statistical test with low power (0.35), and this conclusion is cautioned. For the remainder of the cap, the TOC concentrations observed in 2017 were significantly ($p>0.05$) lower than measured in all of the historic surveys.

Similar to TOC, the current and historical TP data was separated into two groups: coarse sand cap stations and medium sand cap stations. Over the coarse cap footprint, concentrations of TP significantly ($p<0.05$) declined since the 2002 survey (no significant difference from the TP concentrations measured in 2000). Contrary to the coarse cap, the stations over the medium cap displayed no significant ($p<0.05$) difference since the 2002 survey.

Historical comparison for TN could only be made to the 2000 (Milani and Grapentine 2005) and 2002 (Grapentine 2005) datasets, as TN was not analysed in the 2009 and 2011 pre-cap baseline surveys (TKN was measured). Given the variability observed in the post-cap data, historical comparisons were made based on the deployment and retrieval surveys individually. The concentrations of TN observed during the deployment survey was not significantly ($p<0.05$) different from the historical surveys, while concentrations measured in the retrieval survey were significantly ($p<0.05$) less.

4.1.3. Metals

4.1.3.1. Trace Metals

Concentrations of select trace metals in the surficial sediment overlying the cap are presented in

Table **5**. The variability (CV) between the replicates was reasonable, ranging from 22 to 47%. Metal concentrations in the surficial sediment on the cap were compared to concentrations measured in 2011 at reference station in Beatty Cove and the index station in McKellar harbour. Again, it is recognized that the surficial sediment at the reference and index stations had a higher percentage of silt and clay; however, based on bulk chemistry alone, the concentrations of metals observed on the cap were generally similar or less (with a few exceptions) than measurements taken at the index and reference stations. The lowest concentrations of metals were detected over the coarse cap stations 19 and 21, and highest concentrations mainly in the northern section of the cap at station 12, 11, 20, 10, as well as stations 23 and 15 in the northwest cap area (Table 5). There were exceptions to this generalization, specifically with As, Sb, B, Mo, Se, Sn, Sr, and Tl. However, other than B and Sr, the concentrations of these metals were less than the method detection limit at the stations on the medium cap, and only slightly above on the coarse cap, so there is a hesitation to draw any conclusions on their distribution pattern. It should be noted that the levels of Sn in the retrieval and deployment surveys at many stations were significantly different, and this metal should be re-assessed in the next LTM survey.

Based on the index and reference data, the sediment is naturally enriched with Cu, Ni, and Cr. Elevated concentrations of Cu and Ni are explained by the Coldwell Complex (Ecometrix 2012), and Cr likely by the presence of mafic to ultramafic rocks in the Complex (M. Puumala, *per. comm*., 2019). As expected, based on the elevated naturally occurring concentrations, these metals exceeded the PSQG-LELs (Cu: 16 µg/g, Ni: 16 µg/g, Cr: 26 µg/g) at various stations on the cap (Table 5). The median concentrations of Ni and Cr exceeded their respective LELs at all stations except 16, 19, and 21 (Cr also exceeded at station 25). As described previously, generally the lowest concentrations were measured at the coarse stations 19 and 21, and the highest at stations located in the north and northwest portion of the cap (Figure 10).

For sake of completion, metals from the surficial sediment over the cap were compared to pre-cap measurements. Prior to historical comparisons, metals were normalized to Al, as there was no correlation between particle size and Al over the cap. As discussed previously, this finding was likely an indication of the mixing of the surficial sediment and sand from the cap. In general, most of the metals correlated well with Al (except B and Cu).

An assessment of the bulk metals data from the cap surficial sediment against the pre-cap baseline bulk data indicated that concentrations of metals in the surficial sediment increased after the placement of the cap. However, normalizing the current and historical data to Al, indicated that metal concentrations were actually less than the pre-cap survey measurements. Exceptions to this trend were: Mn, which had concentrations post-cap that were significantly ($p<0.05$) greater than pre-cap measurements; Cu, which had concentrations that did not changed; and Ti, which had concentrations that were similar to concentrations measured in 2011. The assessment of bulk data at individual stations showed that metals decreased at the coarse sand stations 16 and 19, and stayed the same or increased at the remainder of the medium sand stations; there were some exceptions (Mn and Zn), but this was the general pattern. Again, normalizing the metals and individual stations to Al showed that the concentrations of many metals had decreased post-cap, with similar exceptions as the whole cap for Mn, Sr, and Ti. Metals (Sb, As, Cd, Mo, Ag, and Sn) that were detected at less than the method detection limit, or had an elevated detection limit (on account of another parameter at a higher concentration), in both the pre-cap surveys and the current survey were not assessed further.

4.1.3.2. Specific Ions

The anions and cations Ca, Mg, K, Na, and S were measured on the cap as part of the metals scan (Table 6). Elevated concentrations of Ca and Mg on the coarse sand stations 16, 19, and 21 can likely be attributed to the coarse sand which was sourced from Manitoulin Island and primarily consists of limestone and marbles, in which Ca and Mg carbonates are naturally elevated (R. Purdon, *per comm*. 2019). The material for the medium sand cap was sourced locally, and therefore concentrations of Mg and Ca were consistent to what was measured at the reference and index stations. Levels of S were also higher at the coarse sand cap stations and north-central stations 12 and 10, although concentrations were not as high as concentrations observed in sediment adjacent to other kraft mills (MECP unpublished data). Generally, the distribution of S over the majority of the cap could be considered even, as the coarse cap and north-central stations were only significantly ($p<0.05$) different from station 17. Bulk concentrations of K were highest at stations 12, 20, 15, and 23; however, when normalized to Al, the coarse cap stations were shown to be enriched compared to the remainder of the cap. Reasons for this observation are unknown. Generally bulk concentrations of Na followed a trend similar to K, but due to a weak relationship with particle size and Al, normalized data was not assessed.

Given that the level of these specific ions seemed to be attributed mainly to the source of the sand material, historical comparisons were not completed.

4.1.3.3. Total Mercury

The median concentrations of total Hg in the cap surficial sediment ranged from 0.07 µg/g to 1.10 µg/g, with a median SWAC of 0.37 µg/g (min: 0.23 µg/g, max: 0.61 µg/g) (Table 7, Figure 11). The CV for this data ranged from 27 to 53%, which was reasonable given that the data was derived from the two surveys, and two separate jars for each survey (one jar collected for metals scan and another for MeHg analysis). The median Hg concentration of the surficial sediment at the cap reference station 25 was 0.53 µg/g (range 0.21 µg/g), which was higher than the concentration of Hg at all stations except 16 and 19.

The distribution of total Hg over the cap is depicted in the Figure 12. The greatest median (range) concentrations of Hg were observed over the coarse cap stations 16 (1.10 µg/g, range 1.05 µg/g) and 19 (1.00 µg/g, range 1.36 µg/g). A statistical comparison showed Hg concentrations at stations 16 and 19 to be significantly ($p<0.05$) higher than Hg concentrations detected in the northwest corner of the cap (stations 23, 17, and 14). A regression analysis indicated that log-TOC explained 61% of the variance in log-Hg concentrations ($p<0.001$, power = 1.0). As such, Hg concentrations were TOC-normalized and assessed, showing no significant ($p<0.05$) difference between stations on the cap.

Considering the cap as a whole, the median SWAC (0.37 µg/g) was approximately eight times less than the remedial target concentration (3 µg/g) (Figure 12). As a point of comparison, the cap median SWAC was the same as median concentration measured at the index station in Beatty Cove in 2011. At the reference station in McKellar Harbour, outside of Peninsula Harbour AOC, the median concentration measured was 0.04 µg/g. The PSQG-LEL (0.2 µg/g) was exceeded at all individual stations, except the northwest stations 15, 23, 14, 17, and 21.

A comparison of the 2017 dataset to the pre-cap data sets (both bulk and TOC-normalized concentrations) indicated that Hg concentrations in the surficial sediment on the cap were significantly less (p<0.05) than the concentrations measured in each historic survey (Figure 13). The SWACs calculated for the 2009 and 2011 pre-cap baseline dataset were 7.69 µg/g and 6.37 µg/g, respectively (Figure 14). Given the relatively elevated concentrations of Hg detected at stations 16 and 19 in 2017, these two stations (data combined) were compared to the pre-cap baseline data (2009 and 2011) for stations over the coarse cap footprint. The comparison indicated Hg concentrations in surficial sediment over the coarse cap footprint were significantly (p<0.05) less than in the sediment collected pre-cap over the same general area.

4.1.3.4. Methyl-Mercury

The median surficial sediment concentrations of MeHg on the cap ranged from 0.42 ng/g to 12.14 ng/g (single replicate), with a median SWAC of 3.02 ng/g (min: 2.54 ng/g, max: 4.61 ng/g) (Table 8, Figure 15). The MeHg concentration detected in the surficial sediment at the cap reference station 25 was 1.33 ng/g (range 0.74 ng/g). The variability (CV) among the replicates between surveys ranged from 0.4 to 80%. Excluding the variability observed at stations 16 and 12, the CV for the remainder of the stations did not exceed 49%.

The distribution of MeHg on the cap is depicted in Figure 16. Similar to the cap Hg analysis, the highest concentrations were detected at station 16 (median 4.63 ng/g, range 14.20 ng/g) and station 19 (12.14 ng/g, single replicate). The median MeHg concentration of the surficial sediment at reference station 25 was 1.33 ng/g (range 0.74 ng/g), which was higher than the concentration of MeHg in the northwest portion of the cap. Due to the lack of replication of samples at several stations, the MeHg data was assessed according to groups based on a combination of observed concentrations and location on the cap: <1 ng/g (stations 17 and 23 in the northwest area of the cap); 1.1-1.9 ng/g (stations 21, 14, and 20, located mid-cap); and >2 ng/g (stations 16, 19, 11, 12, and 10, located in the southeast area of the cap). A comparison of the groups using a one-way ANOVA showed the lowest concentration (<1 ng/g) group and the highest concentration (>2 ng/g) group to be significantly (p<0.05) different. Given the significant relationship between log-TOC and log-MeHg (r^2= 0.69, p<0.001, power = 1.0), TOC-normalized MeHg data was assessed according to the predetermined groups. The result of the MeHg-TOC normalized comparison was the same as the bulk data comparison – there was a significant (p<0.05) difference between the high and low concentration group.

Methyl-mercury concentrations were compared to the Peninsula Harbour ERA risk-based sediment management goal of 2.0 ng/g for the protection of fish (ENVIRON 2008a); there is no provincial sediment guideline for MeHg. Specifically, sediment at stations 10, 12, 11, 16 and 19 (located in the southeast area of the cap) had concentrations of MeHg that exceeded the goal (Table 8, Figure 15). The median SWAC of 3.02 ng/g exceeded the risk-based goal by a factor of 1.5. However, there was a decrease compared to SWACs derived from pre-cap assessments:

5.1 ng/g, as provided in the ERA and calculated using theissen polygons from data from multiple years (ENVIRON 2008a); 7.78 ng/g in 2009; and 5.11 ng/g in 2011 (Figure 17). The decrease observed post-cap in both the bulk and TOC-normalized concentrations were statistically significant ($p<0.05$), with the exception of the comparison of 2011 and 2017 TOC-normalized MeHg concentrations.

4.1.4. PCBs

The total PCB concentrations in the surficial sediment overlying the thin-layer cap in both the deployment and retrieval surveys ranged from 10 (indicating less than method detection limit (<MDL)) to 660 ng/g (Table 9). The concentration of PCBs at the cap reference station 25 was less than the detection limit. The variability in total PCB concentrations both between and within surveys for many stations on the cap was considerable; coefficient of variations for the surveys at individual sampling stations on the cap ranged from 4 to 120%. There appeared to be no relationship between log-TOC and log-PCBs ($r^2 = 0.05$, $p = 0.115$, power = 0.35), which is unusual given the high affinity of chlorinated compounds to organic matter in sediment. There was a significant, but weak, relationship between log-PCB and log-particle size ($r^2 = 0.27$, $p<0.001$, power = 0.96).

The SWAC for the cap ranged from a minimum of 53 ng/g to a maximum of 196 ng/g (Figure 19). Given the variation in the data, the median or mean were not provided, but rather the minimum and maximum SWAC values were compared to the risk-based sediment management goal (60 ng/g – protective of mink) and the PSQG-LEL (70 ng/g). The minimum SWAC value was below both the risk-based goal and guideline, while the maximum SWAC value exceeded both. Of the total number of replicate sediment samples collected during both surveys at all cap stations, 46% exceeded the PSQG-LEL and 52% exceeded the risk-based sediment management goal. The only pre-cap survey available for historical comparison of PCBs was ECCC's 2011 study, where concentrations ranged from 111 ng/g to 835 ng/g; all measurements exceeding the goal and guideline. The SWAC calculated using the 2011 cap footprint data was 372 ng/g (Figure 20), which was greater than both the max and min SWACs calculated for 2017. At the reference station in Beatty Cove, concentrations measured in three replicates collected in 2011 were 65, 86, and 100 ng/g, whereas total PCBs were not detected (<MDL) at the index station in McKellar Harbour. While many of the total PCB levels measured at the stations were similar or below the Beatty Cove reference station concentrations, the reasons for the elevated concentrations (relative to the remainder of the cap) observed in the northeast corner of the cap (stations 12, 10, 11, and 14) is unknown. However, the greatest concentrations of PCBs detected in ECCC's 2011 survey were in this same area, in particular around stations 12, 14, and 20 (there were no historical stations sampled in the area of stations 10 and 11).

Analysis of the individual PCB congeners data showed a predominantly Aroclor 1260 pattern (Figure 21). Previous investigations on and around the Marathon Pulp Mill site, as well as in Jellicoe Cove have indicated an Aroclor 1260 pattern in samples as well (MOE 2009, Hayton 2005).

4.1.5. Surficial Sediment Discussion

Overall the surficial sediment over the cap was variable in terms of concentrations of various measured parameters in sediment collected from selected stations over the cap. Levels of TOC, TP, most conventional metals and ions, total Hg, and MeHg were highest over most of, or portions of, stations sampled on the coarse cap footprint. Contrarily, the highest concentrations of TN, PCBs, and some metals and ions were measured at stations sampled along the northern portion of the cap, on the medium sand cap footprint. The lack of a significant relationship between TOC and particle size, particle size and most metals, and PCB and TOC made it difficult to assess the cap in a manner that accounted for any differences in substrate (to assess both the current study and make historical comparisons).

The main contaminants of concern (Hg, MeHg, and PCBs) were measured at levels less than observed during the pre-cap surveys. The most notable difference was the decline in Hg concentrations since the placement of the cap, with the median SWAC (0.37 µg/g) being more than thirteen times less than the pre-cap baseline SWACs, and approximately eight times less than the remedial target of < 3 µg/g. Concentrations of MeHg also decreased since cap placement, but the median SWAC (3.02 ng/g) remained above the risk-based goal for the protection of fish (2.0 ng/g).

There was a significant relationship between Hg and MeHg ($r^2 = 0.79$, $p<0.001$, power = 1.0) on the cap. Given that MeHg remains above the risk-based goal, this relationship should be analyzed further in the next study. To accomplish this, a more robust sampling effort is required – in terms of increased numbers of stations and replicates – over the cap, especially the coarse cap area where concentrations of Hg and MeHg are elevated relative to the medium cap.

There was a decrease in the concentration of PCBs following the placement of the cap, as indicated by the comparison of pre-cap and post-cap SWACs. Oddly the PCBs did not follow the depositional trend observed with TOC on the cap. Vane *et al*. (2007) observed a similar pattern in an industrialized and urbanized estuary, and attributed the lack of correlation between TOC and PCBs to other PCB inputs and/or geochemical processes. Similarly, in a study to understand the spatial and temporal distributions on TOC in the sediment, Ouyang *et al*. (2006) found that a lack of correlation between TOC and PCBs was due to the differences in source location. There was a substantial amount of variation in the PCB data, and an additional survey would need to be conducted to further understand the relationship between TOC and PCBs on the cap.

4.2. Benthic Invertebrates

In total there were 102 species from 24 families that were identified from the eight (8) stations sampled on the thin-layer cap. The highest average total density of organisms on the cap was observed at coarse cap stations 16 (4429 individuals/m^2) and 19 (1971 individuals/m^2) (Table 10, Figure 22). However, these stations had a significant amount of variability between replicates (station 16: 149% CV; station 19: 95% CV), which appeared to be the result of hitting a pocket of oligochaetes and chironomids in one replicate at both stations. The undisturbed cap reference station 25 had an average total density of 1591 individuals/m^2, while the range of total density values on the remainder of the cap was 516 – 1110 individuals/m^2 (Table 10).

Oligochaeta was the dominant taxon on the cap, ranging from 38 to 75% of the total taxa counted (Table 11, Figure 23). The class Insecta, predominantly consisting of the family Chironomidae, were also present in larger relative quantities on the cap, making up 20 to 29% of the total taxa counted on the cap. In the case of the cap, the sandy substrate may have accounted for the high proportion of Chironomidae, as this was the dominant taxa at reference station 25 (making up 53% of the total count), and the taxa is tolerant of sandy substrate. Mollusca (Bivalvia and Gastropoda), with varying degrees of tolerance, were also present on the cap in relatively higher proportions, ranging from 3 to 26%. The presence of more sensitive taxa such as Amphipoda was encouraging.

Indices were examined using the density data calculated for each genus/species identified; immature Tubicicinae were added to the counts for *Limnodrillus hoffmeisteri* for the purpose of these calculations. With only a few minor exceptions (mainly at station 23, and the coarse cap stations 16 and 19), the diversity, evenness, and species richness of the benthos across the cap and at the cap reference station 25 was fairly consistent (Table 12). The relatively lower evenness values of 0.52 and 0.64 at the coarse cap stations 16 and 19, respectively, was likely indicative of the variability observed between the replicates. Station 23 was the deepest station (18.5 m) sampled for benthos and had relatively lower TOC concentrations, which may likely be reasons for the relatively lower index values. The Shannon-Weiner Diversity Index values were high (ranging from 2.07 to 3.30 on the cap), which could be due to the presence of many taxa with low individual counts, such as observed in this study.

4.2.1. Pre-cap Baseline Comparison

Comparisons to the 2009 pre-cap baseline benthos survey (ECCC unpublished) were made based on densities calculated for families, as this was a level of detail that satisfied both the 2009 and 2017 dataset. Therefore, for the purposes of comparison, index values for the 2017 data were recalculated using densities based on the family level (discussion above was based on genus and species). It is also noted that the sampling method differed between the surveys, with samples collected by ponar in 2009 and a benthic air-lift in 2017. Drake and Elliot (1982) showed that differences in density estimates can be observed when different samplers were used. At this point, it is not possible to estimate the extent of deviation in the results because of the different samplers used in 2017 and 2009.

The density of organisms at stations on the cap footprint in 2009 was significantly (p<0.05) greater than the density observed on the cap in 2017 (Table 13). As observed with the 2017 counts, the highest average total density of organisms in 2009 was on the footprint of the coarse cap (ranging from 36 158 – 39 446 individuals/m^2). The average total density at the remainder of the 2009 stations on the cap footprint ranged from 8363 – 16 477 individuals/m^2. In total there were 24 families identified on the cap footprint in 2009, which is equal to the number of families identified on the cap in 2017. When the 2017 counts at station 19 and 16 were disregarded (for reasons explained previously), the diversity and evenness of benthos were very similar in 2017 and 2009. The measure of richness is strongly dependent on sample size and effort, and therefore the comparison of this index between the two datasets is difficult given the difference in sampling method. Generally, Oligochaeta, Insecta, and Malacostraca were the dominant taxa collected in 2009, with the percent distribution being more even than the 2017 observation.

4.3. Fish Tissue

A full report on the trend analysis of contaminant levels in Peninsula Harbour fish, as well as the potential health risk to humans consuming the fish, was provided by Drouillard (2019). The risks posed to fish dwelling in Peninsula Harbour, as well as the potential risks to mammals and birds consuming fish in the Harbour, was assessed as part of this report. There is uncertainty associated with these risk estimations, specifically for factors used to transform fillets to whole-body concentrations, literature values used for risk comparison (i.e., TRGs and TRVs), and the small sample size used to establish site-specific relationships between fish length and contaminant level. In addition, there are many factors that influence the accumulation and depuration of mercury in fish, as evidenced by within- and among-population variability in Hg concentrations in fish (Trudel and Rasmussen 2006). The risk assessment conducted here was based on a fairly simplistic approach.

4.3.1. Trend Analysis

Short-term (2012 – 2017) and long-term (1970s – 2017) temporal comparisons were conducted for Lake Whitefish and Lake Trout in Peninsula Harbour AOC. Longnose Suckers were also collected in 2017, but there was no pre-cap collection, and therefore a short-term temporal comparison could not be completed. The comparisons were conducted for each species using fish that were in the same size class. Long-term comparisons from the 1970s have consistently shown a decline in concentrations of Hg and PCBs in these fish species. However, assessing the data post-1980, to reflect operational changes at the mill, resulted in variable results that Drouillard (2019) described as '*fish species dependent and either not changing or continuing to decline for both Hg and PCBs.*'

The short-term comparisons showed a decrease in the concentrations of Hg and PCBs in both Lake Whitefish and Lake Trout. In Lake Whitefish – 50-55 cm size range – the concentrations of Hg and PCBs in the fish tissue in 2017 decreased from 2012 concentrations by 26% and 85%, respectively. In Lake Trout – 45-55 cm size range – the concentrations of Hg and PCBs in tissue decreased by 50% and 84%, respectively.

4.3.2. Human Fish Consumption

Drouillard (2019) simulated fish consumption advisories for Peninsula Harbour using the 2017 fish data. Results indicated that PCB and Hg continue to be elevated above the fish consumption advisory benchmarks. The primary contaminant of concern was PCBs, which have fairly restrictive advisories (0-2 meals/month) for most sizes of Lake Trout and Longnose Suckers for both the general and sensitive populations. Mercury restrictions (4 meals/month) were focused mainly on the sensitive populations eating Lake Trout and Longnose Suckers.

4.3.3. Risks to Fish

The pre-cap ERA (ENVIRON 2008a) indicated that Hg may have impaired reproduction to individual Lake Trout, Lake Whitefish, Walleye, and Longnose Suckers. For Longnose Suckers, the potential adverse reproductive effects were estimated to propagate to population levels. The only impairment noted with PCBs was the reproductive success of individual Longnose Suckers.

The 2017 Hg fish tissue data suggested no potential risks (HQ < 1) at the individual or population level for Lake Trout, Lake Whitefish, or YOY Round Whitefish exposed to Hg (Table 14). There was no estimated potential risk to the population of Longnose Suckers. However, risk to individual Longnose Suckers were predicted based on the 95^{th} percentile estimation of hazard; a more detailed assessment and uncertainty analysis would be required to predict the extent of potential risk given that the HQ was only 1. Compared to the pre-cap risk estimations, individual Lake Whitefish and Lake Trout were no longer deemed to be at risk from Hg exposure, as well as the adverse reproductive effects of Longnose Suckers at a population level.

Post-cap, there were no potential individual or population level risks (HQ < 1) to PCBs estimated for Lake Whitefish, Lake Trout, Longnose Suckers, and YOY Round Whitefish (Table 14).

4.3.4. Risks to Mammals and Birds

The pre-cap ERA (ENVIRON 2008a) predicted risk to the reproductive success in bald eagles exposed to Hg in fish under worst-case scenario foraging scenarios (the majority of feeding on fish from Jellicoe Cove versus the ‘rest of Peninsula Harbour’). There was no risk predicted for mammals and birds that feed predominantly in the rest of Peninsula Harbour. Piscivorous mammals exposed to PCBs in fish tissue under all exposure scenarios were predicted to be at risk in the ERA.

There were no estimated risks (HQ < 1) from Hg or PCBs to mink or eagles consuming fish collected post-cap (Table 15). This result was determined considering all fish species captured in 2017 for Hg, but did not include Longnose Suckers for PCBs due to the lack of a significant relationship between length and total PCB concentration.

It is important to note that the estimates of risk in 2017 was based on YOY, which were captured near the boat launch in Jellicoe Cove, and larger sport fish, which were netted in Carden Cove. According to the feeding strategies outlined in the ERA (ENVIRON 2008a), the YOY would be following a feeding scenario of 100% in Jellicoe Cove, and the sport fish would be considered as 100% feeding in the ‘rest of Peninsula Harbour’. However, as noted in Neff and Kipfer’s (2011) report on the Hg and PCB concentrations in Peninsula Harbour fish, Lake Superior Lake Trout and Lake Whitefish populations are considered migratory. Therefore, it is reasonable to assume that the fish captured in Carden Cove would feed throughout Peninsula Harbour, including Jellicoe Cove.

4.4. Passive Samplers and Sediment Cores

The allocation of passive samplers on the cap, as well as the locations for the collection of sediment cores is outlined in Table 2. Rao *et al*. (2018) has provided full results and discussion of the passive sampler and sediment core surveys, this is a summary for purposes of further discussion in this report.

4.4.1. Passive Samplers

4.4.1.1. Peepers

Peepers were placed at every sampling station, except the coarse sand stations 19, 21, and 22. Using the results of the field blank set, a statistically significant non-zero concentration of Hg in porewater was set at 4.8 ng/L. Peepers at stations 10, 11, 12, 14, 17, 18, and 23 had no statistically significant concentrations (4.8 ng/L) detected in the chambers that were present in the cap (i.e., not different than the field blanks). In addition, the chamber that was inserted into the native sediment at these stations also had concentrations that were low, which could be due to local conditions of low Hg contamination or the precipitation of Hg on account of reducing conditions under the cap. At station 16, the sampler had slightly elevated Hg concentrations at the cap-sediment interface which was attributed to sediment contamination, as there were no elevated concentrations in the overlying cap layers. Slightly elevated concentrations of Hg were detected in the upper layers of the cap (station 9) or in the overlying water (station 13). This result was attributed to near-surface recontamination and not migration through the cap. The greatest concentrations of Hg in porewater were observed at the cap reference station 25. It was theorized that inputs from adjacent groundwater could have contributed to the elevated Hg concentrations (average 30.1 ng/L). This theory is also supported by elevated levels of Cl with sediment depth, and at concentrations greater than other stations, and higher levels of SO_4 in the sediment than the overlying water. Contrary to results observed at the cap reference station 25 located near the shore, reference station 26, located north of the cap, had Hg levels less than the non-zero concentration (4.8 ng/L).

4.4.1.2. Horizontal Flux Chambers

The horizontal flux chambers were deployed at all of the coarse sand cap stations (16, 21, 19, and 22), medium sand cap stations 17, 11, and 20, and cap reference station 25. The highest flux (65 ng/m^2/day) was at cap reference station 25. The high flux was consistent with the high concentration of Hg in the porewater collected from the peepers. All other stations had horizontal flux chambers with fluxes calculated at approximately 15 ng/m^2/day, with the exception of station 22 which had a flux of 56 ng/m^2/day (a peeper was not deployed at this site).

4.4.2. Sediment Cores

Sediment was collected from various depths in cores taken at stations 25, 16, 9, 110, 10, 14, 15, 17, 23, and 12. In general, the Hg concentrations measured in the cap layer were <0.05 µg/g at all stations, except station 15, which appeared to be thinner and had some intermixing of underlying native sediment. The top 3 cm of the cap – which in most cases included the surficial sediment depositional layer – exceeded 0.10 µg/g at stations 9, 11, 12, 15, and 16. This relatively elevated concentration, compared to the concentrations observed in the middle of the cap, was attributed to new deposition of sediment over the cap, and not the migration of Hg through the cap. The concentrations of Hg measured in the native sediment under the cap were several order of magnitude higher than what was detected in the cap and on top of the cap.

5. CONCLUSIONS

The first post-cap LTM survey has demonstrated that the thin-layer sediment cap is effective and met the goals and objectives – that were measured in this survey – of the remedial effort. As previously described, there were three main goals associated with the thin-layer cap: performance monitoring; remedial monitoring; and assessing ecological recovery. The data collected and assessed for this survey were used to answer the questions associated with each goal and objective (Table 1) and are discussed below.

5.1. Performance Monitoring Goal

There were two main objectives of performance monitoring: the evaluation of cap placement; and the evaluation of surficial sediment total Hg concentration.

5.1.1. Objective 1a - Cap Placement

Two surveys were conducted in 2017 to evaluate cap placement: ECCC's high resolution multibeam sonar, and RoxAnn seabed classification; and Northern Bioscience's submerged aquatic vegetation survey. Environment and Climate Change Canada's results were not available at the time of this report write-up; however, Northern Bioscience's researchers Foster and Ratcliff (2018) found there to be little cap mobilization since placement. A layer of fine silt that had accumulated over the cap was observed by Foster and Ratcliff and appeared to be thicker than previous studies.

5.1.2. Objective 1b - Surficial Sediment Evaluation

The objective of evaluating the surficial sediment total Hg concentration was intended to determine if the native sediment, either originating from under the cap or off the cap, was incorporated into the thin-layer cap. Based on the passive samplers and sediment cores assessed by TTU (Rao *et al*. 2018), the cap layer is effective in reducing Hg exposure and flux. The porewater concentrations of Hg in the cap were not elevated relative to blank samples at most stations. In addition, porewater concentrations of Hg in the underlying sediment were also low despite elevated concentrations of bulk Hg in the native sediment; this was likely a result of the cap causing reducing conditions and Hg precipitation. As expected, given the porewater results, bulk Hg concentrations in the bottom portion of the cap were very low (<0.05 µg/g) at most stations. The measurements of Hg at the top portion of the cap (which did include some of the surficial sediment) was elevated above 0.10 µg/g at some stations. The low Hg concentrations detected in the bottom portion of the cap sediment, as well in the porewater measured throughout the cap at these stations, suggests the elevated Hg concentrations in the sediment at the top of the cap were attributed to the deposition of new sediment over the cap, and not from migration through the cap. These results were supported by the measurements of Hg in this MECP study, where concentrations of Hg in the surficial sediment of the cap were at or exceed levels measured at the Peninsula Harbour reference station in Beatty Cove (2011 unpublished data). Concentrations of Hg measured in the top layers of the core were less than levels measured in the surficial sediment collected from the divers; however, this is expected given the top 3 cm of the core was sampled and the Hg levels would be diluted by the cleaner cap material.

5.1.3. Overall Conclusion of Performance Monitoring Goals

The thin-layer cap has remained stable and has been effective in reducing exposure of Hg, and other contaminants of concern, from the underlying contaminated sediment. A thin-layer cap is not intended to isolate the contaminants, but rather to enhance natural recovery (AECOM 2011). Therefore, it was generally expected that the thin-layer cap substrate and the underlying contaminated sediment would mix both during construction (Biberhofer *et al*. 2019) and over time due to processes such as bioturbation and erosion (Merritt *et al*. 2009). However, in this case, the current survey by Rao *et al*. (2018) and a previous assessment conducted by Biberhofer *et al*. (2019) using pollucite, a zeolite mineral tracer, showed that the migration of underlying contaminants through the cap is generally not occurring. The measured concentrations of Hg on the surface of the cap has been attributed to the layer of fine surficial sediment that was observed on the cap by both Foster and Ratcliff (2018), and the ECCC divers that collected sediment for this MECP study. Results from Rao *et al*. (2018) core analysis, as well as results of this survey, show the concentrations of Hg in the deposited surficial sediment to be relatively low and similar to concentrations measured in sediment at the Peninsula Harbour reference station 289 in Beatty Cove (MECP unpublished data, 2011). Additionally, levels of other parameters detected on the cap were similar to concentrations measured at the Beatty Cove reference site, thereby suggesting lateral transport of sediment from the greater Peninsula Harbour and deposition on the Jellicoe Cove cap. Further to the deposition on the cap, there does appear to be some mixing of the newly deposited surficial sediment and the cap fines given the elevated concentrations of Ca and Mg in the surficial sediment on the coarse cap. While not measured prior to construction, it is likely the coarse sand, sourced from Manitoulin Island, has naturally elevated levels of Ca and Mg carbonates given that the island consists primarily of limestone and marbles. The elevated concentration of Ca and Mg in the surficial sediment on the coarse cap, compared to both the medium sand cap sites and the Beatty Cove reference sediments, indicates mixing of the surficial sediment and cap sand.

5.2. Remedial Monitoring Goal

The objective of the remedial monitoring was to determine if the area average concentration of Hg on the cap surface was less than the remedial target of < 3 µg/g. The calculated SWAC for Hg in the surficial sediment was 0.37 µg/g, and therefore it can be concluded that the cap has effectively reduced the total Hg exposure and met the remedial goal for Jellicoe Cove.

5.3. Ecological Recovery Goal

There were four main objectives under the ecological recovery goal, which included the evaluation of: 1) benthic invertebrate community re-colonization; 2) trends for contaminant tissue concentrations in benthic invertebrates and fish; 3) re-colonization of submerged aquatic vegetation; and 4) habitat for benthic invertebrates.

