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2025
Conference

Canada's Premier
Stormwater and Erosion
and Sediment Control
Conference

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Creek Erosion Inventory Methodologies, Data Collection and Management

Source to Stream 2025



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March 27, 2025

Content developed by
Montrose Environmental



OUTLINE

- Introduction
- Purpose
- Inventory Development
- Scale
- Data Collection Framework
- Resources
- Applications
- Future Considerations



INTRODUCTION

Creek erosion inventories:

- Identify and evaluate channel erosion risks
- Prioritize sites for remediation using a standardized framework
- Manage both legacy and emerging erosion issues



PURPOSE



INFRASTRUCTURE

- Sewer infrastructure (water, storm, sanitary)
- Bridges, roads, culverts
- Trails, park infrastructure



PROPERTY

- Public property
- Conservation areas / lands
- Private property*



PUBLIC SAFETY

- Potential hazards to public safety associated with erosion hazards

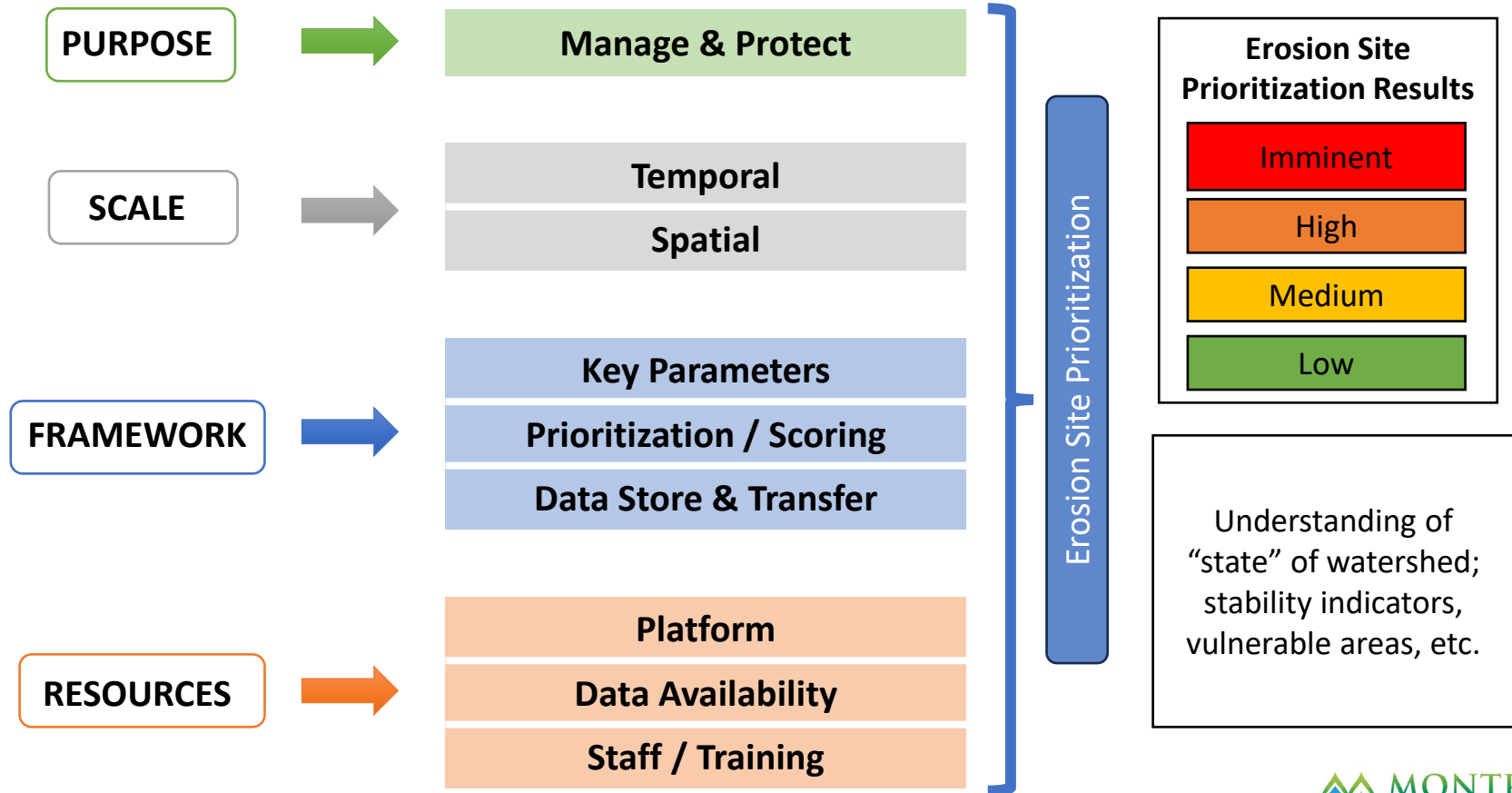


NATURAL ASSETS

- Watercourses
- Wetlands
- Natural heritage features
- 'Sensitive' areas

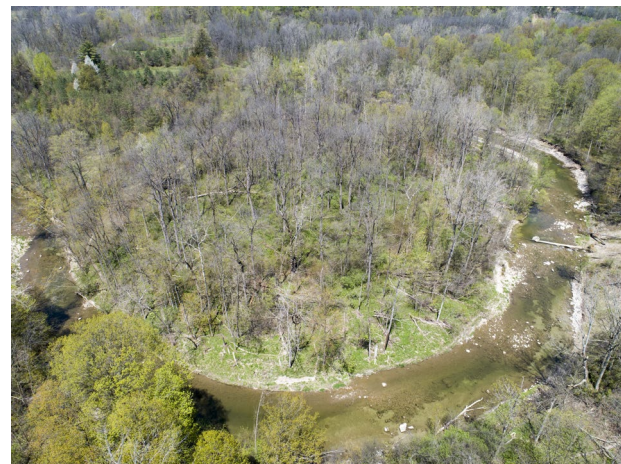
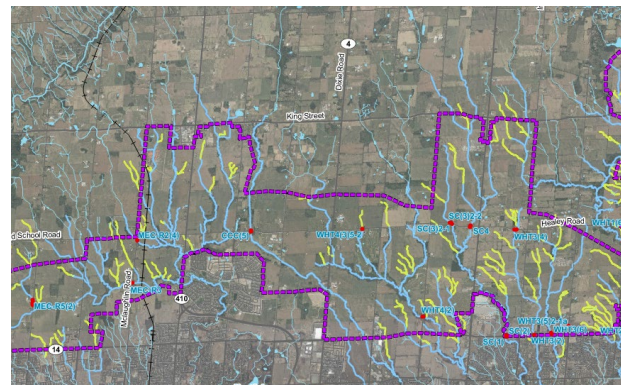
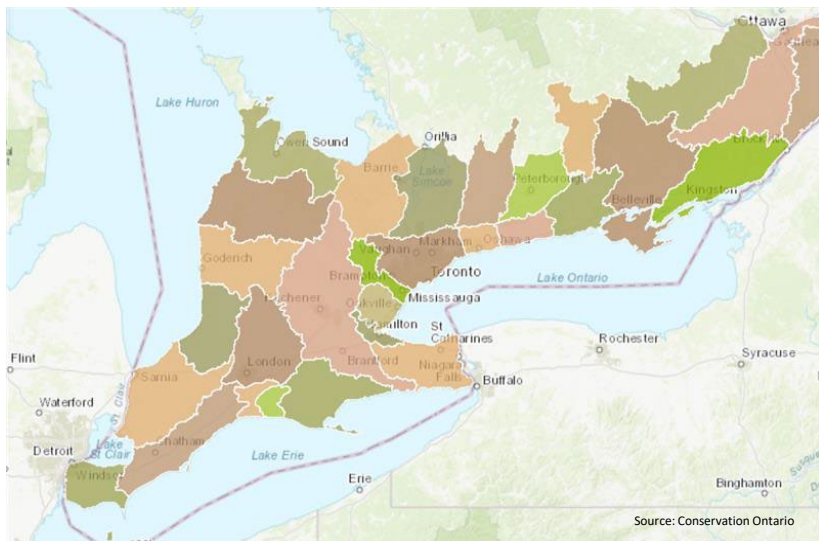


