



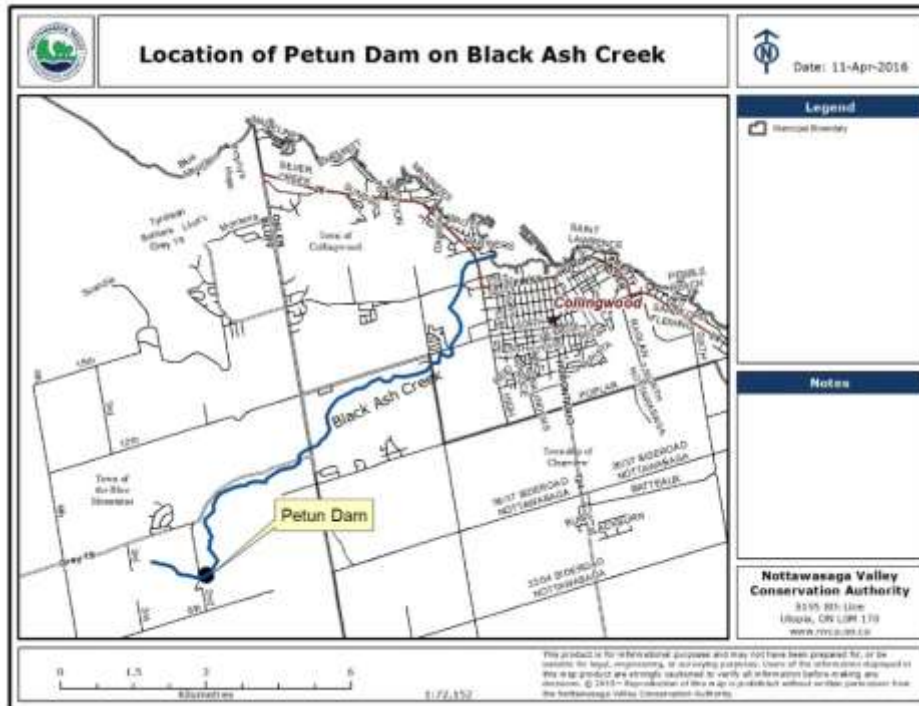
# Petun Dam Removal Project

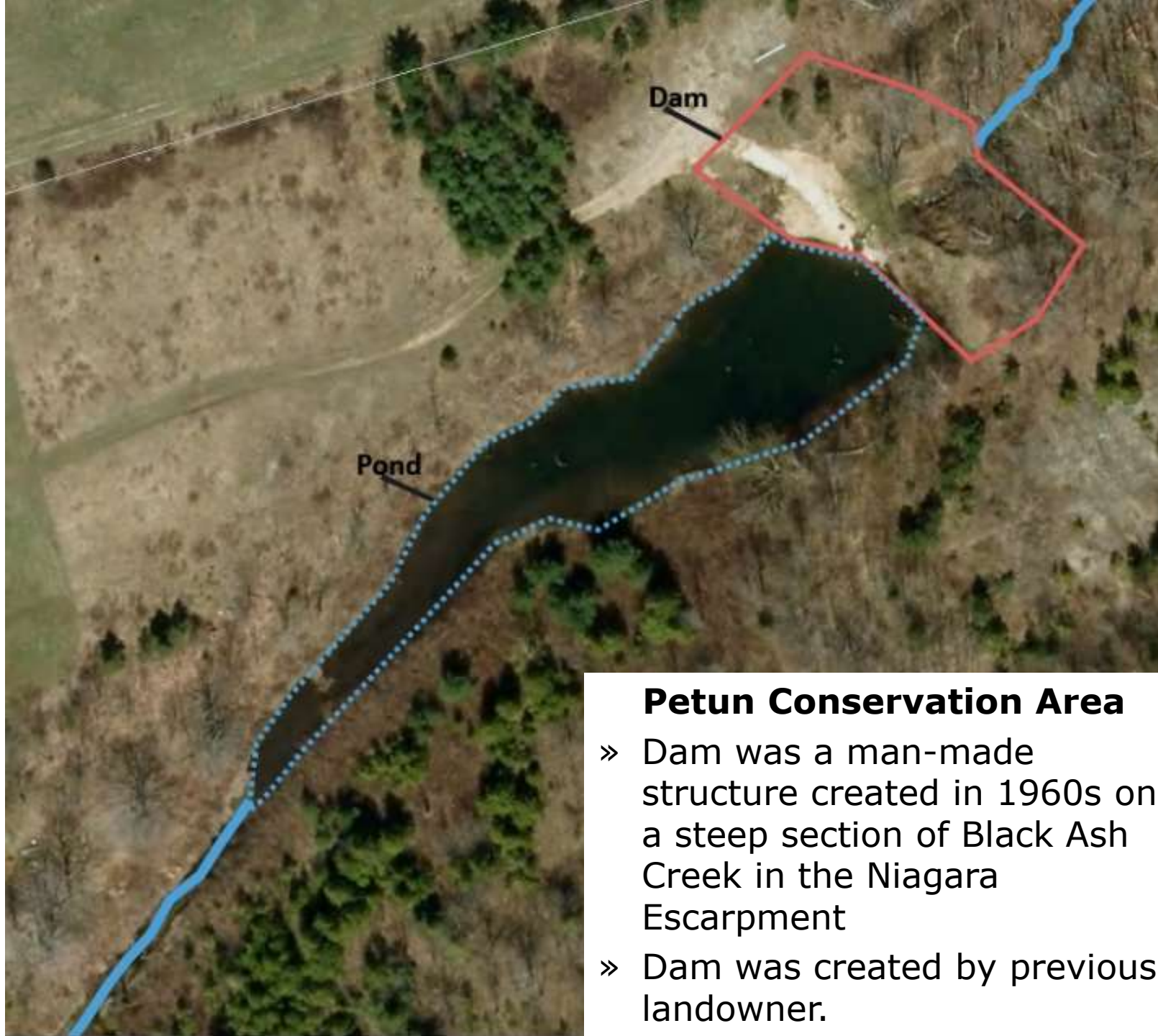
Fred Dobbs, Manager Stewardship Services  
Laura Wensink, River Restoration Technician  
29 November, 2023



