



Niagara Peninsula
CONSERVATION
nature for all

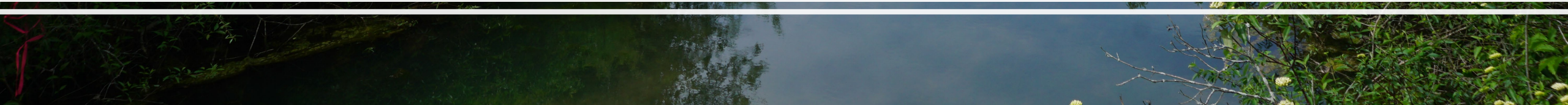
Lyons Creek East Public Information Centre

June 18, 2025





Land Acknowledgement



Meeting Outline

- Housekeeping / Evening Overview
- Introduction of speakers
- Recap & Progress Update
- Sediment Management Options
- Questions
- Closings Remarks

Meet Tonight's Speakers



Danielle Thorson
Geosyntec Consultants Inc.



Roger Santiago
Canada Water Agency



Natalie Green
Niagara Peninsula
Conservation



Canada
Water Agency

Agence de l'eau
du Canada

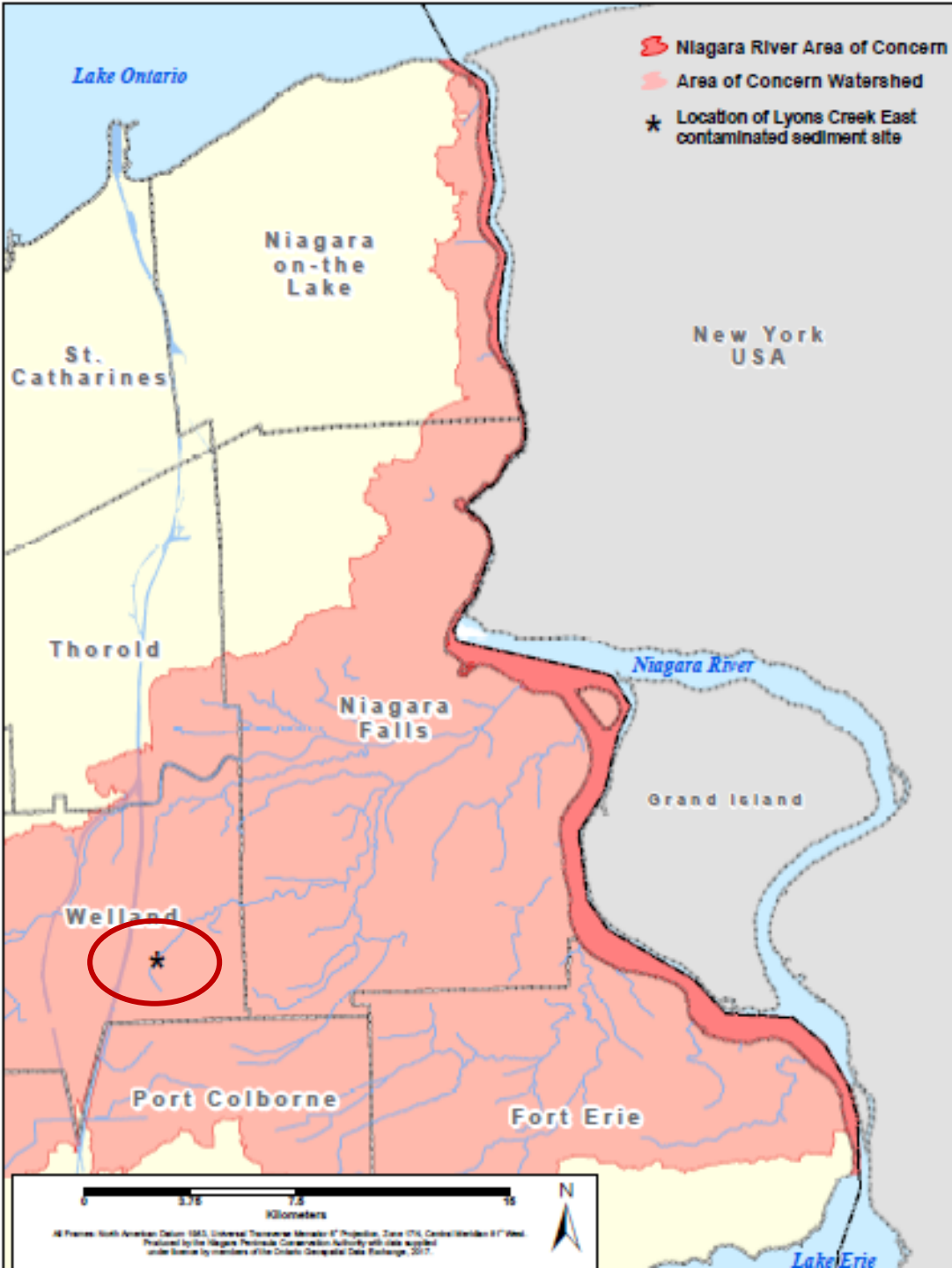


Recap: Outreach and Engagement

- Public Information Centres:
 - May 30, 2023
 - Nov 19, 2024
 - June 18, 2025
- Over 60 people in attendance at two events (120+ total)
- Efforts continue through Get Involved platform, RAP e-newsletter, meetings, mailouts/letters, and additional public sessions.



getinvolved.npca.ca/lyons-creek-east



Recap: Lyons Creek East

- Tributary of the Welland River within the Niagara River watershed
- Lyons Creek was bisected for construction of canal
- Legacy PCBs in portion of Lyons Creek East near Welland Canal found in 1990s
 - Exact source of contamination unknown
 - Type and depth of PCB suggests historic source
- Last of 14 contaminated sediment sites as part of the Niagara River Remedial Action Plan

