

Creek Erosion Inventory Methodologies, Data Collection and Management for Municipal Asset Management Programs

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Matrix Solution
A Montrose Environment

OUTLINE

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



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

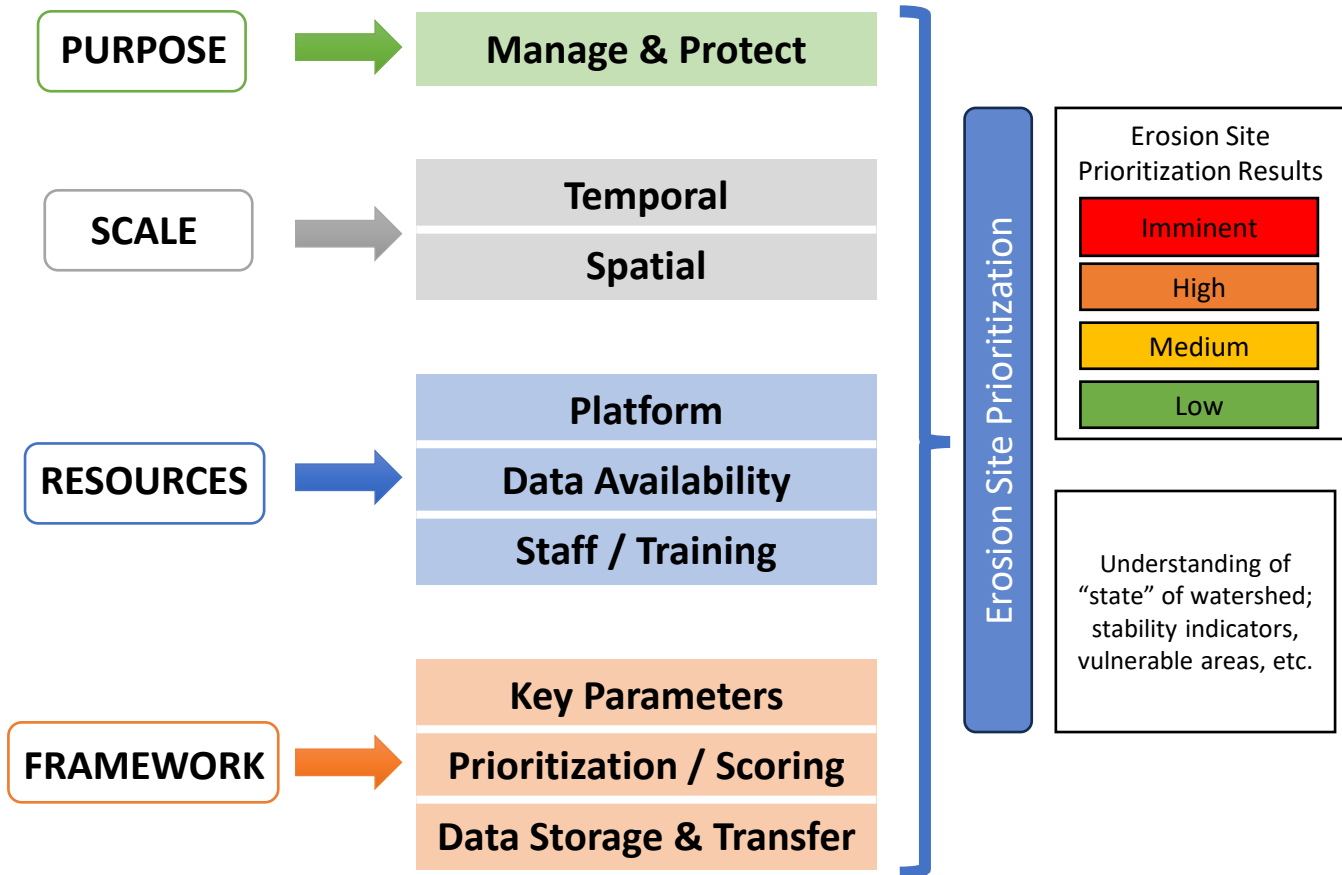


NATURAL ASSETS

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

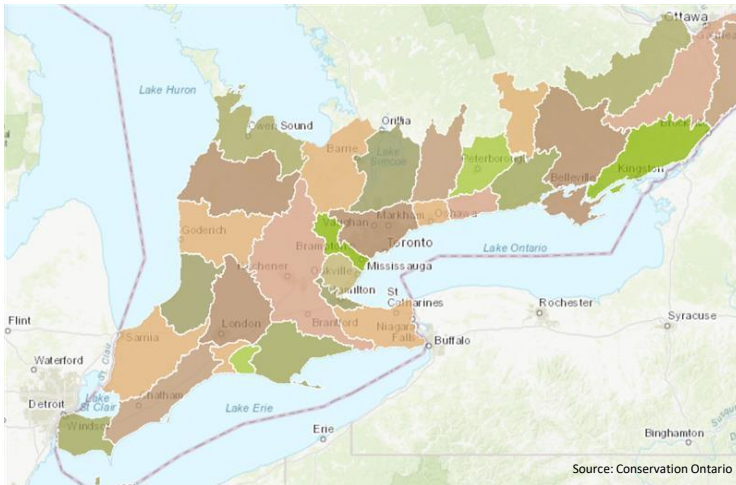
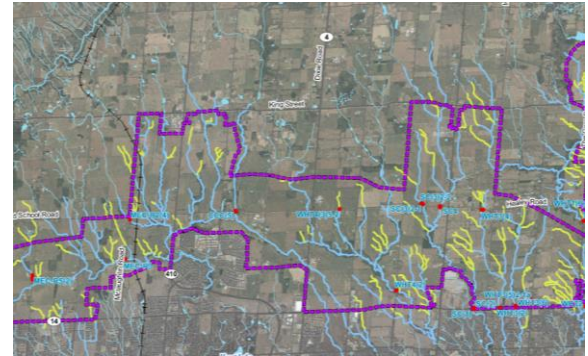


INVENTORY DEVELOPMENT

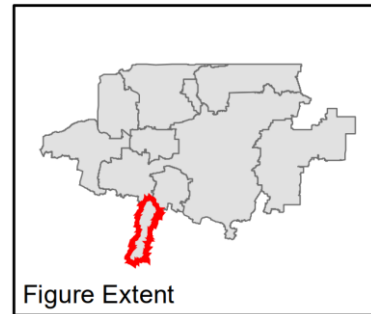
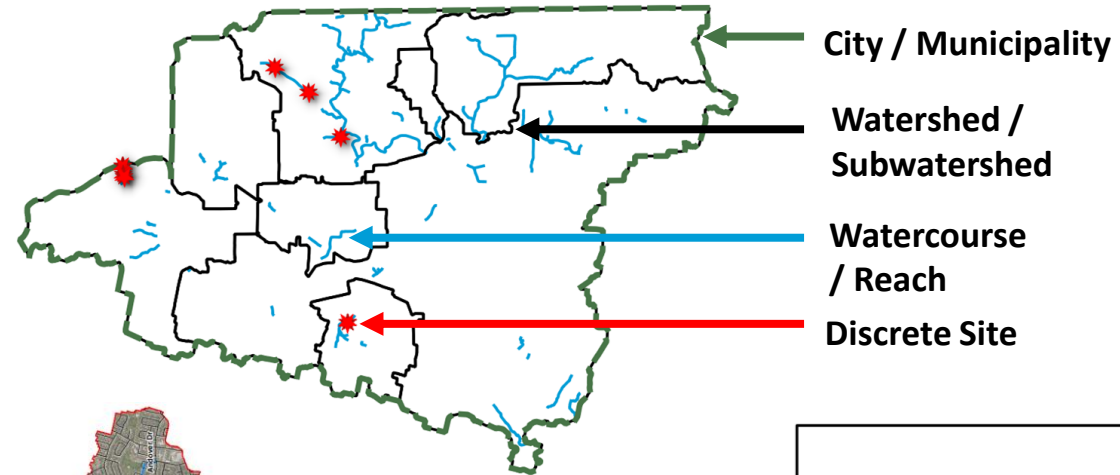