INVENTORY DEVELOPMENT

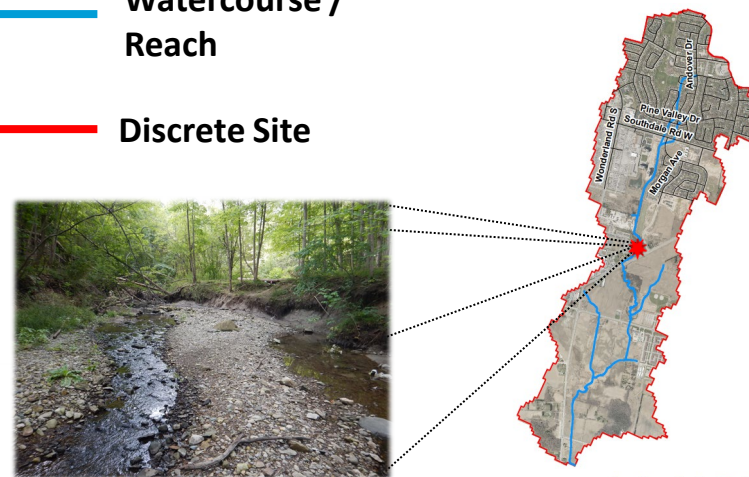
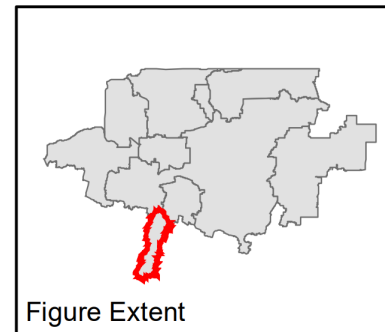
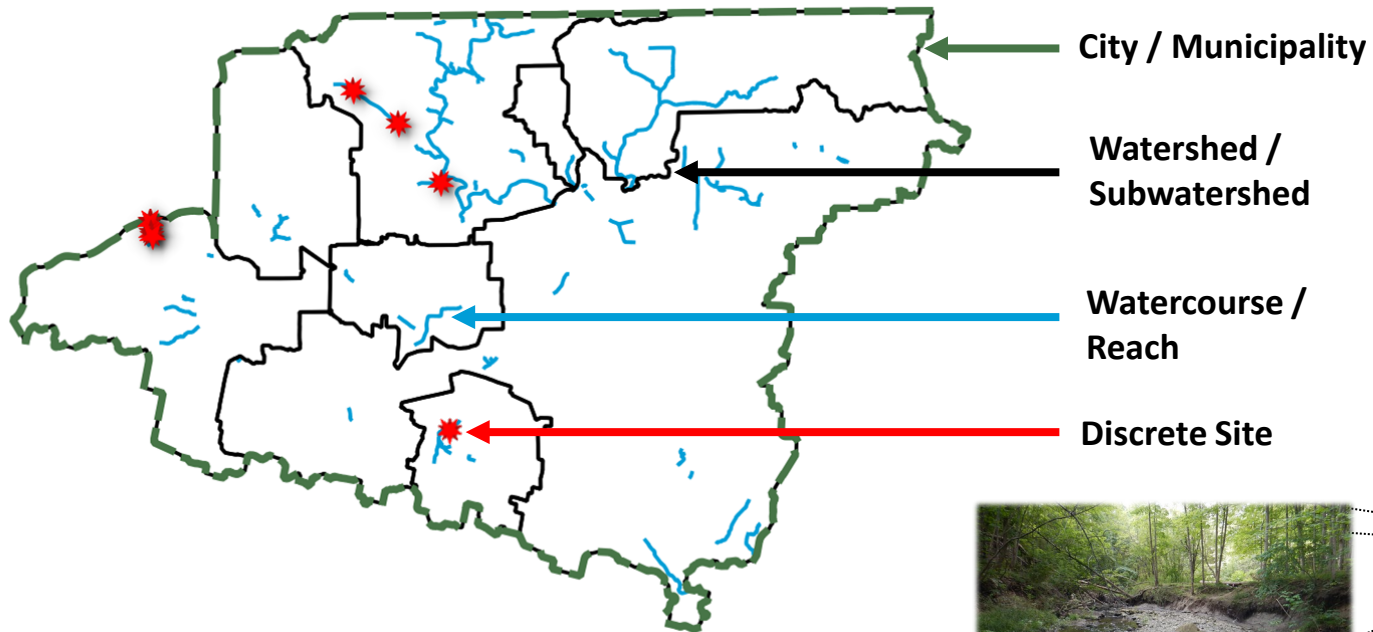


SCALE

- Spatial and temporal scale considerations of inventories
- 'Static' vs. 'dynamic' database
- Future considerations