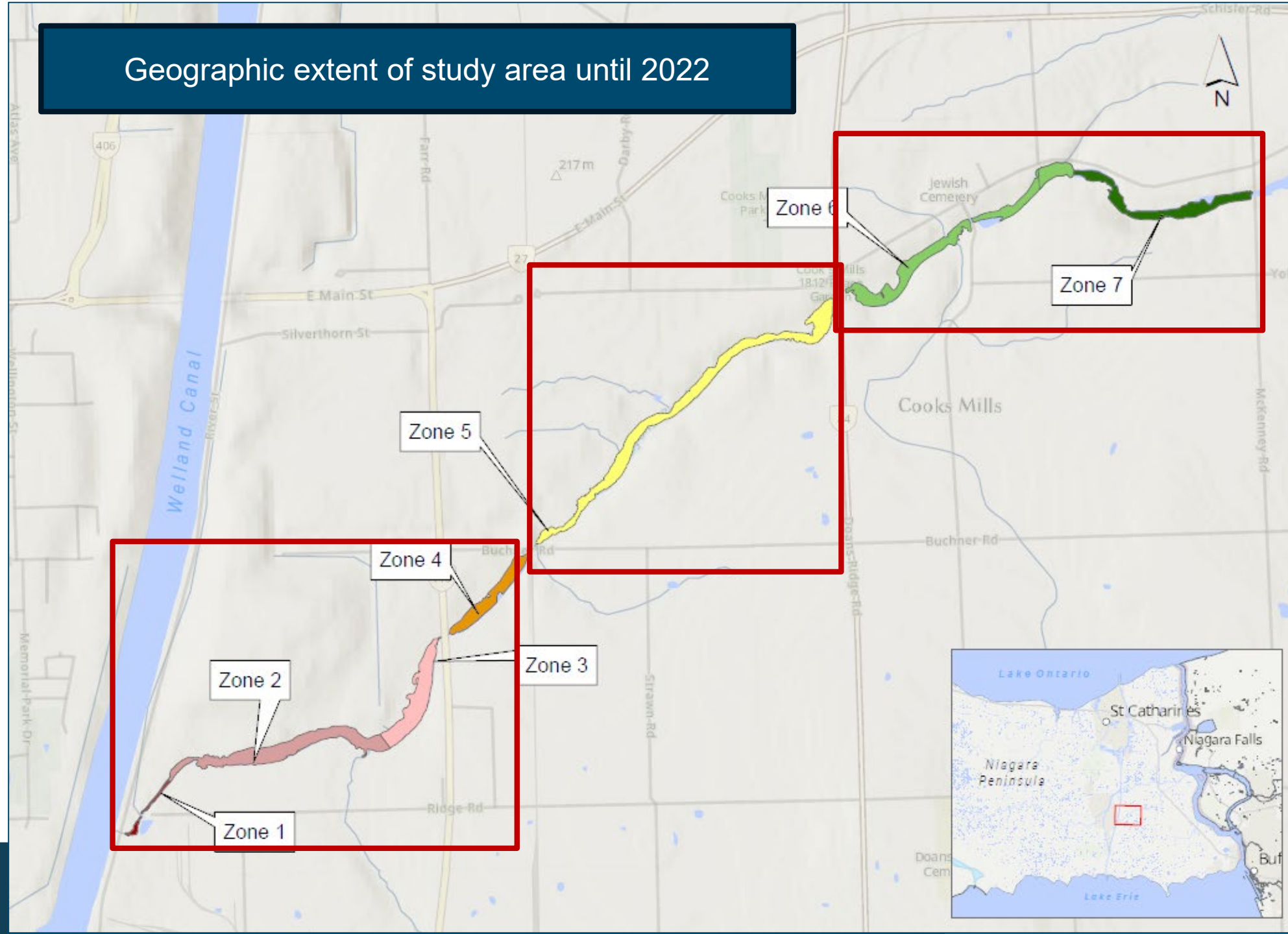


Recap: What is the problem?

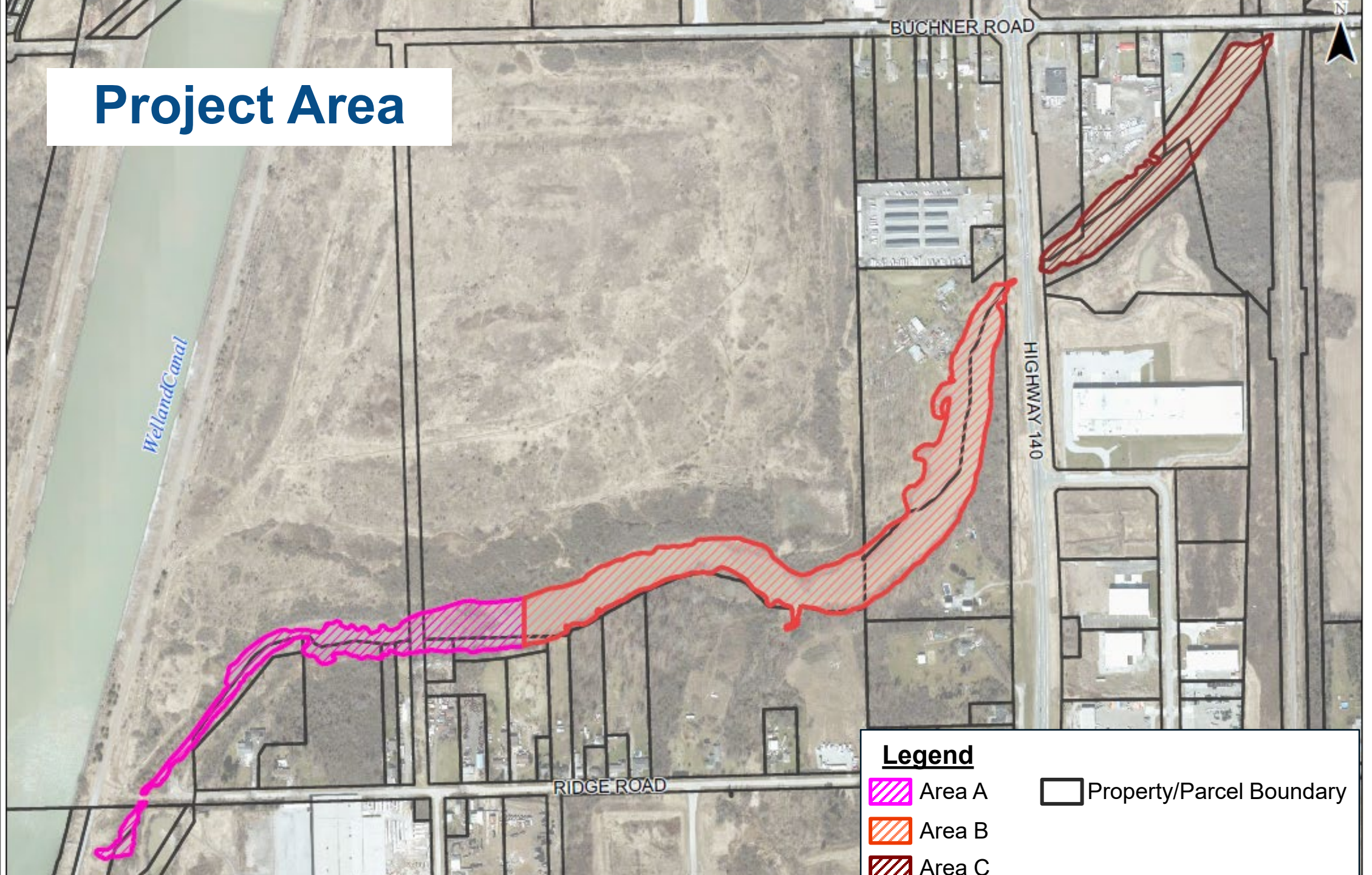
- For approx. 15 years, scientific monitoring of multiple lines of evidence
 - Sediment chemistry
 - Water chemistry
 - Benthic tissue
 - Benthic community
 - Young of the year fish
- **Results indicate natural recovery has not occurred in some areas**

Geographic extent of study area until 2022

- Zones 6 & 7 have achieved natural recovery
- Natural recovery is slow in Zone 5
- Cleanup recommended for Zones 1 - 4