5.3.1. Objective 3a – Benthic Invertebrate Re-Colonization

The re-colonization of benthic invertebrate community was determined through the assessment of the abundance and diversity of the benthos collected. Overall, benthic invertebrates are inhabiting the cap, and while the number of individuals were still low in 2017 – compared to 2009 pre-cap assessment – the major taxa identified were similar to those observed in the 2009 survey. The diversity of benthos, based on genus and species counts, was calculated to be fairly high over the cap; however, the cap was predominantly recolonized by Oligochaeta and Chironomidae. More sensitive taxa, such as amphipods, were also observed, which was encouraging. The diversity, evenness, and species richness of the benthos across the cap was fairly consistent, with only minor differences noted at the coarse cap stations 16 and 19, and station 23. Differences noted at stations 16 and 19 were attributed to variation in replicates, while low index values at station 23 were likely due to the station being the deepest station sampled for benthos. It is expected that and abundance of benthic invertebrates on the cap will continue to increase over time as sediment continues to deposit over the cap, and coverage of aquatic vegetation increases.

5.3.2. Objective 3b – Tissue Contamination

5.3.2.1. Benthic Invertebrates

Determining the trends for contaminant tissue concentrations in the benthic invertebrates will be completed in the next LTM survey. This first LTM survey was used to determine the presence of benthos on the cap, as well as types of taxa and relative abundance.

5.3.2.2. Fish

The assessment of fish tissue contaminant levels measured in 2017 in Lake Whitefish and Lake Trout in comparison to pre-cap databases was conducted by Drouillard (2019). In general, the short-term temporal comparison showed decreases of Hg from 26% to 50%, and PCBs of about 85% from 2012 to 2017. These trends are in line with the substantial decreases of the contaminants in the tissue of these fish species that have been observed since the 1970s.

The derivation of Hg HQs for individuals and populations of Lake Whitefish, Lake Trout, and YOY Round Whitefish indicated no potential risk. Continued potential risk to the reproductive success of individual Longnose Suckers was indicated; however, there was no potential for adverse effects to be propagated to a population level. There was no potential for fish reproductive adverse effects from PCBs predicted at both the individual or population level.

Current estimated Hg and PCB HQs for fish at specified lengths were not at a level that would likely pose a risk to exposed bald eagles and mink. These results demonstrate an improvement for bald eagles feeding mostly in Jellicoe Cove and mink consuming fish both in Jellicoe Cove and the rest of Peninsula Harbour.

5.3.3. Objective 3c – Submerged Aquatic Vegetation and Re-Colonization

The re-colonization of the submerged aquatic vegetation survey was conducted by an external contractor (Foster and Ratcliff 2018). The survey showed sparse patches of stonewort and other submerged aquatic vegetation over the cap. The measured coverage of submergents was 5%, up from 3% measured in a previous study in 2013 (one-year post-cap survey).

5.3.4. Objective 3d – Habitat for Benthic Invertebrates

A survey was conducted by ECCC a year after cap construction to determine the structure and integrity of the cap (ECCC, unpublished trip report, 2013). During that survey, a thin-organic layer that covered sections of the sand cap was observed. This thin-organic layer was to be targeted in this survey; however, it was not observed by ECCC divers during sample collection. At this time there can be no conclusions drawn regarding the previously observed thin-organic layer and its potential role in providing habitat for benthic invertebrates.

5.4. Overall Conclusions

Overall, the Jellicoe Cove thin-layer cap is stable, and through the use of passive samplers and sediment cores, has been shown to effectively reduce the vertical flux of Hg from the contaminated native sediment below the cap. Natural sedimentation has occurred since the construction of the cap in 2012, and to some degree, mixing of the cap surficial fines and the deposited sediment has been observed. Concentrations of some nutrients and metals in the cap surficial sediment at some sampling stations exceeded their respective PSQG-LELs; however, the levels of many parameters measured on the cap were similar to concentrations detected at the Peninsula Harbour reference station in Beatty Cove (MECP unpublished data, 2011), thereby indicating sediment is being laterally transported from Peninsula Harbour and deposited on the cap.

This survey has shown that the cap has been effective in reducing the total Hg surficial sediment concentration (median SWAC 0.37 µg/g) to below the remedial target of 3 µg/g in the Jellicoe Cove capped area. In addition, comparisons of cap Hg concentrations to pre-cap baseline surveys have indicated that Hg concentrations in sediment have been reduced significantly in the cap area; SWACs calculated for the 2009 and 2011 pre-cap baseline dataset were 7.69 µg/g and 6.37 µg/g, respectively.

As expected, the cap also effectively reduced the surface sediment concentrations of MeHg and PCBs. The median calculated SWAC for MeHg in the surficial sediment was 3.02 ng/g; less than the pre-cap baseline SWACS of 7.78 ng/g in 2009 and 5.11 ng/g in 2011. Although MeHg levels have decreased, the concentrations in the surficial sediment on the cap continue to exceed the risk-based sediment management goal of 2.0 ng/g for the protection of fish (ENVIRON 2008a). The PCB data was highly variable and interpreted with caution. Similar to MeHg, the calculated SWACs for PCB in cap surficial sediment, that ranged from a minimum of 53 ng/g to a maximum of 196 ng/g, were below the 2011 pre-cap SWAC of 372 ng/g. However, when compared to the risk-based sediment management goal (60 ng/g – protective of mink), only the minimum SWAC value was below the risk-based goal, while the maximum SWAC value was over three times greater than the goal.

Biological surveys have indicated that the cap has been colonized with benthic invertebrates, and the coverage of submerged aquatic vegetation continues to increase over time. The abundance of benthos was low in 2017, but the diversity was high, and taxa identified were similar to what was observed in the 2009 survey. It is expected that over time as the sediment continues to deposit over the cap, the abundance of benthic invertebrates, as well as the abundance and distribution of macrophytes on the cap will continue to increase. The colonization of the cap and reduced levels of available contaminants aligned with the decreases in fish tissue contaminant levels that have been observed since the placement of the cap. In addition, given this result, further decreases in fish tissue contaminant levels are expected over time.

6. RECOMMENDATIONS

With regard to the components that were sampled in this MECP survey, the following is recommended for the next Jellicoe Cove thin-layer LTM survey:

a. Deploy sediment traps on the cap at various locations to determine the quality of the deposited sediment, to estimate deposition rates, and to investigate the differences in rates and quality of sediment that is depositing on certain portions of the cap (i.e., southern nearshore coarse cap stations versus north-east stations versus north-west stations);

b. Include the MECP Peninsula Harbour reference station, located in Beatty Cove, for a point of comparison for the deposited sediment on the cap;

c. Increase the sampling effort over the coarse sand cap to further understand the elevated levels of some parameters in relation to the medium sand cap;

d. Further examine the relationship between Hg and MeHg;

e. Collect sediment cores at select locations on the cap to further verify the sediment core results from Rao *et al*. (2018);

f. Increase the sampling effort to include three or more replicates of surficial sediment samples from each station to better assess any potential variability that may be presented between replicates;

g. Increase the sampling effort in the north-east portion of the cap for PCBs, where the highest concentrations were measured in both pre- and post-cap surveys;

h. Collect either oligochaetes or chironomids for benthic invertebrate tissue analysis;

i. Conduct multivariate analysis on benthic invertebrate data to examine any correlative associations between response and potential variables that would influence habitat (depth, particle size) as deposition over the cap continues;

j. Collect smaller fish (~25 cm) to reduce uncertainty in risk estimations for fish, wildlife, and birds exposed to Hg and PCBs;

k. Collect the thin-organic layer for analysis, if it is present; and

l. Continue with all primary monitoring components (Table 1), but discontinue with passive sampling survey, unless sediment core results from 2022 indicates a flux of Hg through the cap.

7. REFERENCES

AECOM. 2011. Long term monitoring following capping operations, Marathon environmental remediation contract number EA754-093130/A. Prepared for: Public Works and Government Services Canada. July 2011.

Amrhein JF, Stow CA, and Wible C. 1999. Whole-fish versus filet polychlorinated-biphenyl concentrations: an analysis using classification and regression tree models. *Environmental Toxicology and Chemistry* 18:1817-1823.

Beckvar N, Dillon TM, and Read LB. 2005. Approaches for linking whole-body fish tissue residues of mercury or DDT to biological effect thresholds. *Environmental Toxicology and Chemistry* 24:2094-2105.

Biberhofer J, Graham M, Hartman E, and Peters J. 2019. Assessment of sediment disturbance during application of a thin-layer cap in Peninsula Harbour, Canada. *Journal of Soils and Sediments* 19:1040-1052.

Drake CM and Elliott JM. 1982. A comparative study of three air-lift samplers used for sampling benthic macro-invertebrates in rivers. *Freshwater Biology* 12:511-533.

Drouillard, K. 2019. Contaminants in Peninsula Harbour Fish. A report from an analysis of long-term monitoring data. Prepared for: Environment Canada and Climate Change. University of Windsor. March 4, 2019.

ECOMETRIX Incorporated. 2012, Geological conditions at the Marathon PGM-Cu project site. Prepared for: Stillwater Canada Inc. 11-1851. June 2012.

ENVIRON International Corporation. 2008a. Environmental Risk Assessment for Peninsula Harbour Area of Concern. Final Report, Revision 2, Volume 1. Project Number: 21-16548C. September 2008.

ENVIRON International Corporation. 2008b. Sediment Management Options for Peninsula Harbour Area of Concern, Final Report. Prepared for: EcoSuperior Environmental Programs, Thunder Bay, ON. September 2008.

Environment Canada. 1998. Tissue residue guideline for polychlorinated biphenyls for the protection of wildlife consumers of aquatic biota. Final unpublished draft. November 1998. Environment Canada, Guidelines and Standards Division, Ottawa, ON.

Environment Canada. 2000. Canadian tissue residue guideline for methylmercury for the protection of wildlife consumers of aquatic biota. February 2000. Environment Canada, Guidelines and Standards Division, Ottawa, ON (unpublished).

ESRI. 2011. ArcGIS Desktop: Release 10.3.1. Redlands, CA: Environmental Systems Research Institute.

Fletcher R, Welsh P, Fletcher T. 2008. Guidelines for identifying, assessing and managing contaminated sediments in Ontario: an integrated approach. Ontario Ministry of the Environment, May 2008.

Forstner U. 1990. Inorganic sediment chemistry and elemental speciation. In Baudo R, Giesy JP, and Muntau H (eds.). Sediments: chemistry and toxicity of in-place pollutants. Lewis Publishers, United States, pp 61-106.

Foster RF and Ratcliff B. 2018. Peninsula Harbour submerged aquatic vegetation (SAV) and cap movement study: 5 years post-cap survey. Prepared for: Environment and Climate Change Canada. April 25, 2018.

Grapentine L, Milani D, Mackay S. 2005. A study of bioavailability of mercury and the potential for biomagnification from sediment in Jellicoe Cove, Peninsula Harbour. Environment Canada Water Science and Technology Directorate, NWRI Contribution No. 05-321. October 2005.

Hammer O. 2018. Paleontological Statistics, version 3.20. Natural History Museum, University of Oslo, Norway.

Hansen DJ, Schimmel SC, Forester J. 1974. Aroclor 1254 in eggs of sheepshead minnows: effect on fertilization success and survival of embryos and fry. Proceedings of Southeastern Game and Fish Commission, pp. 420-426.

Hayton A. 2005. PCB investigations at Peninsula Harbour Lake Superior. Ontario Ministry of the Environment. Draft Report, July 2005.

Hilsenhoff WL. 1987. An improved biotic index of organic stream pollution. *The Great Lakes Entomologist* 20:31-39.

Hynes HB. 1960. The biology of polluted waters. Liverpool University Press, 202p.

Merritt K, Condor J, Mager V, Kirtay VJ, and Chadwick BD. 2009. Enhanced monitoring naturl recovery (EMNR) case studies review. U.S. Navy Tech Report No. 1983. San Diego, California, USA.

Milani D and Grapentine LC. 2005. The application of the BEAST sediment quality guidelines to Peninsula Harbour, Lake Superior, an Area of Concern. Environment Canada National Water Research Institute, NWRI Contribution No. 05-320.

MOE (Ontario Ministry of the Environment). 2009. PCB Soils Investigation: Marathon Pulp Inc., Marathon, Ontario (2006). Report prepared by: Terrestrial Assessment Unit, Air Monitoring and Reporting Section, Environmental Monitoring and Reporting Branch. Report No. S6016-2006. April 2009.

MOE (Ontario Ministry of the Environment). 2014. Protocol for the collection of fish samples for contaminant analysis. Fish Contaminant Monitoring Program. Updated April 2014.

Neff, MR and Kipfer M. 2011. Comparison of recent (2000-2007) mercury and PCB concentrations between Peninsula Harbour (AOC) and other Lake Superior blocks: a baseline for future AOC monitoring of sport fish contaminants. Ontario Ministry of the Environment, Biomonitoring Unit.

Peninsula Harbour RAP Team. 1991. Stage 1: Environmental Conditions and Problem Definition. September 1991.

Peterson DE, Van Sickle J, Hughes RM, Schacher JA, and Echols SF. 2005. A biopsy procedure for determining filet and predicting whole-fish mercury concentration. *Archives of Environmental Contamination and Toxicology* 48:99-107.

Ouyang Y, Zhang JE, Ou LT. 2006. Temporal and spatial distribution of sediment total organic carbon in an estuary river. *Journal of Environmental Quality*. 3:93-100.

Rao B, Schneider H, Garza-Rubalcava U, Jackson A, and Reible D. 2018. Final technical report: passive sampling for mercury in a sediment environment – Jellicoe Cove, Ontario. Texas Tech University, Lubbock, Texas. March 27, 2018.

Rodriguez P and Reynoldson TB. 2011. The pollution biology of aquatic oligochaetes. Springer Science+Business Media, 265 p.

Trudel M and Rasmussen JB. 2006. Bioenergetics and mercury dynamics in fish: a modelling perspective. *Canadian Journal of Fisheries and Aquatic Science* 63:1890-1902.

USEPA (United States Environmental Protection Agency). 1997. Guidelines establishing test procedures for the analysis of pollutants (App. B, Part 136, Definition and procedures for the determination of the method detection limit): U.S. Code of Federal Regulations, Title 40, revised July 1, 1997, p. 265-267.

Vane CH, Harrison I, and Kim AW. 2007. Polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) in sediments from the Mersey Estuary, U.K. *Science in the Total Environment* 347: 112-126.

Table 1. Monitoring goals, objectives, and monitoring components to fulfil the Jellicoe-Cove thin-layer cap Long Term Monitoring program.

LTM Goal	Objective	Monitoring Component[1]	Question to Address
Performance Monitoring	1a. Evaluate Cap Placement – assess the overall structural condition and integrity of the cap	i. Visual observations of substrate via photographs, videos, and grab samples *ii. Secondary - High resolution multibeam sonar, RoxAnn seabed classification and underwater video documentation*	Has the cap, as constructed, continued to provide consistent performance in protecting the underlying mercury contaminated sediments from resuspension and subsequent redistribution into the environment?
	1b. Evaluate Surficial Sediment Total Hg Concentration – determine if the native sediment (on-cap or off-cap) incorporated into the thin-layer cap	i. Surficial sediment from the cap	What is the concentration of total Hg in the surficial sediment?
		ii. Secondary - passive samplers to assess the extent of total Hg mixing within the cap	Is total Hg moving from the native sediment up through the cap?
Remedial Monitoring	2. Evaluate Cap Effectiveness – determine if the area average concentration of total Hg of the on-cap surface sediment is <3 mg/kg (remedial target)	i. Surface sediment with particle size <2000 um	Is the total Hg level on the surface of the thin-layer cap < 3 mg/kg?
Ecological Recovery	3a. Evaluate benthic invertebrate community re-colonization	i. Visual observations of benthic invertebrates in samples or by divers ii. Abundance and diversity of benthic invertebrates collected via benthic air lifter	Are there benthic invertebrates present in the thin-layer cap, and if so, how many and what kind?

LTM Goal	Objective	Monitoring Component[1]	Question to Address
	3b. Evaluate trends for contaminant tissue concentrations in benthic invertebrates and (benthivorous) fish	i. Benthic invertebrate tissue (postponed)[2] ii. Fish tissue Hg concentrations in varying species of varying sizes	Is Hg continuing to be taken up by biota on and around the cap, and if so, how much?
	3c. Evaluate re-colonization of submerged aquatic vegetation	i. Plant colonization based on high density underwater video transects and targeted sampling	What is the estimated coverage and taxa present on the cap?
	3d. Evaluate habitat for benthic invertebrates	*Secondary - thin-organic layer covering cap*[3]	What is the physical and chemical composition of the organic layer covering the cap, and is it hospitable for benthos?

[1]secondary monitoring components in italics
[2] postponed to the next survey. Needed to first ensure the presence of benthos and relative abundance of species that could be used to assess benthic tissue contaminant levels.
[3] thin-organic layer was not observed in the 5 year post-cap monitoring survey

Table 2. Sampling station locations for survey components (presented in directional order from SE to NW).

MECP Station Number	Cap Type[1]	Coordinates[2]		Depth (m)	Samples Collected					
		Easting (mE)	Northing (mN)		Vertical Peeper	Horizontal Flux Chamber	Surficial Sediment		Sediment Core	Benthic Invertebrate
							Deploy	Retrieve		
01001700**25**	Ref	544751	5396569	3.0	x	x	x	x	x	x
01001700**19**	C	544609	5396644	5.5	x	x	x			x
01001700**22**	C	544451	5396652	6.9		x				
01001700**16**	C	544483	5396734	11.4	x	x	x	x	x	x
01001700**09**	M	544705	5396728	6.2	x		x		x	
01001700**20**	M	544539	5396780	10.7	x	x	x	x		x
01001700**11**	M	544841	5396801	6.5	x	x	x	x	x	
01001700**21**	C	544319	5396829	13.7		x	x	x		
01001700**12**	M	544550	5396850	12.4	x			x	x	
01001700**10**	M	544679	5396830	10.5	x		x	x	x	x
01001700**13**	M	544749	5396854	7.7	x				E[3]	
01001700**18**	M	544390	5396852	14.0	x					
01001700**15**	M	544309	5396929	17.9	x		x	x	x	
01001700**17**	M	544450	5396968	14.8	x	x	x	x	x	x
01001700**14**	M	544557	5396955	13.5	x		x	x	x	x
01001700**24**	M	544259	5397039	24.0	x					
01001700**23**	M	544353	5397047	18.5	x		x	x	x	x
01001700**26**	Ref	544354	5397247	16.7	x					

[1] M – medium sand cap; C – coarse sand cap; Ref – reference
[2] UTM zone 16
[3] excavate of top and bottom layer of cap

Table 3. Particle size (median and range) of surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	Number of Replicates	Particle Size (% sand: 62–2000µm)			
			Individual surveys		Combined surveys	
			median	range	median	range
0100170025	D	2	81	6.1	82	12
	R	3	82	7.3		
0100170019	D	3	86	8.2	77	17
	R	3	72	6.4		
0100170016	D	3	26	45	67	60
	R	3	78	20		
0100170009	D	1	92	---	92	---
0100170020	D	1	82	---	82	10
	R	3	83	10		
0100170011	D	1	78	---	74	9.7
	R	3	73	6.3		
0100170021	D	1	61	---	74	25
	R	3	76	14		
0100170012	R	3	64	20	64	20
0100170010	D	1	56	---	68	15
	R	3	70	5.4		
0100170015	D	1	83	---	54	48
	R	3	38	36		
0100170017	D	1	85	---	87	5.4
	R	2	89	3.1		
0100170014	D	1	92	---	85	7.8
	R	3	84	0.9		
0100170023	D	3	85	6.5	88	6.5
	R	1	91	---		

[1] D – deployment; R - retrieval

Table 4. Nutrient concentrations (median and range) in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	No. of Reps	Total Organic Carbon (mg/g)				Total Nitrogen (mg/g)				Total Phosphorus (µg/g)			
			Individual surveys		Combined surveys		Individual surveys		Combined surveys		Individual surveys		Combined surveys	
			median	range	median	range	median	range	median	range	median	range	median	range
0100170025	D	2	4.3	0.1	4.2	1.3	0.10	---	0.25	0.48	970	---	1000	260
	R	3	3.9	1.3			0.30	0.33			1000	200		
0100170019	D	3	47.0	15.0	40.5	25.0	0.10	---	0.10	0.69	280	80	335	90
	R	3	31.0	11.0			0.27	0.69			340	20		
0100170016	D	3	33.0	10.0	31.0	13.0	1.53	0.44	0.66	1.46	490	50	415	230
	R	3	29.0	11.0			0.18	0.10			330	90		
0100170009	D	1	10.0	---	10.0	---	1.31	---	1.31	---	650	---	650	---
0100170020	D	1	10.0	---	10.0	2.9	1.31	---	0.32	1.18	630	---	615	140
	R	3	10.0	2.9			0.25	0.26			610	130		
0100170011	D	1	6.5	---	14.0	11.5	1.13	---	0.50	0.75	440	---	460	40
	R	3	15.0	5.0			0.42	0.19			470	30		
0100170021	D	1	28.0	---	45.0	19.0	0.93	---	0.24	0.83	400	---	270	150
	R	3	47.0	4.0			0.10	0.27			250	40		
0100170012	R	3	28.0	20.1	28.0	20.1	0.58	0.91	0.58	0.91	610	40	610	40
0100170010	D	1	28.0	---	17.5	14.0	1.68	---	0.75	1.29	570	---	665	110
	R	3	16.0	5.0			0.68	0.43			670	20		
0100170015	D	1	9.8	---	10.4	3.3	1.68	---	0.13	1.58	610	---	530	100
	R	3	11.0	3.3			0.10	0.06			520	30		
0100170017	D	1	10.0	---	5.7	4.9	1.05	---	0.23	0.95	610	---	520	90
	R	2	5.4	0.6			0.17	0.13			520	0		
0100170014	D	1	14.0	---	17.0	10.0	1.46	---	0.31	1.36	600	---	510	120
	R	3	18.0	8.0			0.10	0.42			500	40		
0100170023	D	3	9.4	2.0	8.6	5.1	1.14	0.39	0.98	1.10	650	40	635	130
	R	1	4.7	---			0.10	---			530	---		
PSQG-LEL			10				0.55				600			
PSQG-SEL			**100**				**4.8**				**2000**			

[1] D – deployment; R - retrieval

Table 5. Concentrations (median and range) of select metals in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	No. of Reps	Aluminum (µg/g)				Chromium (µg/g)				Copper (µg/g)			
			Individual surveys		Combined surveys		Individual surveys		Combined surveys		Individual surveys		Combined surveys	
			median	range	median	range	median	range	median	range	median	range	median	range
0100170025	D	2	4600	440	4820	1090	42.8	3.9	41.9	5.4	5.6	2.0	5.4	2.0
	R	3	5160	1090			41.9	3.2			41.9	3.2		
0100170019	D	3	2420	960	3410	2550	12.1	5.3	16.6	10.6	7.4	1.2	8.3	4.8
	R	3	4200	1050			18.2	3.9			18.2	3.9		
0100170016	D	3	6870	1090	5415	2510	29.7	3.2	23.7	11.7	24.0	2.6	20.5	9.6
	R	3	4800	470			20.3	2.1			20.3	2.1		
0100170009	D	1	6290	0	6290	0	32.1	0.0	32.1	0.0	16.6	0.0	16.6	0.0
0100170020	D	1	7400	0	7875	940	33.4	0.0	33.5	3.5	28.0	0.0	27.1	1.8
	R	3	8200	790			33.5	3.5			33.5	3.5		
0100170011	D	1	8090	0	9080	2110	44.6	0.0	44.4	5.2	9.0	0.0	10.6	3.0
	R	3	9370	1410			44.1	5.2			44.1	5.2		
0100170021	D	1	5570	0	3840	2140	25.3	0.0	16.2	11.0	14.4	0.0	9.0	6.6
	R	3	3530	720			14.7	3.4			14.7	3.4		
0100170012	R	3	7910	350	7910	350	35.5	4.3	35.5	4.3	35.5	4.3	29.2	3.0
0100170010	D	1	7220	0	7630	780	34.5	0.0	33.5	1.4	21.6	0.0	20.8	3.2
	R	3	7680	420			33.3	0.5			33.3	0.5		
0100170015	D	1	7800	0	8225	930	33.5	0.0	31.8	2.3	30.0	0.0	24.6	7.6
	R	3	8400	680			31.4	1.0			31.4	1.0		
0100170017	D	1	6920	0	7650	1330	31.8	0.0	27.8	4.2	23.6	0.0	23.4	1.2
	R	2	7950	600			27.7	0.2			27.7	0.2		
0100170014	D	1	6080	0	7090	1500	30.4	0.0	28.8	3.3	16.4	0.0	15.7	1.2
	R	3	7360	760			28.6	0.0			28.6	1.8		
0100170023	D	3	7620	530	7760	600	35.8	3.0	34.7	8.1	32.0	2.2	31.3	8.8
	R	1	7970	0			28.4	0.0			28.4	0.0		
PSQG-LEL							26				16			
PSQG-SEL							**110**				**110**			

[1] D – deployment; R - retrieval

Table 5 cont'd. Concentrations (median and range) of selected metals in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	No. of Reps	Iron (µg/g)				Manganese (µg/g)				Nickel (µg/g)			
			Individual surveys		Combined surveys		Individual surveys		Combined surveys		Individual surveys		Combined surveys	
			median	range	median	range	median	range	median	range	median	range	median	range
01170**025**	D	2	18500	1400	19200	2400	164	11	169	30	14.7	0.1	14.8	2.0
	R	3	19900	2200			182	25			14.8	2.0		
01170**019**	D	3	6830	2120	8755	5140	136	32	165	92	2.8	3.3	6.8	7.4
	R	3	9740	2070			193	34			7.7	2.8		
01170**016**	D	3	15400	1700	12800	5480	316	54	262	122	15.3	2.2	12.6	7.3
	R	3	11500	1980			233	21			9.8	2.4		
01170**009**	D	1	15300	0	15300	0	238	0	238	0	17.3	0.0	17.3	0.0
01170**020**	D	1	17000	0	18450	2000	323	0	367	65	19.5	0.0	20.6	2.4
	R	3	19000	1100			370	24			20.7	1.5		
01170**011**	D	1	18800	0	21650	5500	335	0	413	121	24.7	0.0	26.5	5.5
	R	3	21800	2800			426	56			26.5	3.8		
01170**021**	D	1	12300	0	8080	4920	236	0	173	77	13.6	0.0	6.6	8.3
	R	3	7400	1380			160	27			5.6	2.3		
01170**012**	R	3	19700	1700	19700	1700	409	112	409	112	22.0	2.3	22.0	2.3
01170**010**	D	1	17100	0	17900	1100	387	0	367	38	19.0	0.0	19.3	0.9
	R	3	17900	300			358	27			19.4	0.8		
01170**015**	D	1	17100	0	17350	1000	320	0	325	19	19.7	0.0	19.8	1.4
	R	3	17600	1000			329	19			19.9	1.4		
01170**017**	D	1	15900	0	16700	1400	301	0	278	24	17.9	0.0	18.3	1.2
	R	2	17000	600			278	1			18.7	0.8		
01170**014**	D	1	15200	0	16200	1400	305	0	294	23	16.3	0.0	17.4	1.4
	R	3	16500	700			292	14			17.5	0.4		
01170**023**	D	3	17700	900	17550	900	319	24	307	57	21.1	0.6	19.3	2.8
	R	1	17400	0			262	0			18.7	0.0		
PSQG-LEL			20000				460				16			
PSQG-SEL			**40000**				**1110**				**75**			

[1] D – deployment; R - retrieval

Table 5 cont'd. Concentrations (median and range) of selected metals in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	No. of Reps	Zinc (µg/g) Individual surveys median	range	Combined surveys median	range
011700**25**	D	2	45.1	2.4	49.1	12.1
	R	3	53.0	6.9		
011700**19**	D	3	30.1	5.7	37.9	16.7
	R	3	42.5	3.9		
011700**16**	D	3	57.0	6.6	48.5	23.8
	R	3	39.8	6.9		
011700**09**	D	1	55.3	0.0	55.3	0.0
011700**20**	D	1	55.9	0.0	55.6	10.5
	R	3	55.2	10.5		
011700**11**	D	1	74.7	0.0	91.2	29.3
	R	3	92.2	13.9		
011700**21**	D	1	45.1	0.0	29.0	19.4
	R	3	26.1	6.2		
011700**12**	R	3	71.1	16.9	71.1	16.9
011700**10**	D	1	81.8	0.0	63.9	21.1
	R	3	62.1	4.9		
011700**15**	D	1	51.7	0.0	51.6	7.3
	R	3	51.6	7.3		
011700**17**	D	1	48.4	0.0	41.5	7.1
	R	2	41.4	0.2		
011700**14**	D	1	46.1	0.0	46.0	0.9
	R	3	45.8	0.9		
011700**23**	D	3	51.9	1.7	51.9	14.2
	R	1	39.3	0.0		
PSQG-LEL			120			
PSQG-SEL			**820**			

[1] D – deployment; R – retrieval

Table 6. Concentrations (median and range) of selected ions in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	No. of Reps	Calcium (µg/g)				Magnesium (µg/g)				Potassium (µg/g)			
			Individual surveys		Combined surveys		Individual surveys		Combined surveys		Individual surveys		Combined surveys	
			median	range	median	range	median	range	median	range	median	range	median	range
0100170**025**	D	2	9950	2500	9670	4890	7115	2230	6000	3820	420	60	450	200
	R	3	9760	4890			5524	2720			540	200		
0100170**019**	D	3	129000	20000	110000	35100	82000	13500	65250	31400	440	0	605	450
	R	3	107000	13100			58600	6800			780	190		
0100170**016**	D	3	75100	16800	93200	50400	47600	11700	56200	21700	1110	90	945	290
	R	3	112000	16000			62500	8600			830	50		
0100170**009**	D	1	20500	0	20500	0	9470	0	9470	0	870	0	870	0
0100170**020**	D	1	32800	0	33700	3700	17000	0	15200	2400	1160	0	1190	120
	R	3	33800	2900			14800	1000			1220	120		
0100170**011**	D	1	7700	0	10200	3100	9300	0	9925	1100	740	0	780	140
	R	3	10300	700			10100	650			820	140		
0100170**021**	D	1	83600	0	121500	47400	55100	0	68900	19200	850	0	695	210
	R	3	130000	18000			73900	10400			680	70		
0100170**012**	R	3	30900	2800	30900	2800	16400	3600	16400	3600	1200	70	1200	70
0100170**010**	D	1	31900	0	22200	10300	19100	0	13250	6100	1020	0	1005	60
	R	3	21900	900			13100	400			990	60		
0100170**015**	D	1	41500	0	41550	2400	22100	0	22250	2300	1210	0	1140	150
	R	3	41600	2400			22400	2300			1120	100		
0100170**017**	D	1	30800	0	36600	6000	15500	0	12200	4100	980	0	980	90
	R	2	36700	200			11800	800			1005	90		
0100170**014**	D	1	24600	0	27450	4300	13400	0	11650	2300	760	0	815	170
	R	3	28100	2100			11600	600			870	170		
0100170**023**	D	3	33900	600	34100	5100	18400	2000	17550	6500	1160	90	1155	240
	R	1	38800	0			12200	0			1000	0		

[1] D – deployment; R - retrieval

Table 6 cont'd. Concentrations (median and range) of selected ions in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys.

MECP Station Number	Survey[1]	No. of Reps	Sodium (µg/g)				Sulphur (µg/g)			
			Individual surveys		Combined surveys		Individual surveys		Combined surveys	
			median	range	median	range	median	range	median	range
0100170025	D R	2 3	135 160	10 50	140	50	105 130	10 30	130	60
0100170019	D R	3 3	150 200	30 20	175	60	460 540	20 30	510	110
0100170016	D R	3 3	210 200	10 30	205	50	600 420	160 100	520	380
0100170009	D	1	160	0	160	0	190	0	190	0
0100170020	D R	1 3	230 260	0 40	245	40	240 290	0 150	265	150
0100170011	D R	1 3	140 140	0 30	140	30	200 350	0 70	340	200
0100170021	D R	1 3	200 180	0 10	185	20	420 420	0 130	420	130
0100170012	R	3	240	40	240	40	570	330	570	330
0100170010	D R	1 3	200 210	0 20	205	20	660 370	0 60	395	300
0100170015	D R	1 3	230 180	0 40	200	50	200 310	0 100	275	140
0100170017	D R	1 2	200 220	0 40	200	40	240 160	0 0	160	80
0100170014	D R	1 3	160 190	0 50	175	50	250 310	0 40	295	70
0100170023	D R	3 1	220 210	50 0	215	50	210 140	30 0	205	90

[1] D – deployment; R - retrieval

Table 7. Total mercury concentrations (median and range) in surficial sediment on the thin-layer cap and at cap reference station 25. Sediment was from all surveys and all jars.

MECP Station Number	Number of Replicates	Total Mercury (µg/g)		Coefficient of Variation of all Replicates
		median	range	(%)
01001700**25**	9	0.53	0.21	13
01001700**19**	7	1.00	1.36	38
01001700**16**	11	1.10	1.05	38
01001700**09**	1	0.41	---	---
01001700**20**	6	0.22	0.15	27
01001700**11**	5	0.24	0.19	29
01001700**21**	5	0.19	0.21	42
01001700**12**	5	0.36	0.37	48
01001700**10**	7	0.31	0.40	37
01001700**15**	4	0.16	0.20	53
01001700**17**	8	0.07	0.15	53
01001700**14**	7	0.17	0.14	27
01001700**23**	7	0.08	0.13	51
PSQG- LEL 0.2		0.2		
PSQG-SEL		**2.0**		

Table 8. Concentrations (median and range) of methyl-mercury, mercury, and total organic carbon in surficial sediment collected in individual deployment and retrieval surveys, and a combination of both surveys. All analysis conducted on sediment from MeHg jar.

