

Ministry of the Environment, Conservation and Parks: Brenntag Canada Inc. Fire Off-Site Environmental Monitoring Summary Report

Date: November 16, 2023

Executive Summary:

On August 11, 2023, a 6-alarm fire occurred at a chemical distributor, Brenntag Canada Inc. (Brenntag), located at 35 Vulcan Street, in Etobicoke, Ontario. Brenntag reported that approximately 700,000 litres of oil (soybean and petroleum-based oil), transmission fluids and solvents were stored at the facility at the time of the fire. The event led to heavy emulsions/slurry of oils and fire suppression materials along with impacted fire douse water to enter the municipal storm sewer system and discharge into Mimico Creek, Humber Creek and the Humber Bay Park area of Lake Ontario.

On the day of the incident, the ministry deployed its mobile trace atmospheric gas analyzer (TAGA) and undertook real-time ambient air measurements of a wide array of air contaminants upwind and downwind of the fire to determine any potential impacts to the local air quality. All measured air contaminant levels were far below their respective emergency screening values, confirming there were no local air quality concerns resulting from the fire.

Several milestones have been achieved in the cleanup to date, with strict oversight provided by the Ministry of the Environment, Conservation and Parks (ministry) and its regulatory partners. This includes the completion of large-scale containment and cleanup work, with efforts now transitioning to restoration of the natural environment. In addition, the ministry conducted extensive sampling of water, sediment, stream bank soil and vegetation to identify potential impacts of the run-off to Mimico Creek, Humber Creek and Lake Ontario.

Water and sediment samples were collected at multiple locations along Mimico Creek, Humber Creek, and Lake Ontario, and analyzed for petroleum hydrocarbons, volatile organic hydrocarbons (VOCs), per- and polyfluorinated alkyl substances (PFAS), polycyclic aromatic hydrocarbons (PAHs), and metals.

The main sources of contaminants were petroleum hydrocarbons and fire suppression materials. The results showed a decline in the concentration of contaminants over time and with increasing distance from the discharge points in the impacted waterways, and are returning to pre-spill/urban background conditions, with low levels of residual contamination remaining in the impacted waterways following the incident. Sediment sampling results suggest that the current concentrations of contaminants would not have a significant impact on the resident organisms.

Stream bank soil and vegetation samples showed elevated concentrations of contaminant compared to samples collected in non-impacted areas. These results suggest that the

elevated concentrations in the creek bank vegetation adjacent to and downstream from Brenntag likely originated from the fire incident.

The ministry and Environment Canada and Climate Change are currently in the process of verifying the status of the cleanup before restoration work can begin; this process is anticipated to extend into November.

Determination of the cleanup's effectiveness will be based on several factors including visual observations of the cleaned-up waterways, comparison of monitoring results to applicable guidelines and background conditions, and assessment of whether additional cleanup is necessary or would cause greater harm to the environment. Should additional cleanup work be required, the ministry will ensure Brenntag will initiate the work immediately.

Brenntag has submitted a restoration plan that outlines how the impacted environment (water, soil, sediment, vegetation) will be assessed, restored, and monitored to demonstrate the effectiveness of the cleanup efforts. The timelines proposed in the restoration plan include field surveys starting in spring 2024, with monitoring going well into 2025.

Background:

On August 11, 2023, first responders from the City of Toronto fire department responded to a 6-alarm fire at Brenntag Canada Inc. (Brenntag) located on 35 Vulcan Street in Toronto.

Brenntag is a chemical distribution facility that blends lubricating oils. The company reported approximately 700,000 litres of oil (soybean and petroleum-based oil), transmission fuel and solvents were stored at the facility at the time of the fire. During the event, heavy emulsions/slurry of oils, fire suppression materials and impacted fire douse water entered the storm sewer system and discharged into Mimico Creek, Humber Creek and the Humber Bay Park area of Lake Ontario.

The slurry and contaminated douse water travelled west via a storm sewer system and discharged into Mimico Creek at 286 and 258 Attwell Drive. The spilled material reached the mouth of Mimico Creek and Lake Ontario in the Humber Bay Park area. It also travelled south-east and entered Humber Creek (tributary of the Humber River) via the storm water outfall at 23 Acme Crescent. The spill did not reach the Humber River.

Containment and cleanup measures were initiated to remove the material from the waterways.