Project Area



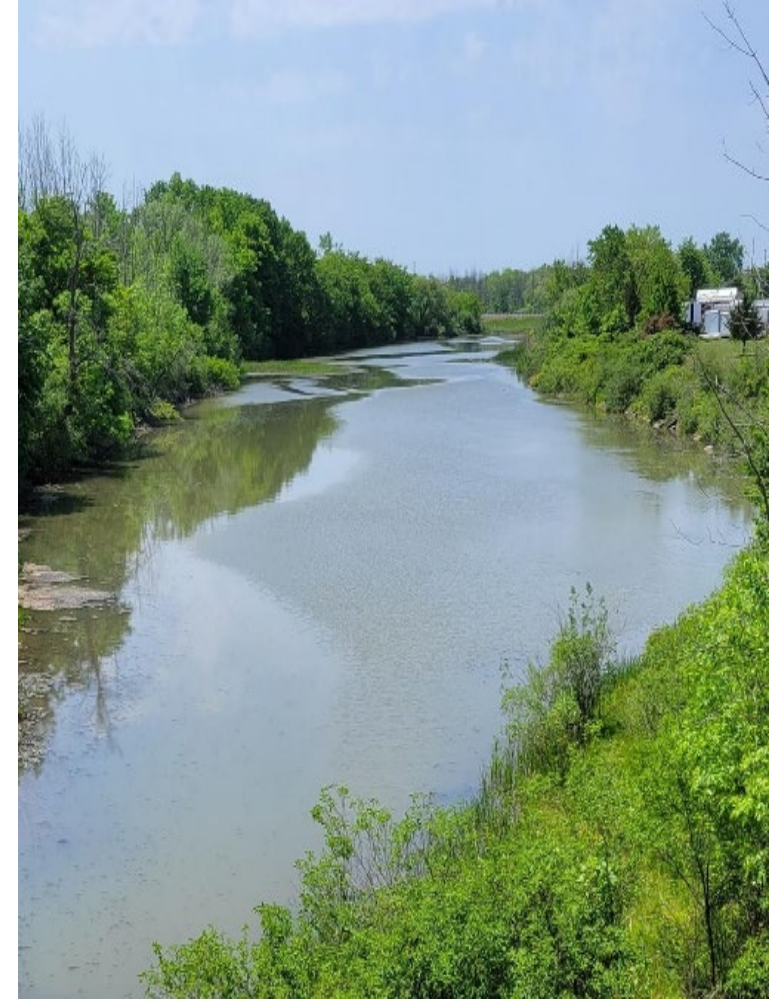
Area A



Area B



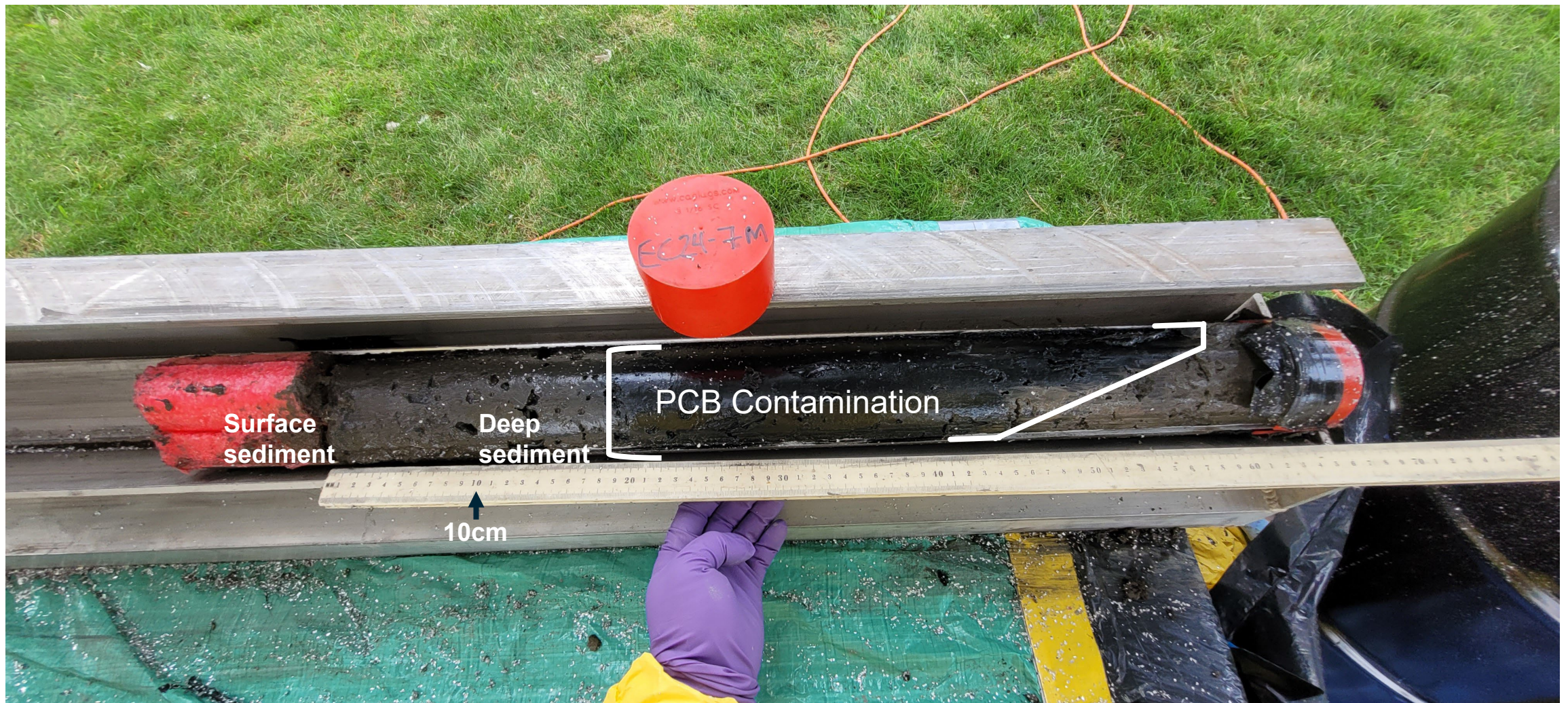
Area C



Sediment Sampling & Processing



Example of a sediment core