MECP Station Number	Survey[1]	Sample Size	Methyl-Mercury (ng/g)				Mercury (µg/g)				Total Organic Carbon (mg/g)			
			Individual surveys		Combined surveys		Individual surveys		Combined surveys		Individual surveys		Combined surveys	
			median	range	median	range	median	range	median	range	median	range	median	range
0100170025	D	2	1.07	0.35	1.33	0.74	0.55	0.13	0.56	0.13	3.5	0.4	4.4	2.9
	R	2	1.53	0.20			0.56	0.00			5.6	1.2		
0100170019	D	1	12.14	0.00	12.14	0.00	2.10	0.00	2.10	0.00	65	0.0	65	0.0
0100170016	D	3	14.24	12.11	4.64	14.20	1.50	0.72	1.10	0.72	31	5.0	31	13
	R	2	3.00	0.89			0.94	0.32			35	10		
0100170020	D	1	1.26	0.00	1.26	0.01	0.17	0.00	0.19	0.04	8.2	0.0	9.1	1.8
	R	1	1.26	0.00			0.21	0.00			10	0.0		
0100170011	R	1	2.10	0.00	2.10	0.00	0.21	0.00	0.21	0.00	16	0.0	16	0.0
0100170021	R	1	1.85	0.00	1.85	0.00	0.29	0.00	0.29	0.00	32	0.0	32	0.0
0100170012	R	2	2.51	2.43	2.51	2.43	0.28	0.16	0.28	0.16	20	17	20	17
0100170010	D	2	3.02	0.38	3.17	1.14	0.39	0.09	0.31	0.19	20	2.0	19	4.0
	R	2	3.55	0.84			0.26	0.04			18	2.0		
0100170017	D	2	1.15	0.20	0.77	0.79	0.17	0.06	0.11	0.13	9.6	2.8	8.0	4.0
	R	2	0.48	0.03			0.07	0.00			7.4	0.7		
0100170014	D	1	2.11	0.00	1.63	1.26	0.08	0.00	0.14	0.09	9.7	0.0	20	11
	R	2	1.24	0.78			0.16	0.03			21	1.0		
0100170023	D	1	0.57	0.00	0.42	0.24	0.08	0.00	0.06	0.02	6.1	0.0	6.1	1.2
	R	2	0.38	0.10			0.06	0.00			5.8	1.2		
PSQG-LEL							0.2				10			
PSQG-SEL							**2**				**100**			
ERA risk-based goal			2											

[1] D – deployment; R - retrieval

Table 9. Total PCBs in surficial sediment overlying the thin-layer cap and at cap reference 25.

MECP Station Number	Survey	Number of Replicates	Range of Total PCB	Coefficient of Variation	Number of Exceedences	
			(ng/g dw)	(%)	PSQG-LEL (70 ng/g)	Risk-based Goal (60 ng/g)
0100170**025**	Deployment	2	10	0		
	Retrieval	3	10	0		
0100170**019**	Deployment	3	24 – 240	116	1	1
	Retrieval	3	44 – 82	37	1	1
0100170**016**	Deployment	3	100 – 140	17	3	3
	Retrieval	3	33 – 69	46		1
0100170**009**	Deployment	1	14	---		
0100170**020**	Deployment	1	40	---		
	Retrieval	3	24 – 250	120	1	1
0100170**011**	Deployment	1	230	---	1	1
	Retrieval	3	540 – 660	11	3	3
0100170**021**	Deployment	1	18	---		
	Retrieval	3	12 – 79	74	1	1
0100170**012**	Retrieval	3	140 – 260	30	3	3
0100170**010**	Deployment	1	310	---	1	1
	Retrieval	3	140 – 160	8	3	3
0100170**015**	Retrieval	3	56 – 110	33	2	2
0100170**017**	Deployment	2	59 – 62	4		1
	Retrieval	3	10– 29	61		
0100170**014**	Deployment	1	29	29		
	Retrieval	3	67 – 520	113	2	3
0100170**023**	Deployment	3	10	---		
	Retrieval	1	10 - 25	48		

Table 10. Average density of benthic invertebrate taxa in the surficial sediment on the thin-layer cap and cap reference station 25.

Station Number	Average Density (individuals/m^2)							
	25 (Ref)	19	16	20	10	17	14	23
Oligochaeta	324.0	1078.7	3337.3	224.0	424.0	326.7	224.0	258.7
Insecta	838.7	552.0	896.0	128.0	261.3	190.7	170.7	132.0
Gastropoda	117.3	85.3	96.0	133.3	109.3	124.0	120.0	38.7
Bivalvia	72.0	156.0	45.3	1.3	44.0	9.3	4.0	4.0
Arachnida	69.3	38.7	20.0	13.3	26.7	26.7	29.3	13.3
Malacostraca	161.3	12.0	20.0	13.3	81.3	22.7	14.7	9.3
Other	8.0	48.0	14.7	12.0	52.0	6.7	29.3	8.0
TOTAL	1590.7	1970.7	4429.3	525.3	998.7	706.7	592.0	464.0

Table 11. Percent dominant benthic invertebrate taxa in the surficial sediment on the thin-layer cap and cap reference station 25.

Station Number	Dominant Taxa (%)							
	25 (Ref)	19	16	20	10	17	14	23
Oligochaeta	20.4	54.7	75.3	42.6	42.5	46.2	37.8	55.7
Insecta	52.7	28.0	20.2	24.4	26.2	27.0	28.8	28.4
Gastropoda	7.4	4.3	2.2	25.4	10.9	17.5	20.3	8.3
Bivalvia	4.5	7.9	1.0	0.3	4.4	1.3	0.7	0.9
Arachnida	4.4	2.0	0.5	2.5	2.7	3.8	5.0	2.9
Malacostraca	10.1	0.6	0.5	2.5	.1	3.2	2.5	2.0
Other	0.5	2.4	0.3	2.3	5.2	0.9	5.0	1.7

Table 12. Indices based on genus and species benthic invertebrate density in the surficial sediment on the thin-layer cap and cap reference station 25.

Taxon Indices	Station Number							
	25 (Ref)	19	16	20	10	17	14	23
Number of taxa	67	56	55	43	59	52	51	37
Shannon-Weiner Diversity Index	3.09	2.57	2.07	2.98	3.10	3.12	3.30	2.44
Margalef's Richness Index	8.97	7.26	6.44	6.74	8.42	7.80	7.87	5.89
Equitability (evenness)	0.74	0.64	0.52	0.79	0.76	0.79	0.84	0.67

Table 13. Indices, based on family benthic invertebrate density in the surficial sediment on the thin-layer cap and cap reference station 25 in 2017, and pre-cap (2009) baseline stations on the cap footprint and at reference station 289 in Beatty Cove.

Station Number	Number of Taxa	Indices			
		Density (individuals/m2)	Shannon-Weiner Diversity Index	Margalef's Richness Index	Equitability (evenness)
2017					
25 ref	25	1591	1.75	2.99	0.56
19	17	1971	1.36	2.11	0.48
16	17	4429	0.80	1.91	0.28
20	16	525	1.62	2.40	0.58
10	23	999	1.85	3.19	0.59
14	20	592	1.75	2.98	0.58
17	18	707	1.62	2.59	0.56
23	13	464	1.37	1.96	0.53
2009					
289 ref	7	5005	1.38	0.70	0.71
5C	16	15 562	1.77	1.55	0.64
B5	15	8363	1.63	1.55	0.60
D4	11	11 231	1.60	1.45	0.67
E3	13	16 503	1.48	1.34	0.58
E5	13	9473	1.76	1.31	0.69
G3	19	16 477	1.75	1.85	0.59
G5	14	36 158	1.74	1.24	0.66
H5	14	39 446	1.51	1.23	0.57

Table 14. Risk estimation of fish collected from Peninsula Harbour, 2017.

Species	Average Length (cm)	Number of Fish	Mercury				Polychlorinated Biphenyls			
			Whole-body Concentration (µg/g ww)		Hazard Quotient		Whole-body Concentration (ng/g ww)		Hazard Quotient	
			Mean	95% UCL	Mean	95% UCL	Mean	95% UCL	Mean	95% UCL
Longnose Sucker	41.7	10	0.15	0.21	0.8	1	1157	2083	0.3	0.5
Lake Whitefish	44.2	6	0.05	0.06	0.2	0.3	40	52	0.01	0.01
Lake Trout	59.8	9	0.16	0.30	0.5	0.7	506	2058	0.1	0.2
YOY Round Whitefish	9.7	4[1]	0.07	0.07	0.3	0.4	590	603	0.1	0.1

[1]composite samples

Table 15. Summary of hazard quotients for wildlife consuming fish in Peninsula Harbour.

Contaminant	Hazard Quotient			
	Mink		Bald Eagle	
	mean	95% UCL	mean	95% UCL
Mercury	0.01	0.02	0.5	0.7
PCBs	0.2	0.4	0.01	0.03

Figure 1. Peninsula Harbour Area of Concern, Lake Superior.

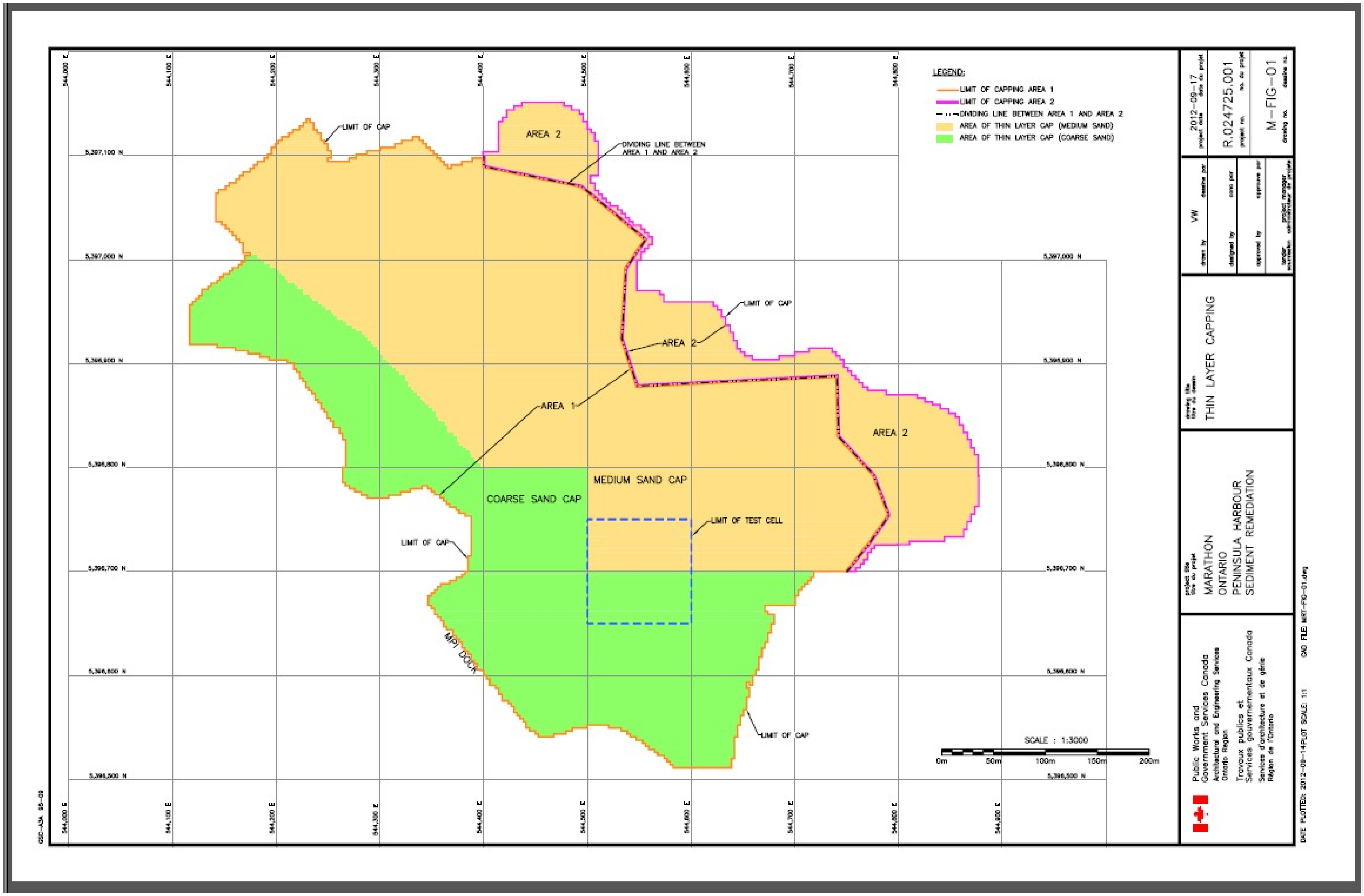


Figure 2. Capped area with 100 m grid lines (Figure source: Public Works and Government Services Canada, 2012).

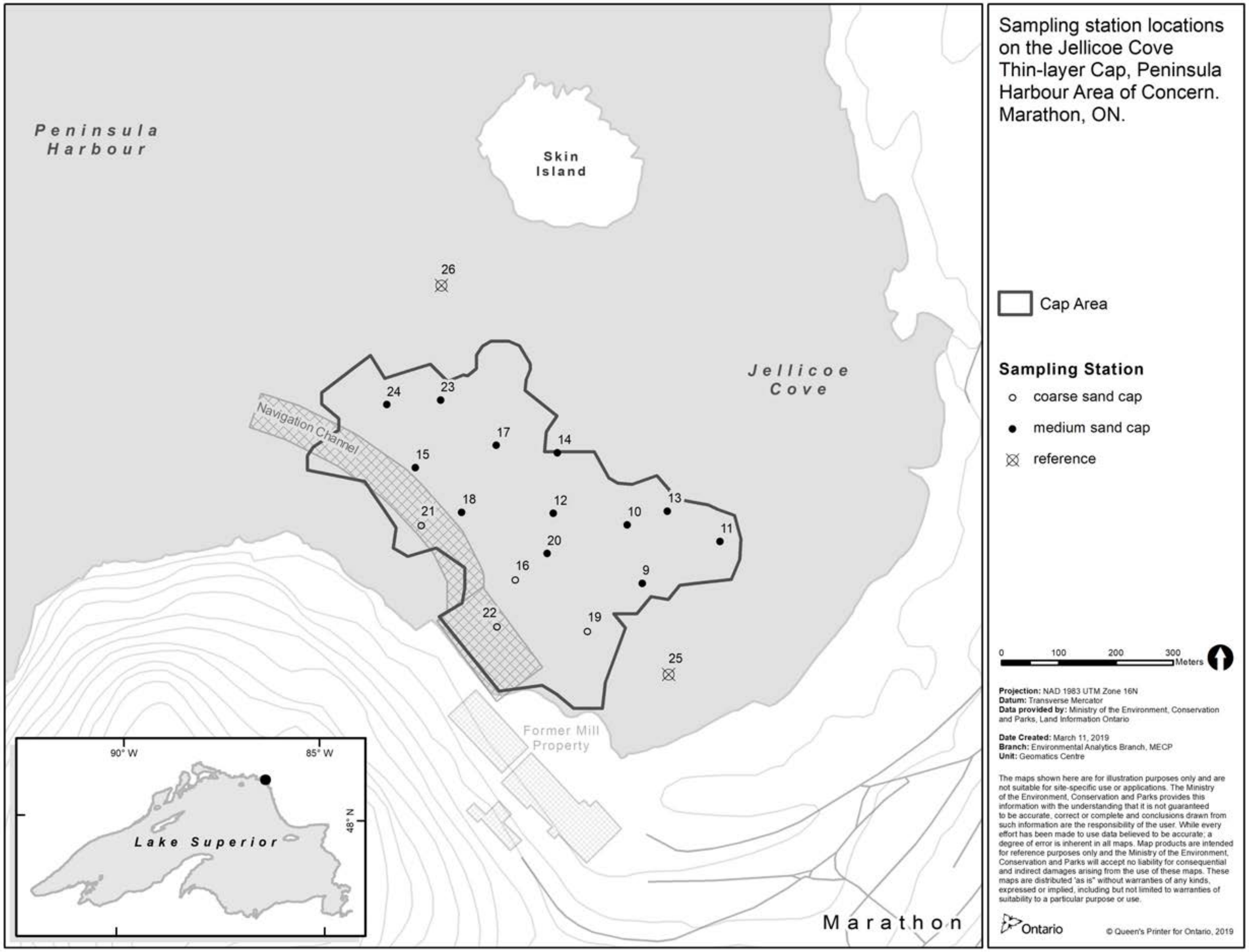


Figure 3. Jellicoe Cove thin-layer sand cap and 2017 sampling station locations.

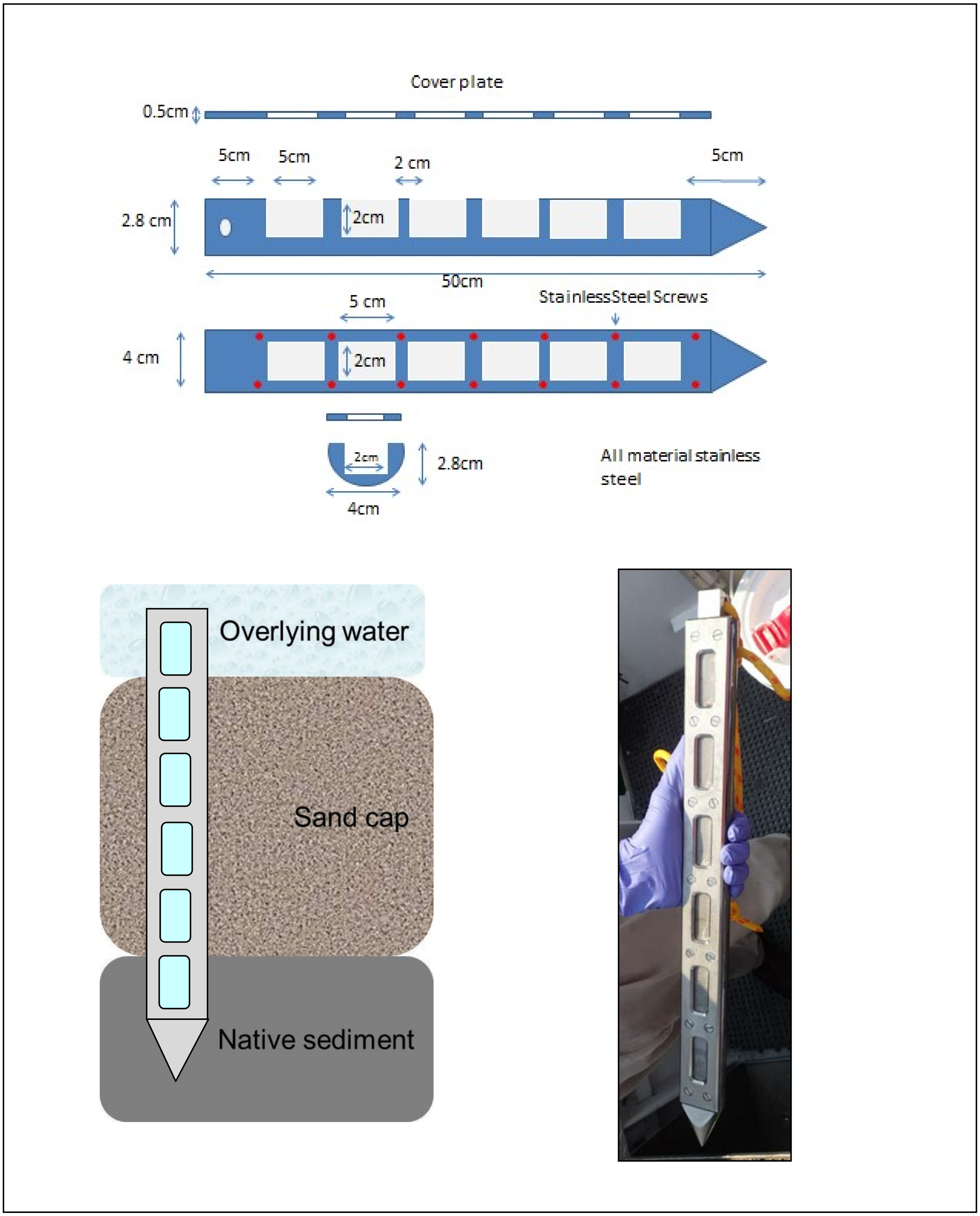


Figure 4. Design and placement configuration of vertical passive sampler (peeper).

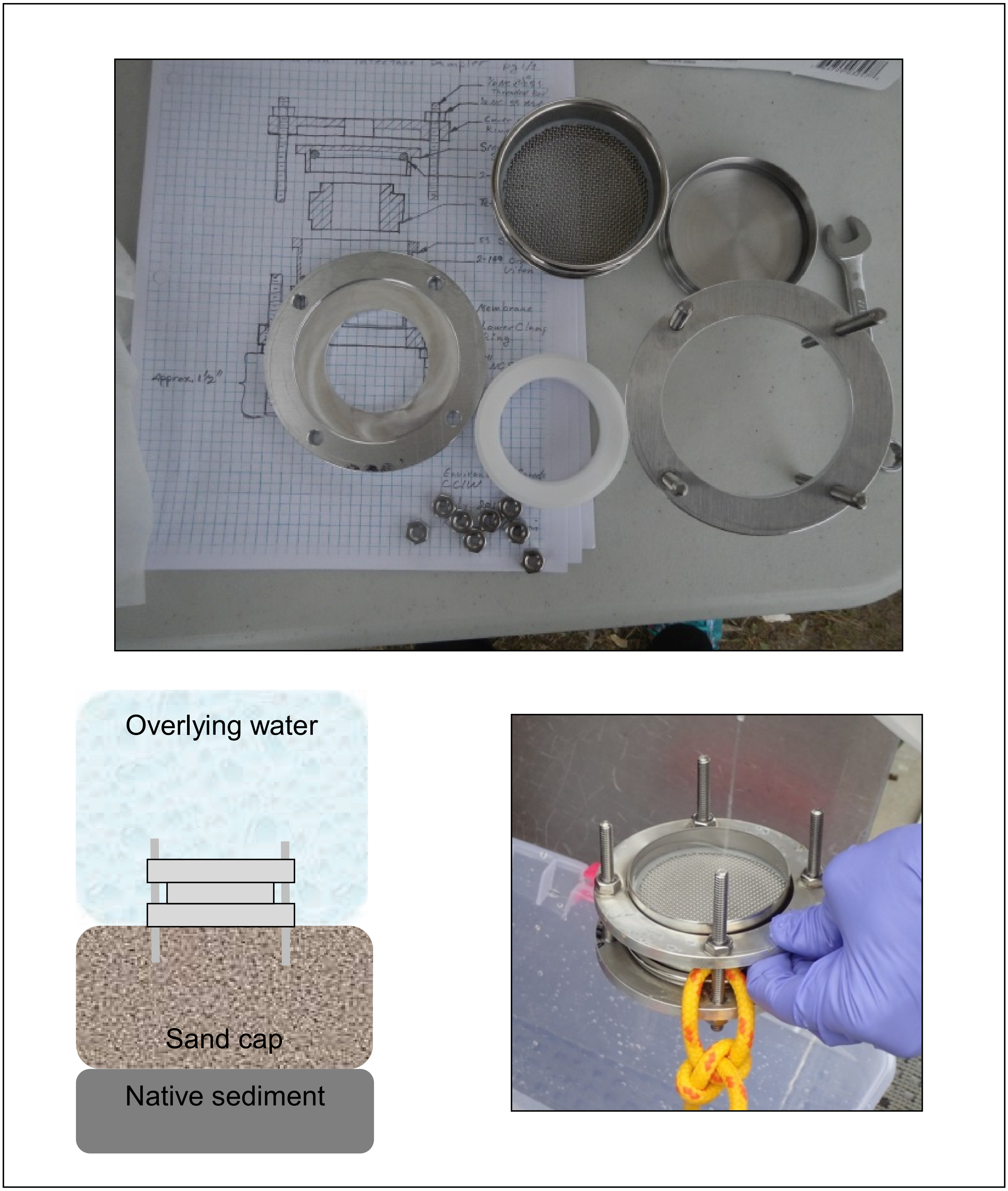
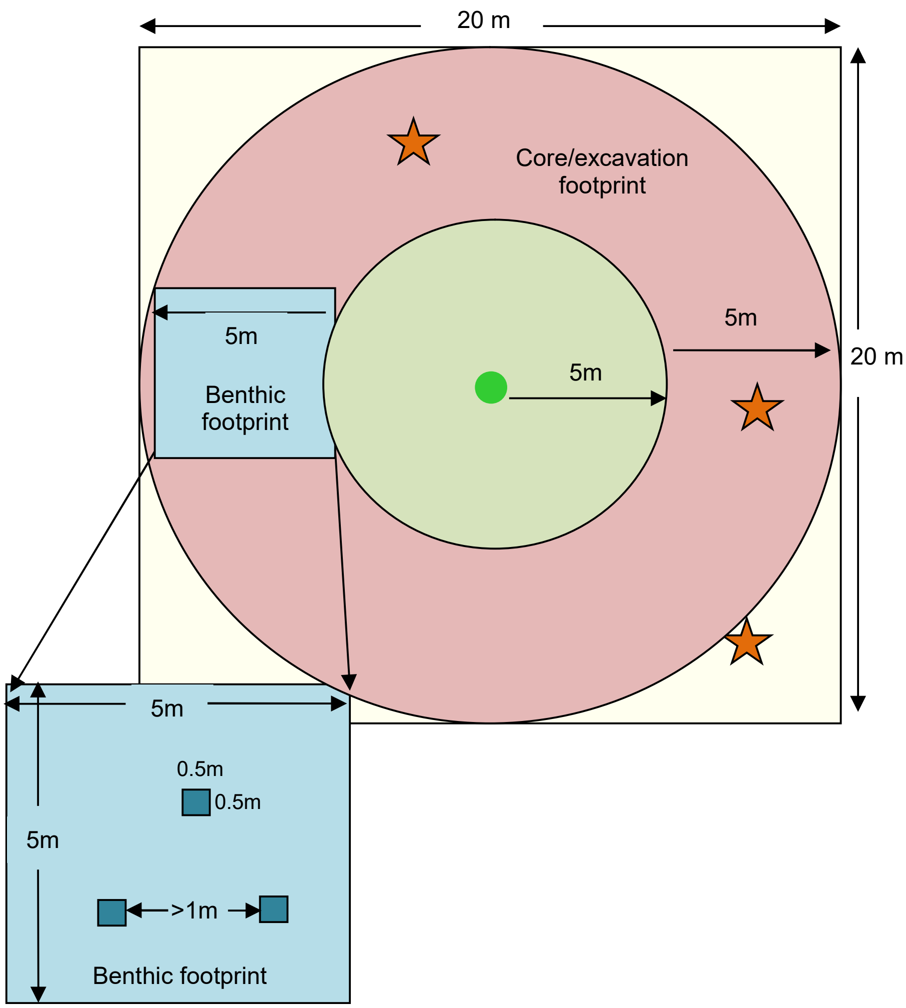


Figure 5. Design and placement configuration of the horizontal passive sampler.

Figure 6. Sediment core collected from sampling station on the thin-layer cap.



- centre point for placement of passive sampler
- area of each air-lifted benthic lift replicate (3 reps no less than 1m apart in a 5x5 m area)
- area for collection of core
- surficial sediment collected in a 20x20 m area, based on centre point

Figure 7. Optimal spacing and sampling design for monitoring components.

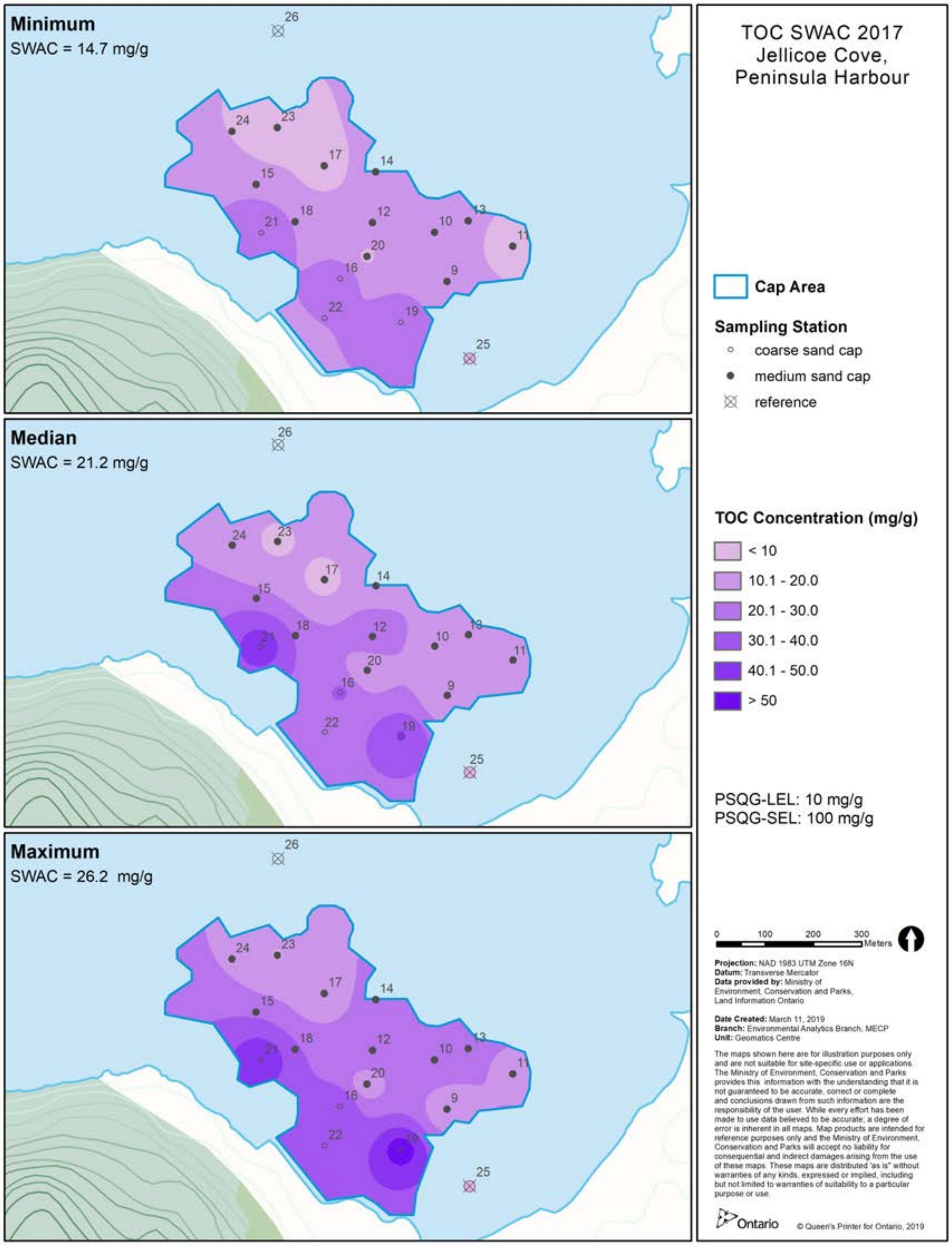


Figure 8. Spatially-weighted area average concentration of total organic carbon (mg/g) in the surficial sediment on the thin-layer cap. SWACs were derived using the maximum concentration detected at each station, the median of replicates from both surveys, and the minimum concentration detected at each station.