# Petun Dam Removal and Restoration of Black Ash Creek

- » The dam was located in the headwaters of Black Ash Creek in the Town of the Blue Mountains at the Petun Conservation Area.
- » Black Ash Creek supports a recreational fishery in Georgian Bay by providing spawning habitat for rainbow trout. A small population of native brook trout exists in the upper reaches.





## **Petun Conservation Area**

- » Dam was a man-made structure created in 1960s on a steep section of Black Ash Creek in the Niagara Escarpment
- » Dam was created by previous landowner.

# Partially Failed Dam



- » The original water outlet pipe failed prior to 1992 and a new outlet channel eroded into the earthen dam.



# Poor Water Quality

- » The remaining dam structure maintained a 100m long X 3m deep stagnant head pond.
- » The pond acted as a sink for sediment and attached nutrients which supported algae blooms.
- » Warming in stagnant head pond increased peak daily summer temperatures in Black Ash Creek by 7C, creating a decrease in habitat suitability for trout



Algal bloom in early June 2014



Migratory rainbow trout use Black Ash Creek as spawning habitat.

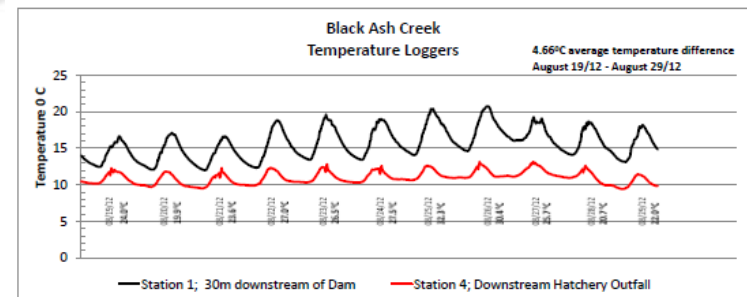
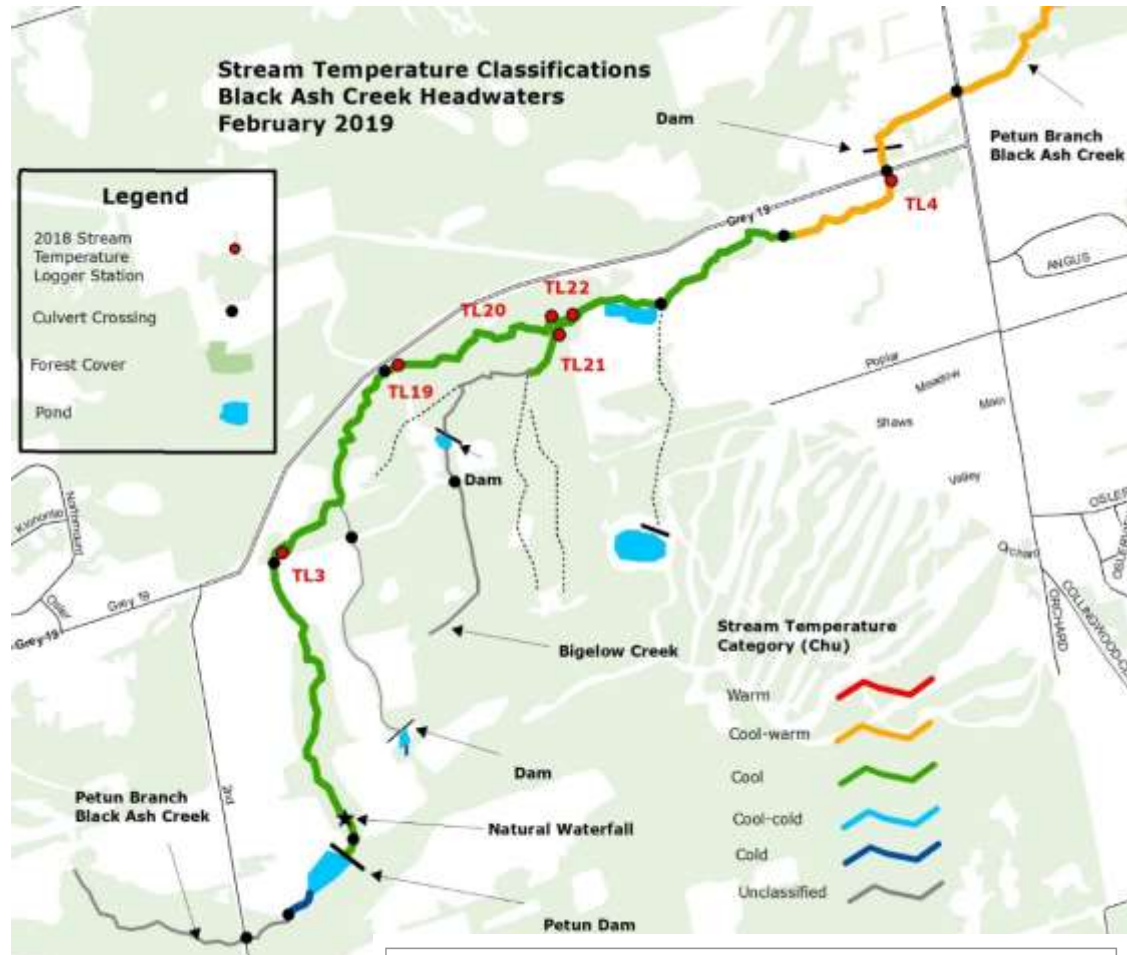


# Black Ash Creek Temperatures

Bruce Power supported a 2017-2018 temperature study and a fish community assessment (4 Biomass Stations).

Black Ash Creek was **COLD** upstream of the dam.

