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North Castor Catchment Study

September 1, 2020





Phase 1 Existing Conditions

- Watershed Delineation & Characterization
- Setting the Vision, Objectives, Goals & Targets

Phase 2 Impacts, Scenarios, and Directions

- Watershed Planning Elements & Best Practices

Phase 3 Watershed Plan Implementation

- Developing the Plan & Implementing Provincial Policy
- Monitoring and Adaptive Management



Catchment Studies

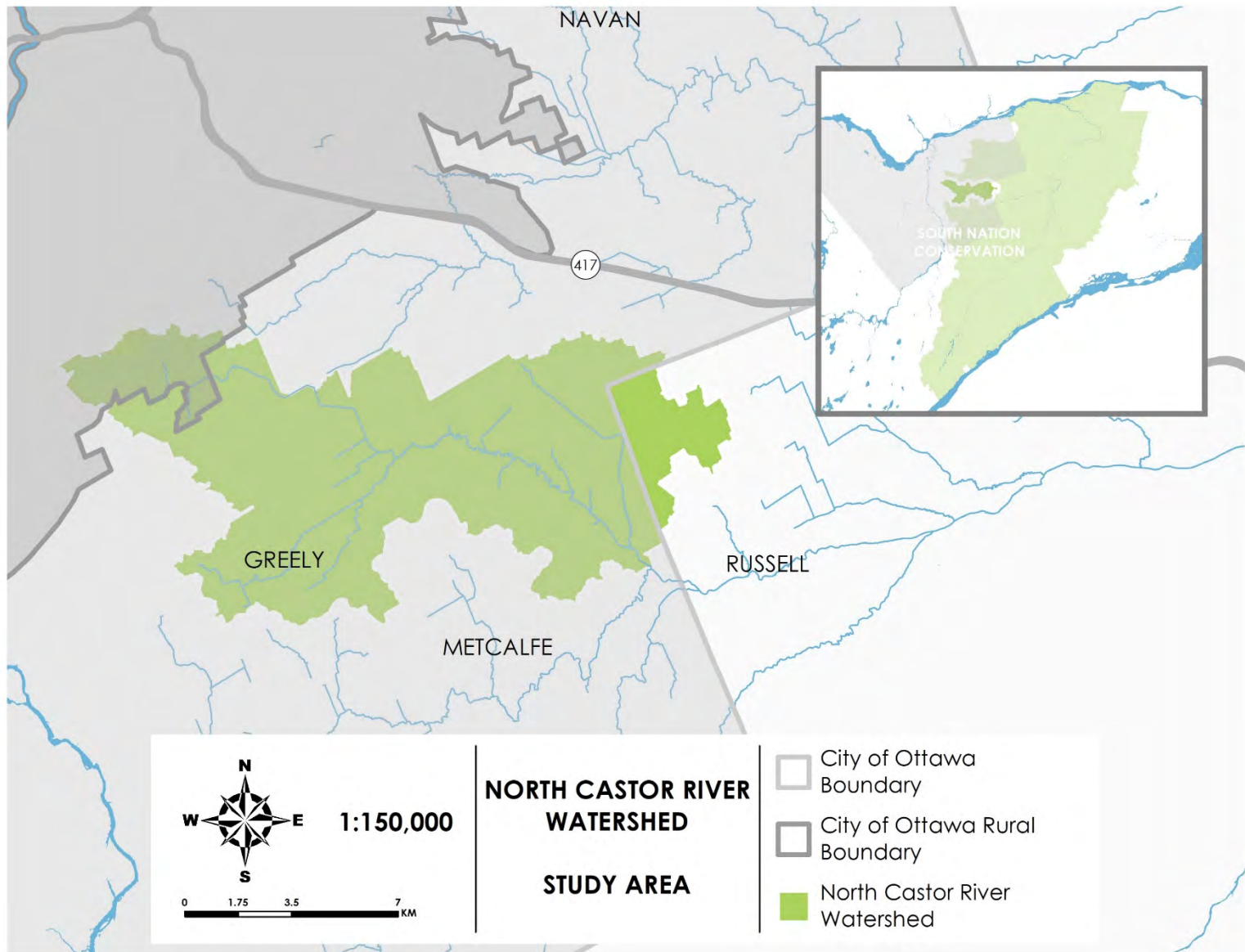


Electrofishing McKinnon's Creek

- Phase 1 of the Watershed Planning process
- Integrated monitoring and analysis of subwatersheds under development pressure
- Includes suite of recommendations for ecosystem and land management