The ministry's mobile trace atmospheric gas analyser (TAGA) arrived on the scene on the morning of August 11, 2023, to undertake ambient air quality monitoring in the vicinity of the fire in support of First Responders and emergency response (Figure 1).

Brenntag, and its spill cleanup contractors (consultants), installed spill containment measures (including booms, hay bales and underflow dams) at 10 locations along Mimico Creek, Humber Creek and Lake Ontario at the Humber Bay Park area (Figure 2), to contain and remove the oil slurry. Vacuum trucks were used to collect the oil slurry accumulating above the containment systems for offsite disposal.

Ministry emergency response staff attended the scene and worked with the company and its contractors (consultants) to ensure appropriate measures were taken to reduce the risk of environmental harm from the slurry and impacted douse water discharging off site as safely and effectively as possible. Ministry staff collected samples at the sewer outfall/discharge locations and further downstream near the affected watercourses (Figure 2).

There were no impacts to the City's municipal drinking water supply from the event.



Figure 1. Mobile TAGA Monitoring sites. UW1, DW1 and Fire Site indicate the upwind monitoring location, the downwind monitoring location, and the location of the active fire.

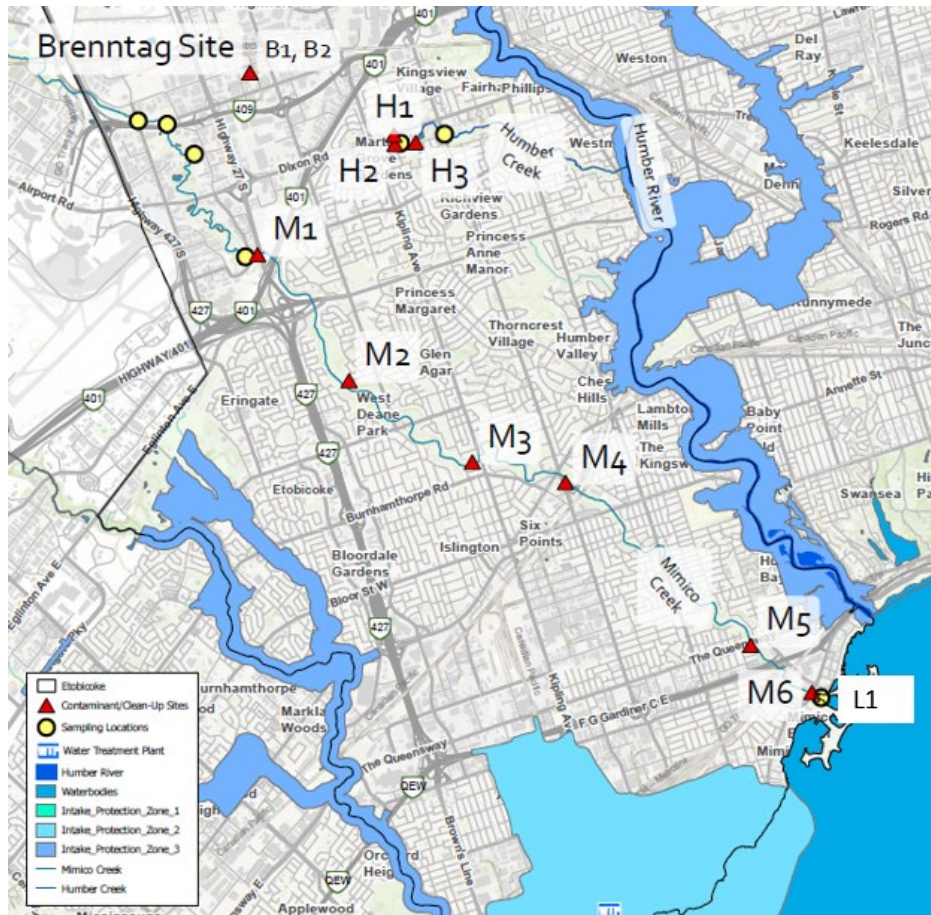


Figure 2: Initial containment and cleanup locations along Mimico and Humber Creeks.

Throughout the event and during the weeks following, the company and its consultants regularly met with the ministry, the City of Toronto Water department (Toronto Water), Toronto Public Health Unit (TPHU), Toronto Parks and Recreation, Toronto and Region Conservation Authority (TRCA), and Environment and Climate Change Canada (ECCC) to provide update and discuss the ongoing cleanup activities and containment efforts underway.