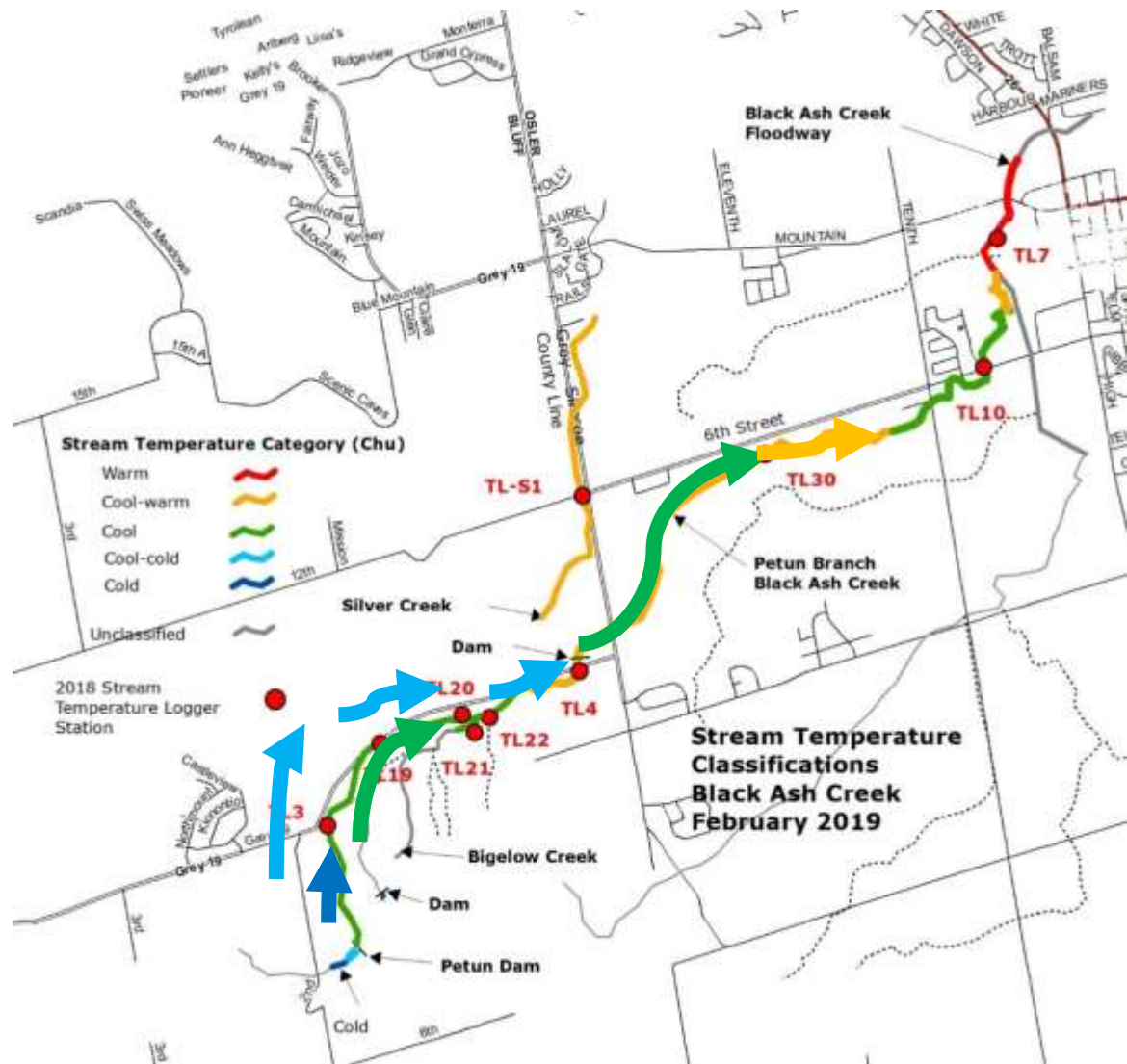
The water warmed significantly in the head pond and exited **7C** warmer, changing the stream classification to **COOL**.



# Anticipated Temperature Improvements from Dam Removal

After dam removal the pond will no longer warm water by 7C.

COLD and COOL-COLD water temperatures could be extended downstream from the dam with measurable temperature benefits extending 7km downstream.



# Project Preparation

- » 2014 feasibility study completed by GSS Engineering
- » 2014 NVCA Staff Completed Site Survey supported by MOECP
- » 2019 Final Dam Removal Design Completed by GSS Engineering with support from GEOMorphix.
- » Permits obtained from Niagara Escarpment Commission (Sep. 2019), DFO (April 2020), NVCA (April 2020) and MNRF Lakes and Rivers Improvement Act (May 2020)
  - Public Engagement
  - Local landowner Engagement
  - Indigenous Engagement (2019)
  - Pre/Post Flows (Greenland 2018)
- » MOECP
  - Environmental Assessment?
  - Permit to Take Water?