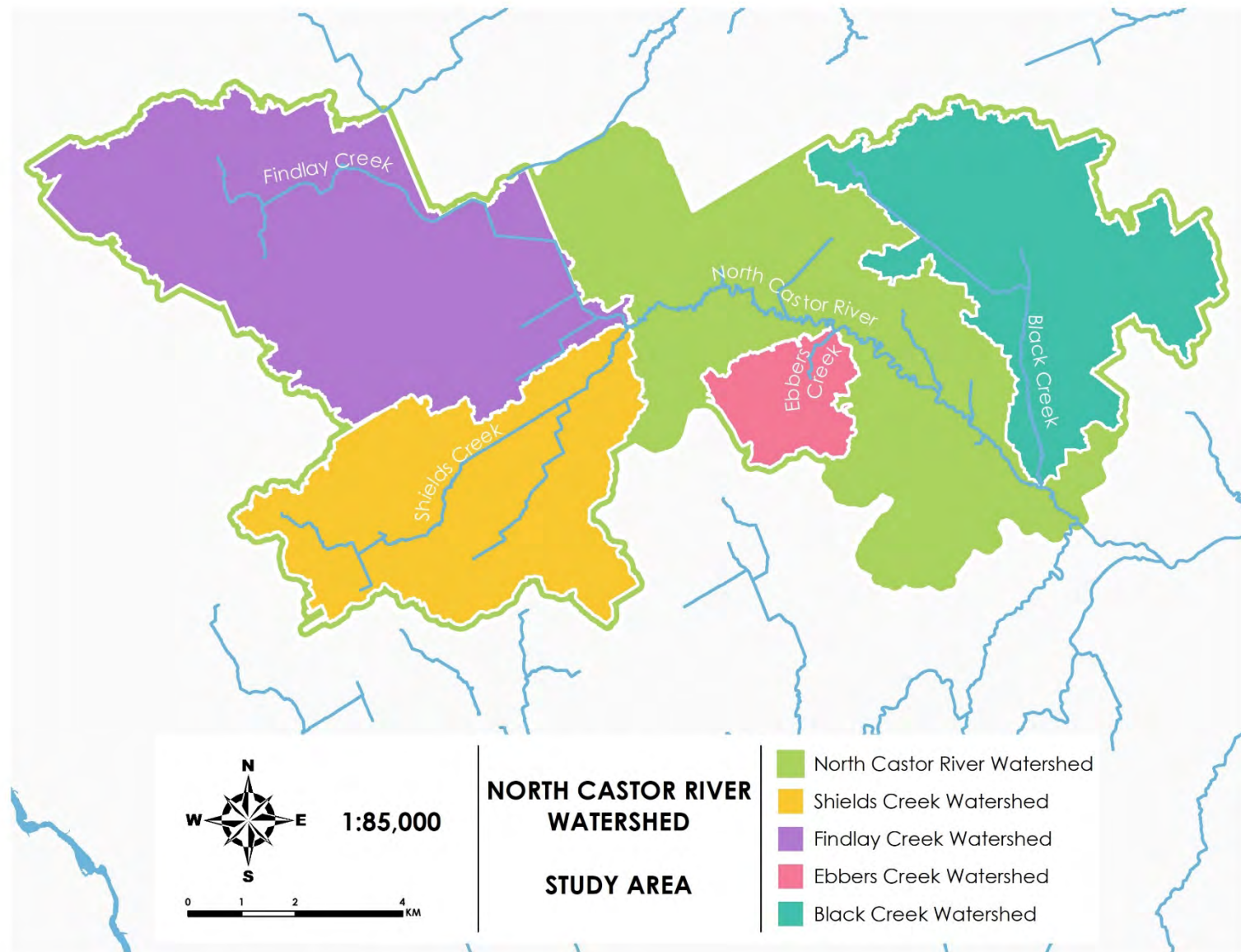


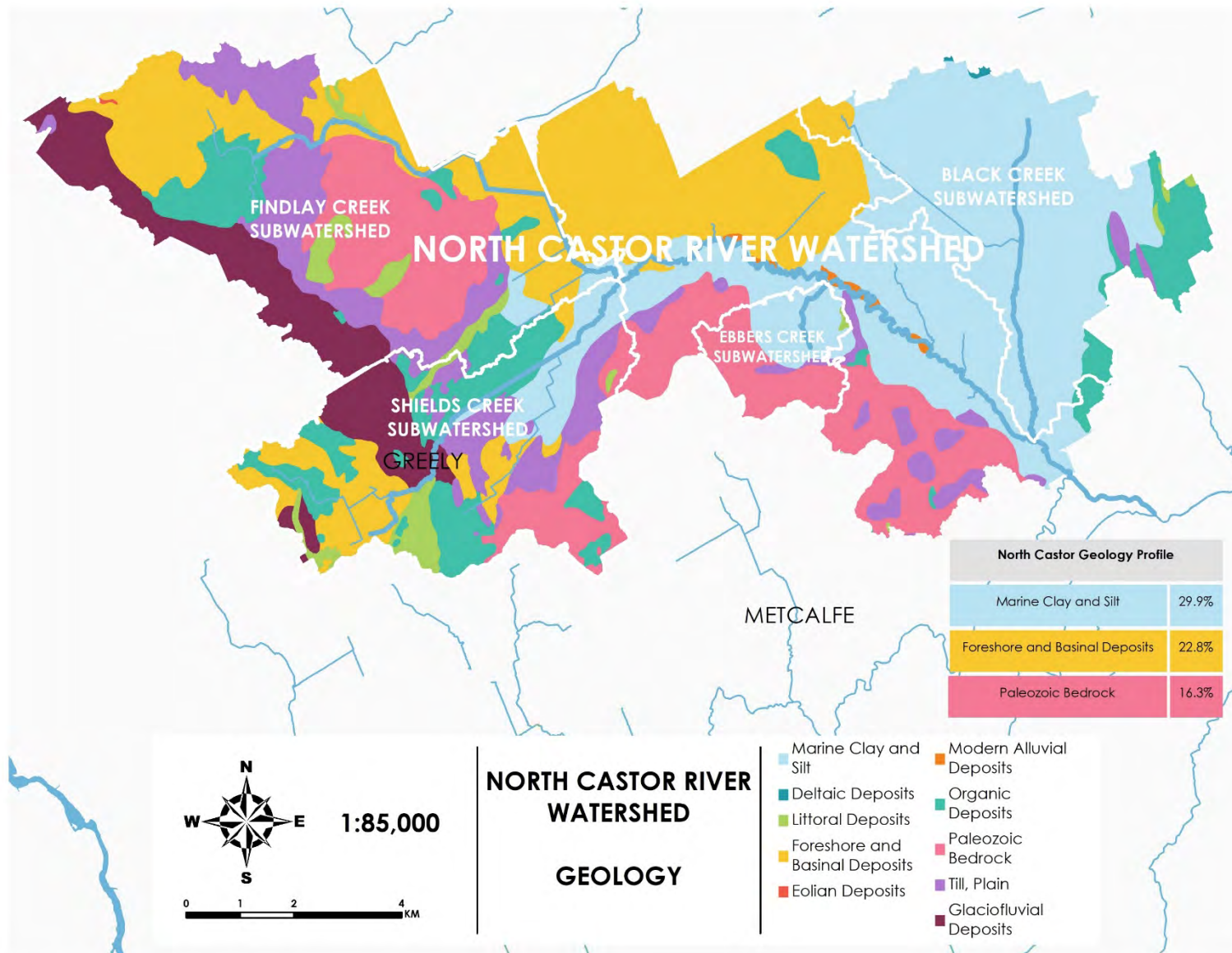
North Castor River Catchment Study