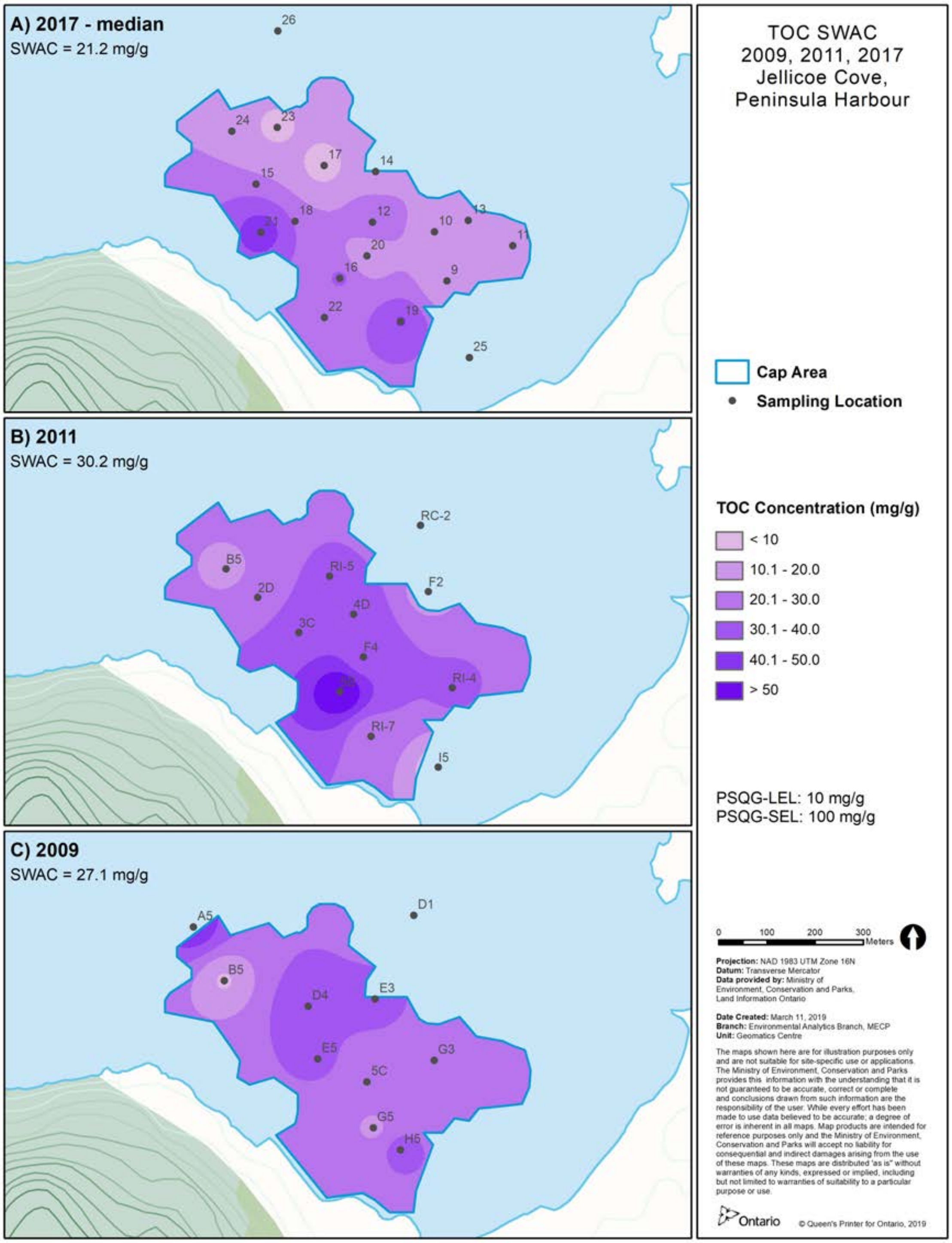


Figure 9. Spatially-weighted area average concentration (SWAC) of total organic carbon (mg/g) in the surficial sediment on the thin-layer cap collected in: A) 2017 (median of replicates at each station); B) 2011 (single replicates at each station); and C) 2009 (single replicate at each station).

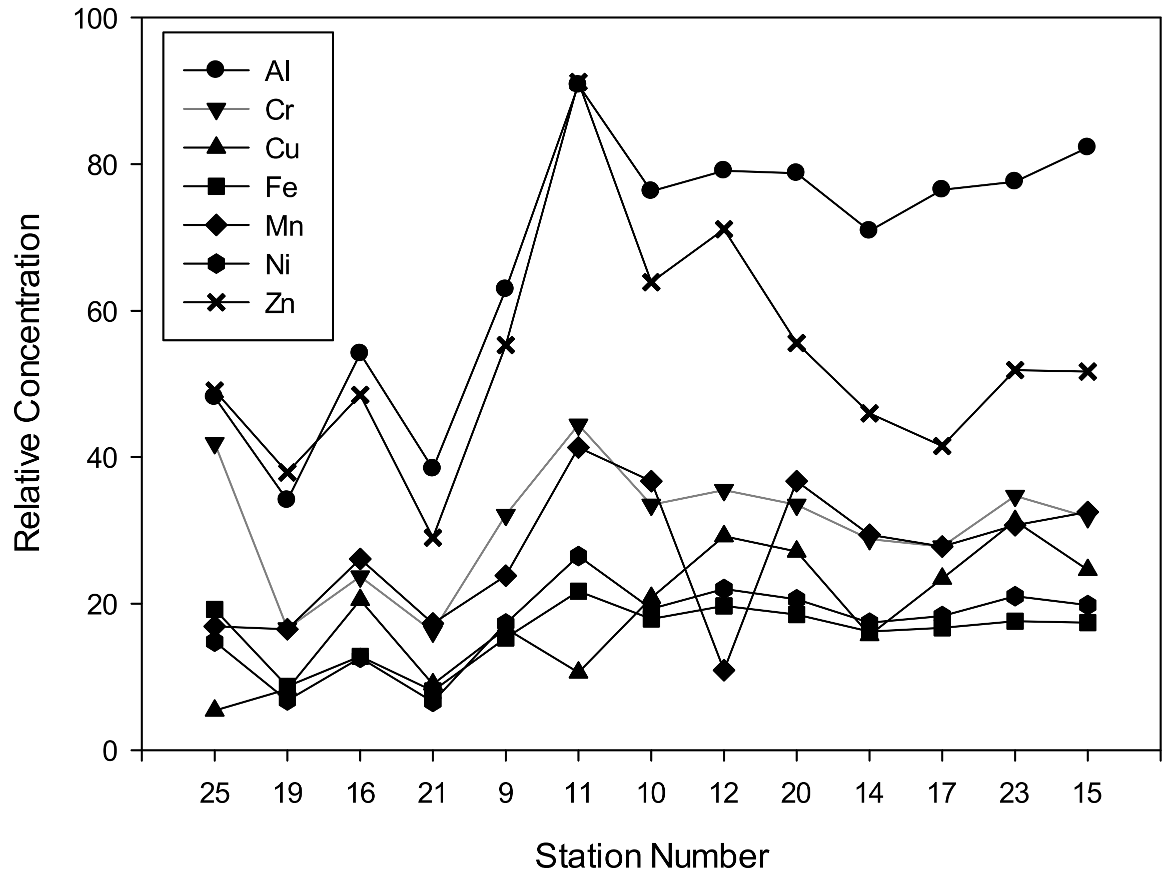


Figure 10. Median concentrations of select metals in surficial sediment at each station on the cap and cap reference station 25. The relative concentration on the y-axis is due to Al, Fe, and Mn being divided by factors of 10 in order to fit the scale so that trends could be easily compared.

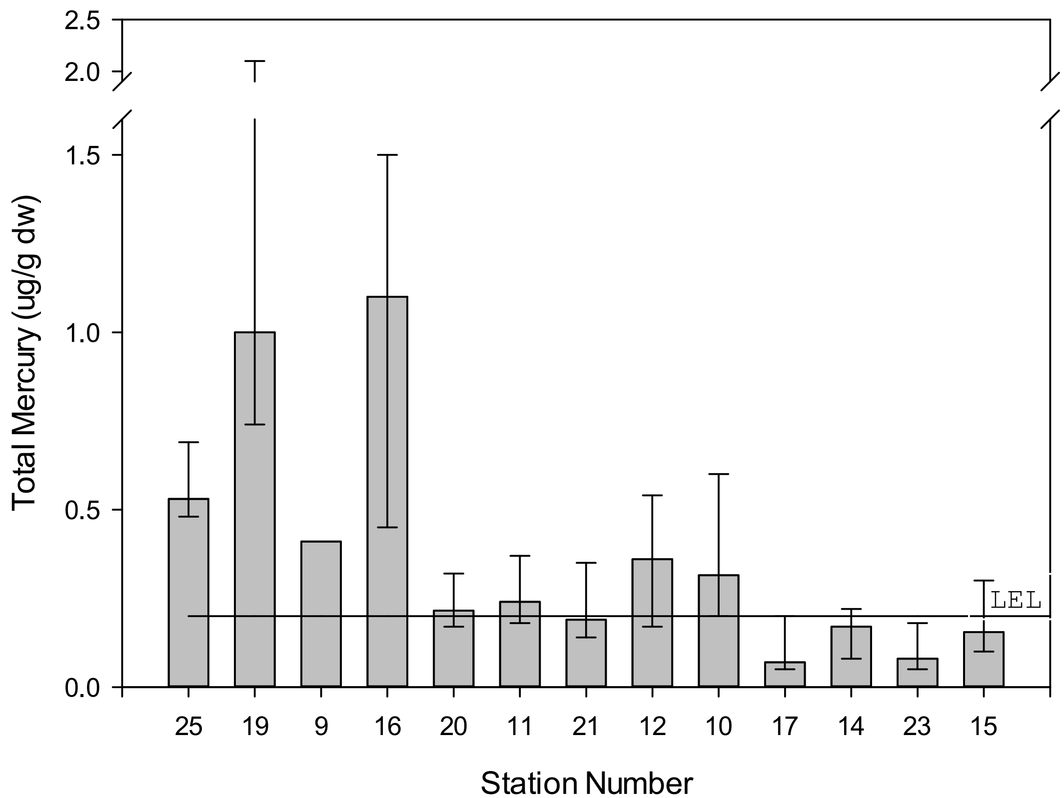


Figure 11. Median (max and min) of total mercury (μg/g) concentrations in surficial sediment on cap stations and cap reference station 25. Horizontal line depicts the PSQG – Lowest Effect Level (LEL) of 0.2 μg/g.

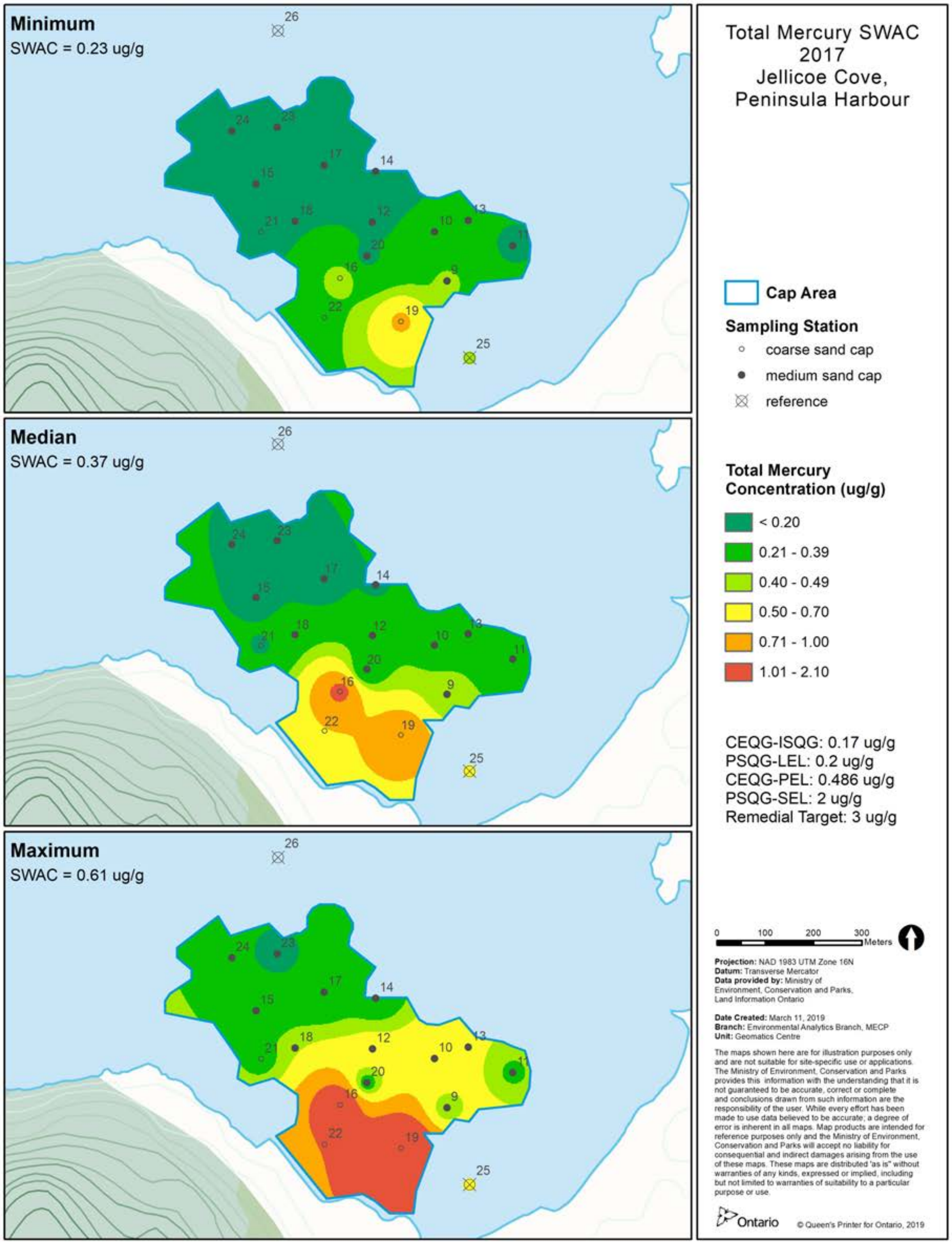


Figure 12. Spatially-weighted area average concentration of total mercury (µg/g) in the surficial sediment on the thin-layer cap. SWACs were derived using the maximum concentration detected at each station, the median of replicates from both surveys, and the minimum concentration detected at each station.

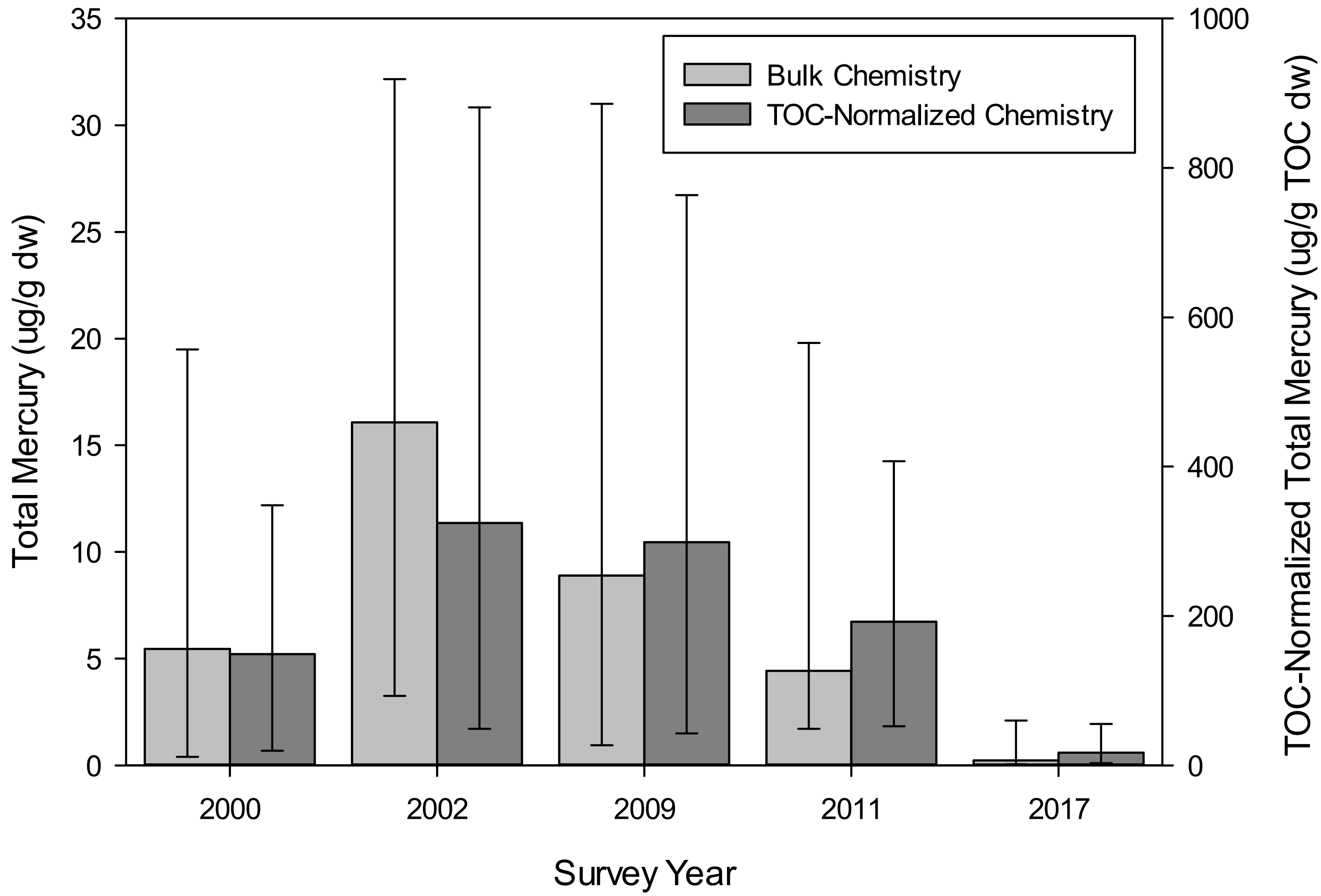


Figure 13. Median (and max and min) of total mercury concentrations (bulk chemistry and TOC-normalized concentrations) measured in the post-cap 2017 survey, and pre-cap/historical surveys conducted in 2000, 2002, 2009, and 2011.

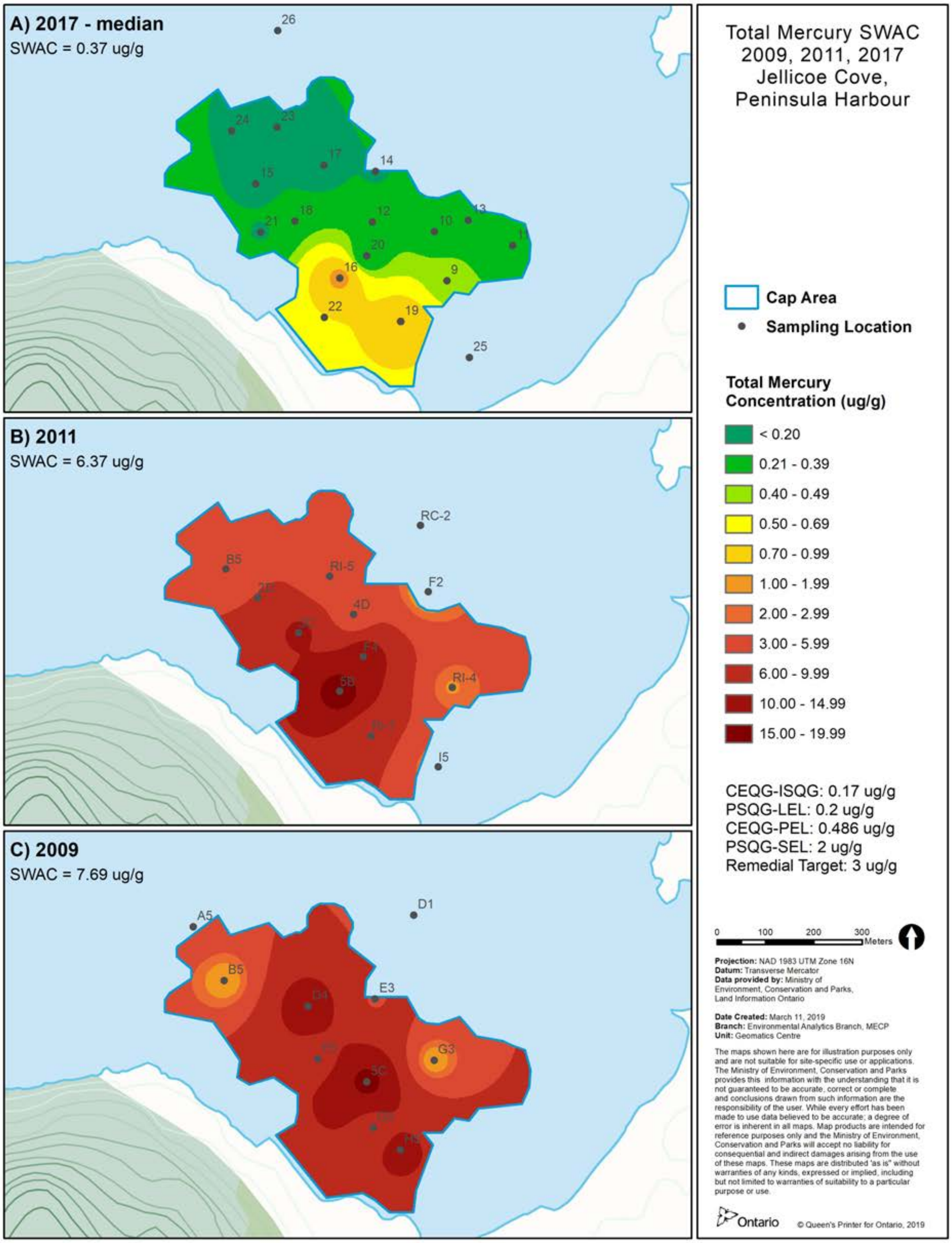


Figure 14. Spatially-weighted area average concentration (SWAC) of total mercury (µg/g) in the surficial sediment on the thin-layer cap collected in: A) 2017 (median of replicates at each station); B) 2011 (single replicates at each station); and C) 2009 (single replicate at each station).

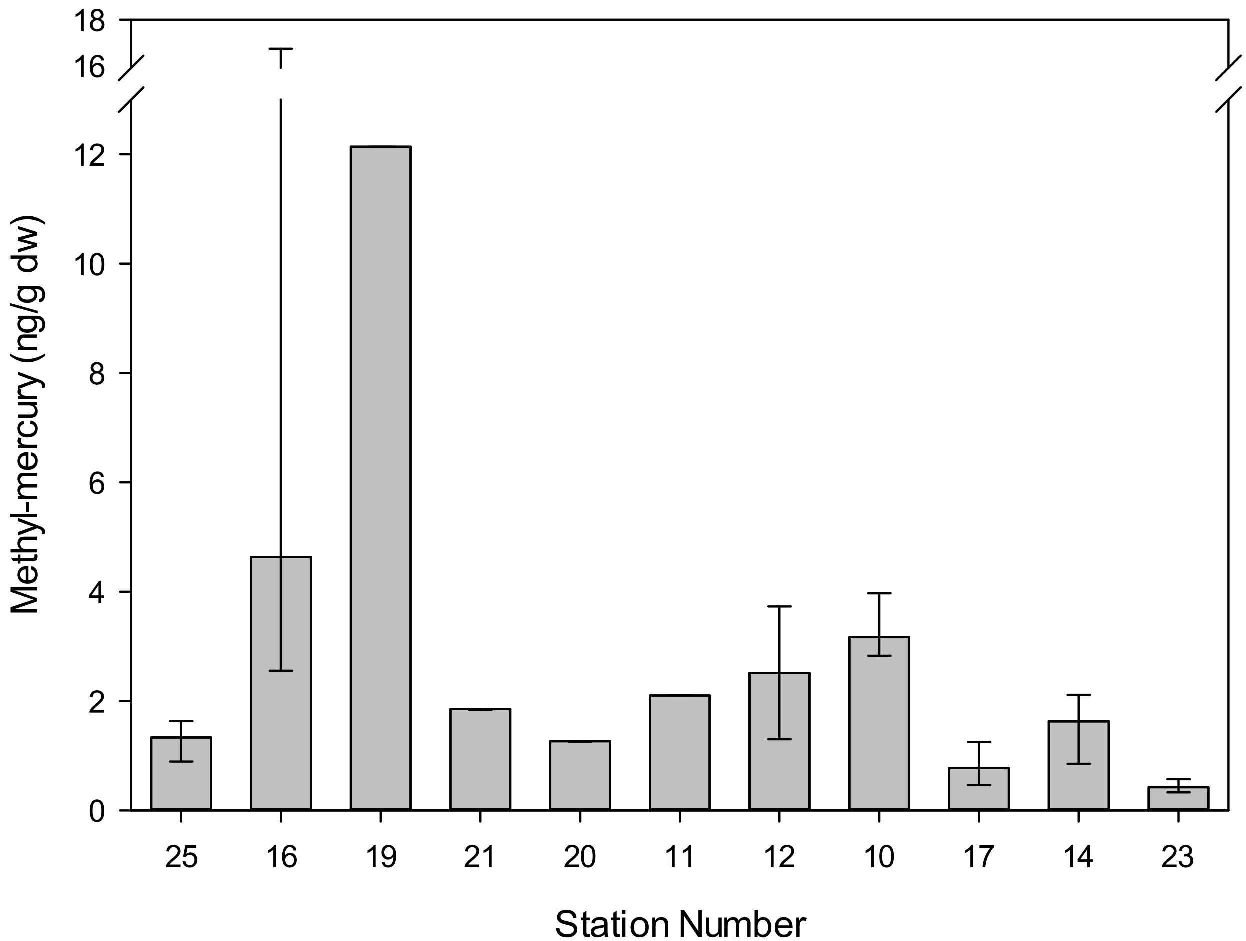


Figure 15. Median (and max and min) of methyl-mercury (ng/g) concentrations in surficial sediment on cap stations and cap reference station 25.

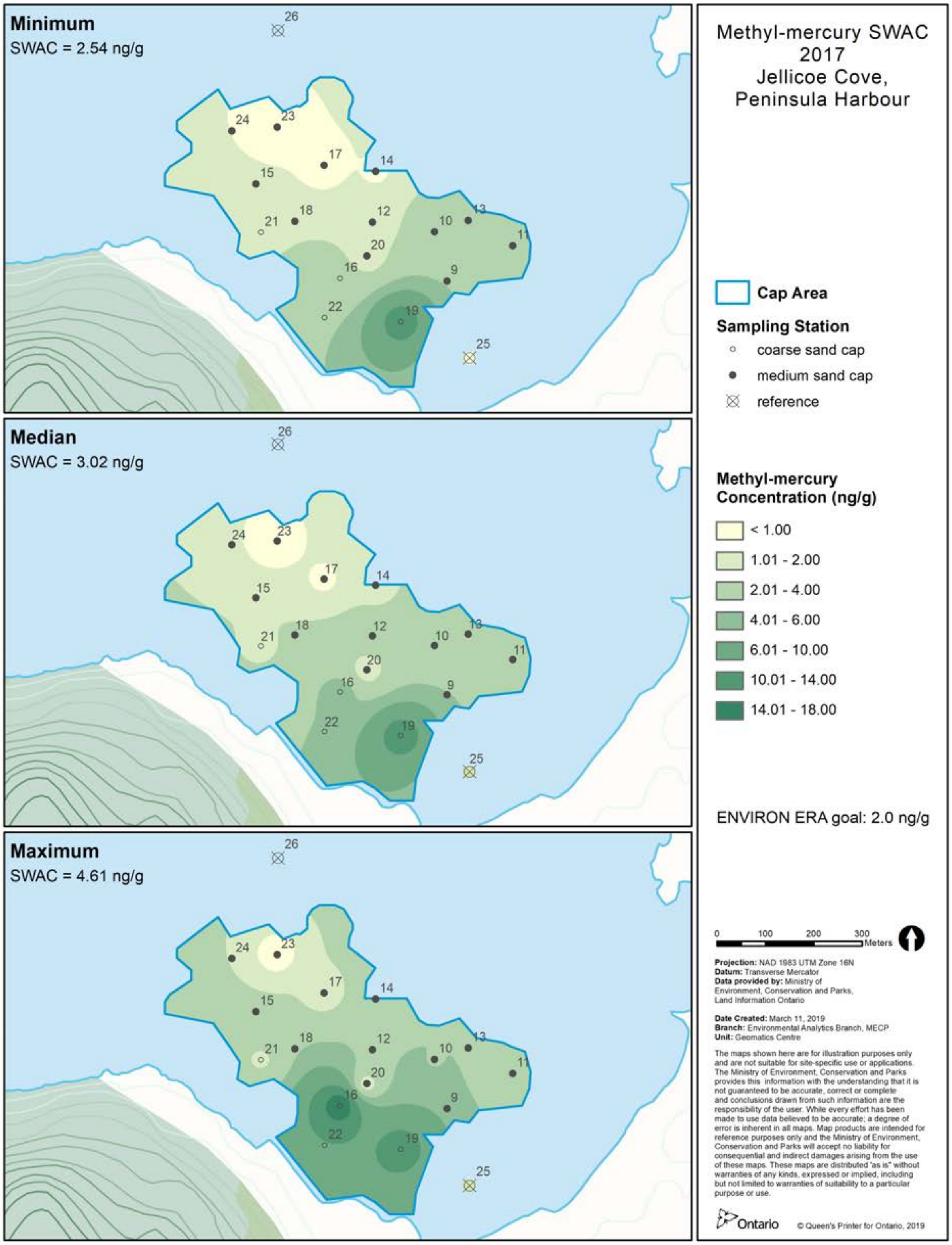


Figure 16. Spatially-weighted area average concentration of methyl-mercury (ng/g) in the surficial sediment on the thin-layer cap. SWACs were derived using the maximum concentration detected at each station, the median of replicates from both surveys, and the minimum concentration detected at each station.

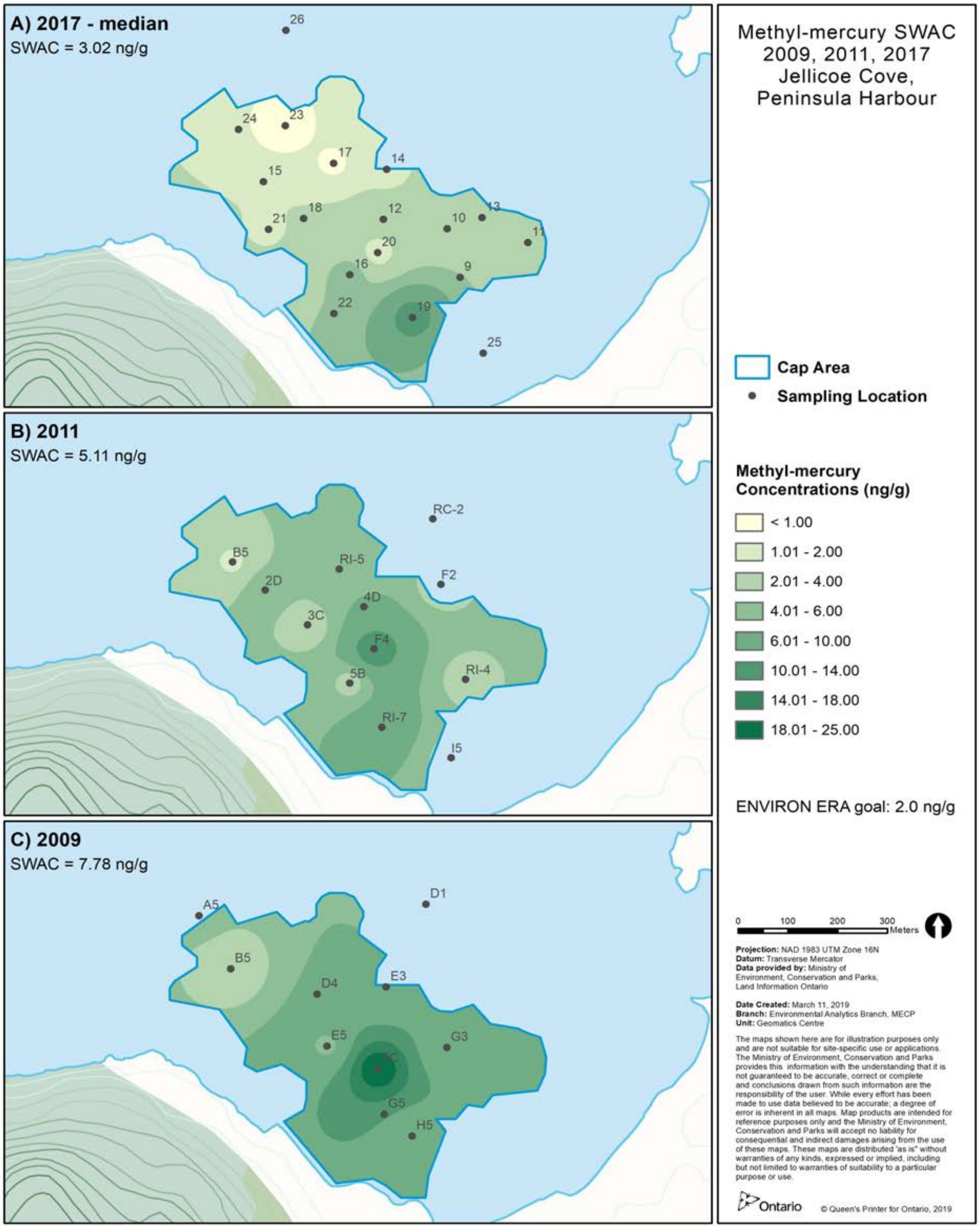


Figure 17.Spatially-weighted area average concentration (SWAC) of methyl-mercury (ng/g) in the surficial sediment on the thin-layer cap collected in: A) 2017 (median of replicates at each station); B) 2011 (single replicates at each station); and C) 2009 (single replicate at each station).