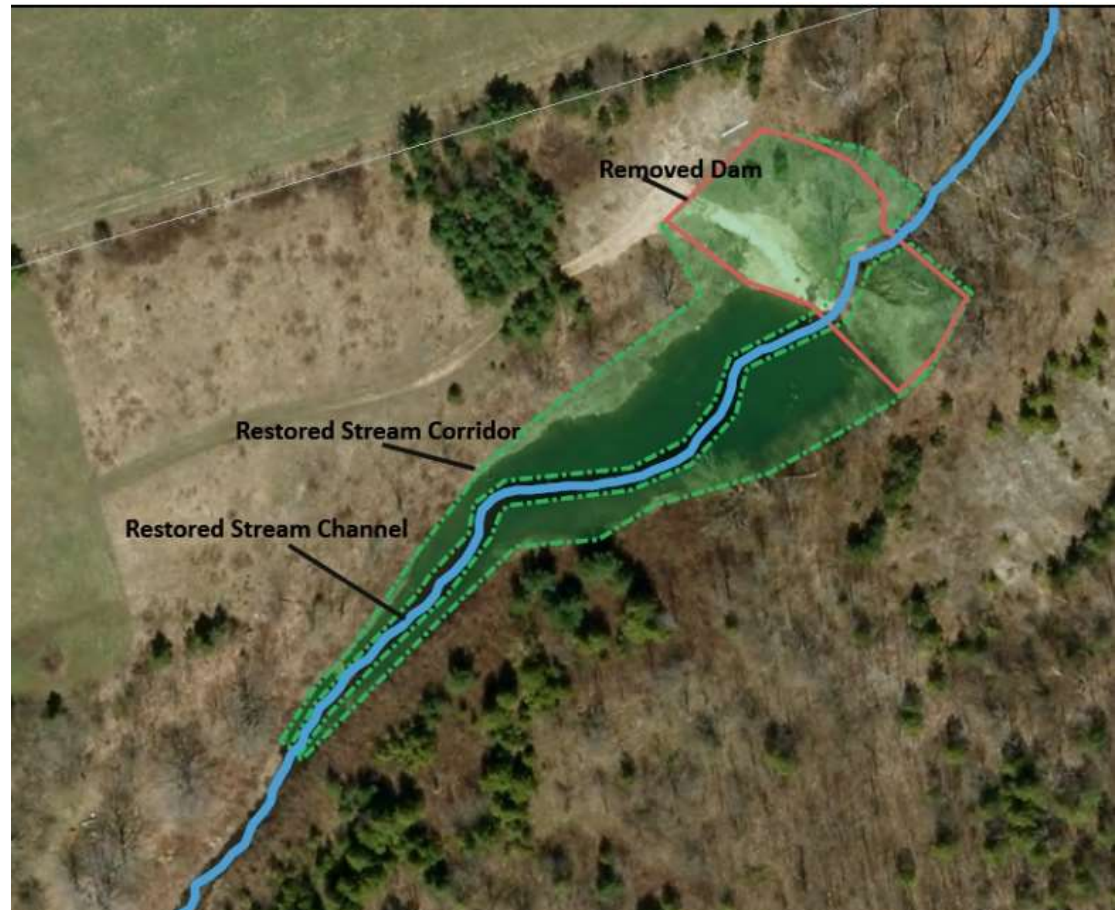


# 2020 Dam Removal Project Scope

Remove the earthen berm and construct a stable step-pool stream channel with moderate floodplain capacity at a 5% grade, in the footprint of the head pond.

Excavate and remove accumulated sediment in the former head pond.

Project cost for implementation in 2020 was **\$180,000** (\$130,000 machinery/materials, \$50,000 staff/consultants).



# Passive Water Control

## Step 1 – Installation of 160m long Flow Bypass Pipe



**Coffer Dam**

- » A coffer dam at the upstream end funnels water into a flow bypass pipe
- » The 10" big-O pipe allows baseflow and regional storms during several weeks of construction.
- » Maintained at 0.5% grade with straps