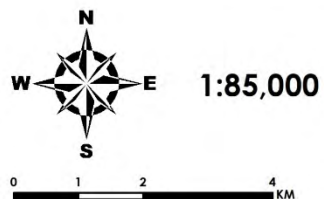
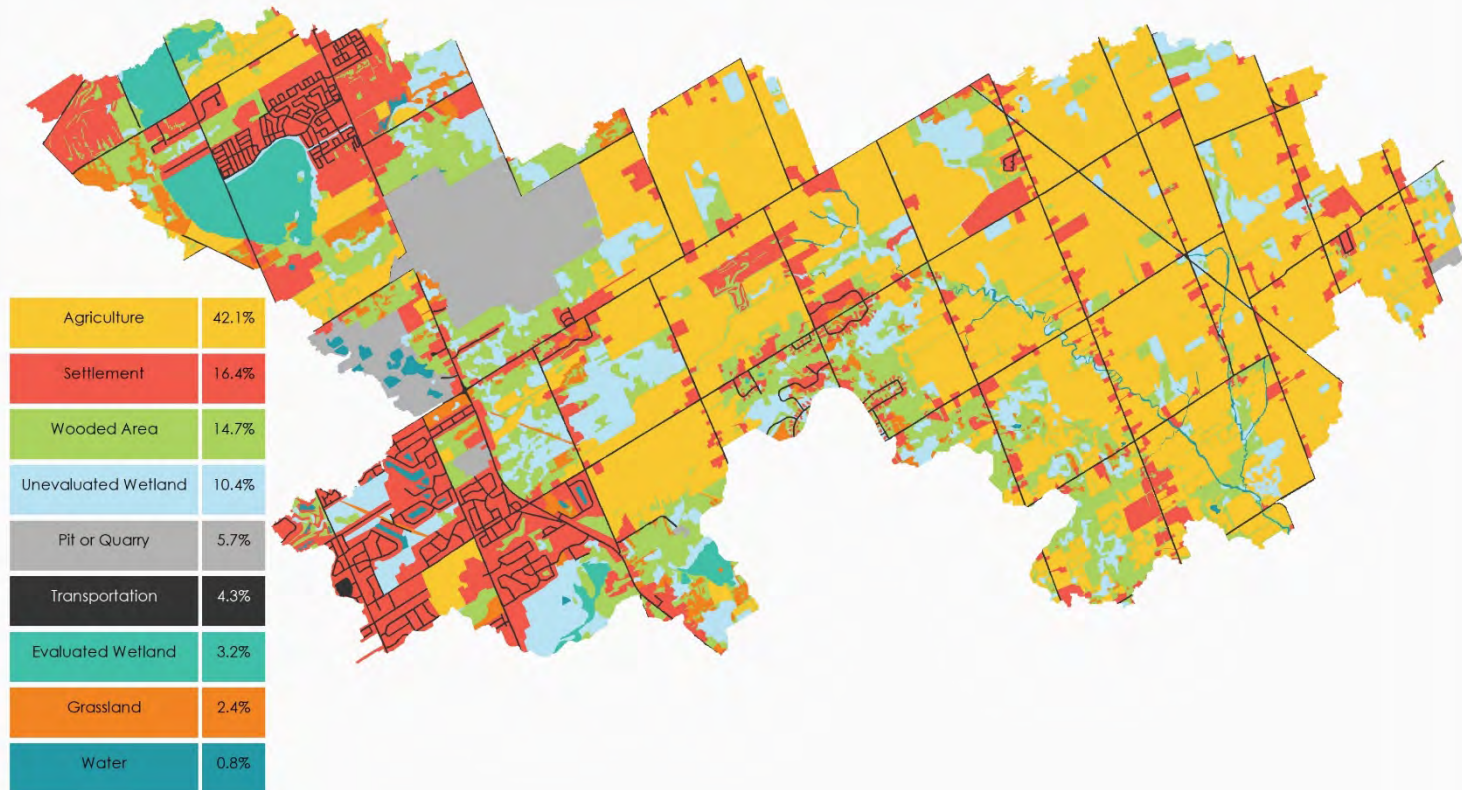
North Castor River Study Area