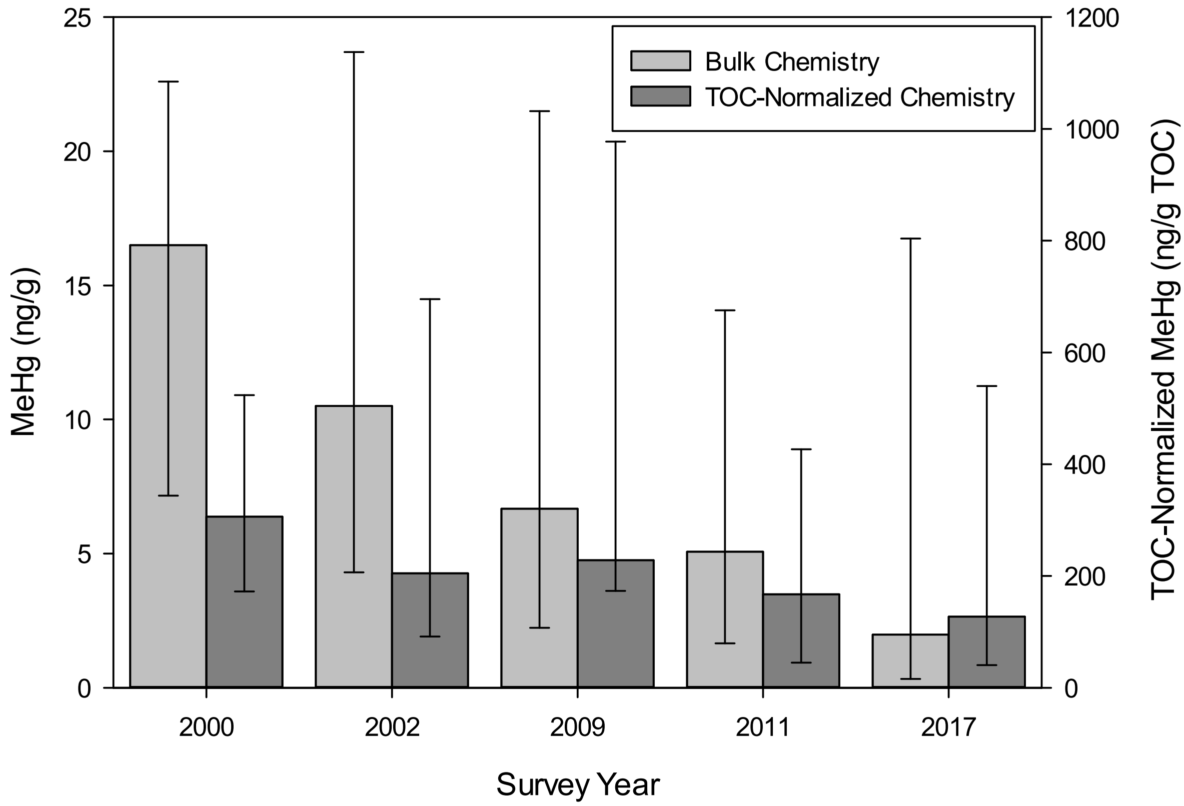


Figure 18. Median and range MeHg concentration (bulk chemistry and TOC-normalized concentrations) measured in the post-cap 2017 survey, and pre-cap surveys conducted in 2000, 2002, 2009, and 2011.

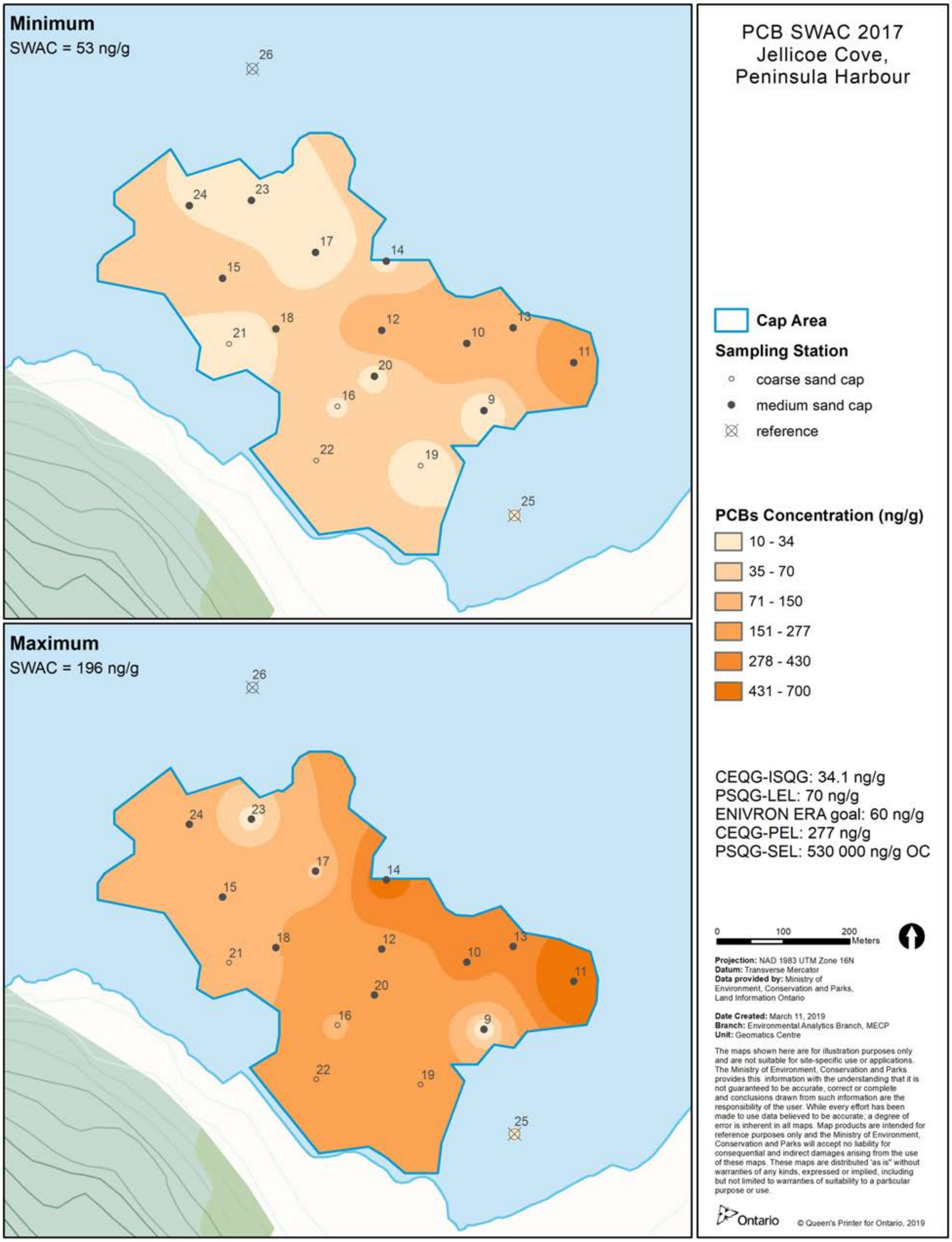


Figure 19. Spatially-weighted area average concentration of PCBs (ng/g) in the surficial sediment on the thin-layer cap. SWACs were derived using the maximum and minimum concentrations detected at each station.

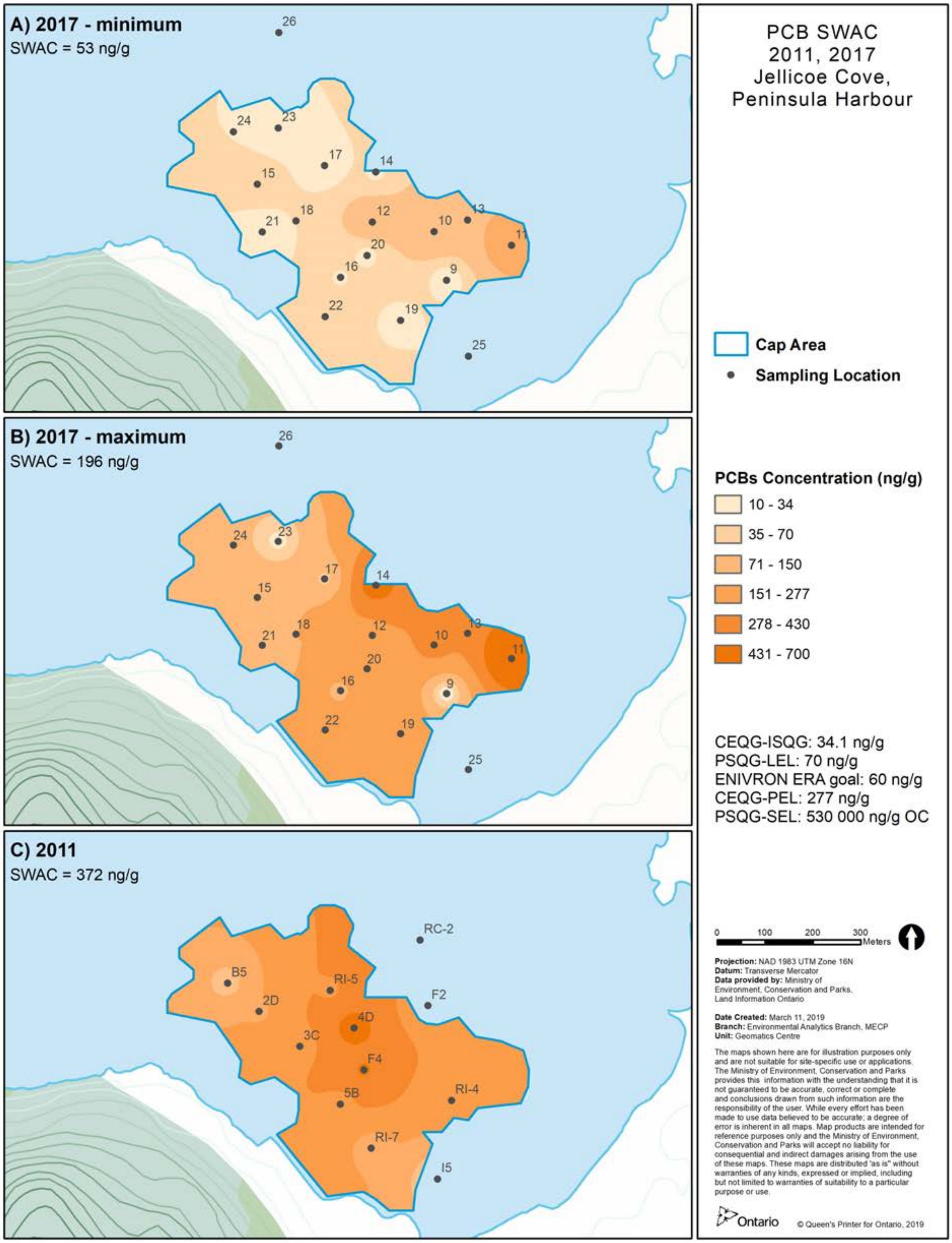


Figure 20. Spatially-weighted area average concentration (SWAC) of PCBs (ng/g) in the surficial sediment on the thin-layer cap collected in: A) 2017 (minimum of replicates at each station); B) 2017 (maximum of replicates at each station; and C) 2011 (single replicates at each station).

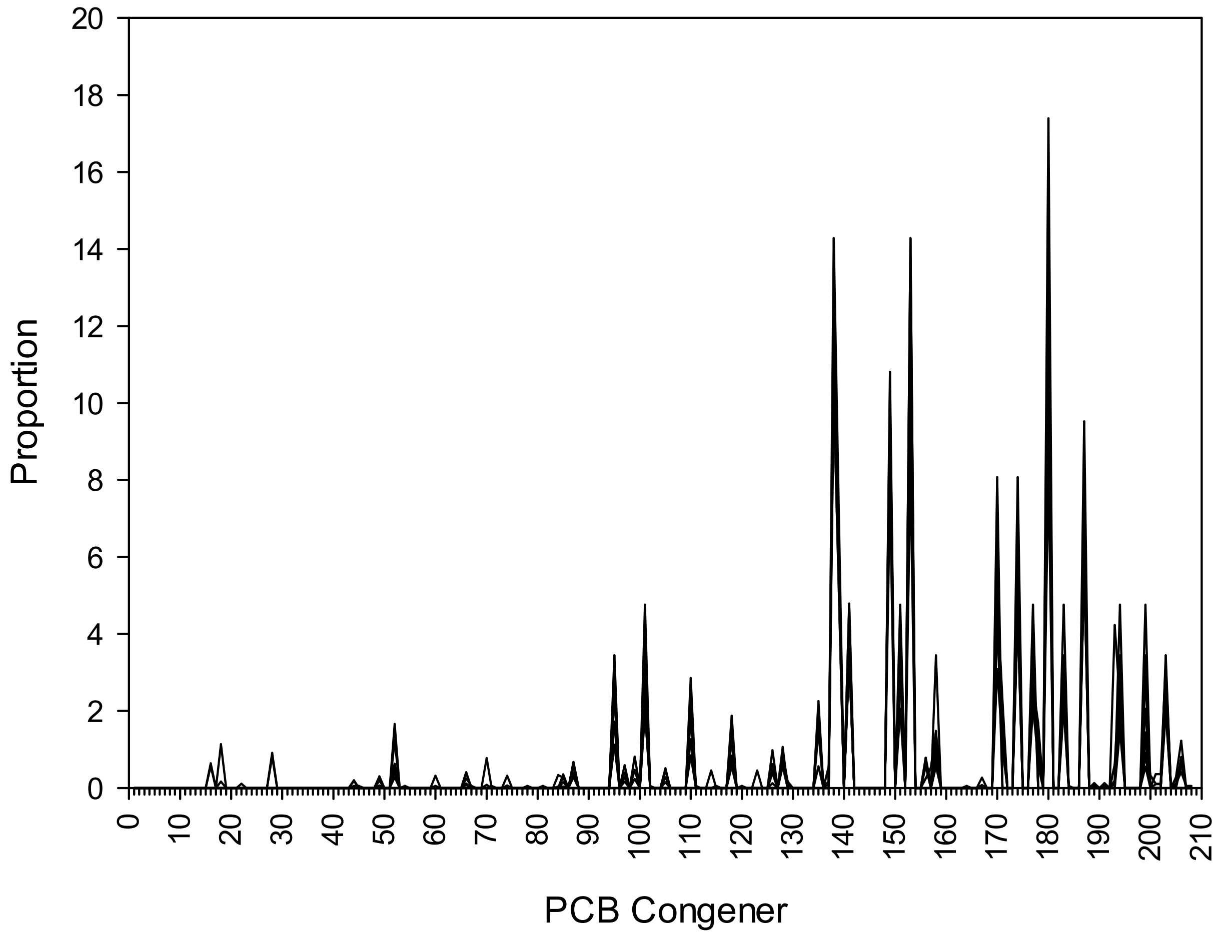


Figure 21. Proportion of PCB congeners in surficial sediment on the thin-layer cap.

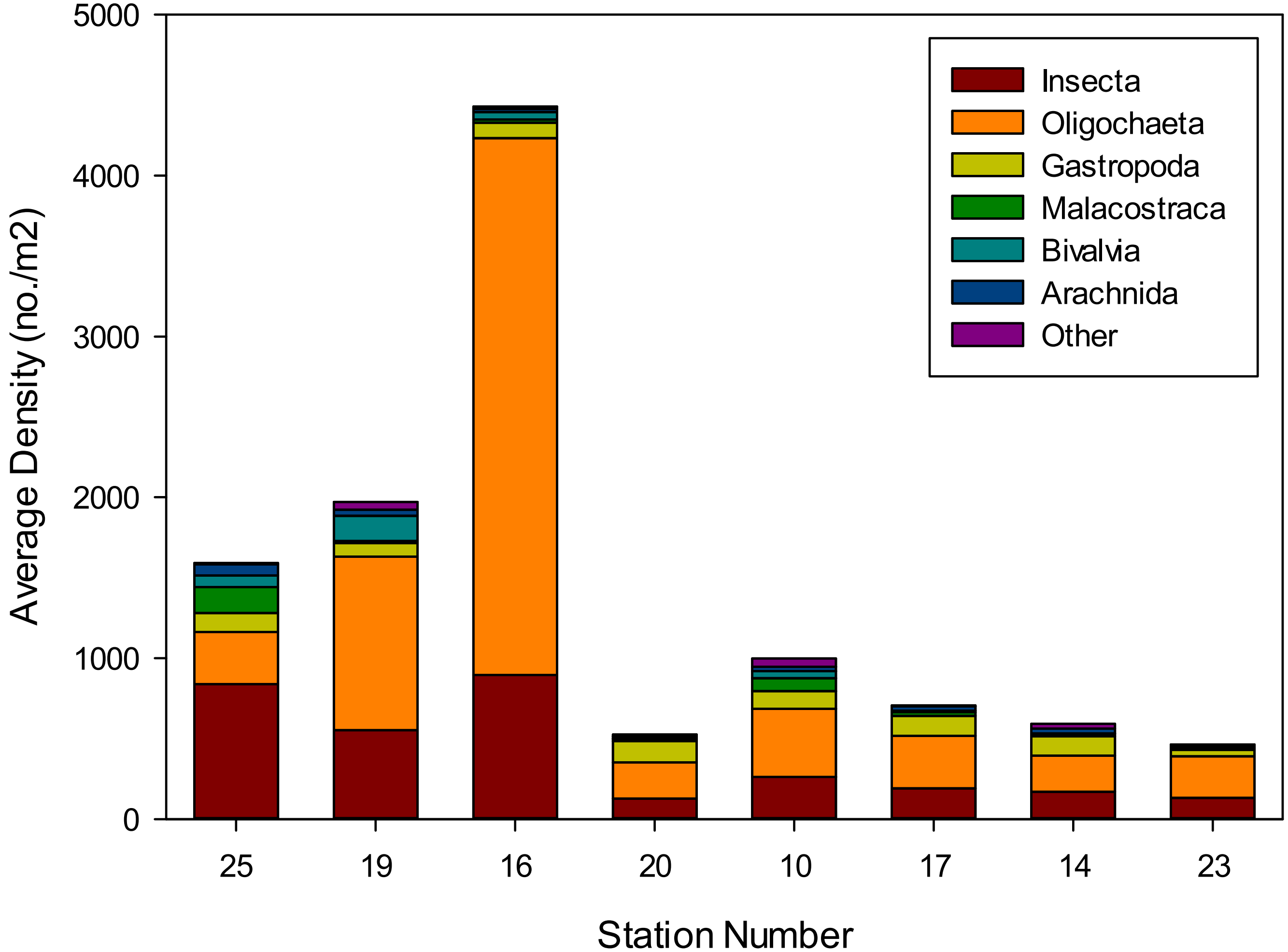


Figure 22. Average density of benthic invertebrates collected from the surficial sediment at the cap stations and reference station 25.

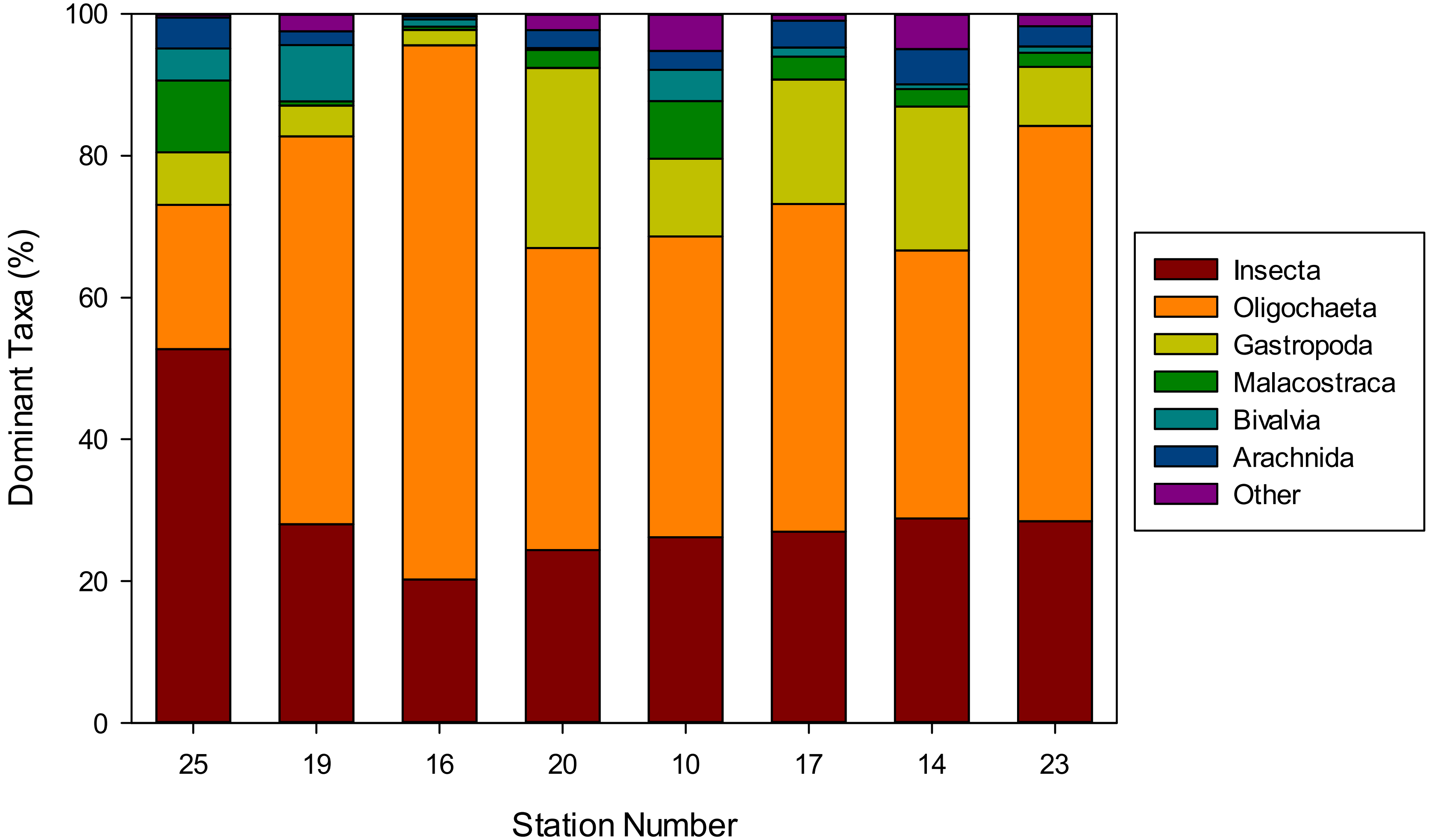


Figure 23. Percent dominant benthic invertebrate taxa in the surficial sediment at the cap stations and reference station 25.

Appendix Table 1a. Particle size of surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	<2.63 um >0.10 um		<62 um >2.63 um		<1000 um >62 um		1000-2000 um	
		% vol.	qualifier	% vol.	qualifier	% vol.	qualifier	% vol.	qualifier
100170009	GL171305	1.2	-	6.5	-	71.4	-	21	-
100170010	GL171306	3.5	-	40.5	-	50.2	-	6	-
100170011	GL171308	2.9	-	19.3	-	75.7	-	2	-
100170014	GL171309	0.9	-	7.3	-	55.1	-	36.5	-
100170015	GL171310	1.7	-	15.7	-	68.7	-	14	-
100170016	GL171311	8.2	-	66.3	-	25.5	-	0.5	<=W
100170016	GL171312	8.8	-	67	-	24.2	-	0.5	<=W
100170016	GL171313	3.5	-	26.7	-	47.9	-	22	-
100170017	GL171316	1.3	-	13.8	-	60.9	-	24	-
100170019	GL171317	1.5	-	12.2	-	57.6	-	28.5	-
100170019	GL171318	1.6	-	12.9	-	63.6	-	22	-
100170019	GL171319	2.5	-	19.6	-	58.4	-	19.5	-
100170020	GL171320	1.7	-	16.5	-	63.6	-	18	-
100170021	GL171321	4.3	-	34.5	-	54	-	7	-
100170023	GL171322	1.6	-	13.7	-	56.9	-	28	-
100170023	GL171323	1	-	7.4	-	60.4	-	31	-
100170023	GL171324	1.6	-	13.2	-	59.8	-	25.5	-
100170025	GL171325	2.3	-	14.7	-	83	-	0.5	<=W
100170025	GL171326	2.8	-	20.3	-	76.9	-	0.5	<=W

Appendix Table 1b. Particle size of surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	<2.63 um >0.10 um		<62 um >2.63 um		<1000 um >62 um		1000-2000 um	
		% vol	qualifier	% vol	qualifier	% vol	qualifier	% vol	qualifier
100170019	GL172261	2.8	-	25.1	-	49.4	-	22.5	-
100170019	GL172262	2.6	-	22	-	49.3	-	26	-
100170019	GL172263	2.8	-	28.5	-	48.9	-	20	-
100170016	GL172264	3.4	-	32.6	-	50.7	-	13.5	-
100170016	GL172265	1.7	-	13.9	-	55.8	-	28.5	-
100170016	GL172266	2.1	-	19.5	-	55.2	-	23	-
100170020	GL172267	2.2	-	23.8	-	58.6	-	15.5	-
100170020	GL172268	1.6	-	15.9	-	61.1	-	21.5	-
100170020	GL172269	1.7	-	13.9	-	53.4	-	31	-
100170012	GL172270	3.9	-	40.2	-	54	-	2	-
100170012	GL172271	3.3	-	32.7	-	58.4	-	5.5	-
100170012	GL172272	2.3	-	21.9	-	64	-	12	-
100170025	GL172273	2.5	-	16.4	-	81.1	-	0.5	<=W
100170025	GL172274	2.2	-	15.4	-	81.2	-	1	<T
100170025	GL172275	1.9	-	9.7	-	88.4	-	0.5	<=W
100170021	GL172276	2.4	-	21.5	-	55.7	-	20.5	-
100170021	GL172277	2.8	-	25.5	-	60.1	-	11.5	-
100170021	GL172278	1.6	-	12.6	-	63.1	-	22.5	-
100170010	GL172279	2.9	-	27.3	-	57.9	-	12	-
100170010	GL172280	2.6	-	26.6	-	57.7	-	13	-
100170010	GL172281	3.1	-	31.6	-	60.8	-	4.5	-
100170011	GL172282	2.6	-	22.9	-	71.3	-	3	-
100170011	GL172283	2.6	-	29.4	-	65.5	-	2.5	-
100170011	GL172284	2.9	-	24.5	-	70.2	-	2.5	-
100170014	GL172285	1.5	-	13.8	-	55.7	-	29	-
100170014	GL172286	1.5	-	14.3	-	55.2	-	29	-
100170014	GL172287	1.6	-	14.7	-	56.8	-	27	-
100170017	GL172288	1.4	-	11.5	-	70.7	-	16.5	-
100170017	GL172289	1	-	8.7	-	60.3	-	30	-
100170023	GL172291	1.1	-	7.7	-	62.9	-	28.5	-
100170015	GL172294	2.9	-	25.9	-	61.5	-	9.5	-
100170015	GL172295	7.5	-	58.4	-	34.1	-	0.5	<=W
100170015	GL172296	6.7	-	56.1	-	37.2	-	0.5	<=W

Appendix Table 2a. Nutrients in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	Total Organic Carbon		Total Nitrogen		Phosphorus	
		(mg/g)	qualifier	(mg/g)	qualifier	(ug/g)	qualifier
100170009	GL171305	10	-	1.31	-	650	-
100170010	GL171306	28	-	1.68	-	570	-
100170011	GL171308	6.5	-	1.13	-	440	-
100170014	GL171309	14	-	1.46	-	600	-
100170015	GL171310	9.8	-	1.68	-	610	-
100170016	GL171311	26	-	1.56	-	510	-
100170016	GL171312	36	-	1.53	-	490	-
100170016	GL171313	33	-	1.12	-	460	-
100170017	GL171316	10	-	1.05	-	610	-
100170019	GL171317	55	-	0.1	<MDL	260	-
100170019	GL171318	47	-	0.1	<MDL	280	-
100170019	GL171319	40	-	0.1	<MDL	340	-
100170020	GL171320	10	-	1.31	-	630	-
100170021	GL171321	28	-	0.93	-	400	-
100170023	GL171322	9.8	-	1.14	-	660	-
100170023	GL171323	7.8	-	1.2	-	650	-
100170023	GL171324	9.4	-	0.81	-	620	-
100170025	GL171325	4.2	-	0.1	<MDL	1110	-
100170025	GL171326	4.3	-	0.1	<MDL	970	-

Appendix Table 2b. Nutrients in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	Total Organic Carbon		Total Nitrogen		Phosphorus	
		mg/g	qualifier	mg/g	qualifier	ug/g	qualifier
100170019	GL172261	41	-	0.27	-	340	-
100170019	GL172262	31	-	0.1	<MDL	350	-
100170019	GL172263	30	-	0.79	-	330	-
100170016	GL172264	28	-	0.1	<MDL	280	-
100170016	GL172265	39	-	0.18	-	330	-
100170016	GL172266	29	-	0.2	-	370	-
100170020	GL172267	12	-	0.25	-	610	-
100170020	GL172268	9.1	-	0.13	-	620	-
100170020	GL172269	10	-	0.39	-	490	-
100170012	GL172270	30	-	1.18	-	610	-
100170012	GL172271	28	-	0.58	-	610	-
100170012	GL172272	9.9	-	0.27	-	570	-
100170025	GL172273	3.8	-	0.25	-	1000	-
100170025	GL172274	5.1	-	0.3	-	850	-
100170025	GL172275	3.9	-	0.58	-	1050	-
100170021	GL172276	47	-	0.1	<MDL	250	-
100170021	GL172277	43	-	0.37	-	290	-
100170021	GL172278	47	-	0.1	<MDL	250	-
100170010	GL172279	16	-	0.39	-	660	-
100170010	GL172280	14	-	0.68	-	680	-
100170010	GL172281	19	-	0.82	-	670	-
100170011	GL172282	15	-	0.42	-	470	-
100170011	GL172283	18	-	0.38	-	450	-
100170011	GL172284	13	-	0.57	-	480	-
100170014	GL172285	18	-	0.1	<MDL	500	-
100170014	GL172286	16	-	0.52	-	520	-
100170014	GL172287	24	-	0.1	<MDL	480	-
100170017	GL172288	5.7	-	0.23	-	520	-
100170017	GL172289	5.1	-	0.1	<MDL	520	-
100170023	GL172291	4.7	-	0.1	<MDL	530	-
100170015	GL172294	8.7	-	0.1	<MDL	540	-
100170015	GL172295	12	-	0.16	-	520	-
100170015	GL172296	11	-	0.1	<MDL	510	-

Appendix Table 3a. Ions in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	Calcium		Magnesium		Potassium		Sodium		Sulphur	
		(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier
100170009	GL171305	20500	-	9470	-	870	-	160	-	190	-
100170010	GL171306	31900	-	19100	-	1020	-	200	-	660	-
100170011	GL171308	7700	-	9300	-	740	-	140	-	200	-
100170014	GL171309	24600	-	13400	-	760	-	160	-	250	-
100170015	GL171310	41500	-	22100	-	1210	-	230	-	200	-
100170016	GL171311	67600	-	43800	-	1110	-	220	-	600	-
100170016	GL171312	75100	-	47600	-	1110	-	210	-	740	-
100170016	GL171313	84400	-	55500	-	1020	-	210	-	580	-
100170017	GL171316	30800	-	15500	-	980	-	200	-	240	-
100170019	GL171317	131000	-	84300	-	400	-	140	-	460	-
100170019	GL171318	129000	-	82000	-	440	-	150	-	460	-
100170019	GL171319	111000	-	70800	-	550	-	170	-	480	-
100170020	GL171320	32800	-	17000	-	1160	-	230	-	240	-
100170021	GL171321	83600	-	55100	-	850	-	200	-	420	-
100170023	GL171322	33900	-	18400	-	1240	-	230	-	210	-
100170023	GL171323	33700	-	16700	-	1160	-	180	-	200	-
100170023	GL171324	34300	-	18700	-	1150	-	220	-	230	-
100170025	GL171325	8700	-	6000	-	390	-	130	-	100	-
100170025	GL171326	11200	-	8230	-	450	-	140	-	110	-

Appendix Table 3b. Ions in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB.