2023 Sediment Surface PCB Concentration - Areas A-C

Legend

- >50 ppm
- >10 to 50 ppm
- >1 to 10 ppm
- < 1 ppm

Area A

Area B

Area C

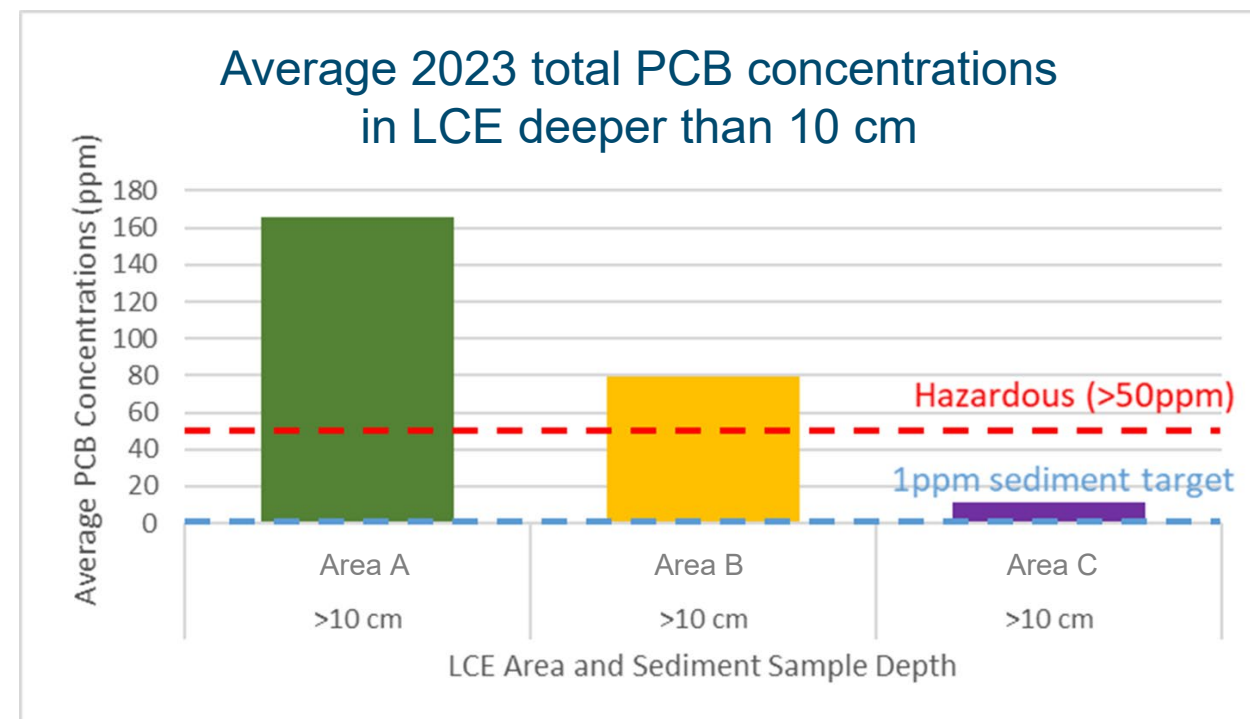
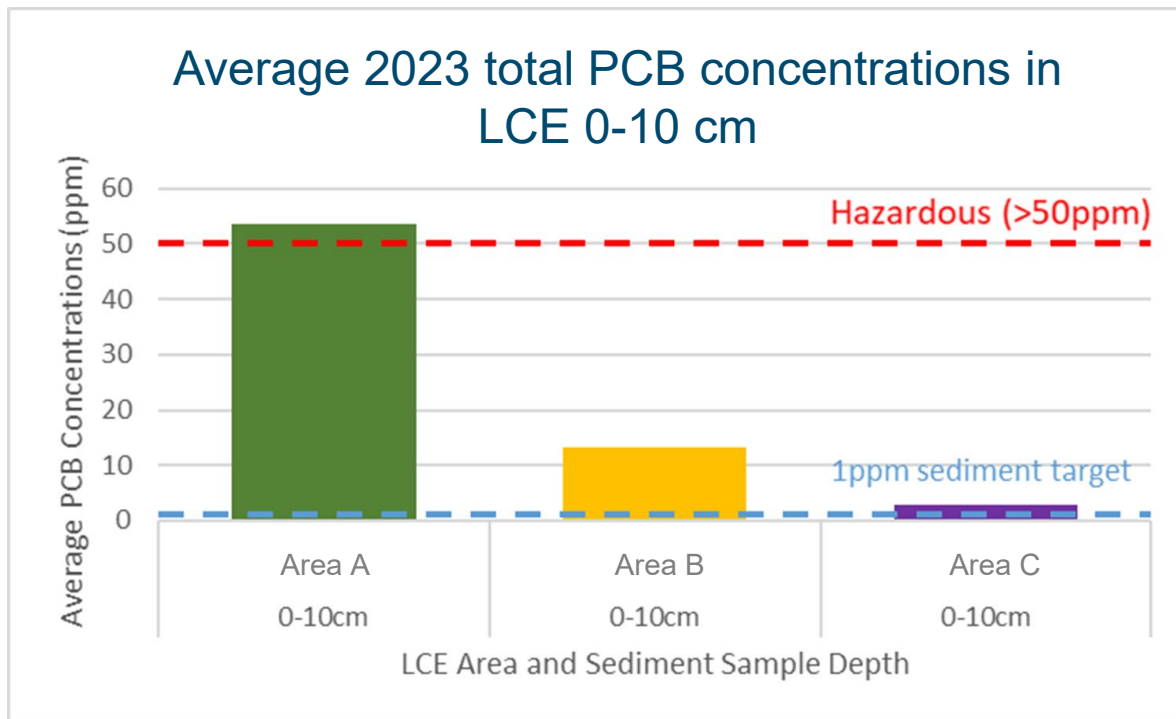
Google Earth