Land Use



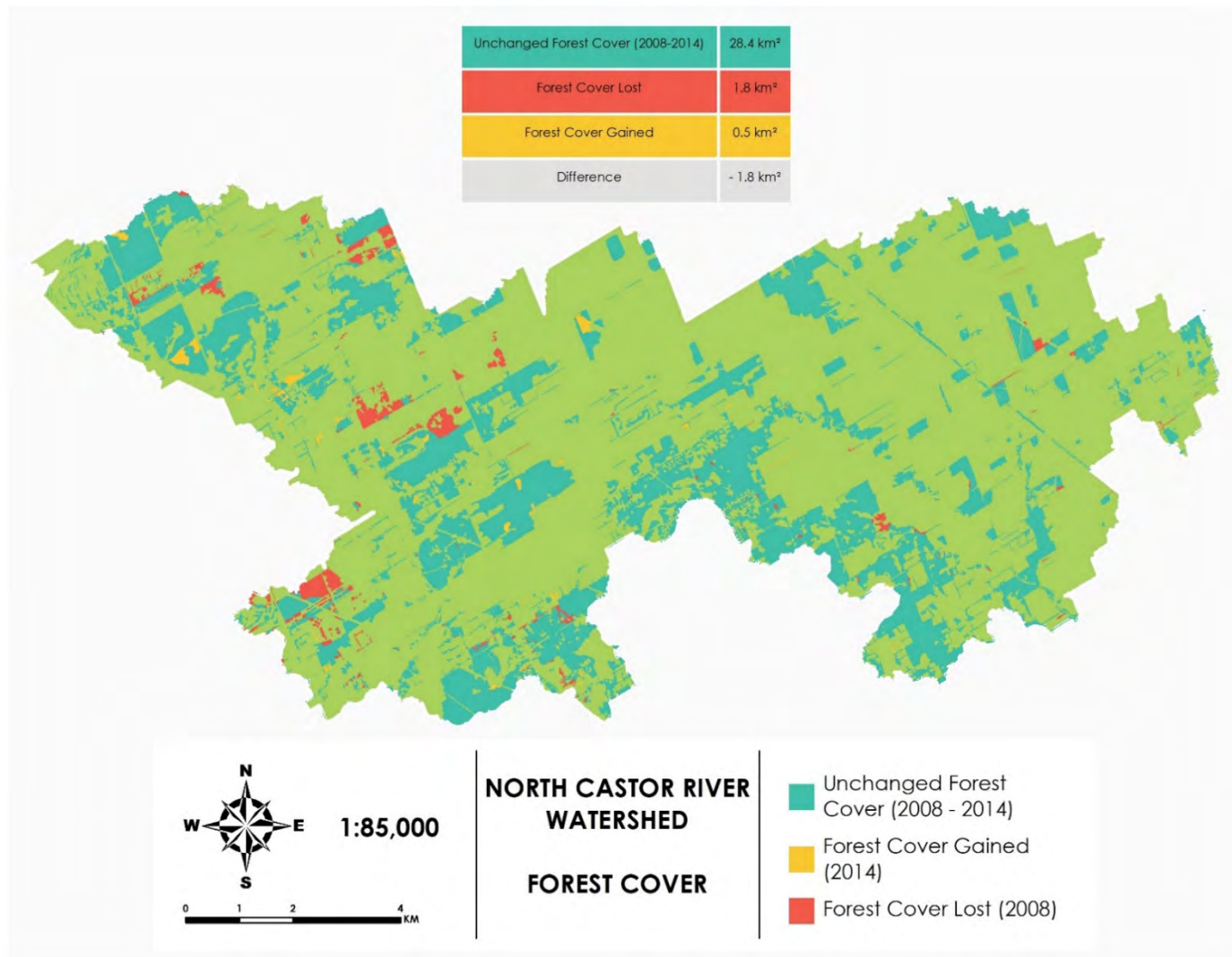
NORTH CASTOR RIVER WATERSHED LAND USE





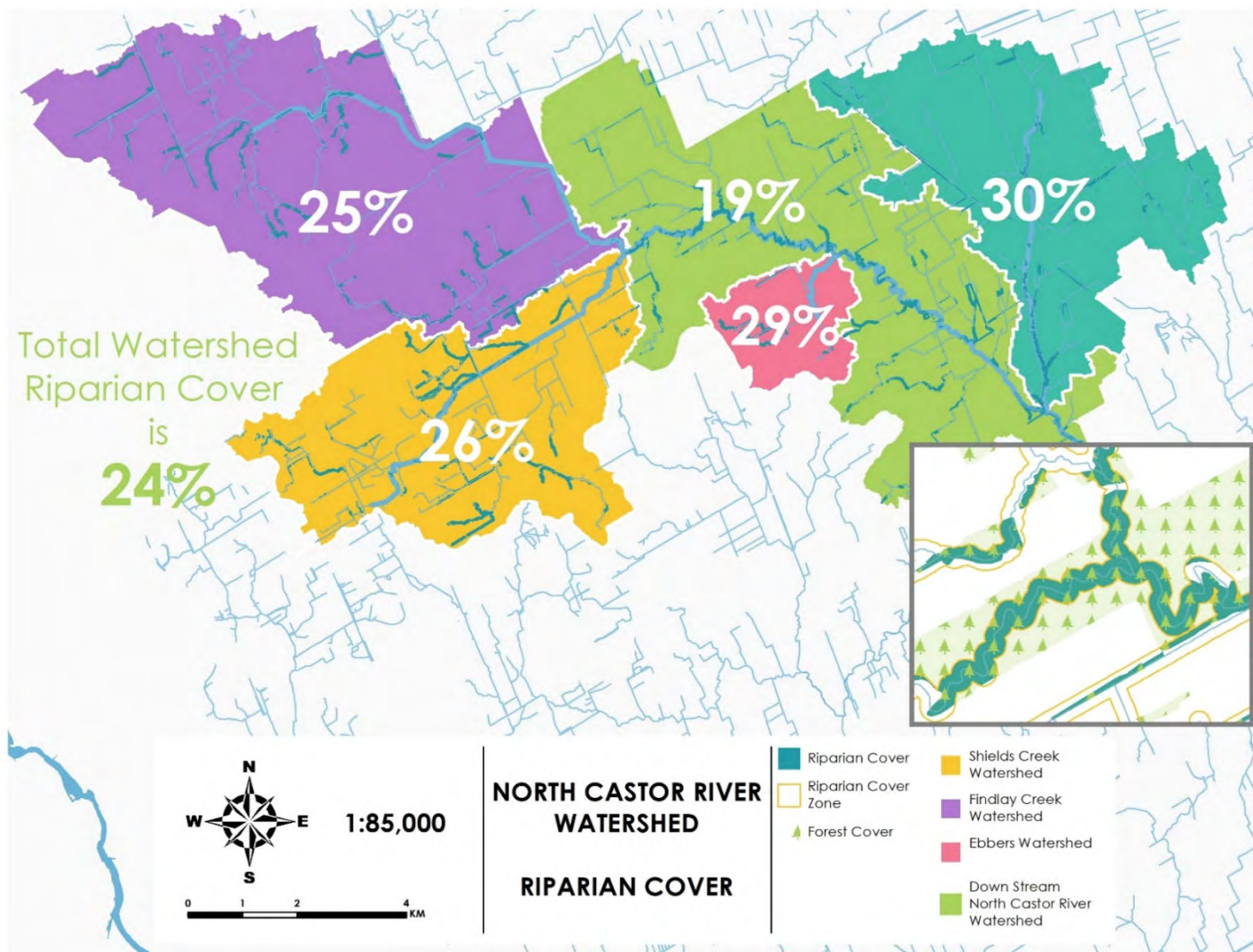


Forest Cover





Riparian Cover





Water Quantity



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Final Draft - Findlay Creek and North Castor River Flood Hazard Mapping Report