Cleanup efforts kept the oil slurry material contained within the Humber Bay Park area of Mimico Creek. On August 19, 2023, the ministry deployed a drone to trace a sheen on Lake Ontario, which was observed leaving the Humber Bay Park into the open water after a moderate rain event had caused elevated stream flows in the area. Ministry staff confirmed that although a sheen was visible by drone, the oil slurry had not reached the open water of Lake Ontario. Plume modeling undertaken by ECCC confirmed the drone observations.

As of August 21, the oil slurry had been collected and additional observations using the drone did not identify any further sheen on the lake. Toronto Public Health advised the ministry that precautionary closures of Toronto's beaches were not required.

On August 25, 2023, the Ontario Fire Marshal released the fire site to Brenntag, allowing the company to begin a full assessment of the incident and expedite comprehensive cleanup efforts at the site, which is currently ongoing.

Ministry Monitoring Efforts and Results

As part of its spill response, the ministry collected air, water, sediment and stream bank soil and vegetation samples, to determine the extent of the environmental impacts.

Air Monitoring Results

On August 11, 2023, the ministry's mobile trace atmospheric gas analyzer (TAGA) unit measured air pollutant concentrations in the vicinity of the fire for approximately three hours between 11:26 am and 2:30 pm.

The ministry's TAGA unit measured air contaminants typically associated with smoke and combustion gases, such as particulate matter smaller than 2.5 micrometres in diameter (PM_{2.5}) and smaller than 10 micrometres in diameter (PM₁₀), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and volatile organic compounds (VOCs). Some of the VOCs measured were benzene, toluene, xylene and methyl ethyl ketone.

Real-time ambient air quality monitoring was conducted upwind and downwind of the fire to determine any potential impacts to local air quality and provide support to First

Responders during the emergency response. All parameters measured were below their respective emergency screening values (ESVs). ESVs are defined as airborne concentrations of a chemical below which effects would either not be observed, or if observed, would only be mild and reversible once exposure had stopped.

The maximum real-time concentrations of air contaminants measured downwind of the fire between 11:45 a.m. and 1:45 p.m. are summarized in Table 1.

Table 1: Maximum real-time concentrations of air contaminants measured downwind of the fire on August 11, 2023.

Start Time	Wind Direction	Benzene	Toluene	Xylenes	TMB	Naphthalene	Acetone	Isoprene	MEK	Pinenes	NO ₂	SO ₂	PM _{2.5}	PM ₁₀
11:45	WNW	5.2	2.5	1.6	1.2	0.7	7.4	5.3	4.9	2	51	4	244	425
12:15	W	3.7	1.8	1.5	0.8	0.4	5.7	3.9	5.2	1.6	43	1.7	248	161
12:45	WNW	3.1	3.2	1.4	0.9	0.4	7.4	3.2	5.5	1.8	31	1.2	50	109
13:15	WNW	3.7	2.1	0.9	0.8	0.5	5.4	3.5	3.6	1.7	28	2.7	127	250
13:45	W	4.8	1.6	1	0.5	0.6	5.6	4.2	1.4	2.1	51	4.7	298	411
emergency screening value		4500	100000	65000	45000	10000	200000	N/A	200000	20000	500	200	N/A	N/A

Notes: Concentrations and ESVs for all air contaminants are reported in units of parts per billion (ppb) except for PM_{2.5} and PM₁₀ which are reported in units of micrograms per cubic meter (µg/m³). TMB = Trimethylbenzenes. MEK = Methyl ethyl ketone.

Water Sampling Results

The ministry collected water samples to characterize and document contamination downstream of the discharge points and assess the extent of environmental impacts in Mimico Creek and Humber Creek/Humber River towards Lake Ontario. Five water monitoring locations were established along Mimico Creek and three along Humber Creek, located at successive points downstream of spill containment booms. Additional water monitoring locations were established in Mimico Creek near the mouth of Lake Ontario, in the Humber River and Lake Ontario. An upstream reference site was also established in Mimico Creek (Site M4) to collect information on background water quality conditions (Figure 3).

Water samples were collected at frequent intervals between August 11 and August 13, and daily until August 18. Additional water samples were also collected on August 25 and 31, 2023.



Figure 3: Ministry Water Sampling locations along Mimico and Humber Creeks, the Humber River and Lake Ontario.