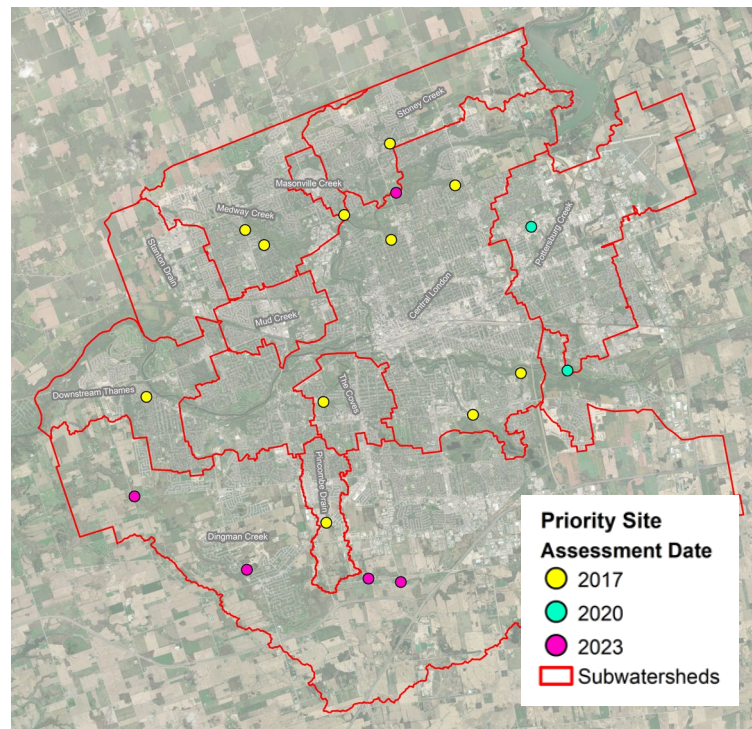


SPATIAL SCALE



TEMPORAL SCALE

- Inventory initiation, frequency and duration
- Seasonal timing
- Consideration of natural channel processes
- Urbanization and infrastructure



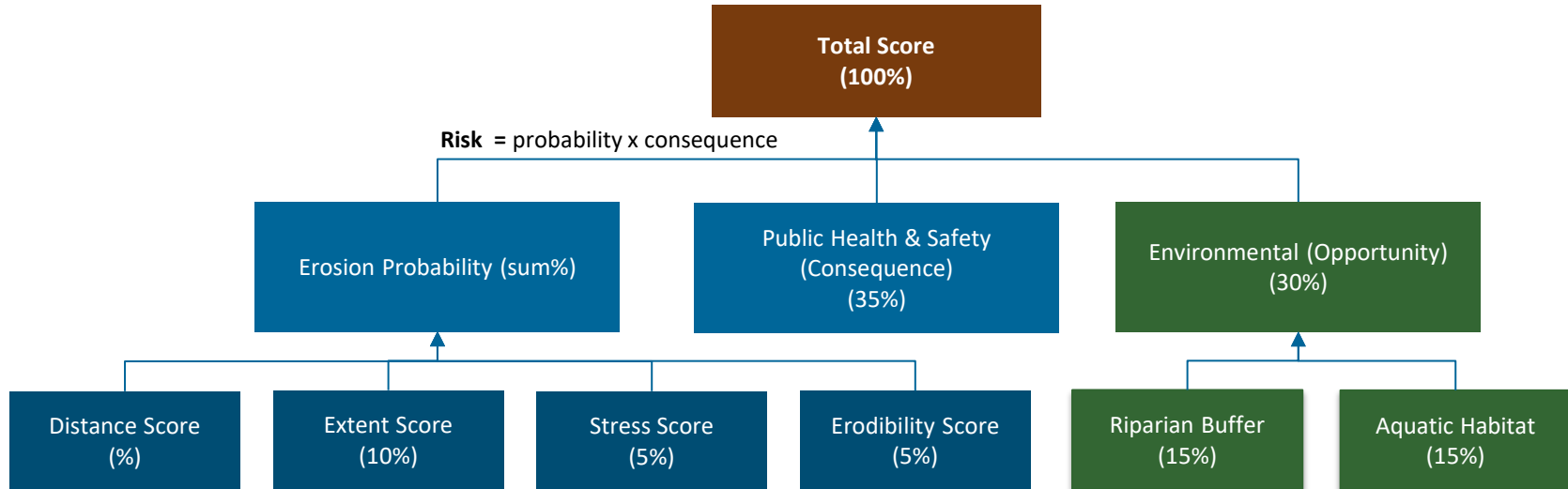
DATA COLLECTION FRAMEWORK

Parameter	Description
Date	Auto-generated ID field
Erosion Feature	Channel bank; valley wall
Position	Left bank; right bank
Length	Length of erosion
Height	Maximum height; average height
Undercutting	Measurements of undercutting
Vegetation Coverage	Bare/exposed, partial vegetation, fully vegetated
Rate of Erosion	Indicators of erosion rate; active, gradual, inactive, relic
Potential Risk	Risk to infrastructure, property, public safety, natural assets
Instability Indicators	Indicators of widening, degradation
Photos	Key photos of erosion site