Image © 2024 Airbus

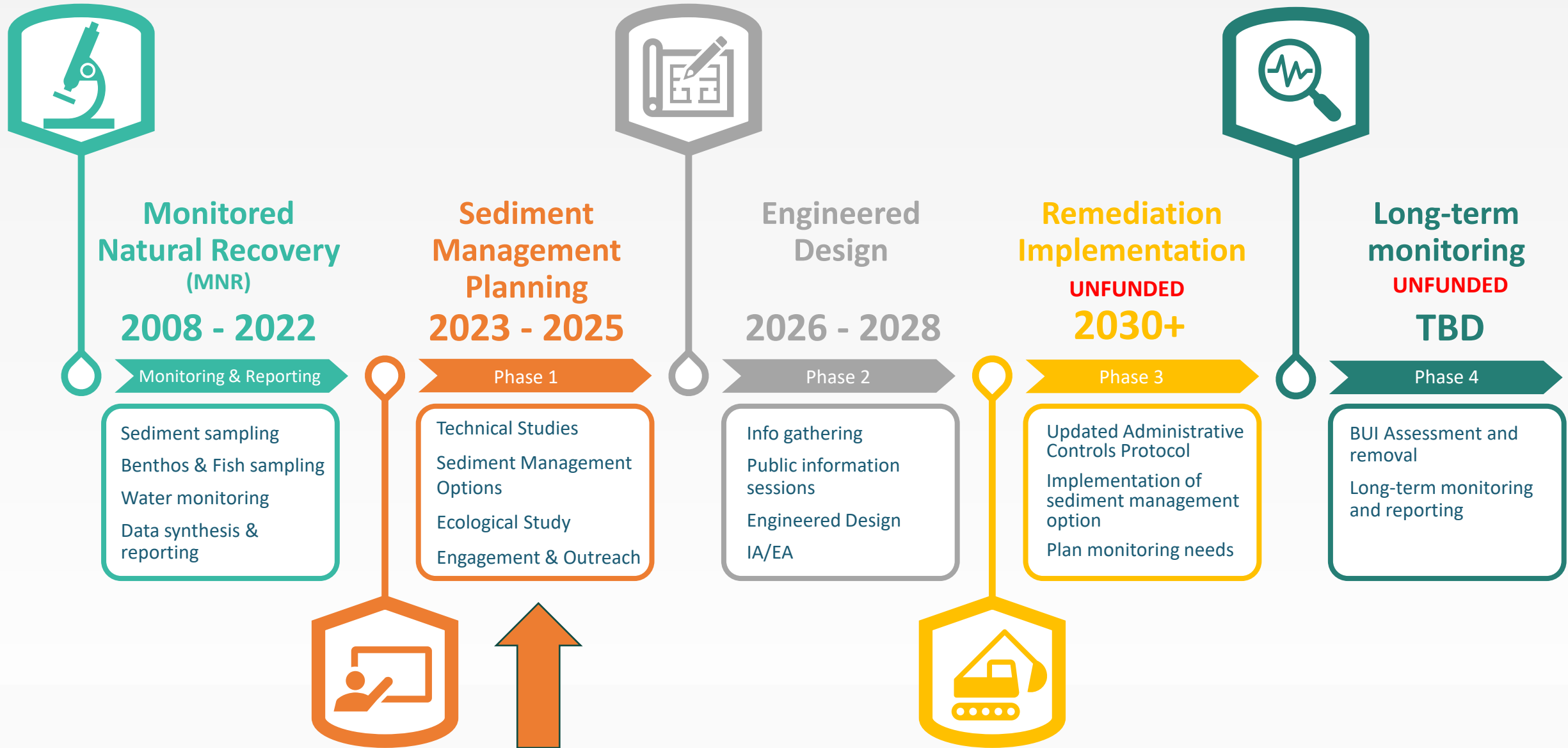


400 m

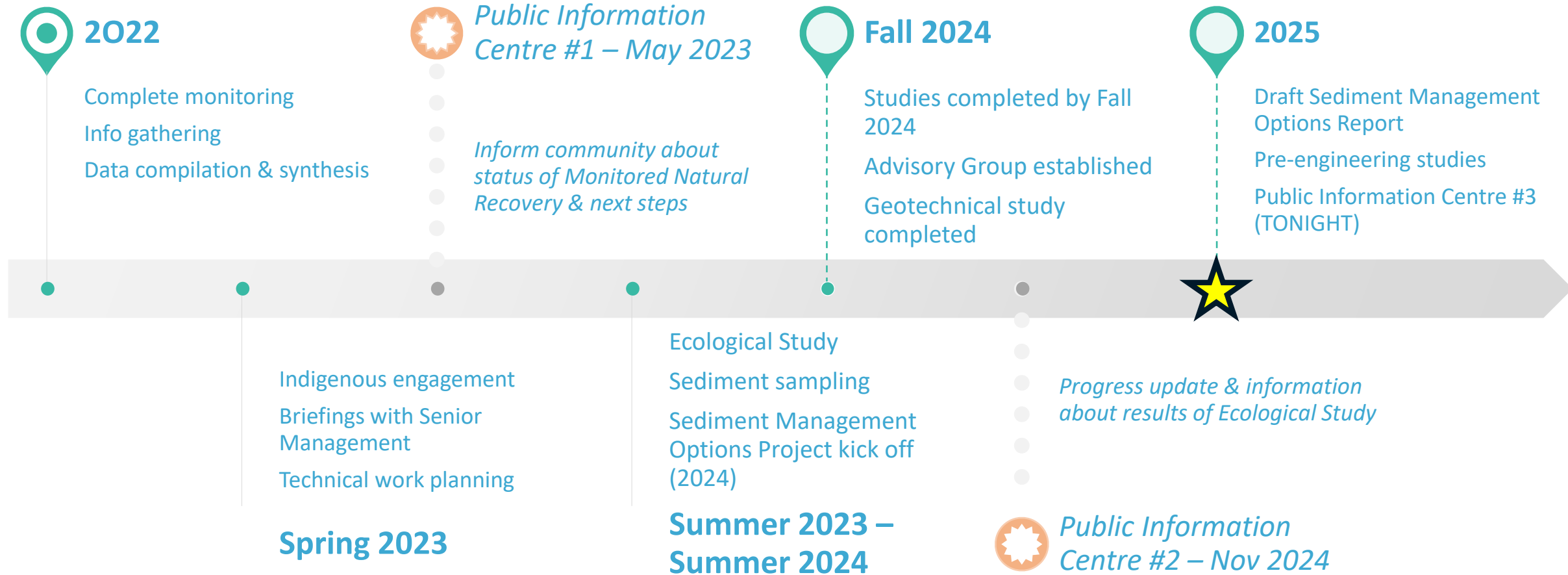
Average LCE PCB concentrations at surface (0-10 cm) and deeper



Conceptual Overview of Lyons Creek East Sediment Management



Phase 1 Project Milestones & Activities (2022 – 2025)





SEDIMENT MANAGEMENT OPTION EVALUATION

Lyons Creek East

Project Purpose

- Build on comprehensive ecological study completed in 2024
- Evaluate and recommend sediment management technologies for Lyons Creek East
 - Review chemical data from the creek collected to date
 - Conduct field investigations to support decision process
 - Assess results and provide recommendation for sediment management options



Project Goal



To prioritize the removal and off-site disposal of hazardous polychlorinated biphenyls (PCBs) contaminated sediment and manage remaining lower PCB concentrations in Lyons Creek East to protect key ecological features.