Water samples were analysed for petroleum hydrocarbons, volatile organic hydrocarbons (VOCs), per- and polyfluorinated alkyl substances (PFAS), polycyclic aromatic hydrocarbons (PAHs), and metals.

Compounds associated with petroleum hydrocarbons were initially observed in the water samples at elevated concentrations, relative to the upstream Mimico Creek reference site, at the discharge points in Mimico Creek and Humber Creek immediately following the fire. Concentrations decreased with distance from the discharge points in both creeks. Concentrations at these sites also decreased over time (Figure 4a).

Petroleum hydrocarbon concentrations increased at downstream sites after the rain event, but at lower concentrations than at the initial site of contamination. This coincided with the visible hydrocarbon sheen that was observed at the mouth of Mimico Creek and had entered Lake Ontario by August 18, 2023.

Elevated concentrations of the fluorotelomer sulfate (FTS) PFAS compounds were present in the water samples shortly after the fire, relative to the upstream Mimico Creek reference site. The source of these compounds may have resulted from the use of fire-fighting foams during the response to the fire. Concentrations of these compounds returned to and remained at the same levels as the upstream reference location shortly after the initial sampling. There does not appear to be any lasting elevated PFAS contamination in water resulting from the fire-fighting activity during this incident (Figure 4b).

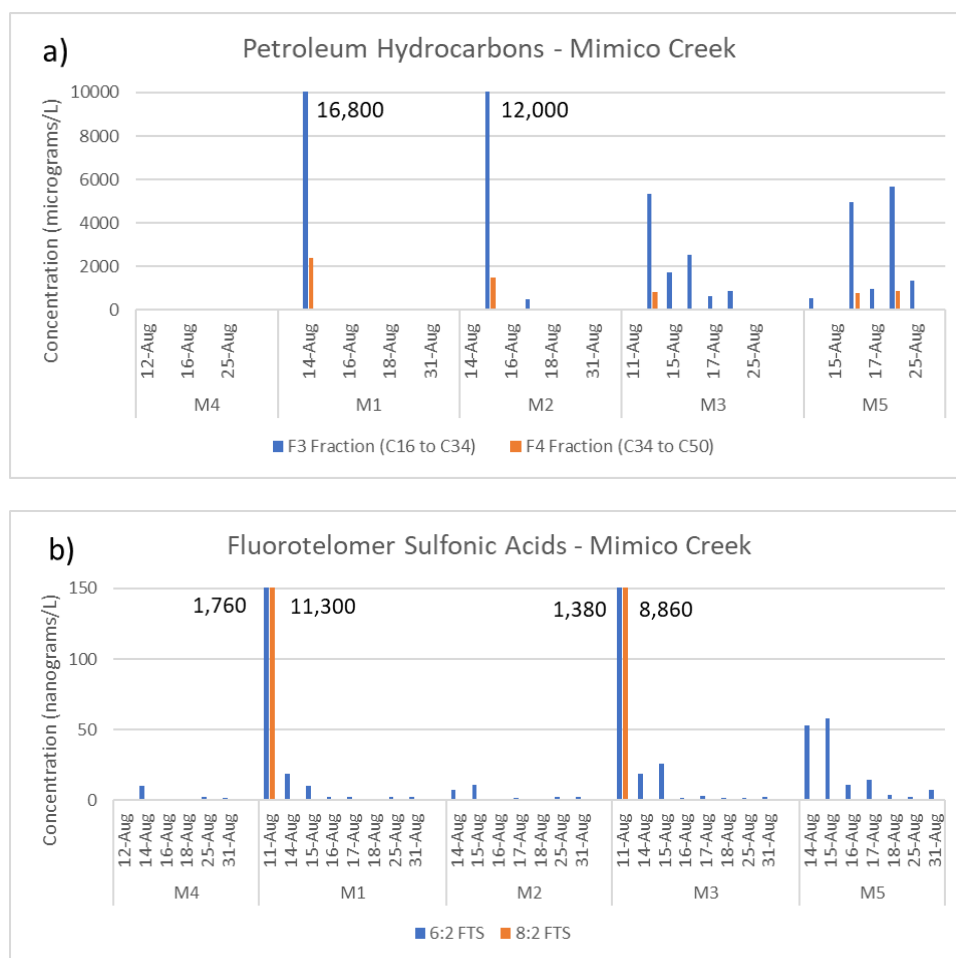


Figure 4: Concentrations of (a) Petroleum hydrocarbons and (b) Fluorotelomer sulfonic acids (PFAS compounds) in Mimico Creek waters.