DATA COLLECTION FRAMEWORK

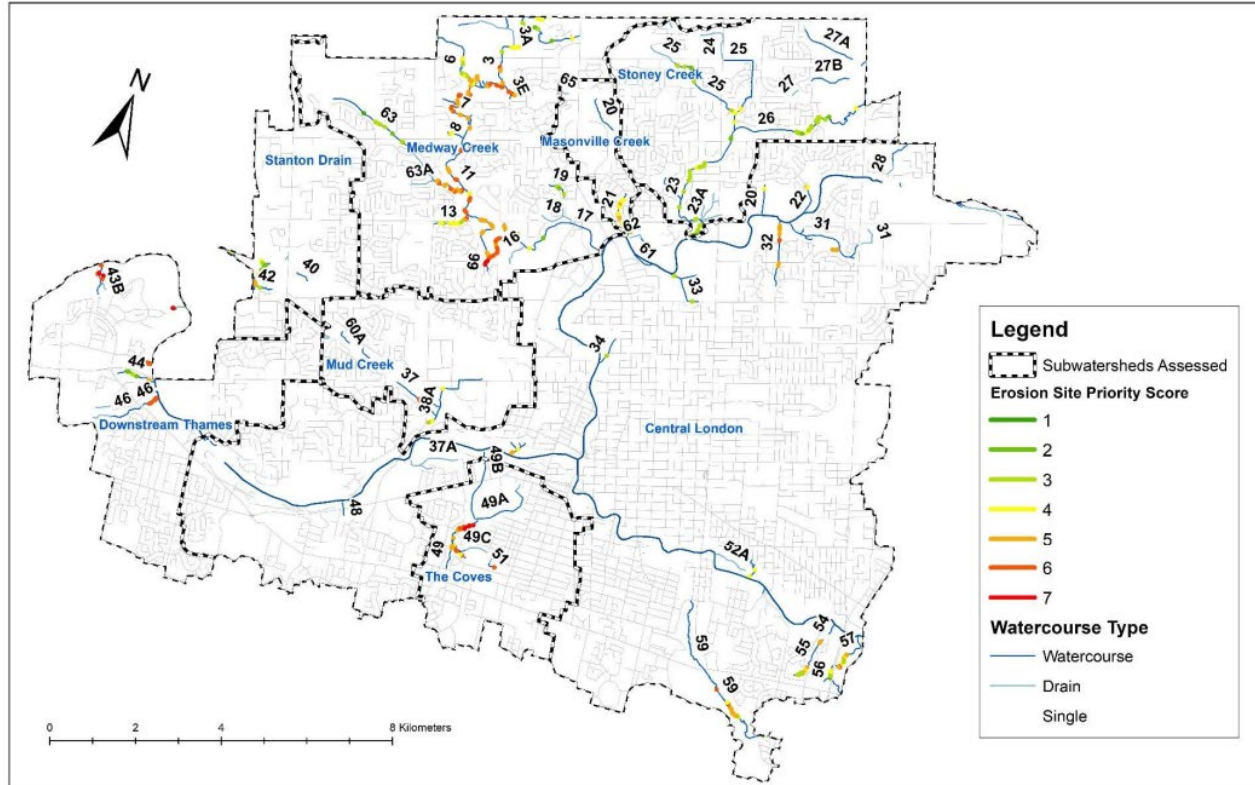
Example Prioritization / Scoring Methodology



- **Evaluate hazards as the product of probability and severity**
- Methodology is adaptable:
 - Scoring factors (include / exclude / adjust definitions)
 - Weighting of individual factors (%)