SCALE

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

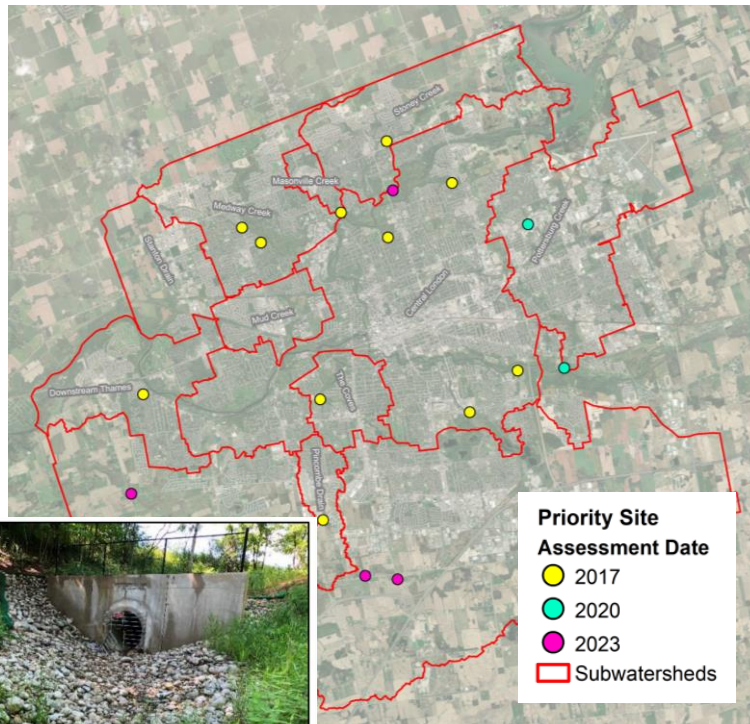


SPATIAL SCALE



TEMPORAL SCALE

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



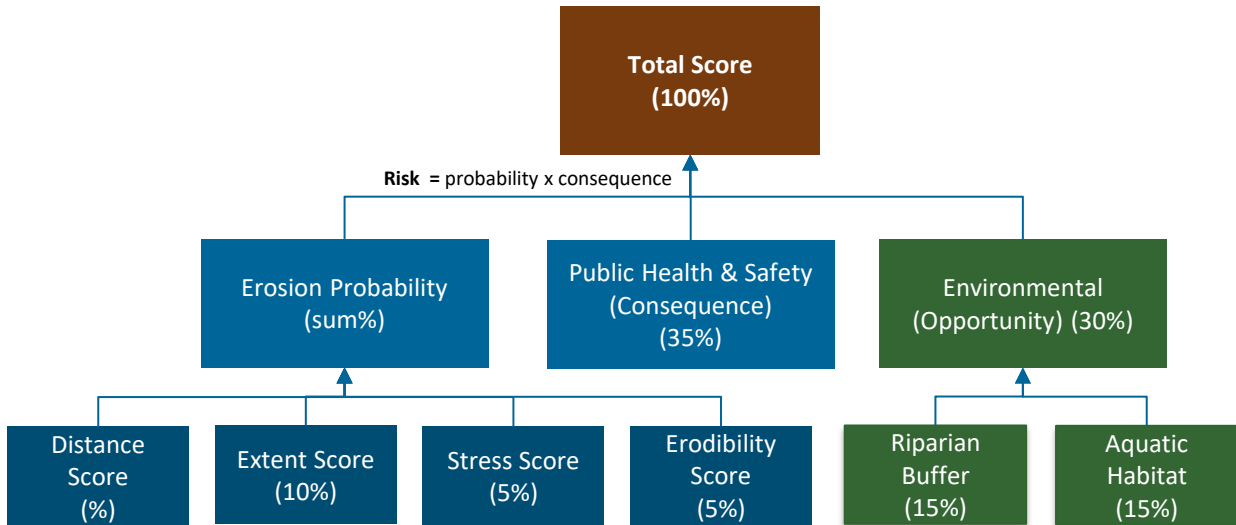
DATA COLLECTION FRAMEWORK

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, in-active, 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

