

St. Clair River Area of Concern
Virtual Community Information Session
June 22, 2021
Engineering and Design Plan for Management of Contaminated Sediment
Questions and Answers Following Presentation

Introduction

The St. Clair Region Conservation Authority (SCRCA) is continuing to lead the work on the development of an engineering and design plan for managing contaminated sediment in three priority areas of the St. Clair River. Parsons Inc. and Anchor QEA have been retained to prepare the plan. Project oversight is being provided by Environment and Climate Change Canada, the Ministry of the Environment, Conservation and Parks and Dow Canada, the three parties that provided the funding to support the project work.

Field activities were completed by Parsons in 2019 and 2020. The work included:

- water velocity measurements at 15 locations, and grain size analysis of sediment at 10 locations to assess sediment stability,
- the collection of sediment samples from 99 locations to assess the horizontal and vertical extent of mercury contaminated sediment in each priority area,
- and a bathymetry survey to measure sediment surface elevations in the targeted areas.

After assessing the extensive amount of new data that was collected, in conjunction with historical data, it was concluded that:

- There are no measurable risks to fish presented by mercury in sediment.
- The risk-based goal of a surface weighted average concentration of 3 mg/kg mercury in the surface sediment has already been met in each Priority Area and at the two Buried Deposits.
- There have been significant decreases in mercury concentrations in surface sediment compared to historical results due to natural recovery.
- Re-exposure of the subsurface buried mercury is unlikely.
- An Erosion Resistant Cover is recommended in focused areas within Priority Areas 1, 2 and 3 to enhance erosion protection and decrease mercury concentrations at the surface.
- The planned remedial actions will achieve the sediment management goals and remedial action objectives.

On June 22, 2021, at 6:30 p.m., the St. Clair Region Conservation Authority hosted a virtual Community Information Session. The purpose of the information session was to provide an update to the community on the work that is underway to prepare the engineering and design plan to address mercury contaminated sediment in the St. Clair

River. During the presentation, information was provided on the results of the sampling, the recommended approach for managing the contaminated sediment based on those results, and timing for completion of the engineering and design plan. Participants had the opportunity to ask questions about the work that was completed, the remediation approach identified, and any other project related questions. The following is a summary of the questions raised and answers provided following the presentation.

Summary of Questions and Answers

- 1. Regarding the higher concentrations of mercury that are no longer in the surface sediment, did most of the reductions occur between 2011 to 2020, or earlier? What happened to it? Did it get moved further downstream?**

The mercury contaminated sediment has primarily become covered by cleaner sediment. Based on extensive new data collected and multiple lines of evidence, the primary reason that the average concentrations of mercury in surface sediment have decreased is because they have been buried over time by cleaner sediment that has deposited since the clean-up of higher levels of mercury in upstream sediment by Dow in 2005, not because there has been significant erosion and redeposition of contaminated sediment downstream. This conclusion is based on the sampling results showing that the highest mercury concentrations are typically buried, and sediment surface elevation surveys showing that there has been sediment deposition over time. The sediment sampling and sediment surface elevation surveys were conducted following a 100-year high river flow event in 2019 when the potential for sediment erosion was high.

If there has been some minor loss of sediment downstream of the priority areas over time, there would be no measurable risks presented. The primary goal of the sediment management work has always been to reduce the risk of bioaccumulation in local fish. Data collected to date, including the historical data, showed that the mercury concentrations in sediment previously only slightly exceeded the risk-based goals to be protective of fish.

- 2. Can the St. Clair Region Conservation Authority also present the findings and recommended remedial approach to the Binational Public Advisory Council (BPAC)?**

Yes, the St. Clair Region Conservation Authority would be pleased to present the information to BPAC at its next regularly scheduled meeting.

- 3. In collecting your data, was it a surprise that the surface sediment concentration had already met your goal?**

It is normal to see changes in surface sediment over time. When undertaking a sediment management project, it may be necessary to take an adaptive

management approach based on the results of the sampling. The sampling was an important first step in the development of an engineering and design plan.