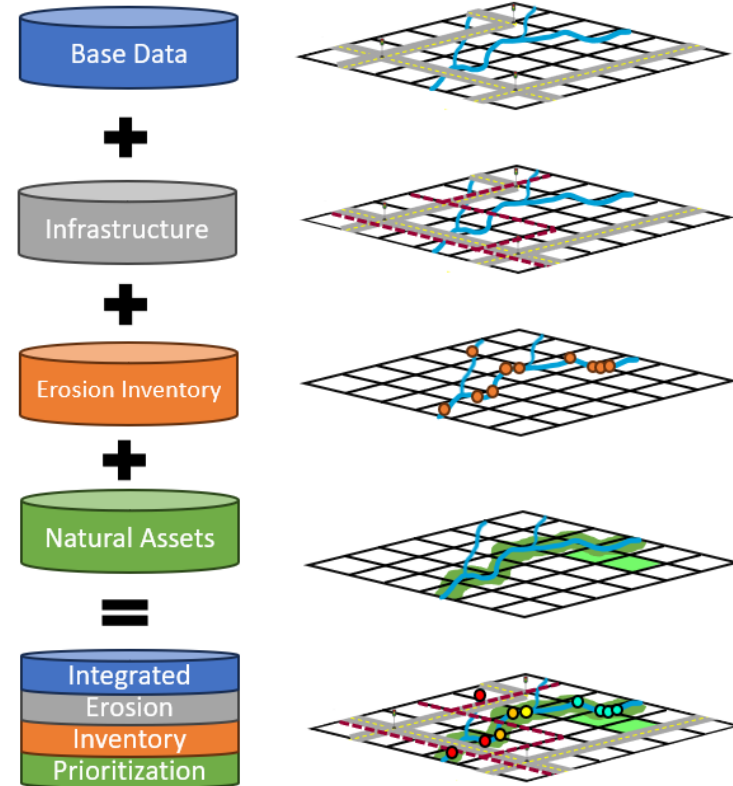
DATA COLLECTION FRAMEWORK

Example Erosion Prioritization: London, Ontario

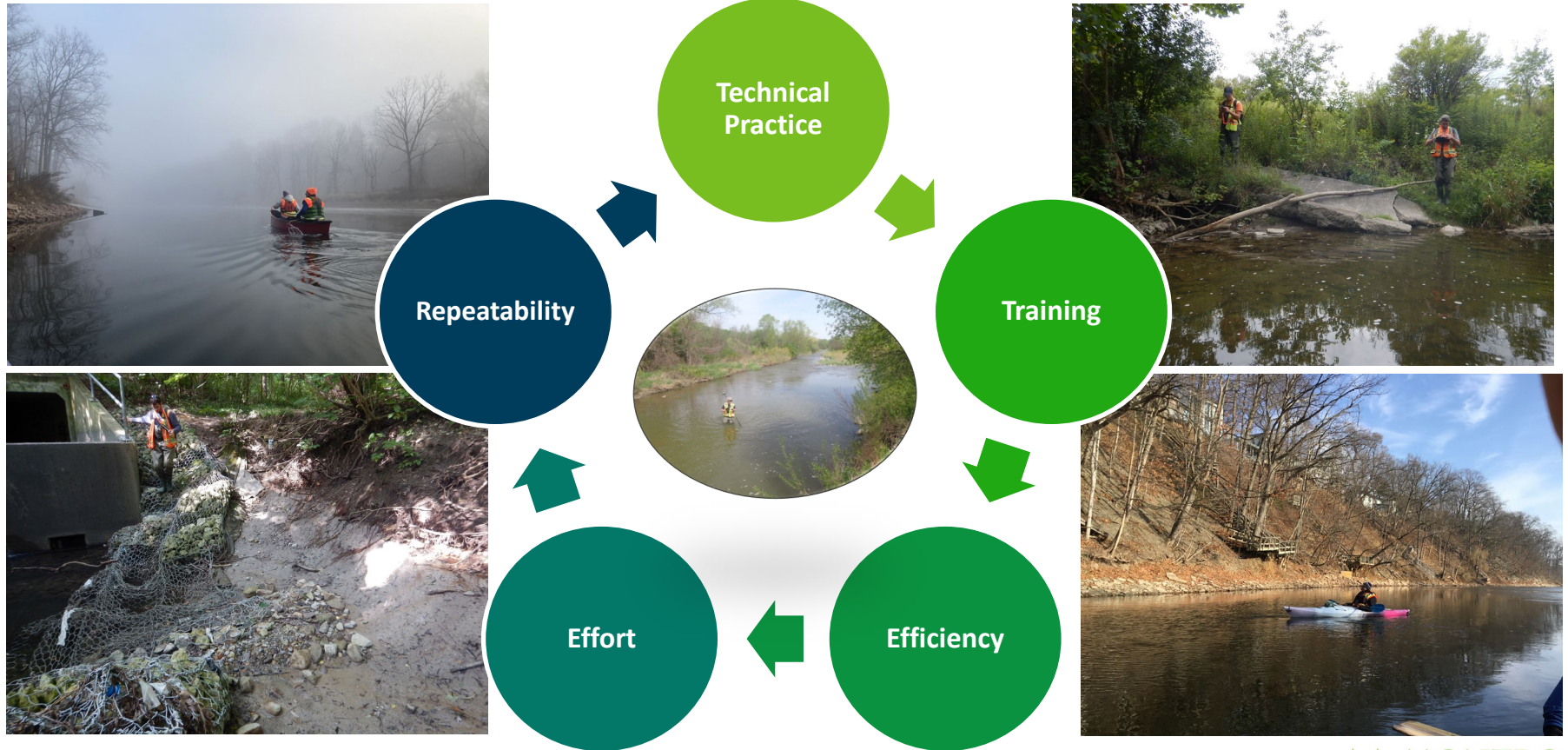


RESOURCES: DATA AVAILABILITY

- Availability of existing 'base' data, infrastructure and natural asset mapping
- Confirmation of 'base' data during field assessments
- Collection of erosion inventory data
- 'Layering' or merging of mapping for prioritization analyses