Concentrations of petroleum hydrocarbons and fluorotelomer sulfonic acids observed in the water are consistent with point source inputs from the storm water outfalls to Mimico

Creek and Humber Creek resulting from the fire suppression activities on the Brenntag property. Ongoing sampling indicates that the levels observed have returned or are returning to urban background conditions. The water sampling results suggest there is little residual contamination remaining in these two watersheds following the incident.

Sediment Sampling Results

Sediment samples were collected on August 31, 2023 at various locations along Mimico and Humber Creek, as well as the mouth of the Humber River and into Lake Ontario. The samples were analyzed for petroleum hydrocarbons, volatile organic compounds (VOCs), per- and polyfluoroalkyl substances (PFAS) compounds, polycyclic aromatic hydrocarbons (PAHs) and metals.

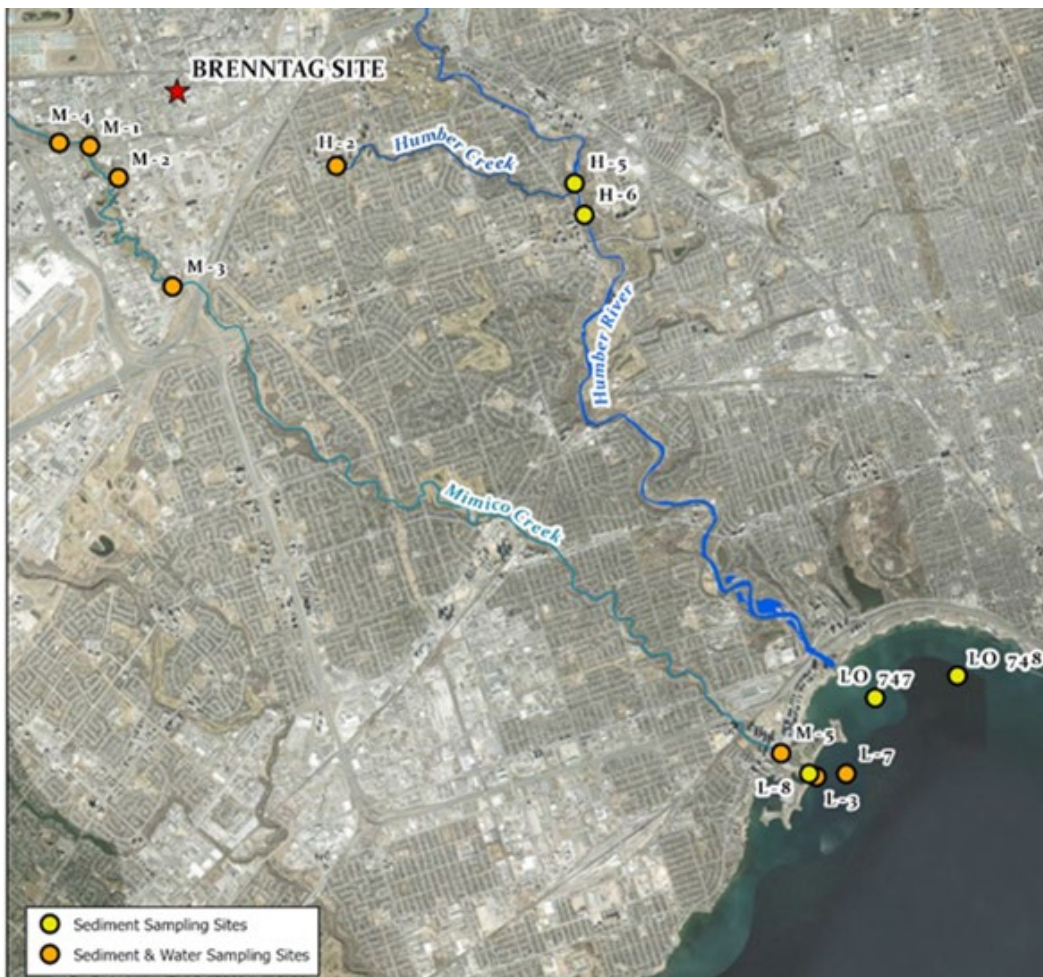


Figure 5: Ministry Sediment Sampling locations along Mimico and Humber Creeks, the Humber River and Lake Ontario

Sediment collected from one of the two storm sewer outfalls into Mimico Creek (Site M1; 286 Attwell outfall), and from Humber Creek (H2; near Acme Crescent) had the highest concentrations of petroleum hydrocarbons compared with other locations sampled in the survey. Concentrations (normalized for total organic carbon) observed in the sediments decreased with distance downstream. The observed patterns in sediment concentrations are indicative of a point source and are consistent with the release of materials such as the oil/grease emulsion from the fire site.

