

# Long-Term Monitoring of River Restoration Projects in South Ontario

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# River Restoration

## Urban Streams - The Usual Subject of Restoration



(Geomorphic Solutions, 2012)



(TRCA, 2018)

# Why Restoration Matters



# Earlier Modifications

**Penticton Creek**  
Okanagan Valley, BC



(City of  
Penticton, 2017)



*Before*

*After*

**Henry Sturm Creek**  
Kitchener, ON



(R&M Construction,  
2018)



# Restoration Diversity

South Ontario's Urban Development - a major contributor to the need for river restoration projects



We have an abundance of projects, all varying in...

- Age
- Design
- Goals
- Monitoring

# Monitoring Gaps

Following construction...

- Post-project monitoring
  - ◆ Standard step
  - ◆ Typically executed for ~2-3 years
    - Dependent on funding, willingness, resources, and time

*This only evaluates the immediate 'success'*

# Monitoring Gaps

This lack of long-term, comprehensive monitoring results in a lack of understanding into...

- Adjustment mechanisms; up to 15 years to stabilize (Padovan et al., 2022)
  - ◆ Sediment transport
  - ◆ Channel geometry
  - ◆ Habitat units
  - ◆ Etc...
- Overall restoration success
  - ◆ Habitat availability, diversity, and stability
  - ◆ Native species populations
  - ◆ Infrastructure protection
  - ◆ Flood conveyance
  - ◆ Etc...

# Monitoring Gaps

While several studies have explored the success of South Ontario restorations, and longer monitoring periods (Cockburn et al., 2016; Padovan et al., 2022)

*They are often focused on a single project*

Filling this gap

- Exploring multiple completed urban restoration projects
- > 10 years post-construction

# Study Objectives

## Long Term Monitoring of South Ontario River Restoration Projects



**Spring Creek**  
Brampton, ON

# Where does this work fit?

Meeting  
Specific  
Goals

Clearly  
Structured  
Frameworks

Improving  
Local  
Understanding

Capturing  
Adjustments

Expanding  
Monitoring  
Timelines

Evidence  
Based Best  
Practices

Benefits for  
Stakeholders

# Study Design

## Background Data

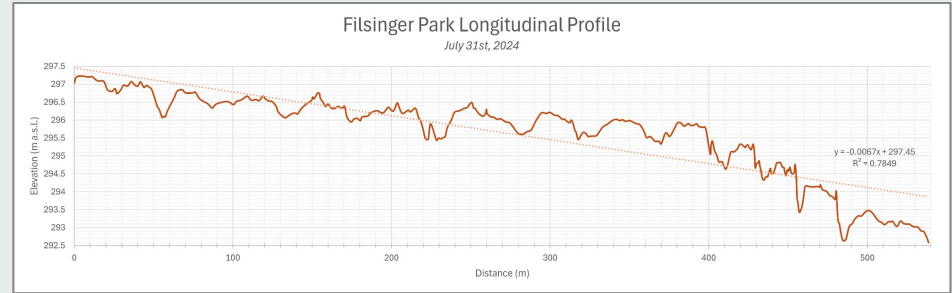
- Proposals
- Design Builds
- As-Builts
- Short-Term Monitoring  
Reports
- Relevant Scientific  
Literature



# Study Design

## Field Data

- Longitudinal Profiles
- Cross-Sectional Profiles
- Water Chemistry
- Grain Size Analysis
- OSAP S4.M2



**Mandatory Fields in Grey**  
Must be filled out for processing

**Channel Morphology**

Stream Name: Mill Creek Reach 2    R.F.I.C. X53    Channel Morphology Pre-determined

Stream Order: 14 Mill Creek    Min. Width (m): 4    Bank Length (m): 4.93m    Active Channel Width (m): 0.83

Bank Code: Rostrum X53    No. of Transverses: 4    Transverse Spacing (m): 0.83

Altitude: 53.4    Elevation: 109.7 E    Points per Transverse: 6

Target: 20    Cross: 24    Bed: 0.5    Bank: 11.5

Calculations: 0.42m

Point No.	Location (m)	Depth (m)	Hydraulic Radius (m)	Point	Max. c/s Rng.	Urbanscape	Channel	Quality	Wood	Bank	Macro	Bank	Other	FL	AL	SO	MC	WC	GR	TR
1	-	-0.02m	N/A	23.3cm	24.1															
2	-	0.3m	0.5	13cm	25.2															
3	-	0.14	0.5	15.6	26.3															
4	-	0.17	1	2.2	12.5															
5	-	0.11	0	13.9	19.1															
6	-	-0.03	-99	9.3	12.9															