Station ID	Sample No.	Calcium		Magnesium		Potassium		Sodium		Sulphur	
		ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier
100170019	GL172261	107000	-	58600	-	660	-	180	-	570	-
100170019	GL172262	109000	-	59700	-	780	-	200	-	540	-
100170019	GL172263	95900	-	52900	-	850	-	200	-	540	-
100170016	GL172264	102000	-	56900	-	820	-	170	-	460	-
100170016	GL172265	118000	-	65500	-	830	-	200	-	360	-
100170016	GL172266	112000	-	62500	-	870	-	200	-	420	-
100170020	GL172267	33600	-	15600	-	1250	-	260	-	360	-
100170020	GL172268	36500	-	14600	-	1220	-	260	-	210	-
100170020	GL172269	33800	-	14800	-	1130	-	220	-	290	-
100170012	GL172270	30900	-	16400	-	1160	-	220	-	570	-
100170012	GL172271	30900	-	16900	-	1230	-	240	-	580	-
100170012	GL172272	33700	-	13300	-	1200	-	260	-	250	-
100170025	GL172273	9670	-	5540	-	540	-	160	-	130	-
100170025	GL172274	13100	-	7130	-	560	-	180	-	160	-
100170025	GL172275	8210	-	4410	-	360	-	130	-	130	-
100170021	GL172276	130000	-	73900	-	640	-	180	-	360	-
100170021	GL172277	113000	-	63900	-	710	-	180	-	420	-
100170021	GL172278	131000	-	74300	-	680	-	190	-	490	-
100170010	GL172279	22500	-	13400	-	1040	-	220	-	420	-
100170010	GL172280	21600	-	13100	-	980	-	210	-	370	-
100170010	GL172281	21900	-	13000	-	990	-	200	-	360	-
100170011	GL172282	10300	-	9750	-	740	-	130	-	350	-
100170011	GL172283	10100	-	10400	-	880	-	140	-	400	-
100170011	GL172284	10800	-	10100	-	820	-	160	-	330	-
100170014	GL172285	26800	-	11700	-	880	-	200	-	310	-
100170014	GL172286	28100	-	11600	-	870	-	190	-	280	-
100170014	GL172287	28900	-	11100	-	710	-	150	-	320	-
100170017	GL172288	36600	-	11400	-	960	-	200	-	160	-
100170017	GL172289	36800	-	12200	-	1050	-	240	-	160	-
100170023	GL172291	38800	-	12200	-	1000	-	210	-	140	-
100170015	GL172294	43800	-	21400	-	1160	-	220	-	240	-
100170015	GL172295	41600	-	23700	-	1120	-	180	-	340	-
100170015	GL172296	41400	-	22400	-	1060	-	180	-	310	-

Appendix Table 4a. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	aluminum		antimony		arsenic		barium		beryllium		boron	
		(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier
100170009	GL171305	6290		5	<MDL	5	<MDL	24.8		0.172		4.44	
100170010	GL171306	7220		5	<MDL	5	<MDL	31.8		0.234		7.64	
100170011	GL171308	8090		5	<MDL	5	<MDL	23.6		0.201		4.43	
100170014	GL171309	6080		5	<MDL	5	<MDL	23.4		0.174		5.95	
100170015	GL171310	7800		5	<MDL	5	<MDL	33.8		0.228		6.42	
100170016	GL171311	6980		5	<MDL	5	<MDL	31.3		0.222		10.2	
100170016	GL171312	6870		5	<MDL	5	<MDL	32.2		0.229		8.89	
100170016	GL171313	5890		10	<EDL	10	<EDL	28.8		0.19		7.8	
100170017	GL171316	6920		5	<MDL	5	<MDL	28.3		0.188		5.8	
100170019	GL171317	2180		10	<EDL	10	<EDL	10.5		0.067		4.91	
100170019	GL171318	2420		10	<EDL	10	<EDL	12.1		0.059		3.8	
100170019	GL171319	3140		10	<EDL	10	<EDL	14.9		0.108		5.87	
100170020	GL171320	7400		5	<MDL	5	<MDL	32.5		0.218		7.69	
100170021	GL171321	5570		10	<EDL	10	<EDL	22.9		0.169		7.99	
100170023	GL171322	7900		5	<MDL	5	<MDL	35.4		0.235		7.64	
100170023	GL171323	7370		5	<MDL	5	<MDL	35.3		0.197		6.01	
100170023	GL171324	7620		5	<MDL	5	<MDL	34.2		0.21		6.32	
100170025	GL171325	4380		5	<MDL	5	<MDL	14		0.13		2.44	
100170025	GL171326	4820		5	<MDL	5	<MDL	14.8		0.155		3.8	

Appendix Table 4a cont'd. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	cadmium		chromium		cobalt		copper		iron		lead	
		(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier
100170009	GL171305	0.1	<MDL	32.1		6.1		16.6		15300		0.8	
100170010	GL171306	0.1		34.5		6.9		21.6		17100		2.9	
100170011	GL171308	0.1	<MDL	44.6		8.4		9		18800		0.5	<MDL
100170014	GL171309	0.1		30.4		5.8		16.4		15200		1.9	
100170015	GL171310	0.1	<MDL	33.5		7.4		30		17100		3.3	
100170016	GL171311	0.1	<MDL	30.1		6.3		24.4		15400		4.6	
100170016	GL171312	0.1	<MDL	29.7		6		24		15400		3.9	
100170016	GL171313	0.2	<EDL	26.9		5.5		21.8		13700		1	<EDL
100170017	GL171316	0.1	<MDL	31.8		6.4		23.6		15900		0.5	<MDL
100170019	GL171317	0.2	<EDL	10.6		2		6.4		6160		1	<EDL
100170019	GL171318	0.2	<EDL	12.1		2.1		7.4		6830		1	<EDL
100170019	GL171319	0.2	<EDL	15.9		2.7		7.6		8280		1	<EDL
100170020	GL171320	0.1	<MDL	33.4		7.4		28		17000		1.1	
100170021	GL171321	0.2	<EDL	25.3		4.4		14.4		12300		1	<EDL
100170023	GL171322	0.1	<MDL	36.5		7.9		32		18100		2.6	
100170023	GL171323	0.1	<MDL	33.5		8		32.8		17200		0.6	
100170023	GL171324	0.1	<MDL	35.8		7.5		30.6		17700		2.1	
100170025	GL171325	0.1	<MDL	44.7		4.1		4.6		19200		1.5	
100170025	GL171326	0.1	<MDL	40.8		4.5		6.6		17800		3.1	

Appendix Table 4a cont'd. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	manganese		mercury		molybdenum		nickel		selenium		silver	
		(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier
100170009	GL171305	238		0.41		0.7		17.3		5	<MDL	0.2	<MDL
100170010	GL171306	387		0.6		0.5	<MDL	19		5	<MDL	0.2	<MDL
100170011	GL171308	335		0.18		0.5	<MDL	24.7		5	<MDL	0.2	<MDL
100170014	GL171309	305		0.19		0.5	<MDL	16.3		5	<MDL	0.2	<MDL
100170015	GL171310	320		0.1		0.5	<MDL	19.7		5	<MDL	0.2	<MDL
100170016	GL171311	316		1.1		0.5	<MDL	16.1		5	<MDL	0.2	<MDL
100170016	GL171312	339		1.5		0.5	<MDL	15.3		5	<MDL	0.2	<MDL
100170016	GL171313	285		1.1		1	<EDL	13.9		10	<EDL	0.4	<EDL
100170017	GL171316	301		0.12		0.5	<MDL	17.9		5	<MDL	0.2	<MDL
100170019	GL171317	120		0.94		1	<EDL	2.8		10	<EDL	0.4	<EDL
100170019	GL171318	136		0.74		1	<EDL	2.8		10	<EDL	0.4	<EDL
100170019	GL171319	152		1		1	<EDL	6.1		10	<EDL	0.4	<EDL
100170020	GL171320	323		0.22		0.5	<MDL	19.5		5	<MDL	0.2	<MDL
100170021	GL171321	236		0.35		1	<EDL	13.6		10	<EDL	0.4	<EDL
100170023	GL171322	319		0.12		0.5	<MDL	21.5		5	<MDL	0.2	<MDL
100170023	GL171323	295		0.08		0.5	<MDL	20.9		5	<MDL	0.2	<MDL
100170023	GL171324	319		0.18		0.5	<MDL	21.1		5	<MDL	0.2	<MDL
100170025	GL171325	158		0.69		0.5	<MDL	14.7		5	<MDL	0.2	<MDL
100170025	GL171326	169		0.49		0.5	<MDL	14.8		5	<MDL	0.2	<MDL

Appendix Table 4a cont'd. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	strontium		thallium		tin		titanium		vanadium		zinc	
		(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier	(ug/g)	qualifier
100170009	GL171305	22.7		7		2.5	<MDL	1200		31.5		55.3	
100170010	GL171306	24		6		2.5	<MDL	1140		32.5		81.8	
100170011	GL171308	13.8		9		2.5	<MDL	1380		35.4		74.7	
100170014	GL171309	21.5		10		2.5	<MDL	1030		30.8		46.1	
100170015	GL171310	30		8		2.5	<MDL	1260		35.4		51.7	
100170016	GL171311	29.1		5	<MDL	2.5	<MDL	971		28.6		57	
100170016	GL171312	30.3		5	<MDL	2.5	<MDL	851		27.2		60.2	
100170016	GL171313	30.2		15		5	<EDL	764		24.4		53.6	
100170017	GL171316	26.6		8		2.5	<MDL	1210		33.1		48.4	
100170019	GL171317	32.6		10	<EDL	5	<EDL	224		9.34		28.6	
100170019	GL171318	32.3		10	<EDL	5	<EDL	226		9.41		30.1	
100170019	GL171319	30.7		10		5	<EDL	408		13.3		34.3	
100170020	GL171320	27.7		6		2.5	<MDL	1250		35.9		55.9	
100170021	GL171321	29		12		5	<EDL	742		23		45.1	
100170023	GL171322	28.5		7		2.5	<MDL	1270		38		53.5	
100170023	GL171323	27		8		2.5	<MDL	1070		35.7		51.8	
100170023	GL171324	27.3		8		2.5	<MDL	1140		36.1		51.9	
100170025	GL171325	16.8		6		2.5	<MDL	1080		41.1		43.9	
100170025	GL171326	17.8		7		2.5	<MDL	1130		38.4		46.3	

Appendix Table 4b. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	Aluminum		Antimony		Arsenic		Barium		Beryllium		Boron	
		ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier
100170019	GL172261	3680	-	10	<EDL	10	<EDL	16.7	-	0.153	-	8.13	-
100170019	GL172262	4200	-	10	<EDL	10	<EDL	17.3	-	0.195	-	7.74	-
100170019	GL172263	4730	-	10	<EDL	10	<EDL	19.5	-	0.206	-	7.23	-
100170016	GL172264	4800	-	10	<EDL	10	<EDL	21	-	0.192	-	5.42	-
100170016	GL172265	4470	-	10	<EDL	10	<EDL	18.2	-	0.186	-	7.3	-
100170016	GL172266	4940	-	10	<EDL	10	<EDL	19.8	-	0.191	-	6.98	-
100170020	GL172267	8340	-	5	<MDL	5	<MDL	33.2	-	0.313	-	6.46	-
100170020	GL172268	8200	-	5	<MDL	5	<MDL	32.3	-	0.293	-	6.73	-
100170020	GL172269	7550	-	5	<MDL	5	<MDL	31	-	0.279	-	6.37	-
100170012	GL172270	7910	-	5	<MDL	5	<MDL	35.3	-	0.298	-	6.45	-
100170012	GL172271	8260	-	5	<MDL	5	<MDL	35.8	-	0.325	-	7	-
100170012	GL172272	7910	-	5	<MDL	5	<MDL	31.7	-	0.282	-	6.97	-
100170025	GL172273	5160	-	5	<MDL	5	<MDL	15	-	0.22	-	2.93	-
100170025	GL172274	5360	-	5	<MDL	5	<MDL	16.2	-	0.236	-	4.25	-
100170025	GL172275	4270	-	5	<MDL	5	<MDL	13.2	-	0.262	-	2.76	-
100170021	GL172276	3430	-	10	<EDL	10	<EDL	13	-	0.141	-	5.85	-
100170021	GL172277	4150	-	10	<EDL	10	<EDL	15.4	-	0.18	-	5.7	-
100170021	GL172278	3530	-	10	<EDL	10	<EDL	13.2	-	0.192	-	6.56	-
100170010	GL172279	8000	-	5	<MDL	5	<MDL	30.1	-	0.287	-	6.58	-
100170010	GL172280	7580	-	5	<MDL	5	<MDL	28	-	0.269	-	5.49	-
100170010	GL172281	7680	-	5	<MDL	5	<MDL	28.3	-	0.264	-	4.85	-
100170011	GL172282	8790	-	5	<MDL	5	<MDL	26.2	-	0.248	-	3.99	-
100170011	GL172283	10200	-	5	<MDL	5	<MDL	29.9	-	0.301	-	4.29	-
100170011	GL172284	9370	-	5	<MDL	5	<MDL	27	-	0.287	-	4.34	-
100170014	GL172285	7580	-	5	<MDL	5	<MDL	23.7	-	0.238	-	5.03	-
100170014	GL172286	7360	-	5	<MDL	5	<MDL	23.6	-	0.247	-	4.91	-
100170014	GL172287	6820	-	5	<MDL	5	<MDL	22.4	-	0.229	-	4.69	-
100170017	GL172288	7650	-	5	<MDL	5	<MDL	26.9	-	0.255	-	5.04	-
100170017	GL172289	8250	-	5	<MDL	5	<MDL	28.6	-	0.278	-	5.24	-
100170023	GL172291	7970	-	5	<MDL	5	<MDL	28.1	-	0.29	-	5.79	-
100170015	GL172294	8730	-	5	<MDL	5	<MDL	31.2	-	0.296	-	6.85	-
100170015	GL172295	8400	-	5	<MDL	5	<MDL	32.2	-	0.287	-	6.37	-
100170015	GL172296	8050	-	5	<MDL	5	<MDL	29.9	-	0.288	-	7.14	-

Appendix Table 4b cont'd. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB

Station No.	Sample ID	Cadmium		Chromium		Cobalt		Copper		Iron		Lead	
		ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier
100170019	GL172261	0.2	<EDL	17.3	-	3	-	9.6	-	9230	-	1.2	-
100170019	GL172262	0.2	<EDL	18.2	-	3.1	-	9	-	9740	-	1	<EDL
100170019	GL172263	0.2	<EDL	21.2	-	3.7	-	11.2	-	11300	-	4.7	-
100170016	GL172264	0.2	<EDL	20.5	-	4.6	-	19.2	-	11900	-	1	<EDL
100170016	GL172265	0.2	<EDL	18.4	-	4.1	-	14.8	-	9920	-	1	<EDL
100170016	GL172266	0.2	<EDL	20.3	-	4.5	-	16.8	-	11500	-	3	-
100170020	GL172267	0.1	<MDL	35	-	7.9	-	26.2	-	19000	-	4.8	-
100170020	GL172268	0.1	<MDL	33.5	-	7.6	-	26.8	-	19000	-	1.3	-
100170020	GL172269	0.1	<MDL	31.5	-	7.8	-	27.4	-	17900	-	3.2	-
100170012	GL172270	0.1	<MDL	35.5	-	8.2	-	29.2	-	19700	-	5.7	-
100170012	GL172271	0.3	-	38.4	-	8.4	-	31.4	-	20500	-	6	-
100170012	GL172272	0.2	-	34.1	-	7.7	-	28.4	-	18800	-	2.8	-
100170025	GL172273	0.1	<MDL	42.5	-	4.4	-	5.4	-	19900	-	4.6	-
100170025	GL172274	0.1	<MDL	39.3	-	4.8	-	6	-	18000	-	3.2	-
100170025	GL172275	0.1	<MDL	41.9	-	4.1	-	5.2	-	20200	-	5.2	-
100170021	GL172276	0.2	<EDL	14.3	-	2.4	-	8.2	-	7400	-	1	<EDL
100170021	GL172277	0.2	<EDL	17.7	-	3.1	-	9.8	-	8760	-	1	<EDL
100170021	GL172278	0.2	<EDL	14.7	-	2.7	-	7.8	-	7380	-	5.7	-
100170010	GL172279	0.2	-	33.6	-	6.7	-	22.6	-	18200	-	4.5	-
100170010	GL172280	0.2	-	33.1	-	6.4	-	20	-	17900	-	5.5	-
100170010	GL172281	0.2	-	33.3	-	6.4	-	19.4	-	17900	-	5.4	-
100170011	GL172282	0.1	<MDL	43.4	-	9.1	-	10.6	-	21500	-	3.9	-
100170011	GL172283	0.2	-	48.6	-	10.7	-	12	-	24300	-	5	-
100170011	GL172284	0.1	<MDL	44.1	-	8.8	-	10.6	-	21800	-	3.3	-
100170014	GL172285	0.1	-	28.9	-	6.3	-	15.8	-	16500	-	3.8	-
100170014	GL172286	0.2	-	28.6	-	6	-	15.2	-	16600	-	3.9	-
100170014	GL172287	0.2	-	27.1	-	6	-	15.6	-	15900	-	2.1	-
100170017	GL172288	0.1	<MDL	27.6	-	6.3	-	22.4	-	16700	-	2.5	-
100170017	GL172289	0.1	<MDL	27.8	-	6.7	-	23.4	-	17300	-	2	-
100170023	GL172291	0.1	<MDL	28.4	-	6.6	-	24	-	17400	-	3.5	-
100170015	GL172294	0.1	<MDL	31.4	-	7.2	-	25.2	-	17800	-	3.1	-
100170015	GL172295	0.2	-	32.2	-	7.3	-	24	-	17600	-	4.2	-
100170015	GL172296	0.1	-	31.2	-	6.8	-	22.4	-	16800	-	4.2	-

Appendix Table 4b cont'd. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB

Station No.	Sample ID	Manganese		Mercury		Molybdenum		Nickel		Selenium		Silver	
		ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier
100170019	GL172261	178	-	1.1	-	1	<EDL	7.4	-	10	<EDL	0.4	<EDL
100170019	GL172262	193	-	1	-	1	<EDL	7.7	-	10	<EDL	0.4	<EDL
100170019	GL172263	212	-	1.4	-	1	<EDL	10.2	-	10	<EDL	0.4	<EDL
100170016	GL172264	238	-	0.69	-	1	<EDL	11.2	-	10	<EDL	0.4	<EDL
100170016	GL172265	217	-	0.45	-	1	<EDL	8.8	-	10	<EDL	0.4	<EDL
100170016	GL172266	233	-	0.55	-	1	<EDL	9.8	-	10	<EDL	0.4	<EDL
100170020	GL172267	388	-	0.32	-	0.5	<MDL	21.9	-	5	<MDL	0.2	<MDL
100170020	GL172268	364	-	0.17	-	0.5	<MDL	20.7	-	5	<MDL	0.2	<MDL
100170020	GL172269	370	-	0.29	-	0.5	<MDL	20.4	-	5	<MDL	0.2	<MDL
100170012	GL172270	409	-	0.5	-	0.5	<MDL	22	-	5	<MDL	0.2	<MDL
100170012	GL172271	436	-	0.54	-	0.5	<MDL	23.9	-	5	<MDL	0.2	<MDL
100170012	GL172272	324	-	0.17	-	0.5	<MDL	21.6	-	5	<MDL	0.2	<MDL
100170025	GL172273	182	-	0.49	-	0.5	<MDL	14.8	-	5	<MDL	0.2	<MDL
100170025	GL172274	188	-	0.49	-	0.5	<MDL	15.9	-	5	<MDL	0.2	<MDL
100170025	GL172275	163	-	0.53	-	0.5	<MDL	13.9	-	5	<MDL	0.2	<MDL
100170021	GL172276	160	-	0.14	-	1	<EDL	5.3	-	10	<EDL	0.4	<EDL
100170021	GL172277	186	-	0.19	-	1	<EDL	7.6	-	10	<EDL	0.4	<EDL
100170021	GL172278	159	-	0.14	-	1	<EDL	5.6	-	10	<EDL	0.4	<EDL
100170010	GL172279	358	-	0.2	-	0.5	<MDL	19.9	-	5	<MDL	0.2	<MDL
100170010	GL172280	376	-	0.32	-	0.5	<MDL	19.4	-	5	<MDL	0.2	<MDL
100170010	GL172281	349	-	0.31	-	0.5	<MDL	19.1	-	5	<MDL	0.2	<MDL
100170011	GL172282	426	-	0.37	-	0.5	<MDL	26.4	-	5	<MDL	0.2	<MDL
100170011	GL172283	456	-	0.29	-	0.5	<MDL	30.2	-	5	<MDL	0.2	<MDL
100170011	GL172284	400	-	0.24	-	0.5	<MDL	26.5	-	5	<MDL	0.2	<MDL
100170014	GL172285	292	-	0.17	-	0.5	<MDL	17.7	-	5	<MDL	0.2	<MDL
100170014	GL172286	296	-	0.18	-	0.5	<MDL	17.5	-	5	<MDL	0.2	<MDL
100170014	GL172287	282	-	0.22	-	0.5	<MDL	17.3	-	5	<MDL	0.2	<MDL
100170017	GL172288	277	-	0.06	-	0.5	<MDL	18.3	-	5	<MDL	0.2	<MDL
100170017	GL172289	278	-	0.07	-	0.5	<MDL	19.1	-	6	-	0.2	<MDL
100170023	GL172291	262	-	0.05	-	0.5	<MDL	18.7	-	5	<MDL	0.2	<MDL
100170015	GL172294	329	-	0.11	-	0.5	<MDL	19.9	-	5	<MDL	0.2	<MDL
100170015	GL172295	333	-	0.3	-	0.5	<MDL	20.8	-	5	<MDL	0.2	<MDL
100170015	GL172296	314	-	0.2	-	0.5	<MDL	19.4	-	5	<MDL	0.2	<MDL

Appendix Table 4b cont'd. Metals in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	Strontium		Thallium		Tin		Titanium		Vanadium		Zinc	
		ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier	ug/g	qualifier
100170019	GL172261	28.8	-	10	<EDL	36.4	-	354	-	13.7	-	42.5	-
100170019	GL172262	31.6	-	10	<EDL	37.2	-	626	-	17.6	-	41.4	-
100170019	GL172263	30.1	-	10	<EDL	29.3	-	697	-	20.1	-	45.3	-
100170016	GL172264	29	-	10	<EDL	33.7	-	320	-	19.1	-	43.3	-
100170016	GL172265	32.9	-	10	<EDL	44.4	-	565	-	17.6	-	36.4	-
100170016	GL172266	32.5	-	10	<EDL	39.2	-	584	-	18.6	-	39.8	-
100170020	GL172267	28	-	5	<MDL	6.4	-	1350	-	36.5	-	63.9	-
100170020	GL172268	29.9	-	5	<MDL	8.6	-	1330	-	36.3	-	53.4	-
100170020	GL172269	24.4	-	5	<MDL	6.5	-	841	-	32.5	-	55.2	-
100170012	GL172270	23.2	-	5	<MDL	4.5	-	1150	-	35.2	-	71.1	-
100170012	GL172271	24.4	-	5	<MDL	5.2	-	1290	-	37.1	-	73.2	-
100170012	GL172272	29.4	-	5	<MDL	7.1	-	1300	-	35.8	-	56.3	-
100170025	GL172273	18.8	-	5	<MDL	2.5	<MDL	1270	-	40	-	49.1	-
100170025	GL172274	18.5	-	5	<MDL	2.5	<MDL	1230	-	36.2	-	56	-
100170025	GL172275	14.6	-	5	<MDL	2.5	<MDL	976	-	39.9	-	53	-
100170021	GL172276	33.6	-	10	<EDL	52.1	-	412	-	13.5	-	26.1	-
100170021	GL172277	31.7	-	10	<EDL	40.3	-	500	-	16	-	31.9	-
100170021	GL172278	34.6	-	10	<EDL	50.8	-	447	-	14.2	-	25.7	-
100170010	GL172279	24.8	-	5	<MDL	2.5	<MDL	1330	-	34.2	-	65.6	-
100170010	GL172280	24.4	-	5	<MDL	2.5	<MDL	1320	-	33.9	-	60.7	-
100170010	GL172281	24.3	-	5	<MDL	2.5	<MDL	1310	-	33.3	-	62.1	-
100170011	GL172282	14.4	-	6	-	2.5	<MDL	1300	-	35.2	-	92.2	-
100170011	GL172283	15.8	-	5	<MDL	2.5	<MDL	1540	-	39.2	-	104	-
100170011	GL172284	18.1	-	5	<MDL	2.5	<MDL	1490	-	36.6	-	90.1	-
100170014	GL172285	27	-	5	<MDL	3.3	-	1160	-	30.6	-	45.6	-
100170014	GL172286	27.8	-	5	<MDL	4.3	-	1130	-	30.8	-	45.8	-
100170014	GL172287	23.9	-	5	<MDL	4.5	-	900	-	28.4	-	46.5	-
100170017	GL172288	33	-	5	<MDL	8.9	-	1080	-	31.5	-	41.3	-
100170017	GL172289	34.1	-	5	<MDL	9.7	-	1190	-	32	-	41.5	-
100170023	GL172291	34.5	-	5	<MDL	10.4	-	1180	-	32.4	-	39.3	-
100170015	GL172294	31.6	-	5	<MDL	12.5	-	1220	-	32.1	-	49.2	-
100170015	GL172295	24.3	-	5	<MDL	11.2	-	998	-	30	-	56.5	-
100170015	GL172296	25.9	-	5	<MDL	10.8	-	1040	-	29.4	-	51.6	-

Appendix Table 5. Methyl-mercury in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval and deployment survey. Data provided by Biotron Laboratory, University of Western.

Station No.	Sample ID	Date Collected	Sample Weight (g)	MeHg from Original Sample (ng)	Moisture (%)	Wet Wt Conc. (ng/g)	Dry Wt Conc. (ng/g)
0100170025	GL171325	07/14/2017	0.1018	0.091	23.7	0.682	0.893
0100170025	GL171326	08/10/2017	0.0980	0.122	29.4	0.876	1.241
0100170025	GL172273	08/11/2017	0.1030	0.168	28.1	1.171	1.630
0100170025	GL172274	08/11/2017	0.1114	0.159	26.9	1.043	1.427
0100170019	GL171317	07/13/2017	0.1077	1.307	27.5	8.802	12.139
0100170016	GL171311	07/13/2017	0.1099	0.509	27.9	3.341	4.636
0100170016	GL171312	07/13/2017	0.0982	1.644	44.6	9.281	16.746
0100170016	GL171313	07/13/2017	0.1029	1.465	45.7	7.738	14.242
0100170016	GL172264	08/10/2017	0.0996	0.254	37.3	1.600	2.551
0100170016	GL172265	08/10/2017	0.1008	0.347	38.7	2.107	3.440
0100170020	GL171320	07/14/2017	0.1126	0.141	31.7	0.857	1.256
0100170020	GL172267	08/10/2017	0.1029	0.130	25.7	0.937	1.262
0100170011	GL172282	08/11/2017	0.1990	0.418	34.2	1.383	2.101
0100170021	GL172276*	08/11/2017	NA	NA	41.8	1.079	1.853
0100170012	GL172270	08/10/2017	0.1013	0.378	34.3	2.453	3.730
0100170012	GL172271	08/11/2017	0.1080	0.140	22.4	1.007	1.298
0100170010	GL171306	07/12/2017	0.1102	0.312	40.1	1.693	2.827
0100170010	GL171307	07/12/2017	0.1050	0.337	28.8	2.283	3.205
0100170010	GL172279	08/11/2017	0.2007	0.629	36.8	1.980	3.133
0100170010	GL172280	08/11/2017	0.2007	0.797	34.1	2.618	3.971
0100170017	GL171314	07/13/2017	0.1037	0.109	24.0	0.798	1.050
0100170017	GL171315	07/13/2017	0.1028	0.128	19.9	1.001	1.250
0100170017	GL172288	08/11/2017	0.2028	0.101	17.1	0.411	0.496
0100170017	GL172289	08/12/2017	0.2067	0.096	12.8	0.403	0.462
0100170014	GL171309	07/13/2017	0.1135	0.240	25.3	1.578	2.111
0100170014	GL172285	08/11/2017	0.1985	0.323	22.7	1.259	1.629
0100170014	GL172286	08/11/2017	0.2005	0.170	25.1	0.636	0.849
0100170023	GL171322	07/14/2017	0.0988	0.056	28.5	0.406	0.568
0100170023	GL172291	08/12/2017	0.2027	0.086	25.7	0.315	0.424
0100170023	GL172292	08/12/2017	0.2056	0.068	12.3	0.289	0.329
	MDL			0.009			
	MRL			0.027			

*an estimated value from multiple runs as the sample had homogenity / matrix issue with high RPD values (46%).

Appendix Table 6. Methyl-mercury, mercury, and total organic carbon in surficial sediment on the thin-layer cap and cap reference station 25 – retrieval and deployment survey. Methyl-mercury data provided by Biotron Laboratory, University of Western (as shown in Table 5), and mercury and TOC data provided by MECP-LSB.

Station No.	Sample ID	MeHg	Hg	TOC
		(ng/g dw)	(ug/g dw)	(mg/g dw)
0100170025	GL171325	0.89	0.48	3.7
0100170025	GL171326	1.24	0.61	3.3
0100170025	GL172273	1.63	0.56	6.2
0100170025	GL172274	1.43	0.56	5.0
0100170019	GL171317	12.14	2.1	65
0100170016	GL171311	4.64	0.78	32
0100170016	GL171312	16.75	1.5	31
0100170016	GL171313	14.24	1.5	27
0100170016	GL172264	2.55	0.78	40
0100170016	GL172265	3.44	1.1	30
0100170020	GL171320	1.26	0.17	8.2
0100170020	GL172267	1.26	0.21	10
0100170011	GL172282	2.10	0.21	16
0100170021	GL172276	1.85*	0.29	32
0100170012	GL172270	3.73	0.36	28
0100170012	GL172271	1.30	0.2	11
0100170010	GL171306	2.83	0.34	21
0100170010	GL171307	3.21	0.43	19
0100170010	GL172279	3.13	0.24	19
0100170010	GL172280	3.97	0.28	17
0100170017	GL171314	1.05	0.14	8.2
0100170017	GL171315	1.25	0.2	11
0100170017	GL172288	0.50	0.07	7.7
0100170017	GL172289	0.46	0.07	7
0100170014	GL171309	2.11	0.08	9.7
0100170014	GL172285	1.63	0.17	20
0100170014	GL172286	0.85	0.14	21
0100170023	GL171322	0.57	0.08	6.1
0100170023	GL172291	0.42	0.06	6.4
0100170023	GL172292	0.33	0.06	5.2

*an estimated value from multiple runs as the sample had homogenity / matrix issue with high RPD values (46%).