- Benefits of digital data collection



RESOURCES: STAFF

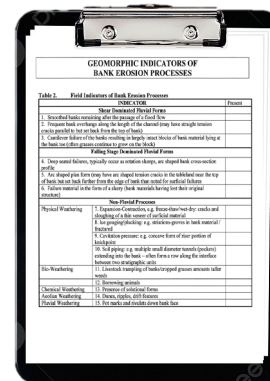


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✓ Accuracy	X Costs / Licenses
✓ Scalability	X Equipment
✓ Workflow	X Remote areas
✓ Efficiency	X Compatibility

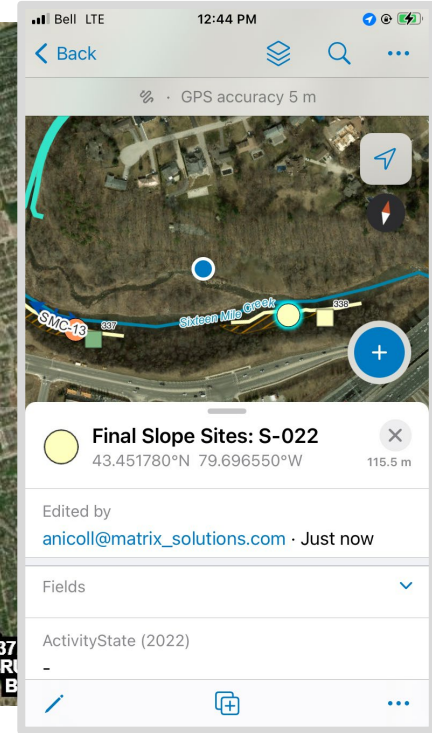
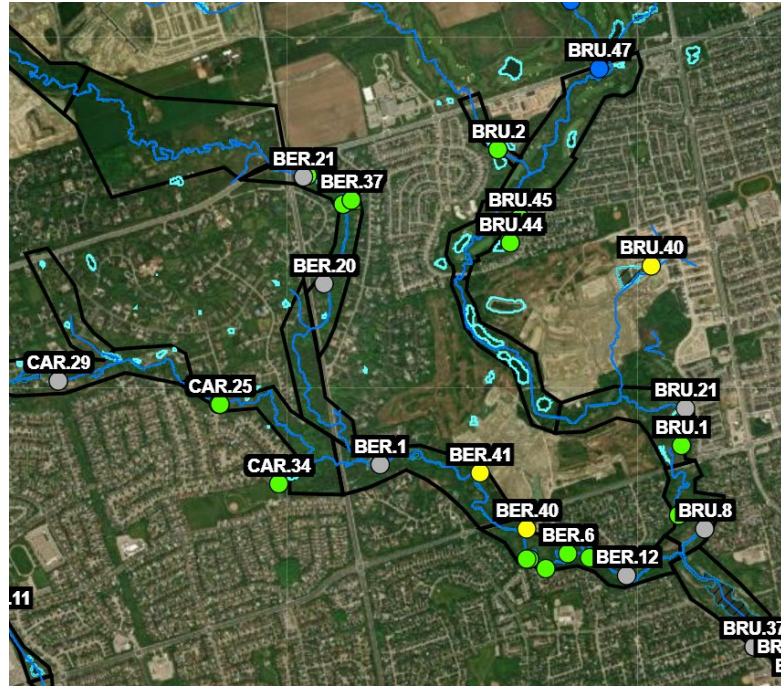
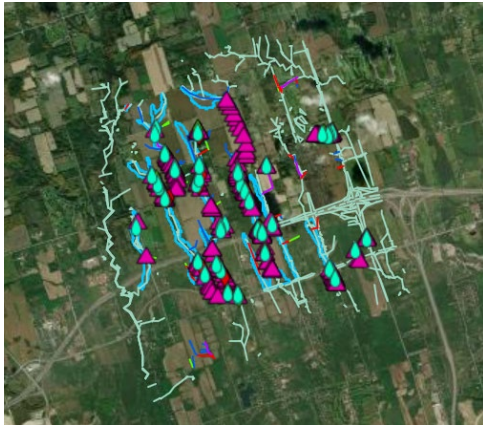