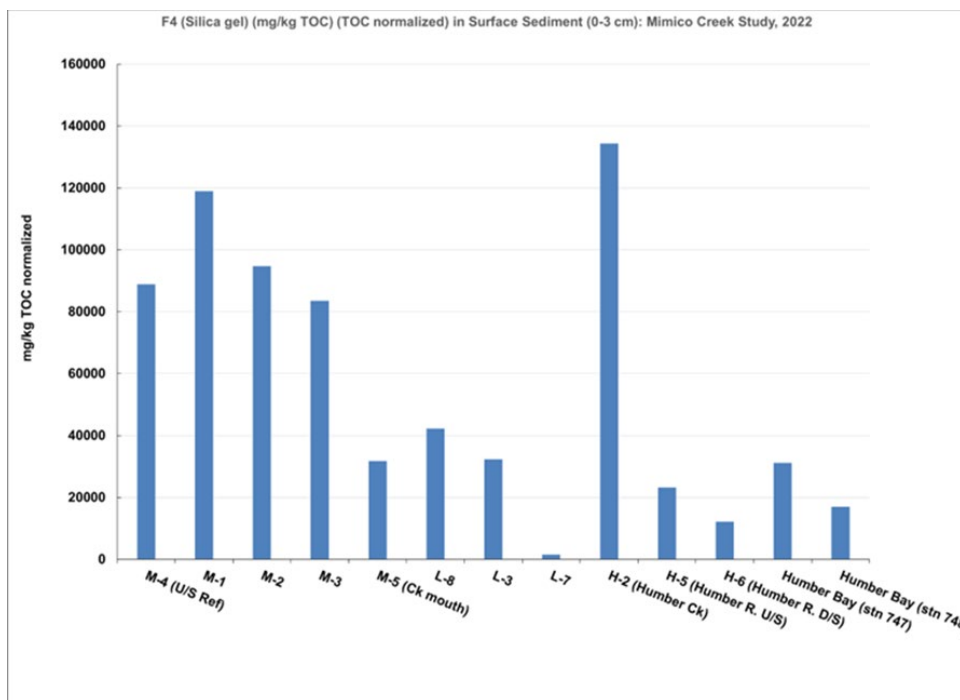


Figure 6: Concentrations (mg/kg total organic carbon (TOC)) of petroleum hydrocarbons in sediment collected from Mimico Creek, Humber Creek, Humber River, and Lake Ontario, August 31, 2023.

Where applicable, sediment concentrations of contaminants were compared to Ontario’s Sediment Quality Guidelines. The Sediment Quality Guidelines Lowest Effect Levels (LEL) and Severe Effect Levels (SEL) represent ecological values at which impairment to organisms living in or on the sediments are observed. The LEL represent the levels of contaminants at which the majority (95%) of organisms living in or on the sediments are not affected, and the SEL represent level above which the majority of organisms living on or in the sediments would not be able to survive.

Overall, sediment concentrations for total PAHs were less than the Ontario Sediment Quality Guidelines LEL, suggesting that the observed concentrations will not have a significant impact on the resident organisms (Figure 7). There were four sites where

concentrations of PAHs were observed at levels above the LEL (Humber Creek downstream of the outfall, Mimico Creek mouth and two in Lake Ontario). These concentrations, however, are considered representative of concentrations found in other urban creeks that are impacted by stormwater runoff.