Appendix Table 7a. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2',3,4-trichloro PCB(33)		2',3,4,4',5-pentachloro PCB(123)		2,2'-/2,6-dichloro PCB(4/10)		2,2',3',4,5-pentachloro PCB(97)		2,2',3-trichloro PCB(16)		2,2',3,3'-tetrachloro PCB(40)		2,2',3,3',4',5,6-heptachloro PCB(177)		2,2',3,3',4,4'-hexachloro PCB(128)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170010	GL171306	2	<MDL	1	<MDL	5	<MDL	1	-	2	<MDL	1	<MDL	8	-	3	-
100170011	GL171308	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	7	-	2	-
100170014	GL171309	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170016	GL171311	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	4	-	1	-
100170016	GL171312	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	4	-	1	-
100170016	GL171313	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	3	-	1	-
100170017	GL171315	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	3	-	1	-
100170017	GL171316	2	<MDL	1	<MDL	5	<MDL	1	-	2	<MDL	1	<MDL	2	-	1	-
100170019	GL171317	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170019	GL171318	2	<MDL	1	<MDL	5	<MDL	6	-	2	<MDL	1	<MDL	2	-	6	-
100170019	GL171319	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	2	-	1	<MDL
100170020	GL171320	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170021	GL171321	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170023	GL171322	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170023	GL171323	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170023	GL171324	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL
100170025	GL171325	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL171326	2	<MDL	1	-	5	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,3',4,4',5-heptachloro PCB(170)		2,2',3,3',4,4',5,5'-octachloro PCB(194)		2,2',3,3',4,5',6,6'-octachloro PCB(201)		2,2',3,3',4,5,5',6'-octachloro PCB(199)		2,2',3,3',4,5,6'-heptachloro PCB(174)		2,2',3,3',4,5,6,6'-octachloro PCB(200)		2,2',3,3',5,5',6-heptachloro PCB(178)		2,2',3,3',5,5',6,6'-octachloro PCB(202)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	-	1	-	1	<MDL	1	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170010	GL171306	16	-	7	-	1	<MDL	8	-	19	-	1	<MDL	4	-	1	<MDL
100170011	GL171308	18	-	12	-	1	-	10	-	15	-	1	<MDL	2	-	1	-
100170014	GL171309	2	-	1	-	1	<MDL	1	-	2	-	1	<MDL	1	<MDL	1	<MDL
100170016	GL171311	7	-	3	-	1	<MDL	1	<MDL	8	-	1	<MDL	2	-	1	<MDL
100170016	GL171312	7	-	4	-	1	<MDL	4	-	8	-	1	<MDL	2	-	1	<MDL
100170016	GL171313	5	-	3	-	1	<MDL	3	-	6	-	1	<MDL	1	-	1	<MDL
100170017	GL171315	3	-	2	-	1	<MDL	2	-	5	-	1	<MDL	1	-	1	<MDL
100170017	GL171316	1	<MDL	1	-	1	<MDL	1	-	4	-	1	<MDL	1	-	1	<MDL
100170019	GL171317	1	<MDL	1	-	1	<MDL	1	-	2	-	1	<MDL	1	<MDL	1	<MDL
100170019	GL171318	5	-	1	-	1	<MDL	1	-	4	-	1	<MDL	1	-	1	<MDL
100170019	GL171319	2	-	1	-	1	<MDL	1	-	3	-	1	<MDL	1	-	1	<MDL
100170020	GL171320	2	-	1	-	1	<MDL	1	-	3	-	1	<MDL	1	<MDL	1	<MDL
100170021	GL171321	2	-	1	-	1	<MDL	1	-	2	-	1	<MDL	1	<MDL	1	<MDL
100170023	GL171322	2	-	1	-	1	<MDL	1	-	2	-	1	<MDL	1	<MDL	1	<MDL
100170023	GL171323	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL
100170023	GL171324	1	-	1	-	1	<MDL	1	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL171326	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,3',5,6'-hexachloro PCB(135)		2,2',3,4',5',6-hexachloro PCB(149)		2,2',3,4',5,5',6-heptachloro PCB(187)		2,2',3,4',5,6,6'-heptachloro PCB(188)		2,2',3,4-tetrachloro PCB(41)		2,2',3,4,4'-pentachloro PCB(85)		2,2',3,4,4',5'-hexachloro PCB(138)		2,2',3,4,4',5',6-heptachloro PCB(183)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	<MDL	2	-	2	-	1	<MDL	1	<MDL	1	<MDL	3	-	1	-
100170010	GL171306	5	-	29	-	20	-	1	<MDL	1	<MDL	1	<MDL	32	-	10	-
100170011	GL171308	2	-	13	-	16	-	1	<MDL	1	<MDL	1	<MDL	18	-	9	-
100170014	GL171309	1	-	4	-	2	-	1	<MDL	1	<MDL	1	<MDL	4	-	1	-
100170016	GL171311	3	-	13	-	10	-	1	<MDL	1	<MDL	1	<MDL	14	-	4	-
100170016	GL171312	2	-	12	-	10	-	1	<MDL	1	<MDL	1	<MDL	14	-	5	-
100170016	GL171313	2	-	10	-	7	-	1	<MDL	1	<MDL	1	-	11	-	3	-
100170017	GL171315	1	-	5	-	4	-	1	<MDL	1	<MDL	1	-	7	-	3	-
100170017	GL171316	1	-	7	-	4	-	1	<MDL	1	<MDL	1	<MDL	8	-	2	-
100170019	GL171317	1	-	3	-	2	-	1	<MDL	1	<MDL	1	<MDL	4	-	1	-
100170019	GL171318	3	-	17	-	1	<MDL	1	<MDL	1	<MDL	4	-	29	-	2	-
100170019	GL171319	1	-	5	-	4	-	1	<MDL	1	<MDL	1	<MDL	5	-	1	-
100170020	GL171320	1	-	5	-	3	-	1	<MDL	1	<MDL	1	<MDL	5	-	1	-
100170021	GL171321	1	<MDL	3	-	2	-	1	<MDL	1	<MDL	1	<MDL	3	-	1	-
100170023	GL171322	1	<MDL	3	-	2	-	1	<MDL	1	<MDL	1	<MDL	4	-	1	-
100170023	GL171323	1	<MDL	1	-	1	-	1	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL
100170023	GL171324	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	<MDL	2	-	1	-
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170025	GL171326	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,4,4',5-hexachloro PCB(137)		2,2',3,4,4',5,5',6-octachloro PCB(203)		2,2',3,4,5'-pentachloro PCB(87)		2,2',3,4,5,5'-hexachloro PCB(141)		2,2',3,5'-tetrachloro PCB(44)		2,2',3,5',6-pentachloro PCB(95)		2,2',3,5,5',6-hexachloro PCB(151)		2,2',4,4',5-pentachloro PCB(99)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170010	GL171306	1	<MDL	8	-	2	-	12	-	1	<MDL	8	-	12	-	2	-
100170011	GL171308	1	<MDL	11	-	1	-	7	-	1	<MDL	4	-	5	-	2	<MDL
100170014	GL171309	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	1	-	1	-	2	<MDL
100170016	GL171311	1	<MDL	3	-	1	-	6	-	1	<MDL	3	-	6	-	2	<MDL
100170016	GL171312	1	<MDL	4	-	1	-	5	-	1	<MDL	3	-	5	-	2	<MDL
100170016	GL171313	1	<MDL	3	-	1	-	4	-	1	<MDL	3	-	4	-	2	<MDL
100170017	GL171315	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	1	-	3	-	2	<MDL
100170017	GL171316	1	<MDL	1	-	1	-	3	-	1	<MDL	3	-	2	-	2	<MDL
100170019	GL171317	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	-	1	-	2	<MDL
100170019	GL171318	2	-	1	-	10	-	6	-	3	-	15	-	5	-	7	-
100170019	GL171319	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	1	-	2	-	2	<MDL
100170020	GL171320	1	<MDL	2	-	1	<MDL	2	-	1	<MDL	1	-	2	-	2	<MDL
100170021	GL171321	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	-	1	-	2	<MDL
100170023	GL171322	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170023	GL171323	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170023	GL171324	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170025	GL171326	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',4,4',6,6'-hexachloro PCB(155)		2,2',4,5'-tetrachloro PCB(49)		2,2',4,6,6'-pentachloro PCB(104)		2,2',5-trichloro PCB(18)		2,2',5,5'-tetrachloro PCB(52)		2,2',6-trichloro PCB(19)		2,2',6,6'-tetrachloro PCB(54)		2,2'3,3',6-pentachloro PCB(84)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170010	GL171306	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL	1	<MDL	1	<MDL
100170011	GL171308	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL	1	<MDL	1	<MDL
100170014	GL171309	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170016	GL171311	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL	1	<MDL	1	<MDL
100170016	GL171312	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL	1	<MDL	1	<MDL
100170016	GL171313	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL	1	<MDL	1	<MDL
100170017	GL171315	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170017	GL171316	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL	1	<MDL	1	<MDL
100170019	GL171317	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL	1	<MDL	1	<MDL
100170019	GL171318	1	<MDL	1	-	1	<MDL	2	<MDL	7	-	2	<MDL	1	<MDL	5	-
100170019	GL171319	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL	1	<MDL	1	<MDL
100170020	GL171320	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170021	GL171321	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170023	GL171322	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170023	GL171323	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170023	GL171324	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL
100170025	GL171326	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL	1	<MDL	1	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2'3,4'5-/2,2'4,5,5'-pentach PCB(90/101)		2,3'-dichloro PCB(6)		2,3',4',5-tetrachloro PCB(70)		2,3',4,4'-tetrachloro PCB(66)		2,3',4,4',5-pentachloro PCB(118)		2,3',4,4',5,5'-hexachloro PCB(167)		2,3',4,4',6-pentachloro PCB(119)		2,3,3',4',6-pentachloro PCB(110)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170010	GL171306	11	-	5	<MDL	1	<MDL	1	-	3	-	1	-	1	<MDL	5	-
100170011	GL171308	5	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	-	1	<MDL	3	-
100170014	GL171309	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-
100170016	GL171311	3	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	2	-
100170016	GL171312	4	-	5	<MDL	1	<MDL	1	-	1	-	1	<MDL	1	<MDL	2	-
100170016	GL171313	3	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	2	-
100170017	GL171315	2	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-
100170017	GL171316	3	-	5	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL	1	<MDL	2	-
100170019	GL171317	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-
100170019	GL171318	19	-	5	<MDL	2	-	1	-	15	-	1	-	1	<MDL	17	-
100170019	GL171319	2	-	5	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-
100170020	GL171320	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-
100170021	GL171321	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170023	GL171322	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170023	GL171323	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170023	GL171324	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL171325	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL171326	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,3,3',4,4'-pentachloro PCB(105)		2,3,3',4,4',5'-hexachloro PCB(157)		2,3,3',4,4',5',6-heptachloro PCB(191)		2,3,3',4,4',5-hexachloro PCB(156)		2,3,3',4,4',5,5'-heptachloro PCB(189)		2,3,3',4,4',5,5',6-octachloro PCB(205)		2,3,3'4,4'6-hexachloro PCB(158)		2,3,4'-trichloro PCB(22)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170010	GL171306	1	<MDL	1	<MDL	1	-	2	-	1	<MDL	1	-	3	-	2	<MDL
100170011	GL171308	1	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL	1	-	2	-	2	<MDL
100170014	GL171309	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	2	<MDL
100170016	GL171311	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170016	GL171312	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170016	GL171313	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170017	GL171315	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	-	2	<MDL
100170017	GL171316	1	-	1	<MDL	1	<MDL	1	-	1	<MDL	1	-	1	-	2	<MDL
100170019	GL171317	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170019	GL171318	7	-	1	-	1	<MDL	4	-	1	<MDL	1	<MDL	4	-	2	<MDL
100170019	GL171319	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	2	<MDL
100170020	GL171320	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	2	<MDL
100170021	GL171321	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	2	<MDL
100170023	GL171322	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	2	<MDL
100170023	GL171323	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170023	GL171324	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170025	GL171326	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,4'-dichloro PCB(8)		2,4,4'-/2,4',5-trichloro PCB(28/31)		22',33',4,5-hexachloro PCB(129)		22',44',55'-hexachloro PCB(153)		22'33'44'55'6-nonachloro PCB(206)		22'33'44'566'-nonachloro PCB(207)		22'33'455'66'-nonachloro PCB(208)		22'344'55'-heptachloro PCB(180)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	5	<MDL	2	<MDL	1	<MDL	3	-	1	<MDL	1	<MDL	1	<MDL	2	-
100170010	GL171306	5	<MDL	2	<MDL	1	<MDL	38	-	2	-	1	<MDL	1	<MDL	38	-
100170011	GL171308	5	<MDL	2	<MDL	1	<MDL	20	-	3	-	1	<MDL	1	<MDL	43	-
100170014	GL171309	5	<MDL	2	<MDL	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL	4	-
100170016	GL171311	5	<MDL	2	<MDL	1	<MDL	17	-	1	-	1	<MDL	1	<MDL	16	-
100170016	GL171312	5	<MDL	2	<MDL	1	<MDL	17	-	1	-	1	<MDL	1	<MDL	17	-
100170016	GL171313	5	<MDL	2	<MDL	1	<MDL	13	-	1	-	1	<MDL	1	<MDL	13	-
100170017	GL171315	5	<MDL	2	<MDL	1	<MDL	6	-	1	-	1	<MDL	1	<MDL	12	-
100170017	GL171316	5	<MDL	2	<MDL	1	<MDL	8	-	1	-	1	<MDL	1	<MDL	7	-
100170019	GL171317	5	<MDL	2	<MDL	1	<MDL	4	-	1	<MDL	1	<MDL	1	<MDL	4	-
100170019	GL171318	5	<MDL	2	<MDL	2	-	21	-	1	<MDL	1	<MDL	1	<MDL	8	-
100170019	GL171319	5	<MDL	2	<MDL	1	<MDL	6	-	1	<MDL	1	<MDL	1	<MDL	5	-
100170020	GL171320	5	<MDL	2	<MDL	1	<MDL	6	-	1	<MDL	1	<MDL	1	<MDL	5	-
100170021	GL171321	5	<MDL	2	<MDL	1	<MDL	4	-	1	<MDL	1	<MDL	1	<MDL	3	-
100170023	GL171322	5	<MDL	2	<MDL	1	<MDL	4	-	1	-	1	<MDL	1	<MDL	4	-
100170023	GL171323	5	<MDL	2	<MDL	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	2	-
100170023	GL171324	5	<MDL	2	<MDL	1	<MDL	3	-	1	<MDL	1	<MDL	1	<MDL	3	-
100170025	GL171325	5	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL171326	5	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	23',44',5'6-hexachloro PCB(168)		233'4'55'6-heptachloro PCB(193)		3,3',4,4'-tetrachloro PCB(77)		3,3',4,4',5-pentachloro PCB(126)		3,3',4,4',5,5'-hexachloro PCB(169)		3,4,4'-trichloro PCB(37)		3,4,4',5-tetrachloro PCB(81)		4,4'-dichloro PCB(15)	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.
100170009	GL171305	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170010	GL171306	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170011	GL171308	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170014	GL171309	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170016	GL171311	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170016	GL171312	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170016	GL171313	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170017	GL171315	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170017	GL171316	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170019	GL171317	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170019	GL171318	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170019	GL171319	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170020	GL171320	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170021	GL171321	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170023	GL171322	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170023	GL171323	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170023	GL171324	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL
100170025	GL171326	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	5	<MDL

Appendix Table 7a cont'd. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap reference station 25 – deployment survey. Data provided by MECP-LSB.

Station No.	Sample ID	cis-nonachlor/2,3,4,4',5-pentach PCB(114)		DMDT/2,2',3,3',4,4',6-heptach PCB(171)		G-CHLA/2,3,4,4'-tetrachloro PCB(60)		H-Epoxide/2,4,4',5-tetrachloro PCB(74)		Total PCB	
		(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qual.	(ng/g)	qualfier
100170009	GL171305	1	<MDL	1	<MDL	1	<MDL	1	<MDL	14	-
100170010	GL171306	1	<MDL	1	<MDL	1	<MDL	1	<MDL	310	-
100170011	GL171308	1	<MDL	1	<MDL	1	<MDL	1	<MDL	230	-
100170014	GL171309	1	<MDL	1	<MDL	1	<MDL	1	<MDL	29	-
100170016	GL171311	1	<MDL	3	-	1	<MDL	1	<MDL	130	-
100170016	GL171312	1	<MDL	3	-	1	<MDL	1	<MDL	140	-
100170016	GL171313	1	<MDL	2	-	1	<MDL	1	<MDL	100	-
100170017	GL171315	1	<MDL	2	-	1	<MDL	1	<MDL	59	-
100170017	GL171316	1	<MDL	1	<MDL	1	<MDL	1	<MDL	62	-
100170019	GL171317	1	<MDL	1	-	1	<MDL	1	<MDL	24	-
100170019	GL171318	1	<MDL	1	-	1	<MDL	1	-	240	-
100170019	GL171319	1	<MDL	1	-	1	-	1	<MDL	45	-
100170020	GL171320	1	<MDL	1	-	1	<MDL	1	<MDL	40	-
100170021	GL171321	1	<MDL	1	<MDL	1	<MDL	1	<MDL	18	-
100170023	GL171322	1	<MDL	1	<MDL	1	<MDL	1	<MDL	25	-
100170023	GL171323	1	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL
100170023	GL171324	1	<MDL	1	<MDL	1	<MDL	1	<MDL	14	-
100170025	GL171325	1	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL
100170025	GL171326	1	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	DMDT/2,2',3,3',4,4',6-heptach PCB(171)		2',3,4-trichloro PCB(33)		2',3,4,4',5-pentachloro PCB(123)		2,2'-/2,6-dichloro PCB(4/10)		2,2',3',4,5-pentachloro PCB(97)		2,2',3-trichloro PCB(16)		2,2',3,3'-tetrachloro PCB(40)	
		(ng/g)	qual	(ng/g)	qual	(ng/g)	qual	(ng/g)	qual	(ng/g)	qual	(ng/g)	qual	(ng/g)	qual
100170019	GL172261	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170019	GL172262	2		2	<MDL	1	<MDL	5	<MDL	1	<MDL	3	-	1	<MDL
100170019	GL172263	1		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170016	GL172264	2			<MDL	1	<MDL	5	<MDL	1	<MDL	3	-	1	<MDL
100170016	GL172265	1		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170016	GL172266	1		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170020	GL172267	6		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170020	GL172268	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170020	GL172269	1		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170012	GL172270	5		2	<MDL	1	<MDL	5	<MDL	2	-	2	<MDL	1	<MDL
100170012	GL172271	5		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170012	GL172272	3		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170025	GL172273	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170025	GL172274	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170025	GL172275	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170021	GL172276	1		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170021	GL172277	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170021	GL172278	2		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170010	GL172279	3		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170010	GL172280	3		2	<MDL	1	<MDL	5	<MDL	2	-	2	<MDL	1	<MDL
100170010	GL172281	3		2	<MDL	1	<MDL	5	<MDL	1	-	2	<MDL	1	<MDL
100170011	GL172282	1	<MDL	2	<MDL	1	<MDL	5	<MDL	2	-	2	<MDL	1	<MDL
100170011	GL172283	12		2	<MDL	1	<MDL	5	<MDL	1	-	2	<MDL	1	<MDL
100170011	GL172284	11		2	<MDL	1	<MDL	5	<MDL	1	-	2	<MDL	1	<MDL
100170014	GL172285	2		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170014	GL172286	2		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170014	GL172287	10		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170017	GL172288	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170017	GL172289	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170017	GL172290	1		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170023	GL172291	1	<MDL	2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170015	GL172294	2		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170015	GL172295	3		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL
100170015	GL172296	2		2	<MDL	1	<MDL	5	<MDL	1	<MDL	2	<MDL	1	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,3',4',5,6-heptachloro PCB(177)		2,2',3,3',4,4'-hexachloro PCB(128)		2,2',3,3',4,4',5-heptachloro PCB(170)		2,2',3,3',4,4',5,5'-octachloro PCB(194)		2,2',3,3',4,5',6,6'-octachloro PCB(201)		2,2',3,3',4,5,5',6'-octachloro PCB(199)		2,2',3,3',4,5,6'-heptachloro PCB(174)		2,2',3,3',4,5,6,6'-octachloro PCB(200)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	-	1	-	2	-	1	-	1	<MDL	1	<MDL	2	-	1	<MDL
100170019	GL172262	3	-	1	-	4	-	2	-	1	<MDL	1	<MDL	4	-	1	<MDL
100170019	GL172263	1	-	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	2	-	1	<MDL
100170016	GL172264	2	-	1	-	4	-	2	-	1	<MDL	1	<MDL	4	-	1	<MDL
100170016	GL172265	1	-	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	2	-	1	<MDL
100170016	GL172266	1	-	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170020	GL172267	8	-	2	-	16	-	8	-	1	-	1	<MDL	16	-	1	<MDL
100170020	GL172268	1	-	1	-	2	-	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170020	GL172269	1	-	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	2	-	1	<MDL
100170012	GL172270	7	-	2	-	12	-	5	-	1	-	5	-	14	-	1	<MDL
100170012	GL172271	6	-	2	-	10	-	5	-	1	-	6	-	12	-	1	<MDL
100170012	GL172272	4	-	1	-	7	-	3	-	1	<MDL	3	-	8	-	1	<MDL
100170025	GL172273	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172274	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170025	GL172275	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172276	2	-	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	3	-	1	<MDL
100170021	GL172277	1	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170021	GL172278	3	-	1	-	6	-	3	-	1	<MDL	1	<MDL	6	-	1	<MDL
100170010	GL172279	4	-	1	-	6	-	2	-	1	<MDL	1	<MDL	8	-	1	<MDL
100170010	GL172280	3	-	2	-	5	-	3	-	1	<MDL	2	-	6	-	1	<MDL
100170010	GL172281	4	-	2	-	7	-	3	-	1	<MDL	3	-	8	-	1	<MDL
100170011	GL172282	19	-	6	-	35	-	15	-	2	-	16	-	38	-	1	<MDL
100170011	GL172283	16	-	4	-	32	-	15	-	2	-	14	-	34	-	1	<MDL
100170011	GL172284	15	-	4	-	28	-	13	-	2	-	14	-	30	-	1	<MDL
100170014	GL172285	3	-	1	-	5	-	2	-	1	<MDL	2	-	5	-	1	<MDL
100170014	GL172286	2	-	1	-	3	-	1	-	1	<MDL	1	<MDL	4	-	1	<MDL
100170014	GL172287	16	-	3	-	27	-	13	-	2	-	1	<MDL	28	-	6	-
100170017	GL172288	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170017	GL172289	1	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170017	GL172290	1	-	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	2	-	1	<MDL
100170023	GL172291	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170015	GL172294	3	-	1	-	5	-	3	-	1	<MDL	1	<MDL	5	-	1	<MDL
100170015	GL172295	4	-	1	-	7	-	4	-	1	<MDL	1	<MDL	8	-	1	<MDL
100170015	GL172296	2	-	1	<MDL	4	-	3	-	1	<MDL	1	<MDL	4	-	1	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,3',5,5',6-heptachloro PCB(178)		2,2',3,3',5,5',6,6'-octachloro PCB(202)		2,2',3,3',5,6'-hexachloro PCB(135)		2,2',3,4',5',6-hexachloro PCB(149)		2,2',3,4',5,5',6-heptachloro PCB(187)		2,2',3,4',5,6,6'-heptachloro PCB(188)		2,2',3,4-tetrachloro PCB(41)		2,2',3,4,4'-pentachloro PCB(85)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	-	1	<MDL	1	-	5	-	3	-	1	<MDL	1	<MDL	1	<MDL
100170019	GL172262	1	-	1	<MDL	2	-	7	-	7	-	1	<MDL	1	<MDL	1	<MDL
100170019	GL172263	1	-	1	<MDL	1	-	5	-	3	-	1	<MDL	1	<MDL	1	<MDL
100170016	GL172264	1	-	1	<MDL	1	-	7	-	5	-	1	<MDL	1	<MDL	1	<MDL
100170016	GL172265	1	-	1	<MDL	1	-	4	-	3	-	1	<MDL	1	<MDL	1	<MDL
100170016	GL172266	1	-	1	<MDL	1	-	4	-	3	-	1	<MDL	1	<MDL	1	<MDL
100170020	GL172267	3	-	1	-	5	-	20	-	19	-	1	<MDL	1	<MDL	1	<MDL
100170020	GL172268	1	-	1	<MDL	1	-	5	-	3	-	1	<MDL	1	<MDL	1	<MDL
100170020	GL172269	1	<MDL	1	<MDL	1	-	4	-	2	-	1	<MDL	1	<MDL	1	<MDL
100170012	GL172270	3	-	1	-	5	-	24	-	17	-	1	<MDL	1	<MDL	1	<MDL
100170012	GL172271	3	-	1	-	4	-	20	-	14	-	1	<MDL	1	<MDL	1	<MDL
100170012	GL172272	2	-	1	<MDL	3	-	13	-	10	-	1	<MDL	1	<MDL	1	<MDL
100170025	GL172273	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172274	1	<MDL	1	<MDL	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170025	GL172275	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172276	1	-	1	<MDL	1	-	5	-	4	-	1	<MDL	1	<MDL	1	<MDL
100170021	GL172277	1	<MDL	1	<MDL	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170021	GL172278	1	-	1	<MDL	1	-	6	-	6	-	1	<MDL	1	<MDL	1	<MDL
100170010	GL172279	2	-	1	<MDL	4	-	15	-	9	-	1	<MDL	1	<MDL	1	-
100170010	GL172280	1	-	1	<MDL	2	-	13	-	7	-	1	<MDL	1	<MDL	1	-
100170010	GL172281	1	-	1	<MDL	3	-	12	-	10	-	1	<MDL	1	<MDL	1	<MDL
100170011	GL172282	6	-	2	-	11	-	55	-	40	-	1	<MDL	1	<MDL	1	-
100170011	GL172283	6	-	2	-	10	-	48	-	37	-	1	<MDL	1	<MDL	1	<MDL
100170011	GL172284	5	-	2	-	9	-	47	-	35	-	1	<MDL	1	<MDL	1	<MDL
100170014	GL172285	1	-	1	<MDL	1	-	9	-	6	-	1	<MDL	1	<MDL	1	<MDL
100170014	GL172286	1	-	1	<MDL	1	-	8	-	4	-	1	<MDL	1	<MDL	1	<MDL
100170014	GL172287	5	-	2	-	8	-	31	-	30	-	1	<MDL	1	<MDL	1	<MDL
100170017	GL172288	1	<MDL	1	<MDL	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170017	GL172289	1	<MDL	1	<MDL	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170017	GL172290	1	<MDL	1	<MDL	1	<MDL	3	-	2	-	1	<MDL	1	<MDL	1	<MDL
100170023	GL172291	1	<MDL	1	<MDL	1	<MDL	1	-	1	-	1	<MDL	1	<MDL	1	<MDL
100170015	GL172294	1	-	1	<MDL	1	-	7	-	6	-	1	<MDL	1	<MDL	1	<MDL
100170015	GL172295	2	-	1	<MDL	2	-	9	-	8	-	1	<MDL	1	<MDL	1	<MDL
100170015	GL172296	1	-	1	<MDL	1	-	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,4,4',5'-hexachloro PCB(138)		2,2',3,4,4',5',6-heptachloro PCB(183)		2,2',3,4,4',5-hexachloro PCB(137)		2,2',3,4,4',5,5',6-octachloro PCB(203)		2,2',3,4,5'-pentachloro PCB(87)		2,2',3,4,5,5'-hexachloro PCB(141)		2,2',3,5'-tetrachloro PCB(44)		2,2',3,5',6-pentachloro PCB(95)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	6	-	1	-	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	2	-
100170019	GL172262	8	-	3	-	1	<MDL	2	-	1	<MDL	3	-	1	<MDL	1	-
100170019	GL172263	6	-	1	-	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	1	-
100170016	GL172264	8	-	2	-	1	<MDL	2	-	1	<MDL	3	-	1	<MDL	2	-
100170016	GL172265	5	-	1	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	-
100170016	GL172266	5	-	1	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	-
100170020	GL172267	27	-	9	-	1	<MDL	9	-	1	-	9	-	1	<MDL	3	-
100170020	GL172268	7	-	1	-	1	<MDL	1	-	1	-	2	-	1	<MDL	2	-
100170020	GL172269	4	-	1	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	-
100170012	GL172270	30	-	8	-	1	<MDL	6	-	1	-	9	-	1	<MDL	6	-
100170012	GL172271	23	-	7	-	1	<MDL	5	-	1	-	7	-	1	<MDL	5	-
100170012	GL172272	18	-	5	-	1	<MDL	3	-	1	-	6	-	1	<MDL	1	<MDL
100170025	GL172273	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-
100170025	GL172274	1	-	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170025	GL172275	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172276	6	-	2	-	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	1	<MDL
100170021	GL172277	2	-	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	-
100170021	GL172278	9	-	4	-	1	<MDL	3	-	1	<MDL	3	-	1	<MDL	1	-
100170010	GL172279	18	-	5	-	1	<MDL	3	-	1	-	6	-	1	<MDL	5	-
100170010	GL172280	16	-	4	-	1	-	3	-	1	-	4	-	1	-	4	-
100170010	GL172281	19	-	5	-	1	<MDL	4	-	1	-	6	-	1	<MDL	5	-
100170011	GL172282	76	-	21	-	4	-	18	-	5	-	22	-	1	<MDL	11	-
100170011	GL172283	63	-	19	-	1	<MDL	16	-	3	-	20	-	1	<MDL	11	-
100170011	GL172284	60	-	18	-	1	<MDL	15	-	2	-	20	-	1	<MDL	9	-
100170014	GL172285	11	-	3	-	1	-	3	-	1	-	3	-	1	<MDL	3	-
100170014	GL172286	9	-	2	-	1	-	2	-	1	-	3	-	1	<MDL	3	-
100170014	GL172287	45	-	16	-	1	<MDL	15	-	1	-	15	-	1	-	3	-
100170017	GL172288	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170017	GL172289	2	-	1	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	<MDL
100170017	GL172290	4	-	1	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	1	<MDL
100170023	GL172291	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170015	GL172294	10	-	3	-	1	<MDL	3	-	1	<MDL	3	-	1	<MDL	1	-
100170015	GL172295	13	-	4	-	1	<MDL	3	-	1	<MDL	4	-	1	<MDL	1	-
100170015	GL172296	6	-	3	-	1	<MDL	3	-	1	<MDL	2	-	1	<MDL	1	-

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',3,5,5',6-hexachloro PCB(151)		2,2',4,4',5-pentachloro PCB(99)		2,2',4,4',6,6'-hexachloro PCB(155)		2,2',4,5'-tetrachloro PCB(49)		2,2',4,6,6'-pentachloro PCB(104)		2,2',5-trichloro PCB(18)		2,2',5,5'-tetrachloro PCB(52)		2,2',6-trichloro PCB(19)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170019	GL172262	3	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	6	-	1	<MDL	2	<MDL
100170019	GL172263	2	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170016	GL172264	3	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170016	GL172265	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170016	GL172266	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170020	GL172267	8	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170020	GL172268	2	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170020	GL172269	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170012	GL172270	9	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170012	GL172271	8	-	2	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170012	GL172272	6	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170025	GL172273	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170025	GL172274	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170025	GL172275	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170021	GL172276	2	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170021	GL172277	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170021	GL172278	2	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170010	GL172279	6	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170010	GL172280	5	-	2	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170010	GL172281	6	-	2	-	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL
100170011	GL172282	20	-	4	-	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL
100170011	GL172283	20	-	2	-	1	<MDL	1	-	1	<MDL	2	<MDL	2	-	2	<MDL
100170011	GL172284	19	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170014	GL172285	3	-	2	<MDL	1	<MDL	1	-	1	<MDL	2	<MDL	1	-	2	<MDL
100170014	GL172286	3	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	-	2	<MDL
100170014	GL172287	12	-	2	<MDL	1	-	1	-	1	<MDL	3	-	1	-	2	<MDL
100170017	GL172288	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170017	GL172289	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170017	GL172290	1	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170023	GL172291	1	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170015	GL172294	3	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170015	GL172295	3	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL
100170015	GL172296	2	-	2	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL	1	<MDL	2	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,2',6,6'-tetrachloro PCB(54)		2,2'3,3',6-pentachloro PCB(84)		2,2'3,4'5-/2,2'4,5,5'-pentach PCB(90/101)		2,3'-dichloro PCB(6)		2,3',4',5-tetrachloro PCB(70)		2,3',4,4'-tetrachloro PCB(66)		2,3',4,4',5-pentachloro PCB(118)		2,3',4,4',5,5'-hexachloro PCB(167)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	-	1	-	1	<MDL
100170019	GL172262	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170019	GL172263	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170016	GL172264	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170016	GL172265	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170016	GL172266	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170020	GL172267	1	<MDL	1	<MDL	5	-	5	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL
100170020	GL172268	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170020	GL172269	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170012	GL172270	1	<MDL	1	<MDL	7	-	5	<MDL	1	<MDL	1	-	2	-	1	-
100170012	GL172271	1	<MDL	1	<MDL	6	-	5	<MDL	1	<MDL	1	-	2	-	1	<MDL
100170012	GL172272	1	<MDL	1	<MDL	1	<MDL	5	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL
100170025	GL172273	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172274	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172275	1	<MDL	1	<MDL	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172276	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170021	GL172277	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172278	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170010	GL172279	1	<MDL	1	<MDL	6	-	5	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL
100170010	GL172280	1	<MDL	1	<MDL	6	-	5	<MDL	1	<MDL	1	-	3	-	1	<MDL
100170010	GL172281	1	<MDL	1	<MDL	6	-	5	<MDL	1	<MDL	1	-	3	-	1	<MDL
100170011	GL172282	1	<MDL	1	-	16	-	5	<MDL	1	-	1	-	10	-	2	-
100170011	GL172283	1	<MDL	1	<MDL	14	-	5	<MDL	1	-	1	<MDL	4	-	1	-
100170011	GL172284	1	<MDL	1	<MDL	13	-	5	<MDL	1	<MDL	1	-	4	-	1	-
100170014	GL172285	1	<MDL	1	<MDL	1	<MDL	5	<MDL	1	<MDL	1	-	3	-	1	<MDL
100170014	GL172286	1	<MDL	1	<MDL	3	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170014	GL172287	1	-	1	<MDL	6	-	5	<MDL	1	<MDL	1	<MDL	3	-	1	-
100170017	GL172288	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170017	GL172289	1	<MDL	1	<MDL	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170017	GL172290	1	<MDL	1	<MDL	1	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170023	GL172291	1	<MDL	1	<MDL	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170015	GL172294	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170015	GL172295	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL
100170015	GL172296	1	<MDL	1	<MDL	2	-	5	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,3',4,4',6-pentachloro PCB(119)		2,3,3',4',6-pentachloro PCB(110)		2,3,3',4,4'-pentachloro PCB(105)		2,3,3',4,4',5'-hexachloro PCB(157)		2,3,3',4,4',5',6-heptachloro PCB(191)		2,3,3',4,4',5-hexachloro PCB(156)		2,3,3',4,4',5,5'-heptachloro PCB(189)		2,3,3',4,4',5,5',6-octachloro PCB(205)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170019	GL172262	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170019	GL172263	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170016	GL172264	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170016	GL172265	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170016	GL172266	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170020	GL172267	1	<MDL	2	-	1	<MDL	1	<MDL	1	-	2	-	1	-	1	<MDL
100170020	GL172268	1	<MDL	2	-	1	-	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170020	GL172269	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170012	GL172270	1	<MDL	4	-	1	<MDL	1	<MDL	1	<MDL	2	-	1	<MDL	1	<MDL
100170012	GL172271	1	<MDL	3	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170012	GL172272	1	<MDL	3	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170025	GL172273	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172274	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172275	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172276	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170021	GL172277	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172278	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170010	GL172279	1	<MDL	3	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170010	GL172280	1	<MDL	3	-	2	-	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170010	GL172281	1	<MDL	3	-	1	-	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170011	GL172282	1	<MDL	10	-	4	-	1	-	1	-	5	-	1	-	1	-
100170011	GL172283	1	<MDL	7	-	1	<MDL	1	<MDL	1	-	4	-	1	-	1	-
100170011	GL172284	1	<MDL	6	-	1	<MDL	1	<MDL	1	-	4	-	1	-	1	-
100170014	GL172285	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170014	GL172286	1	<MDL	2	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170014	GL172287	1	<MDL	3	-	1	<MDL	4	-	1	-	1	<MDL	2	-	2	-
100170017	GL172288	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170017	GL172289	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170017	GL172290	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170023	GL172291	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170015	GL172294	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170015	GL172295	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170015	GL172296	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	2,3,3'4,4'6-hexachloro PCB(158)		2,3,4'-trichloro PCB(22)		2,4'-dichloro PCB(8)		2,4,4'-/2,4',5-trichloro PCB(28/31)		22',33',4,5-hexachloro PCB(129)		22',44',55'-hexachloro PCB(153)		22'33'44'55'6-nonachloro PCB(206)		22'33'44'566'-nonachloro PCB(207)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	6	-	1	<MDL	1	<MDL
100170019	GL172262	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	9	-	1	<MDL	1	<MDL
100170019	GL172263	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	6	-	1	<MDL	1	<MDL
100170016	GL172264	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	8	-	1	-	1	<MDL
100170016	GL172265	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	4	-	1	<MDL	1	<MDL
100170016	GL172266	1	<MDL	2	<MDL	5	<MDL	2	-	1	<MDL	5	-	1	<MDL	1	<MDL
100170020	GL172267	2	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	25	-	2	-	1	<MDL
100170020	GL172268	1	-	2	<MDL	5	<MDL	2	-	1	<MDL	6	-	1	-	1	<MDL
100170020	GL172269	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	4	-	1	<MDL	1	<MDL
100170012	GL172270	2	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	30	-	1	-	1	<MDL
100170012	GL172271	2	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	25	-	1	-	1	<MDL
100170012	GL172272	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	18	-	1	-	1	<MDL
100170025	GL172273	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170025	GL172274	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170025	GL172275	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL
100170021	GL172276	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	7	-	1	<MDL	1	<MDL
100170021	GL172277	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	2	-	1	<MDL	1	<MDL
100170021	GL172278	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	9	-	1	-	1	<MDL
100170010	GL172279	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	17	-	1	-	1	<MDL
100170010	GL172280	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	15	-	1	-	1	<MDL
100170010	GL172281	2	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	21	-	1	-	1	<MDL
100170011	GL172282	6	-	2	<MDL	5	<MDL	2	<MDL	2	-	72	-	3	-	1	<MDL
100170011	GL172283	5	-	2	<MDL	5	<MDL	2	<MDL	1	-	62	-	2	-	1	<MDL
100170011	GL172284	5	-	2	<MDL	5	<MDL	2	<MDL	1	-	62	-	2	-	1	<MDL
100170014	GL172285	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	11	-	1	-	1	<MDL
100170014	GL172286	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	9	-	1	<MDL	1	<MDL
100170014	GL172287	4	-	2	-	5	<MDL	2	<MDL	1	-	47	-	3	-	1	-
100170017	GL172288	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	2	-	1	<MDL	1	<MDL
100170017	GL172289	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	2	-	1	<MDL	1	<MDL
100170017	GL172290	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	3	-	1	-	1	<MDL
100170023	GL172291	1	<MDL	2	<MDL	5	<MDL	2	<MDL	1	<MDL	1	-	1	<MDL	1	<MDL
100170015	GL172294	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	11	-	1	-	1	<MDL
100170015	GL172295	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	14	-	1	-	1	<MDL
100170015	GL172296	1	-	2	<MDL	5	<MDL	2	<MDL	1	<MDL	7	-	1	-	1	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	22'33'455'66'-nonachloro PCB(208)		22'344'55'-heptachloro PCB(180)		23',44',5'6-hexachloro PCB(168)		233'4'55'6-heptachloro PCB(193)		3,3',4,4'-tetrachloro PCB(77)		3,3',4,4',5-pentachloro PCB(126)		3,3',4,4',5,5'-hexachloro PCB(169)		3,4,4'-trichloro PCB(37)	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL	3	-	1	<MDL	2	<MDL
100170019	GL172262	1	<MDL	10	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170019	GL172263	1	<MDL	6	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170016	GL172264	1	<MDL	9	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170016	GL172265	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170016	GL172266	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170020	GL172267	1	<MDL	40	-	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170020	GL172268	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170020	GL172269	1	<MDL	4	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170012	GL172270	1	<MDL	30	-	1	<MDL	2	-	1	<MDL	2	-	1	<MDL	2	<MDL
100170012	GL172271	1	<MDL	26	-	1	<MDL	1	-	1	<MDL	2	-	1	<MDL	2	<MDL
100170012	GL172272	1	<MDL	17	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170025	GL172273	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170025	GL172274	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170025	GL172275	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170021	GL172276	1	<MDL	7	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170021	GL172277	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170021	GL172278	1	<MDL	15	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170010	GL172279	1	<MDL	15	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	2	<MDL
100170010	GL172280	1	<MDL	13	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170010	GL172281	1	<MDL	19	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	2	<MDL
100170011	GL172282	1	<MDL	92	-	1	<MDL	4	-	1	<MDL	1	-	1	<MDL	2	<MDL
100170011	GL172283	1	<MDL	78	-	1	<MDL	4	-	1	<MDL	2	-	1	<MDL	2	<MDL
100170011	GL172284	1	-	73	-	1	<MDL	4	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170014	GL172285	1	<MDL	12	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	2	<MDL
100170014	GL172286	1	<MDL	8	-	1	<MDL	1	<MDL	1	<MDL	1	-	1	<MDL	2	<MDL
100170014	GL172287	1	-	1	<MDL	1	<MDL	72	-	1	<MDL	1	-	1	<MDL	2	<MDL
100170017	GL172288	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170017	GL172289	1	<MDL	3	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170017	GL172290	1	<MDL	5	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170023	GL172291	1	<MDL	2	-	1	<MDL	1	<MDL	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170015	GL172294	1	<MDL	14	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL
100170015	GL172295	1	<MDL	19	-	1	<MDL	1	-	1	<MDL	1	-	1	<MDL	2	<MDL
100170015	GL172296	1	<MDL	11	-	1	<MDL	1	-	1	<MDL	1	<MDL	1	<MDL	2	<MDL

Appendix Table 7b. Polychlorinated biphenyls in surficial sediment on the thin-layer cap and cap ref. stn. 25 – retrieval survey. Data provided by MECP-LSB.