# Excavation

## Step 2 – Bulk Excavation of Earthen Berm and Pond Sediments

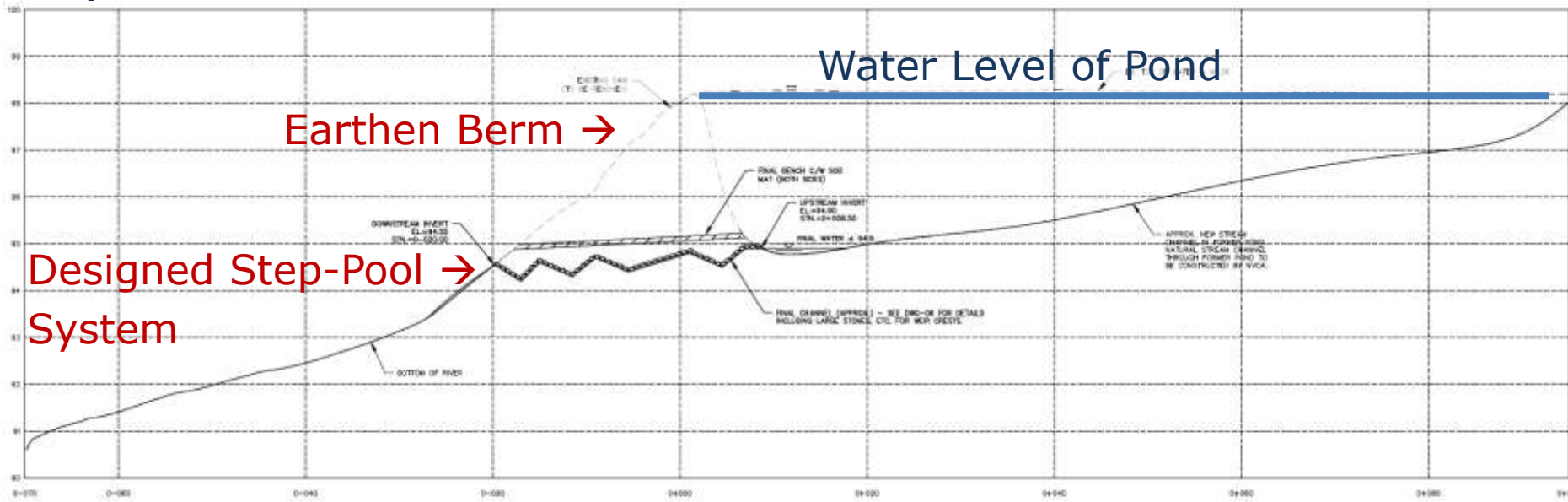


Flow bypass allowed for construction.

700m<sup>3</sup> of material was excavated and removed from the site.

# Channel Restoration

## Step 3: Stream Channel Restoration



LONGITUDINAL CROSS SECTION 1:250 H / 1:50 V  
PETUN DAM POND PROFILE SECTION



- » The steep valley required a step-pool section through the berm.
- » Uncovering natural channel beneath pond



# Stream Channel Reconstructed

Where the dam once stood, a restored stream channel was constructed with rock steps and pools. Terraced shelved on either side of the channel allow for flood capacity.