Bank at Age & Particle Metrics Comments  
(Mark in blue height & height in -0.4 cm cross box, blue circle indicates non-measured points)

Height: 0.1m    250mm    750mm    1500mm    Amount of Unobscured Area: 0    No. of Veg. Stems per 0.1m<sup>2</sup>: 0    Channel Vegetation Type: Grass    Filler Code: Blank

Day: GNSS    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass

Month: September    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass

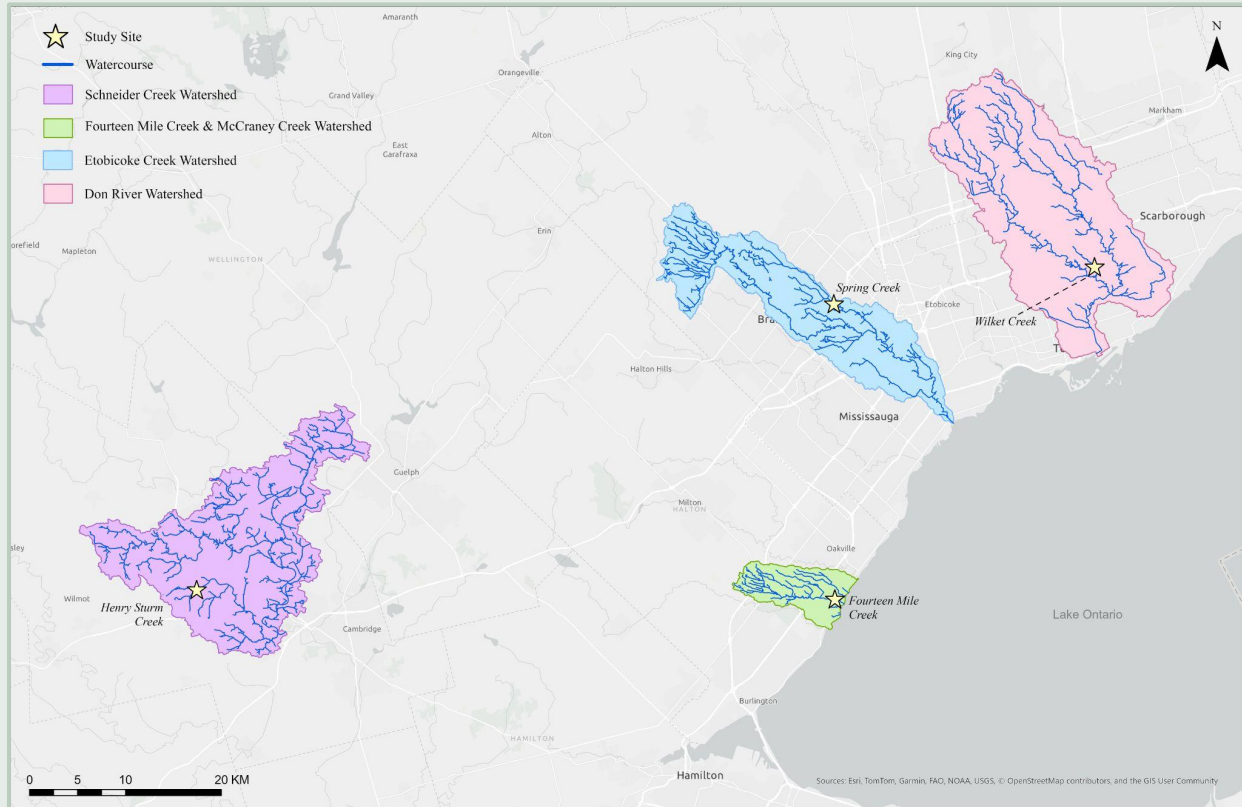
Year: 2024    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass

Time: 10:00    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass    Channel Vegetation Type: Grass