With support from:



March 31, 2020



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Findlay Creek and North Castor River Additional Mapping Products

With support from:



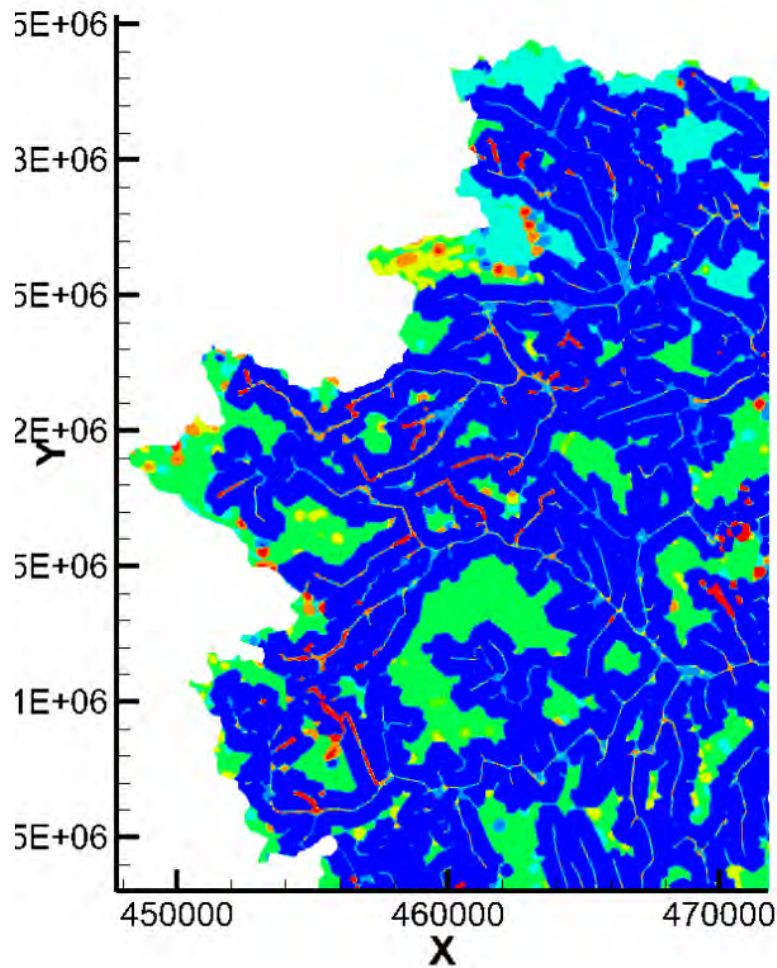
March 30, 2020



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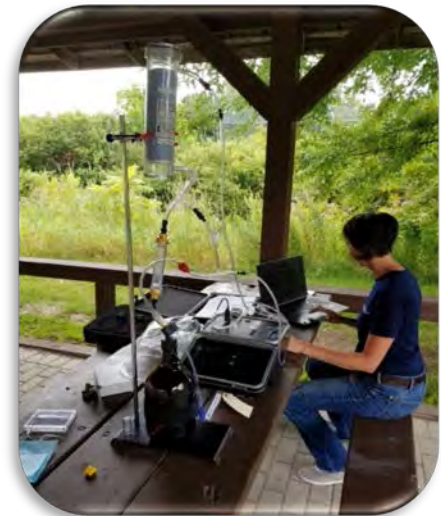
Baseflow Identification