# Stream Channel Naturalization

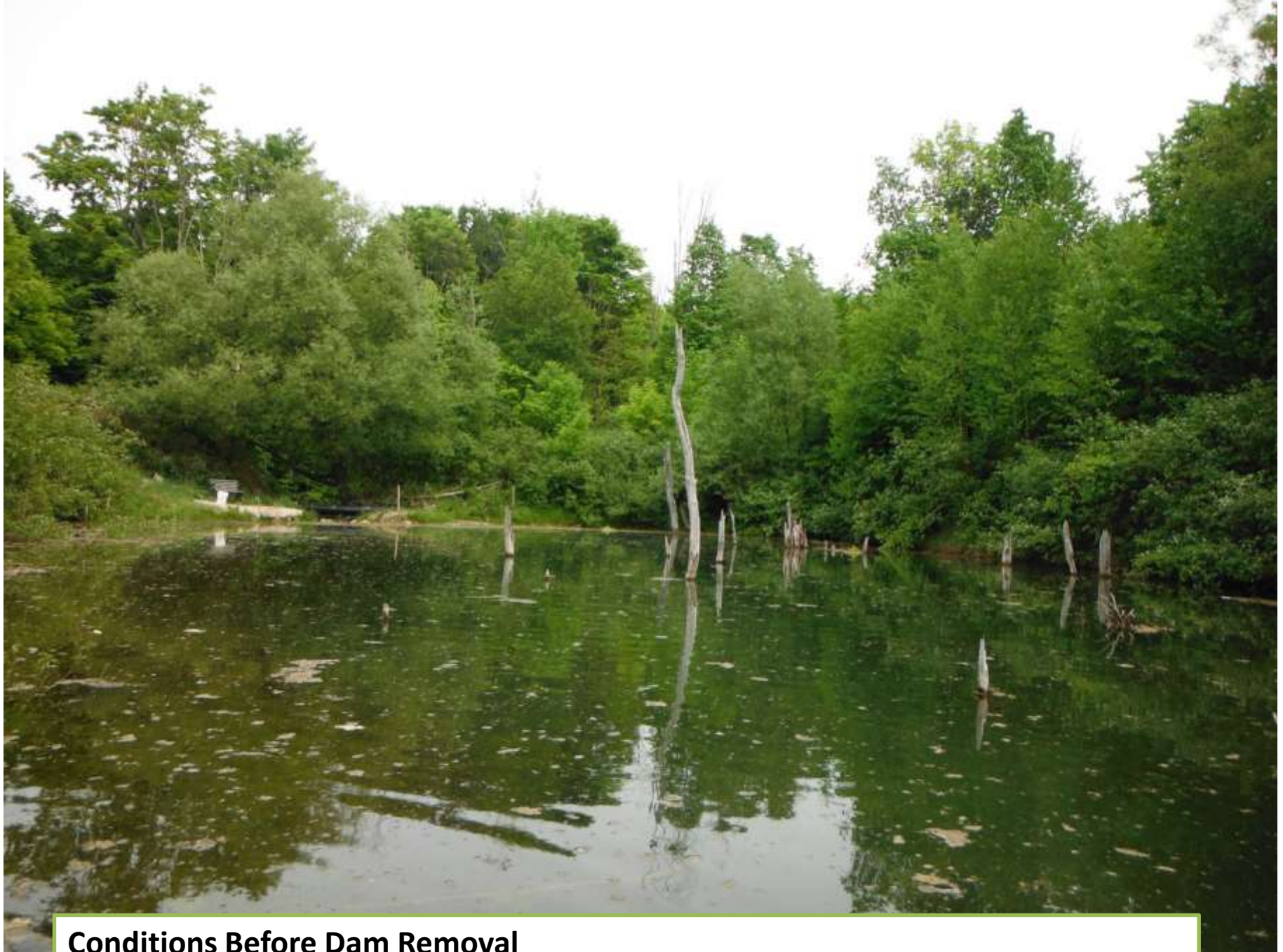
## Step 4: Planting Vegetation and Adaptive Management



Revegetation with native trees, shrubs and grasses. Allows for stakeholder engagement