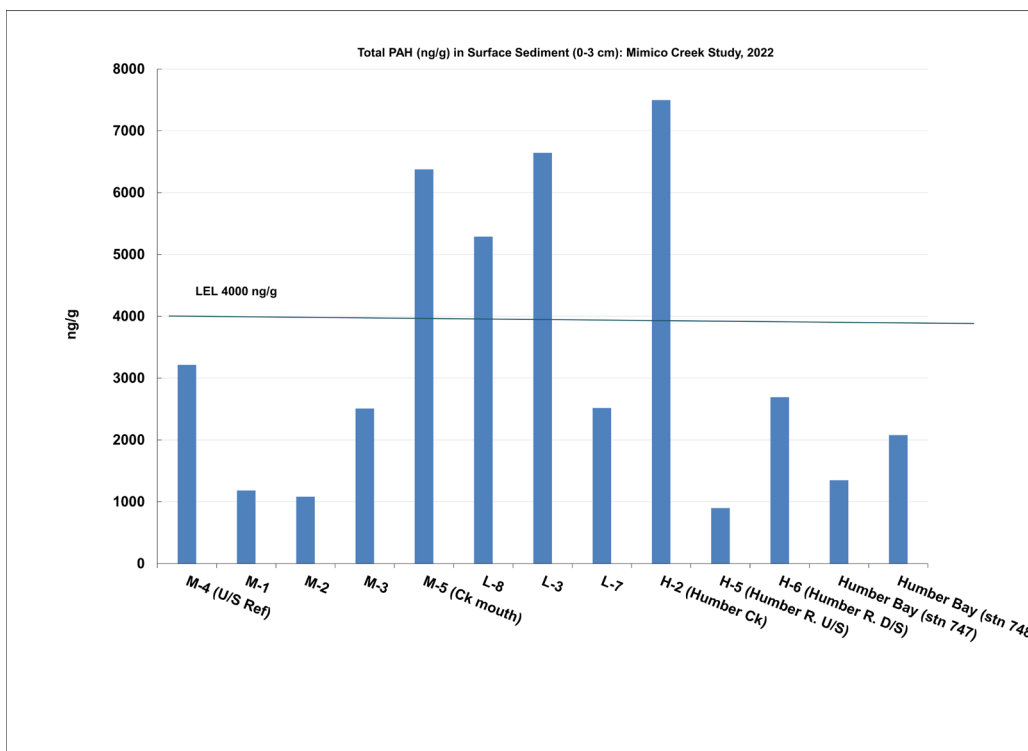


Figure 7: Total PAH (ng/g) in surface sediments (0-3 cm).

Discharge from the fire site into Humber Creek and Mimico Creek were not considered a significant source of the PFAS compounds found in the sediment samples. Concentrations of most common PFAS compounds downstream of the discharge points in Humber Creek and Mimico Creek were similar to or less than those found at the upstream Mimico Creek reference site.

Concentrations of petroleum hydrocarbons in sediment samples are consistent with point source inputs from the storm water outfalls to Mimico Creek and Humber Creek resulting from the fire suppression activities on the Brenntag property. Ongoing sampling indicates that the levels observed have returned or are returning to urban background conditions. The sediment sampling results suggest there is little residual contamination remaining in these two watersheds following the incident.

Stream Bank Soil Sampling and Vegetation Survey Results

On August 30 and 31, 2023, the ministry collected streambank soil and vegetation samples from 17 locations in Mimico and Humber creeks primarily along the drainage path of the Brenntag fire runoff (Figure 8).