Station No.	Sample ID	3,4,4',5-tetrachloro PCB(81)		4,4'-dichloro PCB(15)		G-CHLA/2,3,4,4'-tetrachloro PCB(60)		H-Epoxide/2,4,4',5-tetrachloro PCB(74)		cis-nonachlor/2,3,4,4',5-pentach PCB(114)		Total PCB	
		ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual	ng/g	qual
100170019	GL172261	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	47	-
100170019	GL172262	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	82	-
100170019	GL172263	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	44	-
100170016	GL172264	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	69	-
100170016	GL172265	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	33	-
100170016	GL172266	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	33	-
100170020	GL172267	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	250	-
100170020	GL172268	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	-	41	-
100170020	GL172269	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	24	-
100170012	GL172270	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	260	-
100170012	GL172271	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	210	-
100170012	GL172272	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	140	-
100170025	GL172273	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	-	10	<MDL
100170025	GL172274	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL
100170025	GL172275	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL
100170021	GL172276	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	45	-
100170021	GL172277	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	12	-
100170021	GL172278	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	79	-
100170010	GL172279	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	140	-
100170010	GL172280	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	140	-
100170010	GL172281	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	160	-
100170011	GL172282	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	660	-
100170011	GL172283	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	570	-
100170011	GL172284	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	540	-
100170014	GL172285	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	91	-
100170014	GL172286	1	<MDL	5	<MDL	1	<MDL	1	-	1	<MDL	67	-
100170014	GL172287	1	-	5	<MDL	1	-	1	<MDL	1	<MDL	520	-
100170017	GL172288	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL
100170017	GL172289	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	12	-
100170017	GL172290	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	29	-
100170023	GL172291	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	10	<MDL
100170015	GL172294	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	83	-
100170015	GL172295	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	110	-
100170015	GL172296	1	<MDL	5	<MDL	1	<MDL	1	<MDL	1	<MDL	56	-

Appendix Table 8. Benthic invertebrate counts on the thin-layer cap and cap reference station. 25. Each replicate is 0.25m^2. Data provided by Craig Logan.

	SAMPLE CODE	TSRC-1	TSRC-2	TSRC-3	TSRC-4	TSRC-5	TSRC-6	TSRC-7	TSRC-8	TSRC-9	TSRC-10	TSRC-11	TSRC-12
	STATION NO.	0019			0016			0020			0025		
	#cells picked out of 100 -->	100	100	100	100	100	100	100	100	100	100	100	100
Family	TAXA												
Hydridae	Hydra	2	8	8	1	4	0	5	0	3	2	0	1
Enchytraeidae	Mesenchytraeus	0	0	0	0	0	2	0	0	0	8	1	9
Naididae	Tubificinae - imm. with hairs	86	11	453	45	1696	29	33	21	35	12	6	35
Naididae	Tubificinae - imm. without hairs	2	0	29	0	31	1	0	0	0	0	0	1
Naididae	Amphichaeta leidyi	0	0	0	0	3	0	0	0	0	0	0	0
Naididae	Arcteonais lomondi	1	1	7	0	30	15	3	13	10	10	3	10
Naididae	Aulodrilus americanus	1	0	60	0	0	0	0	1	0	0	0	0
Naididae	Aulodrilus pluriseta	18	0	72	19	209	8	1	2	1	0	0	0
Naididae	Chaetogaster diaphanus	0	0	0	0	0	0	0	0	0	1	0	0
Naididae	Chaetogaster diastrophus	0	0	0	0	0	0	0	0	0	6	2	6
Naididae	Limnodrilus hoffmeisteri	0	0	0	0	2	0	0	0	0	0	0	0
Naididae	Nais	0	0	0	0	0	0	0	0	0	0	0	1
Naididae	Nais behningi	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Nais communis	0	0	0	0	5	0	0	0	1	0	0	0
Naididae	Nais simplex	2	0	2	0	1	0	0	0	2	5	0	18
Naididae	Piguetiella blanci	8	5	11	2	27	9	2	2	2	13	16	23
Naididae	Rhyacodrilus	0	0	0	0	4	1	0	0	0	0	0	0
Naididae	Slavina appendiculata	3	1	1	0	13	0	0	0	0	0	0	0
Naididae	Specaria josinae	0	0	1	1	85	1	0	0	0	0	0	2
Naididae	Spirosperma ferox	16	9	2	11	175	14	3	16	7	1	3	2
Naididae	Stylaria lacustris	0	0	0	0	0	0	2	0	0	0	0	0
Naididae	Tasserkidrilus superiorensis	0	0	0	0	24	2	0	0	0	0	0	0
Naididae	Uncinais uncinata	1	0	5	1	8	5	1	6	2	8	8	17
Naididae	Vejdovskyella comata	0	0	0	0	4	0	0	0	0	0	0	0
Naididae	Vejdovskyella intermedia	0	0	0	0	19	0	0	0	0	0	0	0
Lumbriculidae	Lumbriculus variegatus complex	1	0	0	0	1	0	0	1	1	6	0	0
Lumbriculidae	Stylodrilus herringianus	0	0	0	0	0	0	0	0	0	0	2	8
Glossiphoniidae	Glossiphonia complanata	0	0	0	0	0	0	0	0	0	1	0	0
Glossiphoniidae	Gloiobdella elongata	0	0	0	0	0	0	0	0	0	1	0	0
Plagiostomidae	Hydrolimax grisea	7	1	10	0	3	3	0	1	0	1	0	0
Pisidiidae	Musculium	0	0	0	0	0	0	0	0	0	1	0	0
Pisidiidae	Musculium securis	0	0	0	0	0	0	0	0	0	0	0	0

Pisidiidae	Pisidium	0	0	0	0	0	1	0	0	0	0	3	1
Pisidiidae	Pisidium casertanum	37	2	57	3	21	0	0	0	1	3	0	0
Pisididae	Pisidium ferrugineum	0	0	0	0	0	0	0	0	0	1	0	0
Pisidiidae	Pisidium henslowanum	8	0	7	0	4	0	0	0	0	0	1	0
Pisidiidae	Pisidium nitidum	0	0	0	0	0	0	0	0	0	9	11	24
Pisidiidae	Pisidium ventricosum	0	0	6	1	4	0	0	0	0	0	0	0
Lymnaeidae	Unknown specimens	0	0	0	0	0	0	0	0	0	4	2	2
Lymnaeidae	Fossaria	0	0	0	0	0	0	0	0	0	2	0	0
Lymnaeidae	Pseudosuccinea columella	0	0	0	0	0	0	0	0	0	0	0	0
Physidae	Physa	0	0	4	0	1	0	0	0	0	0	0	0
Planorbidae	Unknown specimens	0	0	0	0	0	0	0	0	0	1	0	0
Planorbidae	Gryaulus	0	0	6	0	2	0	0	0	2	0	0	0
Planorbidae	Gyraulus circumstriatus	0	0	0	0	0	0	0	0	0	0	0	0
Planorbidae	Gyraulus deflectus	0	0	0	0	0	0	0	2	0	0	0	0
Planorbidae	Gyraulus parvus	0	0	1	0	0	0	0	0	3	0	0	0
Planorbidae	Helisoma anceps	0	1	6	1	2	2	0	2	6	0	1	0
Valvatidae	Valvata	0	0	0	0	0	0	0	0	23	11	7	14
Valvatidae	Valvata lewisi	5	1	10	13	30	8	1	9	13	9	5	5
Valvatidae	Valvata piscinalis	7	0	3	3	1	3	2	3	9	1	1	0
Valvatidae	Valvata tricarinata	4	4	5	0	3	1	2	8	12	5	1	1
Hydrobiidae	Pyrgulopsis lacustrica	5	0	2	0	1	1	0	2	1	6	6	4
Leptoceridae	Mystacides sepulchralis	1	0	2	0	0	0	0	0	0	0	1	0
Leptoceridae	Oecetis	1	0	0	0	0	0	0	0	0	0	0	0
Leptoceridae	Oecetis nocturna	6	2	1	4	22	6	0	2	5	1	3	1
Chironomidae	Chironominae	1	0	1	1	1	0	0	0	1	0	0	1
Chironomidae	Orthocladiinae	0	0	3	0	0	0	0	0	0	0	2	0
Chironomidae	Ablabesmyia janta	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Chironomus	22	1	4	2	32	3	0	0	0	1	0	0
Chironomidae	Cladotanytarsus	23	10	14	1	2	6	2	1	6	126	88	101
Chironomidae	Conchapelopia	0	0	1	0	0	0	0	0	0	0	0	0
Chironomidae	Cricotopus	0	0	0	0	0	0	0	0	0	0	1	0
Chironomidae	Cryptochironomus blarina	0	0	1	0	0	0	0	0	0	0	0	0
Chironomidae	Demicryptochironomus cuneatus	0	0	0	0	1	0	0	0	0	0	0	0
Chironomidae	Heterotrissocladius	0	0	0	0	0	0	0	0	0	4	0	1
Chironomidae	Heterotrissocladius changi	1	5	3	3	5	6	1	2	2	18	7	6
Chironomidae	Heterotrissocladius marcidus	0	0	0	0	1	5	1	6	1	5	6	8
Chironomidae	Larsia canadensis	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Mesocricotopus	0	0	1	0	0	0	0	0	0	0	0	0

Chironomidae	Micropsectra	5	0	4	0	143	0	0	0	1	8	2	10
Chironomidae	Microtendipes pedellus group	0	0	0	0	2	0	0	0	0	0	0	0
Chironomidae	Monodiamesa tuberculata	0	0	0	0	0	4	0	0	2	2	1	0
Chironomidae	Orthocladius	0	0	1	0	0	0	0	0	0	1	1	2
Chironomidae	Orthocladius annectens	0	0	0	0	1	0	0	0	0	0	0	0
Chironomidae	Parachronomus potamogeti	0	0	1	0	0	0	0	0	0	0	0	0
Chironomidae	Paracladopelma	0	0	0	0	2	0	0	0	0	0	0	0
Chironomidae	Paracladopelma winnelli	3	0	0	0	0	0	0	0	0	3	2	3
Chironomidae	Parakiefferiella	0	3	13	2	1	1	0	0	1	10	2	6
Chironomidae	Paratanytarsus	0	0	0	0	0	0	0	0	0	2	0	1
Chironomidae	Paratendipes	1	0	6	0	60	0	0	0	0	0	0	0
Chironomidae	Phaenopsectra	1	0	21	0	86	0	0	0	1	0	0	0
Chironomidae	Polypedilum lateum group	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Polypedilum scalaenum group	0	0	3	0	29	0	0	1	0	0	3	2
Chironomidae	Potthastia	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Procladius	67	22	96	6	135	16	15	11	13	25	14	29
Chironomidae	Protanypus	6	1	7	1	2	0	0	0	1	1	0	0
Chironomidae	Psectrocladius	1	1	1	0	0	0	0	0	0	3	1	3
Chironomidae	Pseudochironomus	0	0	0	0	0	0	0	0	0	0	1	0
Chironomidae	Stempellina	6	3	4	5	5	9	2	0	6	3	3	1
Chironomidae	Stempellinella	1	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Tanytarsus	9	1	22	5	51	5	3	1	8	53	29	20
Chironomidae	Thienemannimyia norena	0	0	0	0	0	0	0	0	0	1	0	0
Gammaridae	Gammarus pseudolimnaeus	0	0	4	0	0	0	0	0	1	23	14	19
Pontoporeiidae	Pontoporeia hoyi	1	0	4	3	6	4	5	3	1	7	23	29
Asellidae	Caecidotea	0	0	0	0	2	0	0	0	0	0	1	5
	Unknown specimens	0	0	0	0	0	0	0	0	0	0	0	0
Aturidae	Aturus	0	0	0	0	0	0	0	0	0	0	2	0
Hygrobatidae	Hygrobates	1	0	5	0	0	0	0	0	0	6	7	5
Lebertiidae	Lebertia	5	0	4	0	4	4	0	0	1	3	1	4
Limnesiidae	Limnesia	0	0	0	0	0	0	0	0	0	0	0	0
Oxidae	Frontipoda americana	0	0	0	0	0	0	0	0	0	0	1	1
Oxidae	Oxus	0	1	2	0	0	3	2	0	0	2	0	1
Pionidae	Unknown specimens	1	0	0	0	0	0	0	0	0	0	0	0
Pionidae	Piona	3	0	7	0	0	0	0	0	0	11	4	0
Halicaridae	Unknown specimens	0	0	0	1	3	0	0	4	2	0	0	0
Halicaridae	Parasoldanellonyx parviscutatus	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozetidae	Hydrozetes	0	0	0	0	0	0	0	0	0	1	0	2

Malaconothricidae	Unknown specimens	0	0	0	0	0	0	1	0	0	0	1	0
	Unknown specimens	0	0	0	0	100	3	1	0	4	0	20	34
Chydoridae	Unknown specimens	280	111	299	17	50	18	35	26	30	3316	2712	1567
Daphniidae	Unknown specimens	12	35	28	9	7	2	17	31	35	5	1	0
Holopediidae	Holopedium gibberum	0	0	0	0	0	0	0	0	0	18	23	19
	Unknown specimens	5	11	0	18	6	2	9	14	5	5	11	9
Cyclopidae	Unknown specimens	385	136	444	158	130	106	131	153	193	1046	860	823
	Unknown specimens	14	16	56	26	973	23	43	25	48	115	27	106
	Unknown specimens	42	13	52	2	22	3	7	4	13	308	210	359
Candonidae	Unknown specimens	0	0	0	0	0	0	0	0	0	0	0	0
Candonidae	Candona	112	78	133	17	165	94	74	77	85	622	405	589
Candonidae	Fabaeformiscandona	36	17	57	10	63	10	19	15	50	1	0	0
Cyprididae	Cyclocypris	307	159	267	21	20	48	59	91	154	41	16	23
Cyprididae	Cypria	4	4	6	4	37	0	1	0	3	2	0	0
Cyprididae	Cypridopsis	0	0	0	0	0	0	0	0	0	0	22	30
Cyprididae	Pelocypris	378	0	319	192	254	191	252	251	283	415	532	550
Lymnocythereidae	Limnocythere	104	40	142	5	61	12	23	18	24	30	20	35

Appendix Table 8 cont'd. Benthic invertebrate counts on the thin-layer cap and cap reference station. 25. Each replicate is 0.25m^2. Data provided by Craig Logan.

	SAMPLE CODE	TSRC-13	TSRC-14	TSRC-15	TSRC-16	TSRC-17	TSRC-18	TSRC-19	TSRC-20	TSRC-21	TSRC-22	TSRC-23	TSRC-24
	STATION NO.	0010			0014			0017			0023		
	#cells picked out of 100 -->	100	100	100	100	100	100	100	100	100	100	100	100
Family	TAXA												
Hydridae	Hydra	18	10	8	8	7	6	1	1	0	2	2	0
Enchytraeidae	Mesenchytraeus	0	1	1	0	1	0	0	0	2	1	1	0
Naididae	Tubificinae - imm. with hairs	4	76	115	9	5	1	1	68	11	0	0	0
Naididae	Tubificinae - imm. without hairs	0	0	3	0	0	0	0	2	2	0	0	0
Naididae	Amphichaeta leidyi	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Arcteonais lomondi	0	2	13	5	10	4	9	19	7	0	0	4
Naididae	Aulodrilus americanus	0	0	0	0	0	0	0	0	1	0	0	0
Naididae	Aulodrilus pluriseta	1	2	15	0	1	0	0	1	1	0	0	0
Naididae	Chaetogaster diaphanus	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Chaetogaster diastrophus	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Limnodrilus hoffmeisteri	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Nais	0	0	0	1	2	0	0	1	0	0	0	0
Naididae	Nais behningi	0	0	0	3	0	0	0	0	0	0	0	0
Naididae	Nais communis	0	0	0	0	10	2	2	2	0	0	0	0
Naididae	Nais simplex	0	0	0	0	0	0	0	0	0	1	0	0
Naididae	Piguetiella blanci	1	1	29	0	10	0	3	9	2	2	2	0
Naididae	Rhyacodrilus	0	0	0	0	0	0	0	2	0	0	0	0
Naididae	Slavina appendiculata	0	2	1	7	12	14	0	0	0	0	0	0
Naididae	Specaria josinae	0	0	10	0	0	0	0	0	0	0	0	0
Naididae	Spirosperma ferox	0	6	13	3	9	4	6	29	7	12	15	18
Naididae	Stylaria lacustris	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Tasserkidrilus superiorensis	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Uncinais uncinata	0	0	1	1	3	1	2	2	2	1	2	1
Naididae	Vejdovskyella comata	0	0	0	0	0	0	0	0	0	0	0	0
Naididae	Vejdovskyella intermedia	2	1	15	15	16	16	16	17	1	49	44	31
Lumbriculidae	Lumbriculus variegatus complex	0	0	0	0	0	0	3	5	10	5	1	4
Lumbriculidae	Stylodrilus herringianus	0	0	3	0	2	1	0	0	0	0	0	0
Glossiphoniidae	Glossiphonia complanata	0	0	0	0	0	0	0	0	0	0	0	0
Glossiphoniidae	Gloiobdella elongata	0	0	0	0	0	0	0	0	0	0	0	0
Plagiostomidae	Hydrolimax grisea	0	2	1	0	0	1	2	0	1	2	0	0
Pisidiidae	Musculium	0	0	0	1	0	0	0	0	0	0	0	0

Pisidiidae	Musculium securis	0	1	1	0	0	0	1	0	0	0	0	0
Pisidiidae	Pisidium	1	3	4	0	0	0	0	0	0	1	0	0
Pisidiidae	Pisidium casertanum	0	0	13	0	0	0	0	1	0	0	0	1
Pisididae	Pisidium ferrugineum	0	0	0	0	0	0	0	1	0	0	0	0
Pisidiidae	Pisidium henslowanum	0	0	0	0	0	0	0	0	0	0	0	0
Pisidiidae	Pisidium nitidum	2	4	1	1	1	0	0	0	1	0	1	0
Pisidiidae	Pisidium ventricosum	0	2	1	0	0	0	0	2	1	0	0	0
Lymnaeidae	Unknown specimens	0	1	0	1	0	0	0	0	0	0	0	0
Lymnaeidae	Fossaria	0	0	0	0	0	0	0	0	0	0	0	0
Lymnaeidae	Pseudosuccinea columella	0	0	0	0	0	0	0	0	0	0	0	0
Physidae	Physa	0	0	0	0	0	0	0	0	0	0	0	0
Planorbidae	Unknown specimens	2	0	0	0	0	0	0	0	0	0	0	0
Planorbidae	Gryaulus	0	0	0	0	0	0	0	0	0	0	0	0
Planorbidae	Gyraulus circumstriatus	0	0	0	1	1	0	0	2	0	0	0	0
Planorbidae	Gyraulus deflectus	0	0	0	0	0	0	0	0	0	0	0	1
Planorbidae	Gyraulus parvus	0	0	1	0	0	0	2	0	0	0	0	0
Planorbidae	Helisoma anceps	0	1	4	0	0	0	0	1	0	0	0	0
Valvatidae	Valvata	3	6	1	0	5	2	0	0	10	2	0	3
Valvatidae	Valvata lewisi	10	11	25	17	20	21	11	21	20	6	3	1
Valvatidae	Valvata piscinalis	2	1	0	4	0	1	4	2	6	2	1	10
Valvatidae	Valvata tricarinata	5	4	4	5	9	1	4	2	6	0	0	0
Hydrobiidae	Pyrgulopsis lacustrica	0	0	1	1	1	0	0	2	0	0	0	0
Leptoceridae	Mystacides sepulchralis	1	0	0	0	0	1	0	0	0	0	0	0
Leptoceridae	Oecetis	1	0	0	0	0	2	0	0	0	0	0	0
Leptoceridae	Oecetis nocturna	3	3	6	3	2	0	0	1	0	0	0	0
Chironomidae	Chironominae	0	0	0	5	1	0	0	1	0	0	0	1
Chironomidae	Orthocladiinae	0	4	0	0	1	0	0	0	0	1	0	0
Chironomidae	Ablabesmyia janta	0	0	0	3	0	1	0	0	0	0	0	0
Chironomidae	Chironomus	0	2	1	0	4	0	1	0	0	0	1	0
Chironomidae	Cladotanytarsus	0	3	16	1	6	2	5	12	7	1	0	2
Chironomidae	Conchapelopia	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Cricotopus	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Cryptochironomus blarina	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Demicryptochironomus cuneatus	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Heterotrissocladius	0	5	0	0	1	0	1	0	0	0	0	0
Chironomidae	Heterotrissocladius changi	1	4	4	2	4	3	3	6	2	2	0	2
Chironomidae	Heterotrissocladius marcidus	2	1	3	1	1	0	1	5	7	0	7	0
Chironomidae	Larsia canadensis	0	0	0	0	0	1	0	0	0	0	1	0

Chironomidae	Mesocricotopus	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Micropsectra	0	0	2	1	2	1	0	1	0	1	1	1
Chironomidae	Microtendipes pedellus group	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Monodiamesa tuberculata	0	1	1	0	2	0	0	1	1	0	0	0
Chironomidae	Orthocladius	0	0	1	1	0	0	0	0	0	0	0	1
Chironomidae	Orthocladius annectens	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Parachronomus potamogeti	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Paracladopelma	0	0	0	0	0	0	1	0	0	0	0	0
Chironomidae	Paracladopelma winnelli	0	0	2	0	0	0	0	2	0	0	0	1
Chironomidae	Parakiefferiella	0	3	7	1	2	3	2	4	0	2	0	2
Chironomidae	Paratanytarsus	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Paratendipes	0	2	0	0	0	0	0	0	0	0	0	0
Chironomidae	Phaenopsectra	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Polypedilum lateum group	0	0	0	0	0	0	0	1	0	0	0	0
Chironomidae	Polypedilum scalaenum group	0	4	2	0	0	0	0	0	0	0	0	0
Chironomidae	Potthastia	0	0	1	0	0	0	0	0	0	1	0	0
Chironomidae	Procladius	3	17	58	3	16	9	11	10	8	0	0	4
Chironomidae	Protanypus	0	1	3	0	0	0	0	0	1	0	0	0
Chironomidae	Psectrocladius	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Pseudochironomus	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Stempellina	4	0	12	18	10	4	9	17	8	12	8	28
Chironomidae	Stempellinella	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	Tanytarsus	1	4	7	6	2	2	2	12	0	12	2	5
Chironomidae	Thienemannimyia norena	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridae	Gammarus pseudolimnaeus	8	2	9	1	3	3	0	0	1	0	0	0
Pontoporeiidae	Pontoporeia hoyi	1	11	13	1	3	0	2	8	6	3	2	1
Asellidae	Caecidotea	5	6	6	0	0	0	0	0	0	0	0	1
	Unknown specimens	0	0	0	0	0	0	0	0	0	0	0	0
Aturidae	Aturus	0	0	0	0	0	0	0	0	0	0	0	0
Hygrobatidae	Hygrobates	4	3	3	1	1	3	1	0	2	0	0	0
Lebertiidae	Lebertia	1	0	0	2	0	1	2	1	0	0	0	0
Limnesiidae	Limnesia	1	0	0	0	0	0	0	0	0	0	0	0
Oxidae	Frontipoda americana	0	0	2	0	0	0	0	0	0	0	0	0
Oxidae	Oxus	0	0	0	0	2	1	0	0	0	0	0	0
Pionidae	Unknown specimens	0	0	0	0	0	0	0	0	0	0	0	0
Pionidae	Piona	1	0	1	0	2	0	1	0	0	1	0	0
Halicaridae	Unknown specimens	0	0	2	1	4	3	7	0	5	4	0	4
Halicaridae	Parasoldanellonyx parviscutatus	0	0	0	0	0	0	0	0	0	0	1	0

Hydrozetidae	Hydrozetes	1	0	0	0	1	0	0	1	0	0	0	0
Malaconothricidae	Unknown specimens	0	0	1	0	0	0	0	0	0	0	0	0
	Unknown specimens	0	5	0	0	1	0	0	20	4	23	12	9
Chydoridae	Unknown specimens	61	28	38	18	30	35	34	23	0	22	11	32
Daphniidae	Unknown specimens	53	26	43	13	19	10	7	9	0	0	2	4
Holopediidae	Holopedium gibberum	26	2	4	0	0	8	1	0	1	0	1	4
	Unknown specimens	7	5	5	21	69	60	152	48	37	73	27	101
Cyclopidae	Unknown specimens	159	202	273	323	363	241	328	106	136	84	39	74
	Unknown specimens	49	123	568	96	71	121	39	73	23	7	2	1
	Unknown specimens	5	16	27	13	9	17	10	7	0	6	0	4
Candonidae	Unknown specimens	4	0	0	0	0	0	0	0	0	0	0	0
Candonidae	Candona	21	51	76	82	93	65	50	46	36	72	13	39
Candonidae	Fabaeformiscandona	5	15	12	6	8	11	4	6	0	1	0	3
Cyprididae	Cyclocypris	112	93	142	140	95	87	24	37	41	33	15	31
Cyprididae	Cypria	3	9	8	0	1	3	1	0	0	0	0	0
Cyprididae	Cypridopsis	1	0	9	0	0	0	0	0	0	0	0	0
Cyprididae	Pelocypris	236	149	223	143	231	112	256	256	200	511	249	695
Lymnocythereidae	Limnocythere	10	9	43	29	26	12	38	28	15	38	15	16

Appendix Table 9. Mercury, total PCBs, and DLPCB congener concentrations in dorsal fillet tissue of Lake Trout, Lake Whitefish, and Longnose Suckers, and whole-body composites of young-of-year Round Whitefish collected in Peninsula Harbour. Data provided by MECP-LSB.

Species Name	Length	Weight	Sex	Mercury	Total PCB	Lipid	PCB 77	PCB 81	PCB105	PCB114	PCB118	PCB123	PCB126	PCB156	PCB157	PCB167	PCB169	PCB189
				ug/g ww	ng/g ww	%	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww	pg/g ww
Lake Trout	90.3	7900	M	1.3	6600	5	81	5.6	23000	1500	81000	1000	250	42000	3800	15000	66	9700
Lake Trout	67.2	2605	M	0.38	1400	7.1	21	2	2600	140	9200	110	34	4200	360	1500	9	940
Lake Trout	61.3	2135	M	0.19	160	4.4	33	2.5	1700	82	5300	80	29	1700	200	840	8.7	360
Lake Trout	59.7	1960	M	0.36	600	5	38	2.8	4100	230	14000	200	52	6400	540	2400	12	1400
Lake Trout	54.3	1295	M	0.14	78	2.4												
Lake Trout	54.2	1100	M	0.11	210	4.5												
Lake Trout	52.4	1135	F	0.1	45	3.6												
Lake Trout	51.7	1220	M	0.15	310	9.8												
Lake Trout	45.8	685	F	0.13	70	2.5	7.1	<0.79	430	22	1400	20	7.4	470	51	180	2.7	100
Lake Trout	61	2240	F	0.2	230	5.7												
Lake Whitefish	54.8	1265	M	0.11	39	4												
Lake Whitefish	51.5	1125	M	0.11	20	1.8	3.5	<0.38	89	4.2	250	5.1	2.5	56	9.4	27	<0.64	11
Lake Whitefish	49.8	1140	F	0.09	25	4.3	5.5	<0.48	190	9.8	530	12	4.1	130	22	70	1.5	27
Lake Whitefish	40.5	465	F	0.09	27	2.1												
Lake Whitefish	34.5	330	F	0.07	20	2.2												
Lake Whitefish	34.3	340	M	0.07	20	2.7	<1.6	<0.51	88	4.4	260	5.2	<1.5	52	9.8	31	<0.45	11
Longnose Sucker	48.5	1090	F	0.67	1100	5												
Longnose Sucker	47.3	860	F	0.5	1400	2.4												
Longnose Sucker	47.2	1025	F	0.23	130	1.9												
Longnose Sucker	45.6	955	F	0.21	360	2.1												
Longnose Sucker	44.1	800		0.3	480	2.8												
Longnose Sucker	42	755	F	0.25	200	1.3												
Longnose Sucker	39.4	625	M	0.32	650	2.5												
Longnose Sucker	37.8	550	M	0.43	2700	3.7												
Longnose Sucker	34.2	350	F	0.17	150	1.4												
Longnose Sucker	31.2	285	F	0.15	130	1.6												
Round Whitefish[1]	9.9			0.07	590	2.0												
Round Whitefish[1]	9.8			0.07	590	2.0												
Round Whitefish[1]	9.6			0.06	590	1.5												
Round Whitefish[1]	9.5			0.06	590	1.6												

[1]young-of-year whole-body composites