New Data Collected to Support Recommendation

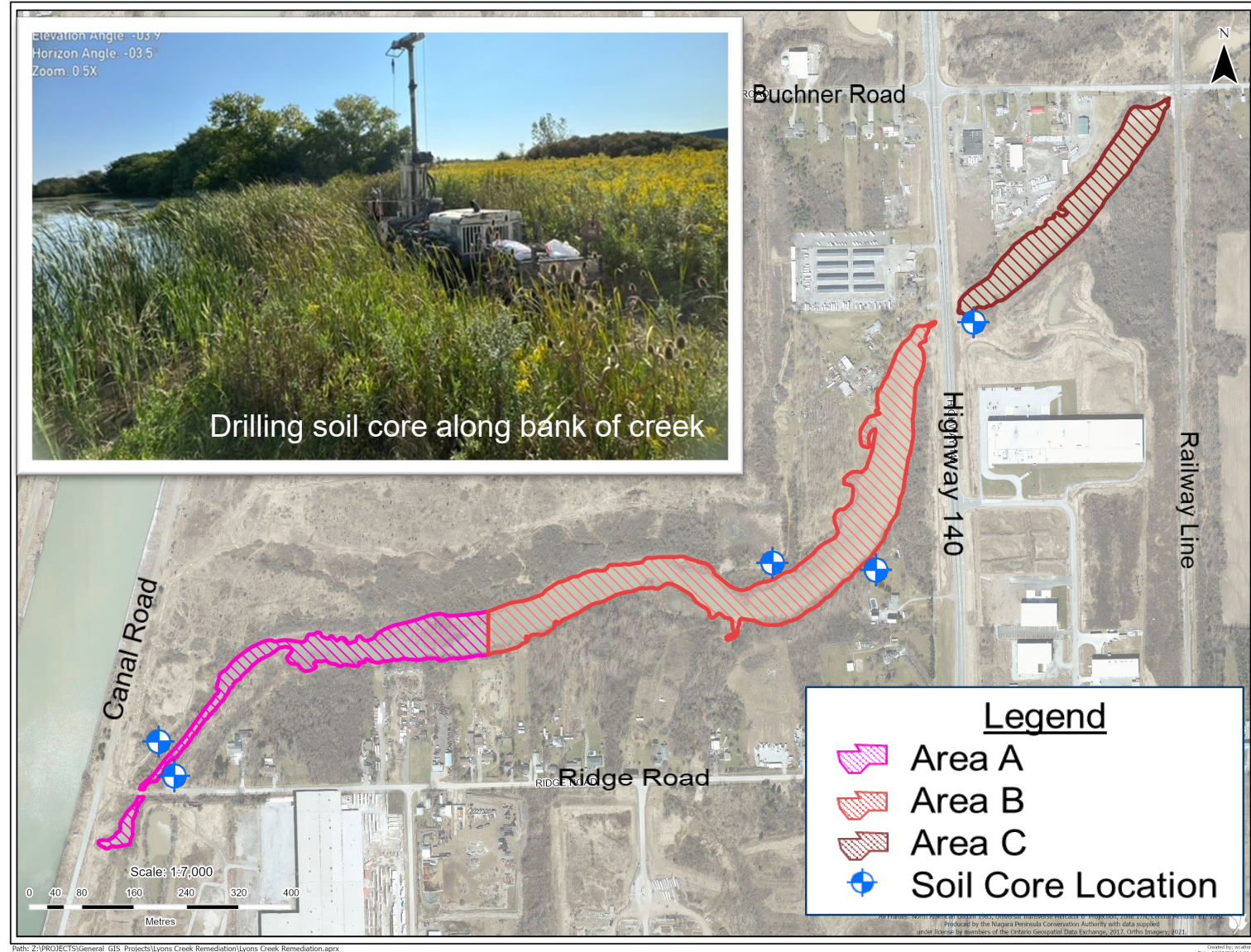
Soil Core to Assess Bank Stability

What We Learned

- Stability characteristic of the shoreline soils

Why it is Important

- Information used by the full-scale design engineer to protect the shoreline from erosion during the clean-up



New Data Collected to Support Recommendation



Sediment Dewatering Tests: Passive Dewatering



Day 0 (2-Aug-24)

Day 4 (6-Aug-24)

Day 5 (7-Aug-24)

Day 6 (8-Aug-24)

Day 7 (9-Aug-24)

- Site sediment allowed to separate from water in jars
- Amendments added to speed up the settlement rates
- PCB concentrations in sediment and water measured



New Data Collected to Support Recommendation



Sediment Dewatering Tests: Bag Dewatering

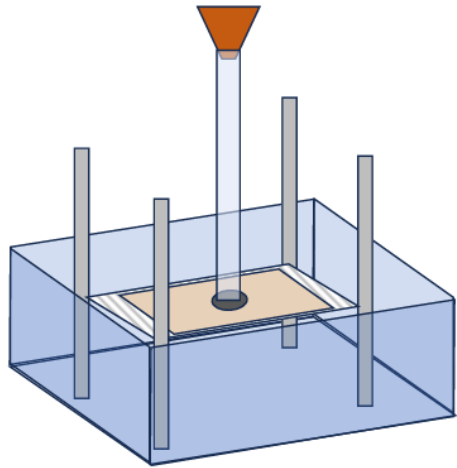


Figure 1: Assembled Bag Dewatering Test Apparatus

Schematic of bag
dewatering test set up



Filling fabric bag
with sediment



Water seeping from fabric bag to
be tested for PCBs



Cutting open bag to test
dry sediment for PCBs



New Data Collected to Support Recommendation



Laboratory Sediment Dewatering Tests



Example of large-scale sediment bag dewatering (courtesy of Canada Water Agency)

What We Learned

- Estimates concentrations of chemicals in water removed from wet sediment (effluent water)
- Can amendments speed up the dewatering process and what ones work best

Why it is Important

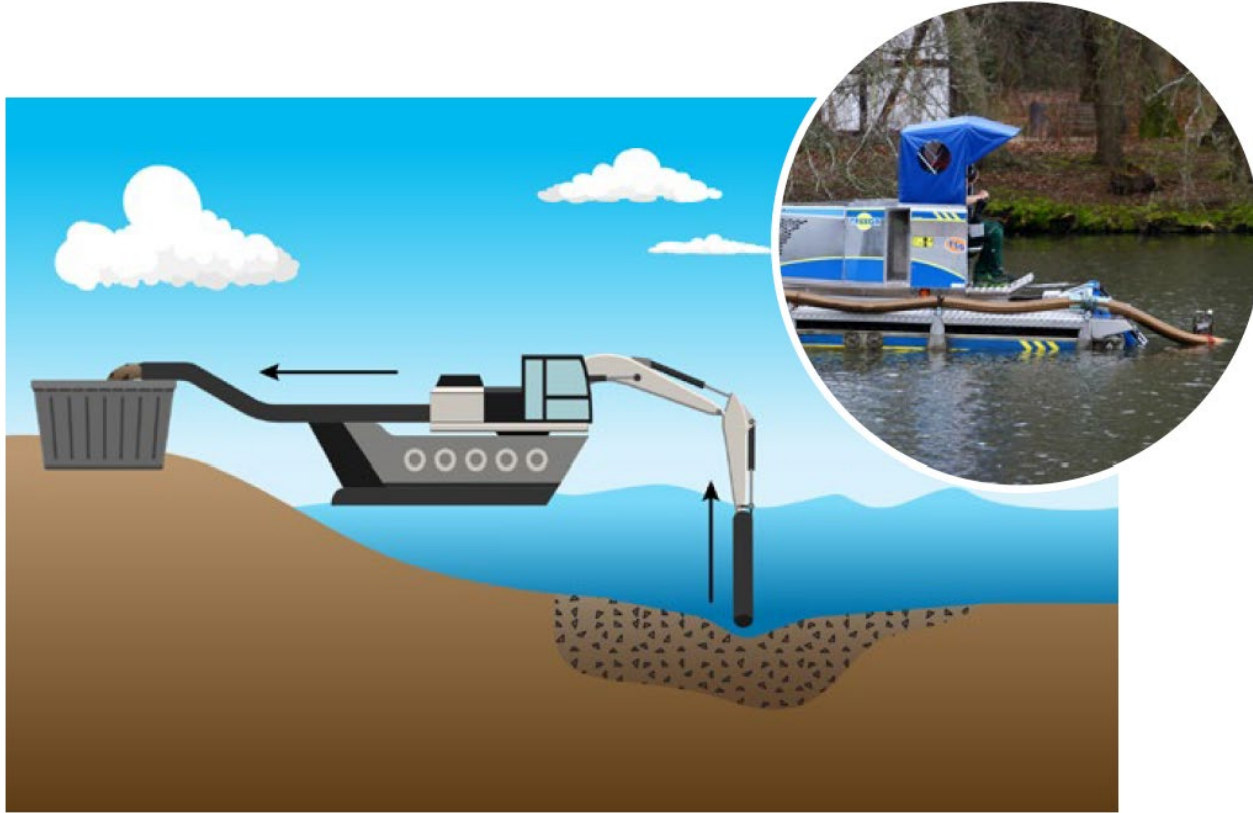
- Small-scale laboratory tests provide site-specific information to help design a full-scale dewatering system
- It tells us what concentrations to expect in the effluent water so that it can be treated safely
- It tells us what concentrations to expect in the dried sediment so that it can be disposed of safely
- Helps estimate full-scale dewatering rates



Sediment Management Options Considered



Hydraulic Dredging



How does it work?