Watershed model output identifies potential for groundwater inflows



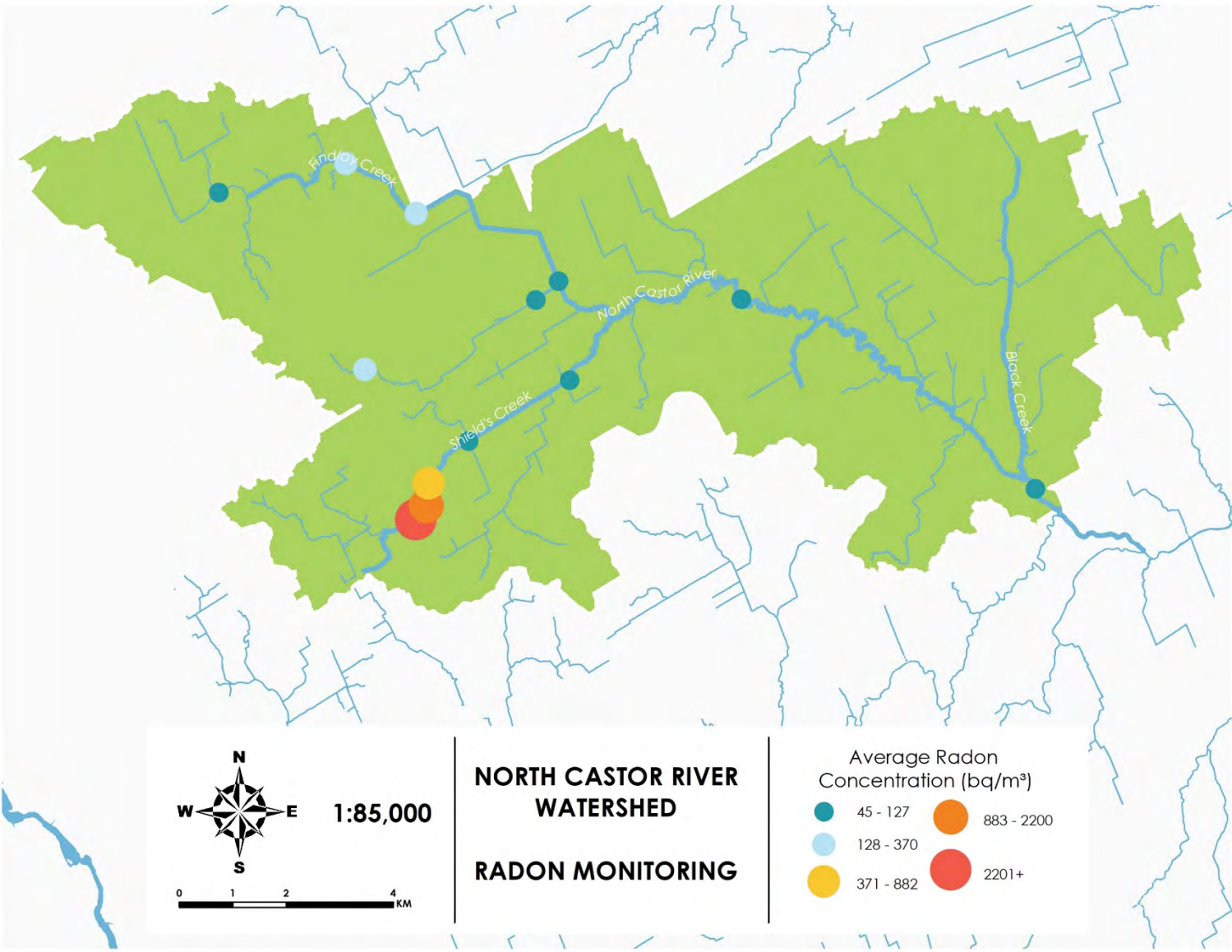
Baseflow monitoring on the North Castor River



Radon sampling on the North Castor River



Potential Groundwater Seepage





- HDF data characterizes the amount of water, sediment transport, and storage within the drainage feature