✓ Cost	X Efficiently
✓ Flexibility	X Organization
✓ Additional observations	X Digitization
	X QA / QC



RESOURCES: DATA MANAGEMENT

- Storage
- Database structure
- Comparability
- Transferability



APPLICATIONS

Results Inform Capital Works Planning

Planning Frameworks:

- Master Plans
- Environmental Assessments
- Independent Studies



City Initiatives:

- Stormwater Management Studies
- Flooding and Erosion Studies



Asset Management:

- Infrastructure
- Parks & Trails
- Natural Assets
- Fisheries



Forecasting:

- Monitoring Efforts
- Planning Horizons
- Climatic Impacts
- Development



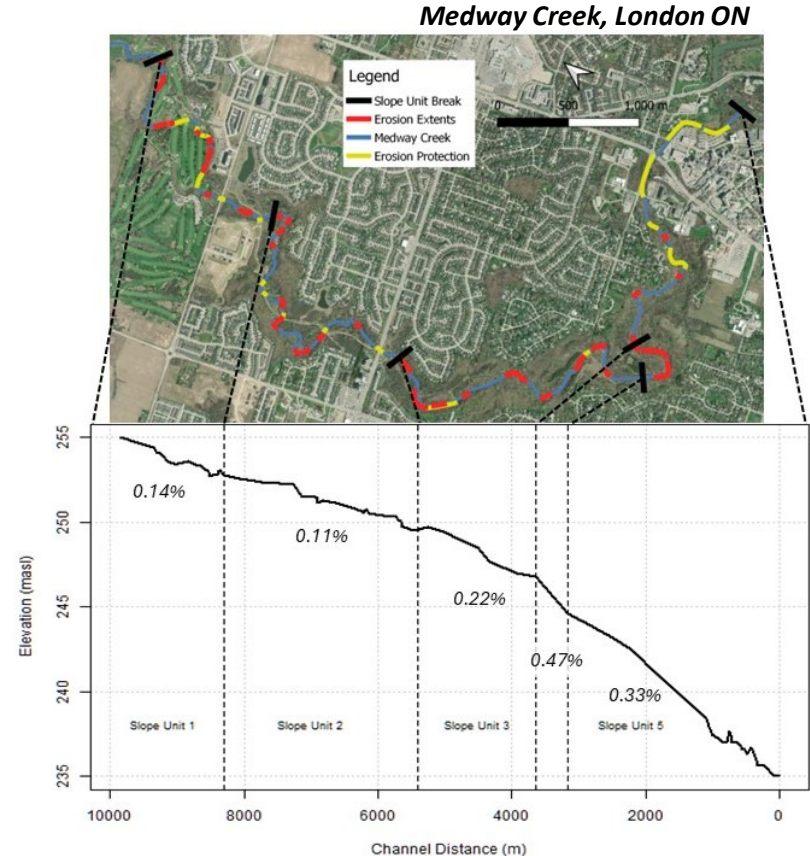
FUTURE CONSIDERATIONS

Pre-screening Phase

- Channel Bed Profile Analyses
- Stream Power Mapping
- Hydrology / Hydraulic Model Outputs
- Boundary Materials
- Historical Assessments

Post-Inventory Analyses

- Local vs. Systemic Processes
- Erosion Site Frequency / Distribution Mapping
- Correlation between Stream Power and Erosion
- Natural Channel Erosion vs. Response to Infrastructure
- Future Land Use Considerations
- Climate Change Implications & Forecasting
 - Future condition stream power mapping w/ discharge





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