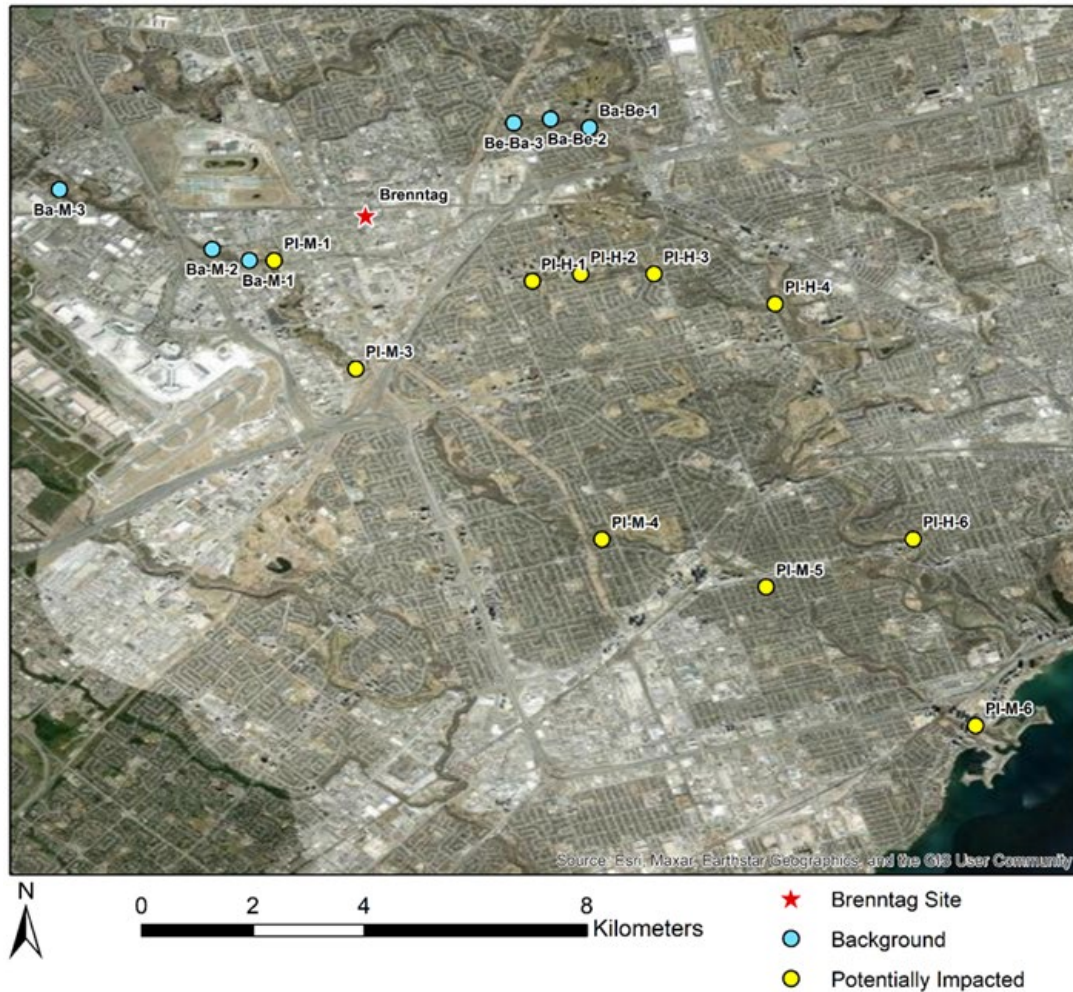


Figure 8: Stream bank soil and vegetation sampling locations.

The soil sampling results indicated that a subset of the Mimico stream banks that were sampled, including those from the drainage ditch at the Brenntag site, had petroleum hydrocarbons concentrations that exceeded Ontario's soil standards, which are set to be protective of ecological and human health.

Human Health standards are stringent, and exceedances do not necessarily mean that health effects would occur but do indicate that further analysis will be needed to determine which soils may require further cleanup.

Mimico Creek tended to have higher soil concentrations of petroleum hydrocarbons relative to the Humber Creek/River sampling sites and background sites. Soil concentrations at Humber Creek/River sampling sites and background sites were similar.

Polycyclic aromatic hydrocarbons (PAH) compounds and selenium were above Ontario's soil standards and were found to be present in both background and potentially impacted sites. This suggests that the elevated levels were not entirely related to the incident at the Brenntag property.

Vegetation at the Brenntag site and Mimico Creek sites downstream from Brenntag tended to have elevated PAHs and molybdenum concentrations relative to typical background concentrations. These results suggest that the elevated PAHs and molybdenum on creek bank vegetation adjacent to and downstream from Brenntag may have originated from the Brenntag fire incident.

Next Steps

Considerable progress has been made to date to remove spilled materials from the Brenntag site and areas impacted by the fire that occurred on August 11, 2023. The Ministry of the Environment, Conservation and Parks continues to ensure that those responsible take all necessary measures to restore the environment.

The ministry and Environment Canada and Climate Change are currently in the process of verifying the status of the cleanup before restoration work can begin. This process is anticipated to continue into November. The effectiveness of the cleanup will be based on several factors, including visual observations of the cleaned waterways, comparison of monitoring results to applicable guidelines and background conditions and, assessment of whether additional cleanup is necessary or would cause greater harm to the environment. If additional cleanup work is required, the ministry will ensure Brenntag begins it immediately.

Brenntag has submitted a restoration plan that outlines how the impacted environment (water, soil, sediment, vegetation) will be assessed, restored and monitored to demonstrate the effectiveness of the cleanup efforts. The timelines proposed in the restoration plan include field surveys starting in spring 2024, with monitoring going well into 2025.