- Pumps and pipes are used to remove sediment/water as a slurry
- Sediment is “dewatered” (i.e., dried) and water is treated in a staging area at a designated area along the shoreline
- Sediment is transported off-site to a disposal facility



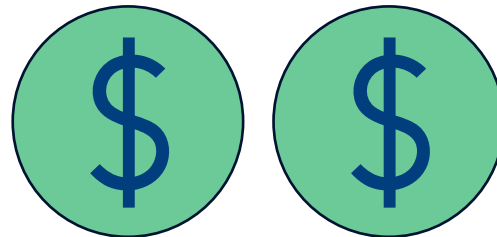
Hydraulic Dredging

Advantages

- Removes contamination
- Long-term monitoring and maintenance minimized
- Can reach areas that are hard to access (marshes/shallow water)
- Lower risk of exposure to workers and the public as sediment, in slurry form moved via piping along creek
- Fewer creek access point required

Limitations

- Requires staging area for dewatering
- Risk management during transportation of sediment to disposal facility
- Heavy truck traffic to transport removed sediment to disposal facility
- Habitat restoration required afterward
- Water quality monitoring required downstream (suspended sediment)
- Large debris needs to be removed



Mechanical Dredging



How does it work?

- Sediment is removed using in-water excavation equipment and transported to a staging area on the shore to dry
- Sediment is “dewatered” and the removed water is treated at a staging area in a designated area along the shoreline
- Sediment is transported off-site to a disposal facility



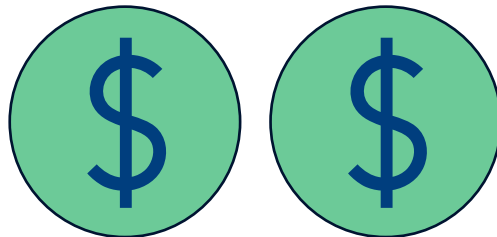
Mechanical Dredging

Advantages

- Removes contamination
- Long-term monitoring and maintenance minimized

Limitations

- Requires staging area for dewatering
- Risk management during transportation of sediment to disposal facility
- Challenges maneuvering excavation equipment in shallow water
- Heavy truck traffic to transport removed sediment to disposal facility
- Habitat restoration required afterward
- Water quality monitoring required downstream (suspended sediment)
- Higher exposure risk for workers



Dry Excavation



How does it work?

- Temporary dams isolate the work area and water is drained from the work area
- Sediment is removed, dried further if needed, and then transported to a disposal facility



Dry Excavation

Advantages

- Removes contamination
- Long-term monitoring and maintenance minimized
- Less dewatering needed
- Risk of contaminated sediment moving downstream is lower

Limitations

- Heavy truck traffic and more temporary roads around creek required
- Higher exposure risk for workers
- Requires more air/dust controls
- More site restoration required (temporary roads returned to original habitat conditions)
- Temporary alteration/diversion of creek
- Risk management during transportation of sediment to disposal facility



Thin-Layer Capping



How does it work?

- Thin layer of material, typically sand, is placed over the contaminated sediment to reduce exposure risk and protect the natural environment
- A helping hand for the original monitored natural recovery sediment management option



Thin-Layer Capping

Advantages

- Limits disturbance to creek, including contaminants, plants, animals, people
- Less risks to workers and public due to PCB exposure
- Can be implemented in hard-to-access areas

Limitations

- Contaminated sediments are not removed
- Administrative controls to prevent disturbance of sediment remain in place
- May require pre-removal of sediment to limit infilling of creek in shallow areas



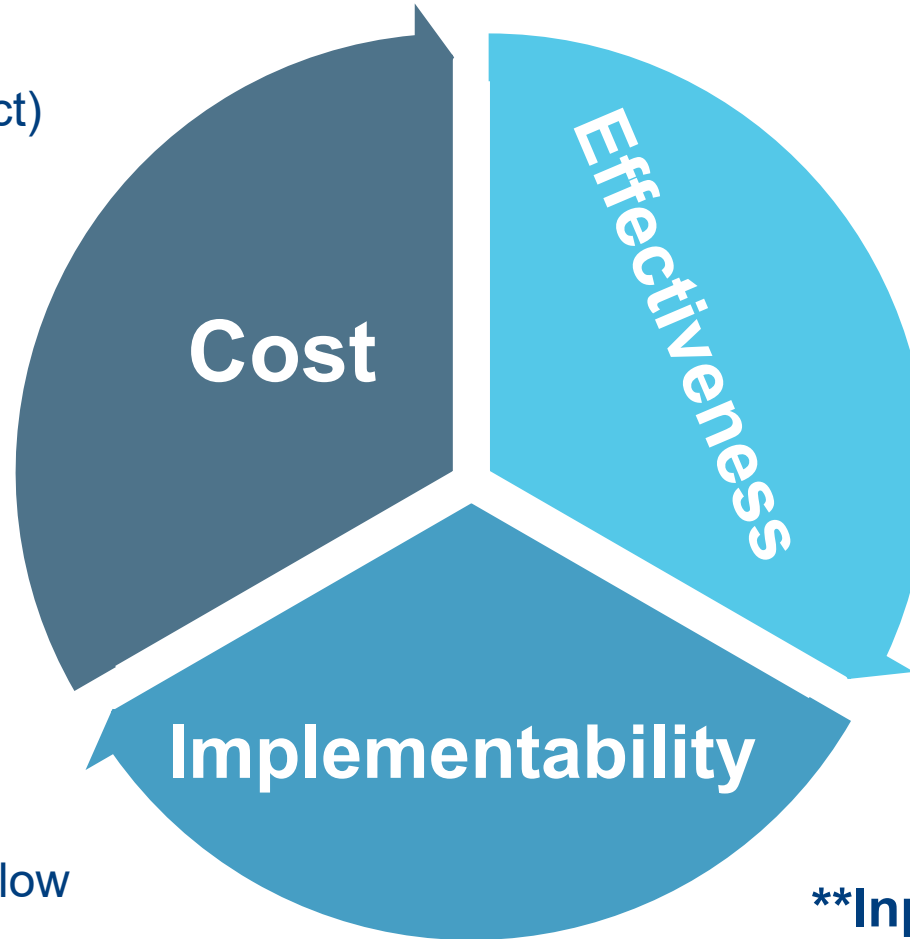
Evaluation Criteria

Is it Cost Efficient?

- Capital costs (direct and indirect)
- Annual operation and maintenance costs
- Long-term liability costs/administrative controls

How Easy is it to Implement?