As a result of all the data collected, the consultant determined that the risk-based surface weighted average concentration goal of 3 mg/kg mercury in surface sediment has been met in all three priority areas and at the two buried deposit areas. We recognized that based on the findings, the use of an Erosion Resistant Cover in focused areas was an appropriate remedial approach based on the level of risk. The Erosion Resistant Cover adds to the achieved risk reduction and provides additional protection against future potential erosion.

4. Is there evidence that levels have gone down because they migrated downstream?

Minor losses could have occurred in combination with the deposition of new clean sediment. Based on all the evidence that has been collected, it is believed that there was very little transported downstream, and that it was primarily as a result of burial beneath cleaner sediment that significant decreases in concentrations in surface sediment have been observed.

The most recent sediment sampling and bathymetry survey work was conducted following a 100-year high river flow event in 2019 when the potential for sediment erosion was high. Despite this, the sediment sample results showed that the highest mercury concentrations that remain are typically buried at depth, greater than 15 cm, and the bathymetry (sediment surface elevation) survey results show that there has been sediment deposition over time.

Opportunities to work with the University of Windsor's Great Lakes Institute for Environmental Research (GLIER) to update the sediment surveys that GLIER completed in the Walpole Island delta in 2005 and again in 2012 are under consideration. Results from the 2012 work showed that none of the sampling stations had chemical concentrations that exceeded MECP Probable Effect Level (PEL) guidelines and that no management actions were warranted.

5. Could you provide more detail about what the surface weighted average concentration means and how it was calculated?

The Surface Weighted Average Concentration (SWAC) was calculated by preparing a grid pattern for each priority area. The consultant collected samples from a number of different locations in each priority area. Each of the sample locations had a mercury concentration associated with it.

The consultant then calculated the area in square metres associated with each sample location. They took the average of all those concentrations, and weighted each sample location by the area that it represented. For example, if at one end

of the priority area there was one sample and at the other end there were a number of samples clustered closer together, that one sample had a larger area associated with it because there was only one sample.

The reason this method was used was because the consultant was trying to estimate the exposure to fish that are swimming around in the area and being exposed to sediment throughout the area. The assumption is that the fish are swimming around and, on average, are exposed to all areas. The SWAC calculation is the best representation of that. This approach has been used at other contaminated sediment sites, especially sites that involve a contaminant that can bioaccumulate.

6. Can you address the issue of cost for the capping and who is paying for it?

Preparing a detailed estimate of the cost to install an Erosion Resistant Cover in Priority Areas 1 and 2 and 3, in focused areas, is one of the key deliverables of the final engineering and design report. The report is still being prepared. It will be a part of the information that will need to be taken into consideration to support discussions related to implementation, including how the implementation phase will be funded.

7. Will a silt curtain be required to be used when the Erosion Resistant Cover is being put in place to minimize the potential for increased turbidity downstream?

A silt curtain is basically a vertical barrier that surrounds the work area to reduce the potential for significant turbidity downstream. The need for the use of silt curtains during placement of the Erosion Resistant Cover is something that is being looked at as part of the design plan. Sometimes they are automatically incorporated into the project work and other times they are only incorporated if necessary based on site observations at the time of implementation.

The Erosion Resistant Cover involves the placement of clean material into the water rather than the removal of contaminated material, therefore the release of contaminants into the water column is a much smaller risk.

8. How much funding has already been approved for this project to date? And who is paying for it?

It is a collaborative effort being led by the St. Clair Region Conservation Authority (SCRCA) with funding being provided by Environment and Climate Change Canada, the Ministry of the Environment, Conservation and Parks, and Dow Canada. The cost to prepare the engineering design plan will be approximately \$1 million. The SCRCA is monitoring the progress of the work closely, tracking it against key deliverables, costs and timelines, and working with the Sediment Management Oversight Committee in that regard.