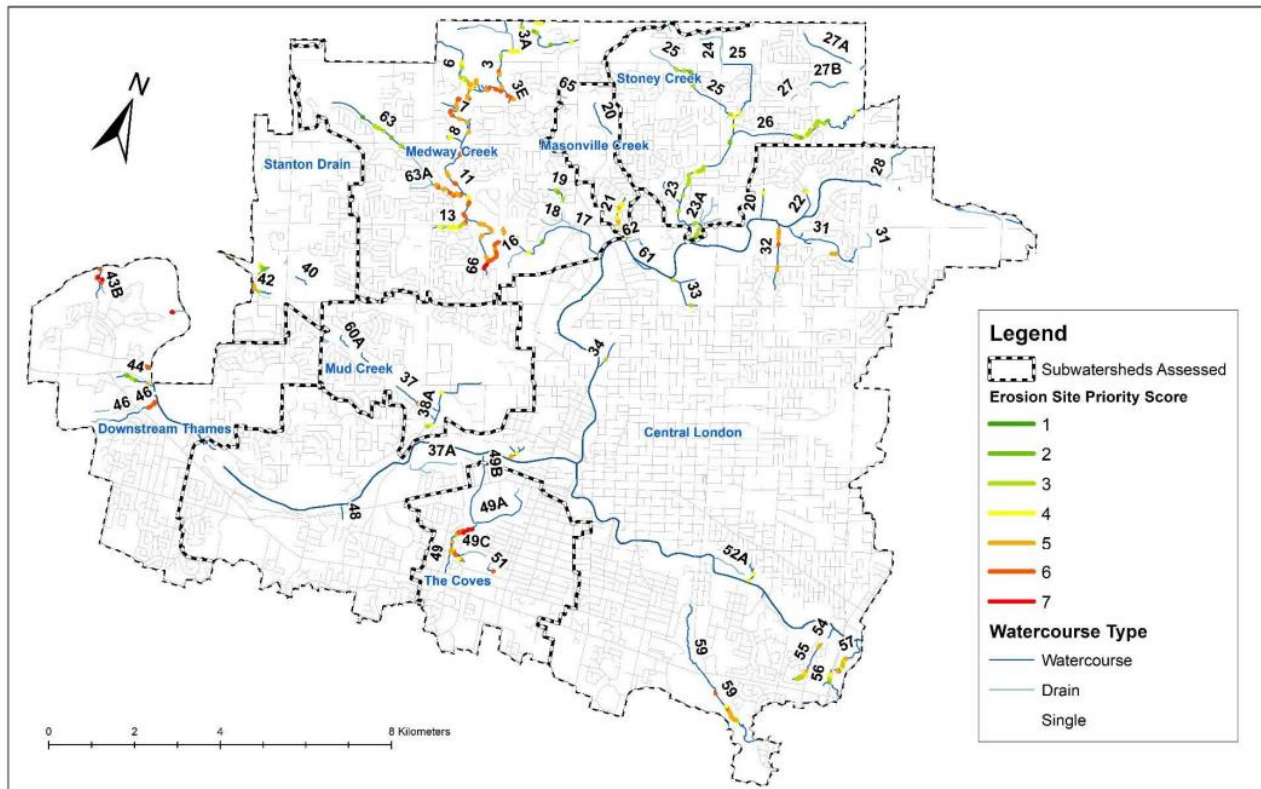
Example Prioritization / Scoring Methodology