Channel narrowed and fish habitat enhanced with woody revetments and lunkers



**Conditions Before Dam Removal  
July 2019**



**Conditions During Dam Removal**  
Removal of Vegetation on Dam and Pond Draw Down  
**August 2020**





**Berm Excavation and Sediment Removal  
Sept 2020**



**After Dam Removal and Channel Construction**  
**Oct 2020**

# Conditions After Dam Removal 2020

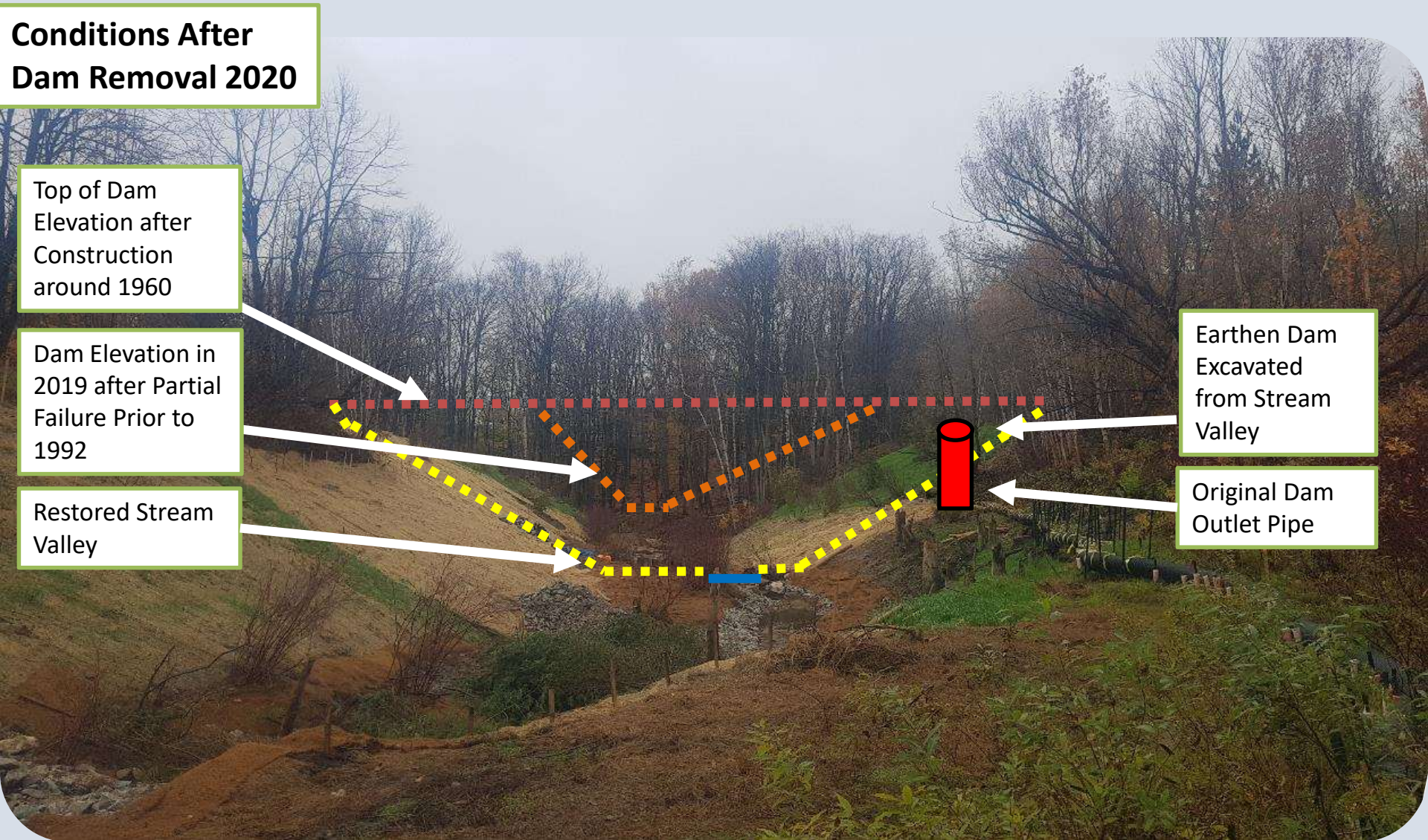
Top of Dam Elevation after Construction around 1960

Dam Elevation in 2019 after Partial Failure Prior to 1992

Restored Stream Valley

Earthen Dam Excavated from Stream Valley

Original Dam Outlet Pipe



## Legend

- Original Dam Elevation After Construction (1960s)
- Partially Failed Dam (Eroding 1992-2019)
- Restored Stream Valley Elevation (2020)
- Water Level
- Dam Outlet Pipe

# Channel Reconstruction through Former Pond



Fall 2021, 1 year after reconstruction

# Challenges with Dam Removal

- » Bypass pipe made from plastic is delicate
- » Difficult to excavate original channel without disturbing channel bed
- » Wet weather prevented triaxle trucks from accessing site



# Funding Partners

Thanks to our amazing funding partners including Bruce Power, Greenbelt Foundation, HJ McDonald Foundation, Environment Canada, Province of Ontario, Enbridge, TD Friends of the Environment Foundation and a Canadian Initiative for Community Action Lake Huron – Georgian Bay Watershed

Draft sign



## DAM REMOVAL AND TROUT HABITAT RESTORATION PROJECT

Restoring Green Infrastructure  
for Flood Control and Water Quality  
Improvement in Black Ash Creek

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*Innovation at work*



*Possibility grows here.*



**HJ McDonald  
Foundation**

This project was undertaken with the financial support of:  
Ce projet a été réalisé avec l'appui financier de:



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

# Thank You

Questions?



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