9. How much mercury contaminated sediment could have been transported downstream? Should drinking water intakes located downstream be concerned about mercury contaminated sediment that may have moved downstream? Could the movement of mercury contaminated sediment have occurred during the 2019 high water flow event?

Based in the information gathered, it is believed that there was not much, if any, erosion of mercury impacted sediments from the priority areas in the last 20 years. Sampling of the priority areas during the 100-year high river flow event in 2019, and the results of the bathymetric surveys, showed that there was not a significant loss of mercury impacted sediment during the high river flow event or prior to that. If any erosion of sediment did occur in the past, any loss from these priority areas would have been small to the point of being immeasurable, and insufficient to pose a risk to the overall quality of the St. Clair River, especially considering the size of the river and the massive volume of water that flows through the system. Like other rivers, deposition of clean sediment in each of the priority areas has helped to reduce mercury concentrations in the surface sediment.

The mercury concentrations in drinking water have never been a concern throughout the sediment assessment work. The reason a need was identified to manage the mercury contaminated sediment in 2009 was because the level of contamination in the surface sediment posed a risk of bioaccumulation in fish. The mercury contamination levels would have to be extremely high to cause any concerns with impacts on drinking water and there is no evidence of that in the St. Clair River.

10. Do you have an estimate on when the cover will be installed? Could it be 2022?

At this time the St. Clair Region Conservation Authority is focusing on the engineering and design plan phase. The next steps, including timing, will be determined following completion of the engineering and design work. This information is essential to have so that those discussions can occur.

11. What is the best way to obtain additional information about the project work after the presentation today?

Anyone with a question about the project work is welcome to contact:

Mike Moroney, Project Manager
St. Clair Region Conservation Authority
205 Mill Pond Cr.
Strathroy, ON N7G-3P9
Email Address: mmoroney@scrca.on.ca

12. Where is the best place to find the background on where the mercury came from in the first place?

There are two reports available that provide background information on the mercury contaminated sediment that has accumulated in the three priority areas. There is the “Final Project Report for Applying the COA Framework to the St. Clair River Area of Concern” dated March 3, 2009, and a “Sediment Management Options for St. Clair River Area of Interest Final Report” dated November 2013. You can obtain a copy of these reports through the contact information provided in Question #11.

Dow acknowledges that prior to 1970 their former manufacturing plant in Sarnia discharged mercury to the St. Clair River. Dow is demonstrating their commitment to environmental stewardship and is voluntarily collaborating with the St. Clair Region Conservation Authority; the Ministry of the Environment, Conservation and Parks; and Environment and Climate Change Canada in the engineering design phase of the project.

13. With respect to the mercury levels sampled in the sediment, did you test for elemental mercury or methyl mercury? In other words, did you test for mercury that is bioavailable?

The most recent work analyzed sediment for total mercury, which includes both inorganic mercury and methylmercury. Inorganic mercury is the form of mercury that is typically found in the environment. It gets absorbed by clay particles, so the vast majority of mercury in a river is in the sediment, not in water or tissue. The most recent sediment analysis did not include methyl mercury, but previous studies reported very low methyl mercury concentrations in sediment in the St. Clair River. Methyl mercury is the bioavailable form of mercury that accumulates into fish tissue. It is formed naturally in the environment, but the priority areas are not very conducive to the production of methyl mercury. Thus, methyl mercury concentrations in sediment are low and there is a very low level of bioaccumulation of mercury into worms and fish in the three priority areas.

14. What is deposition?

Deposition is the process of new cleaner sediment coming from an upstream location and settling on the surface of existing sediment at a downstream location. When there is reference to a reduction in mercury concentrations, it is not necessarily a loss by mercury being suspended and carried downstream, it is a dilution or covering with cleaner sediment. It is a natural process in rivers and lakes. Seeing a reduction in concentrations was not completely unexpected. The consultant has seen similar trends at other sediment remediation sites in terms of natural recovery.