Observer: EN    Recorder: EP    Verifier: EN    Commenter: EN

Comments: Point 1 above water  
Point 6 as well

# Study Sites



# Filsinger Park Stream Restoration Project

Before & (immediately) after construction



(Google Earth, 2024)



2024

(R&M Construction, 2018)

# Fourteen Mile Creek Reach 2 Stabilization and Rehabilitation

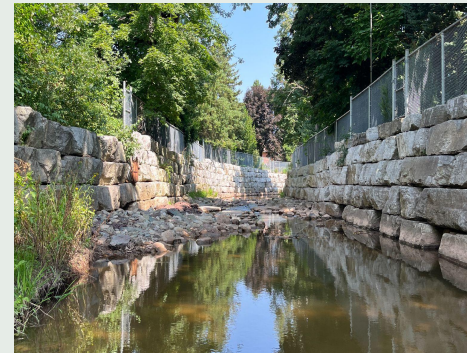
Before & during construction



(Google Earth, 2018)



(Aquafor Beech, 2020)



# Alfred Kuehne Boulevard Stream Realignment

(Google Earth, 2009)



(Google Earth, 2024)

Before & (immediately) after construction



(Geomorphic Solutions, 2012)



(TRCA, 2018)



2024

# Wilket Creek Rehabilitation Project



# Similarities Between Projects

Short-Term Results  
(2-3 years)

≠

Longer-Term Results  
(+10 years)

Pre-Restoration  
Issues Rememerging

Watershed-Wide  
Influences

# Data Resolution and Reporting

**Wilket Creek**  
Toronto, ON

## Field Methodology

- Data Collection
- Locations

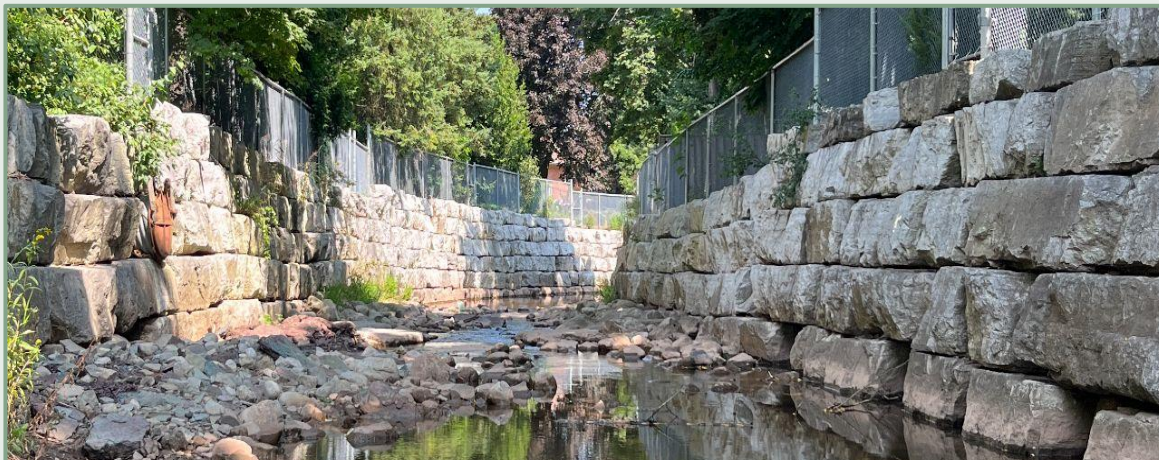
## Reporting

- Units
- Resolution
- Discussion



# Sweet Spots

- Could longer-term monitoring reach this?
- How does urbanization play a role?



**Fourteen Mile Creek** Oakville, ON



**Spring Creek** Brampton, ON

# Future Questions

- Additional surveys & sites
- Monitoring *older* restorations
- Standardizing post-restoration monitoring and reporting
- Ontario-focused framework, strategies that are proven to work

# Conclusion

- 1. Longer term (10+ years) monitoring brings to light adjustments that are not fully captured by short-term (2-3 years) monitoring*
- 2. Consistency (and Resolution) is Key!*



**Wilket Creek** Toronto, ON

# Thank You!

Questions?

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**Filsinger Creek**

Kitchener, ON

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