- Restoration timeframes
- Bank stability
- Obstructions
- Water depth and downstream flow
- Dewatering and effluent treatment
- Dewatering and staging area requirements
- Ability to maintain/protect ecologically sensitive features



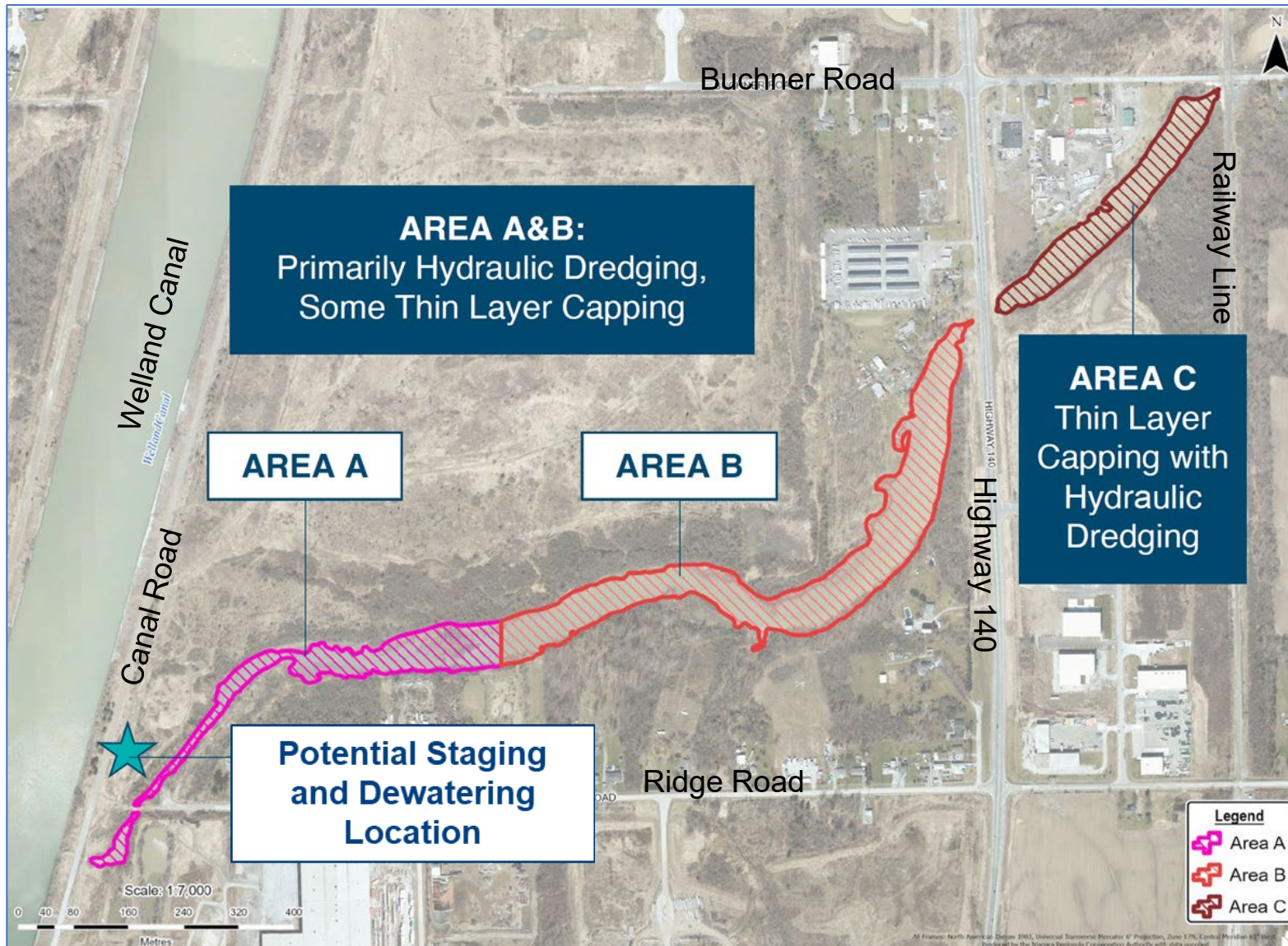
Does it Work?

- Compliance with clean-up criteria
- Long term effectiveness and permanence
- Reduction of contaminant mobility
- Reduction of toxicity
- Short-term effectiveness

****Input from First Nations, the public, and interested parties will also be considered****



The Recommended Approach



A Combination of Approaches Is Recommended

1. Hydraulic dredging for areas with higher PCB concentrations
2. Thin-layer capping for areas with lower PCB concentrations



What to Expect



BEFORE

- Workers collecting data
- Preparing staging area and transportation route(s)
- Mobilizing material and equipment



DURING (3-4 Years)

- See/hear heavy equipment
- Protective measures like silt curtains, temporary truck wash, and site security
- Water, dust, odour, and air monitoring
- Sediment verification sampling
- Sediment dewatering and water treatment



AFTER

- Restoration of area
- Workers collecting data for long-term monitoring
- Administrative controls
- Celebration event for project completion



What to Expect During Construction: In the Creek



Hydraulic Dredging in
Chedoke Creek, Hamilton



Hydraulic Dredge Pipeline Transporting
Sediment to Dewatering Area

What to Expect During Construction: In the Creek



Options for Deployment of Hydraulic Dredge in Shallow Small Waterways

What to Expect During Construction: In the Creek



Image courtesy of Canada Water Agency



Thin-Layer Capping Deployed from Land or Water

What to Expect During Construction: Dewatering

Dewatering Area Construction



Earthwork construction of containment area



Watertight liner covers earthwork to facilitate collection of removed water and dewatering Geotubes placed inside

What to Expect During Construction: Dewatering



Sediment Removed by Hydraulic Dredge

Temporary Pipeline Connected Directly to Sediment Dewatering (Geotubes) that Allow Water to Pass Through But Retain Sediment Inside



Sediment Transported to Dewatering Area through Temporary Pipeline and Pumps



Removed Water Treated in Staging Area at Temporary Water Treatment Plant



What to Expect During Construction: Environmental Controls and Monitoring



Air Quality, Noise, Dust and Odour Monitoring



Sediment Containment Curtains



Sediment Verification Sampling



Water Quality Monitoring



Temporary Truck/Equipment Wash Stations

A background image showing a calm creek with lush green trees and vegetation on the banks. In the foreground, two people are in kayaks on the water, one of whom appears to be using a long pole or tool to interact with the water or sediment. The image is overlaid with a semi-transparent blue filter.

Key Takeaways

- The recommended solution limits impacts to the creek, plants, animals, nearby residents, and communities downstream where possible while effectively cleaning up the PCB contaminated sediment
- The completed field and laboratory activities provide valuable information for the future design engineers
- All information from the sediment management options report will feed into the full-scale sediment management option design



Questions?

For more information: getinvolved.ca/lyons-creek-east
www.niagarariver.ca or follow us on social media





Closing Remarks

- Complete 2025 Studies
- Sediment Management Options Report (Fall 2025)
 - Selection of preferred SMO
 - Report posted on Get Involved project page
- Initiate engineering design phase (2026)
 - More opportunities for engagement
- Stay up to date:
<https://getinvolved.npca.ca/lyons-creek-east>

We appreciate your input!
**Scan the code with your smartphone to fill out a short
survey about the event and information shared.**
Thanks!



For more information: getinvolved.ca/lyons-creek-east
www.niagarariver.ca or follow us on social media



Niagara Peninsula
CONSERVATION



**NIAGARA
RIVER**
Remedial Action Plan