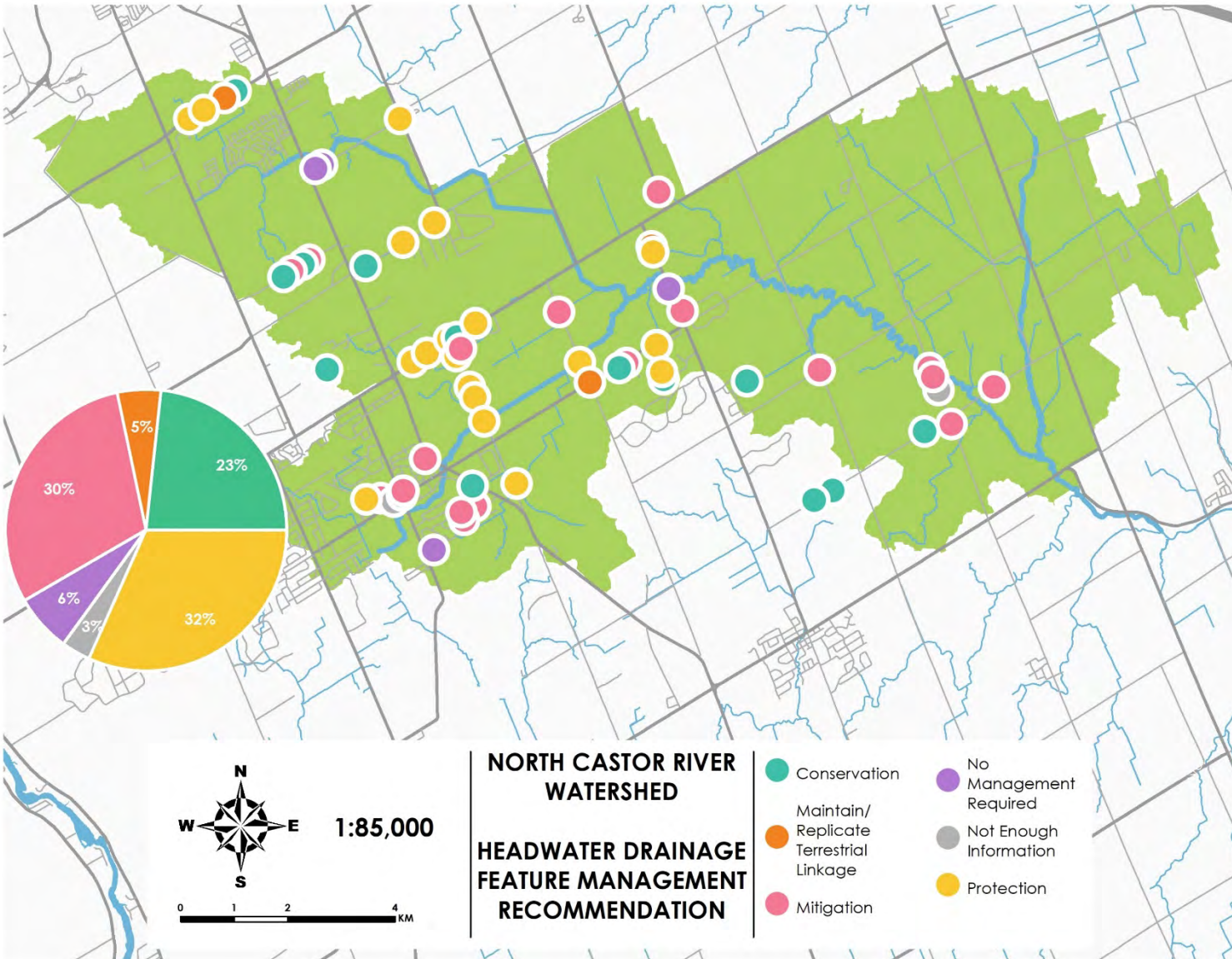
Spring HDF



Summer HDF



HDF Management Recommendation





Water Quality Monitoring – Water Chemistry

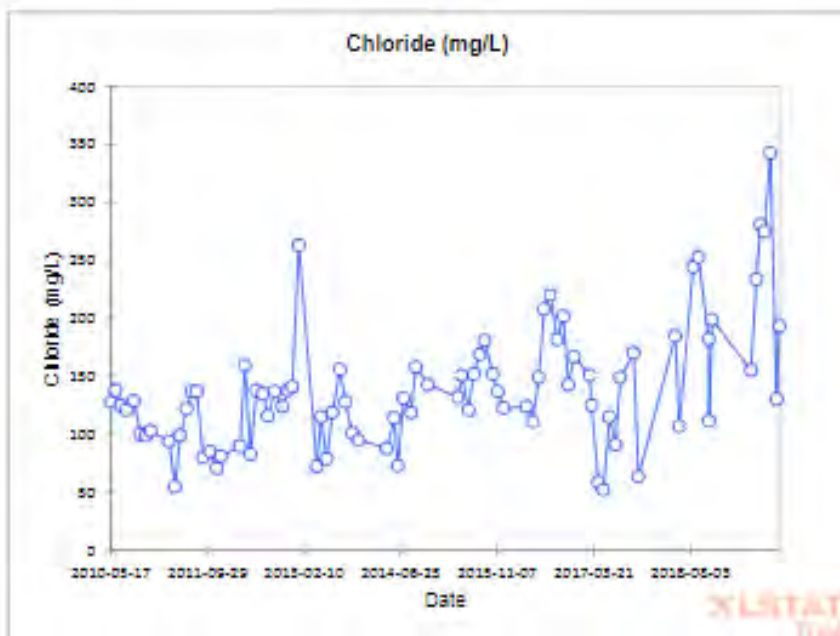


City of Ottawa Baseline Program sampling

- City of Ottawa Baseline Water Quality Program
 - Findlay Creek
 - Shield's Creek
 - North Castor River
- Accredited lab analysis:
 - Nutrients
 - E.coli
 - Metals
 - Chlorides



Water Quality Monitoring – Water Chemistry



- Define baseline conditions (75th percentile)
- Compare against known Water Quality Guidelines
- Percentage of exceedances
- Seasonal Mann-Kendall Trend test

Seasonal Mann Kendall Trend Test for Chloride at Kelly Farm Drive



Water Quality Monitoring – Water Chemistry



Findlay Creek at Blais Road

- WQ Results Findings
 - Exceedances common for chlorides, sulphates, E. coli
 - Baseline phosphorus levels near PWQO
 - Increasing trends for chloride, sulphates in Findlay Creek and North Castor River
 - Decreasing trends for total suspended solids, iron



Water Quality Monitoring – Specialized Equipment



YSI Sonde Deployment

- Multi-sensor, captures water quality data under all stream conditions
- Expensive equipment requiring targeted site selections