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

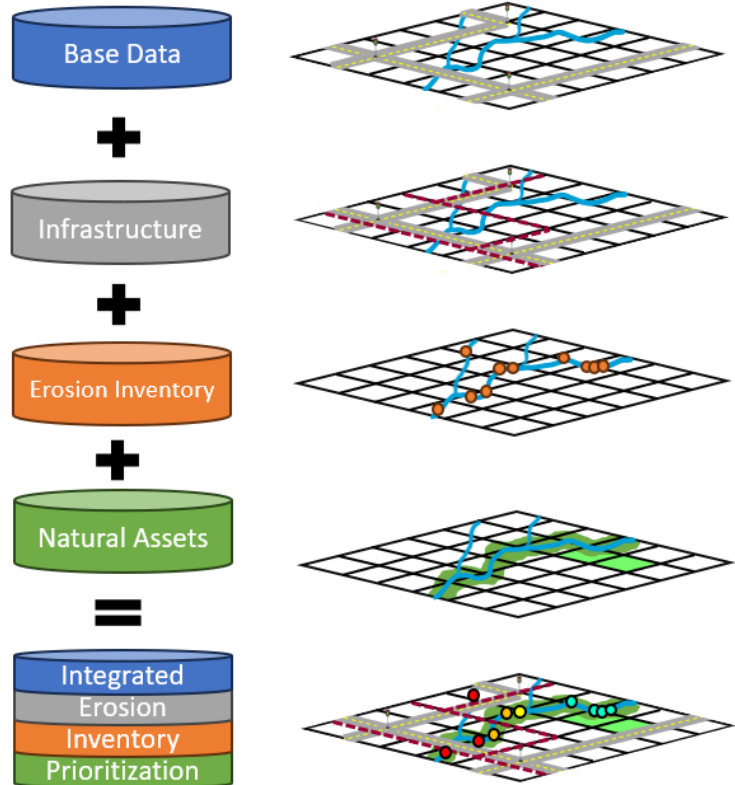
DATA COLLECTION FRAMEWORK

Example Erosion Prioritization: London, Ontario



RESOURCES: DATA AVAILABILITY

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



RESOURCES: STAFF



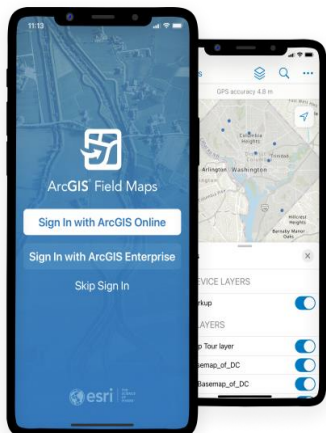
RESOURCES: PLATFORM

Digital Data Collection

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

'Manual' Data Collection

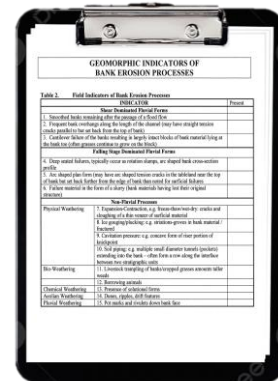
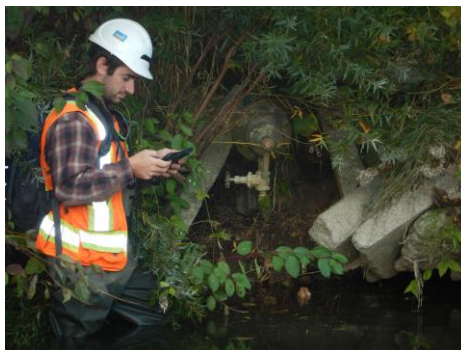
- ✓ Cost
- ✓ Flexibility
- ✓ Additional observations
- X Efficiently
- X Organization
- X Digitization
- X QA / QC



<https://geomarvel.com/arcgis-field-maps-features-and-functionalities-part-2/>

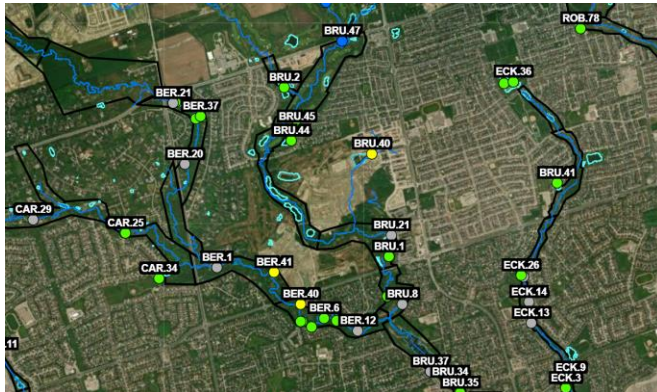


epicollects



RESOURCES: DATA MANAGEMENT

- Storage
- Database structure
- Comparability
- Transferability

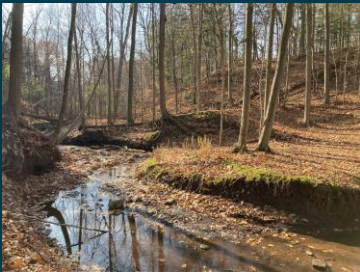


APPLICATIONS

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



Contact Us:

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