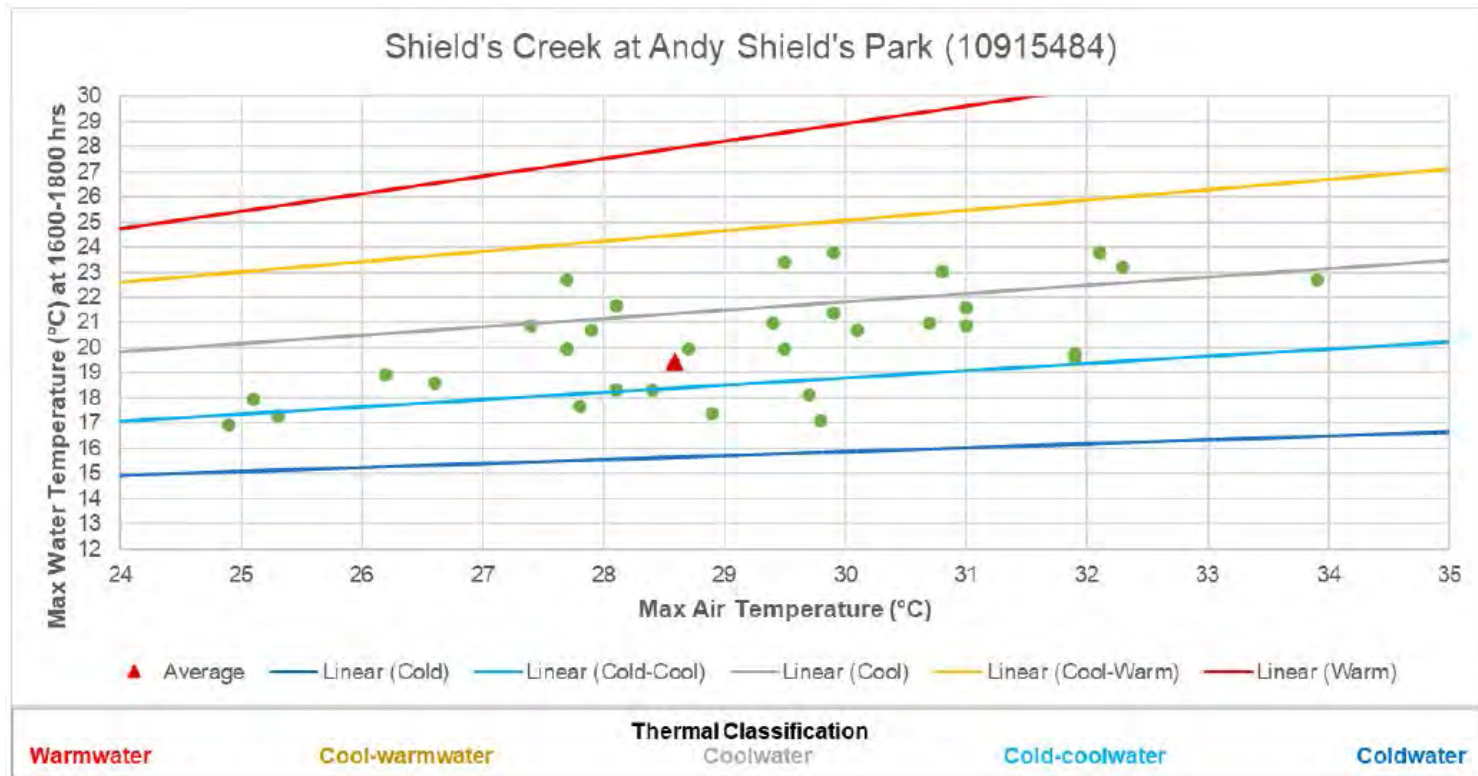
Dissolved Oxygen Levels

	Warmwater Fisheries		Coldwater Fisheries	
	% of time < 5.5 mg/L DO (other life stages)	% of time < 6.0 mg/L DO (early life stages)	% of time < 6.5 mg/L DO (other life stages)	% of time < 9.5 mg/L DO (early life stages)
2018				
North Castor River at Victoria Street	13%	19%	25%	57%
2019				
North Castor River at 8 th Line Road	0.30%	2%	5%	63%
North Castor River at Victoria Street	13%	19%	24%	67%

Percentage of dissolved oxygen levels that do not meet water quality guidelines for 2018 and 2019 (Canadian Council of Ministers of the Environment 2011)



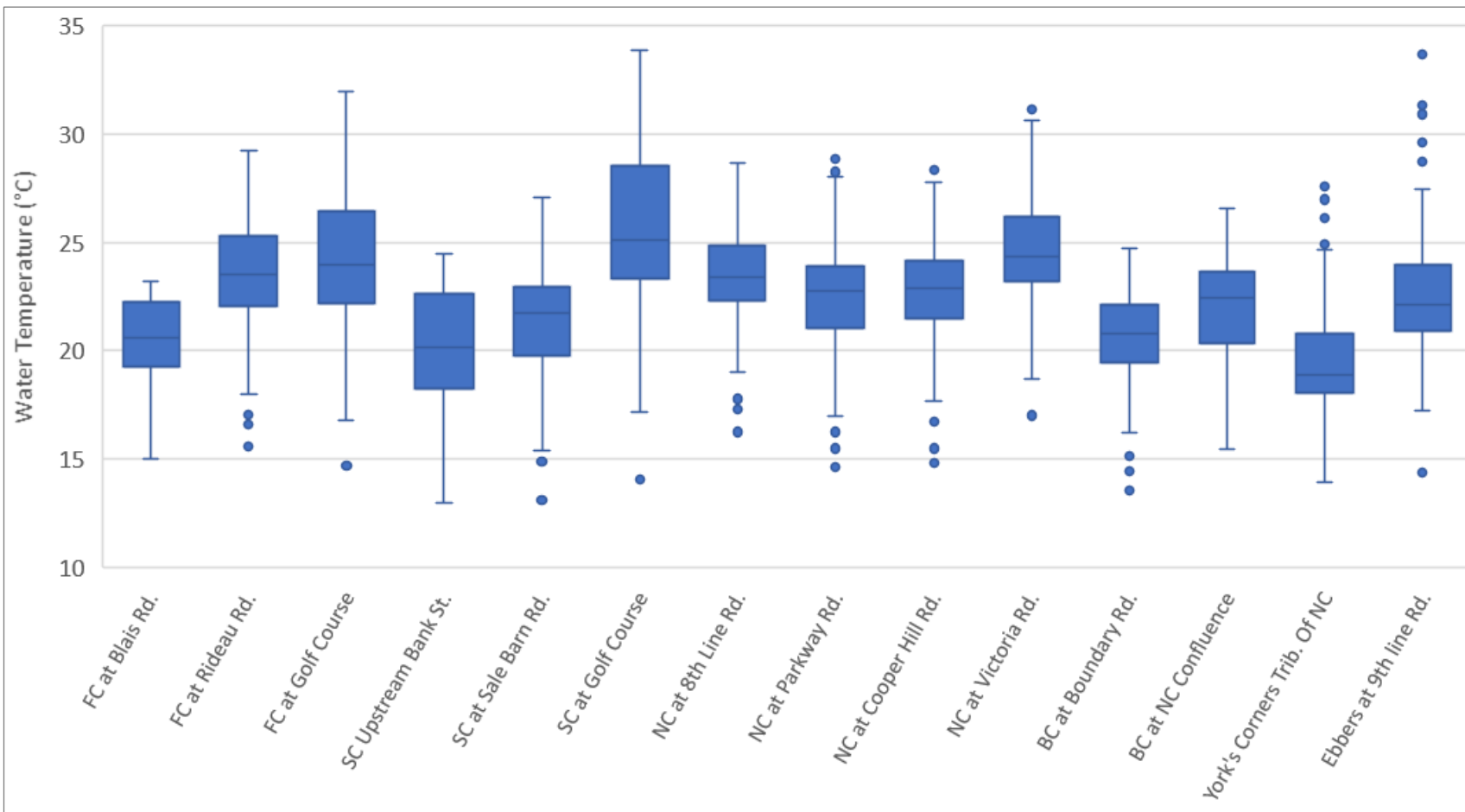
Water Quality Monitoring – Water Temperature



- Developed in Ontario by Ontario scientists with Ontario data
- Average of data, distribution of points, and slope of line of best fit all tell you something
- Predictor of species composition, groundwater upwelling, stream shading, thermal pollution, impoundments, water chemistry influence



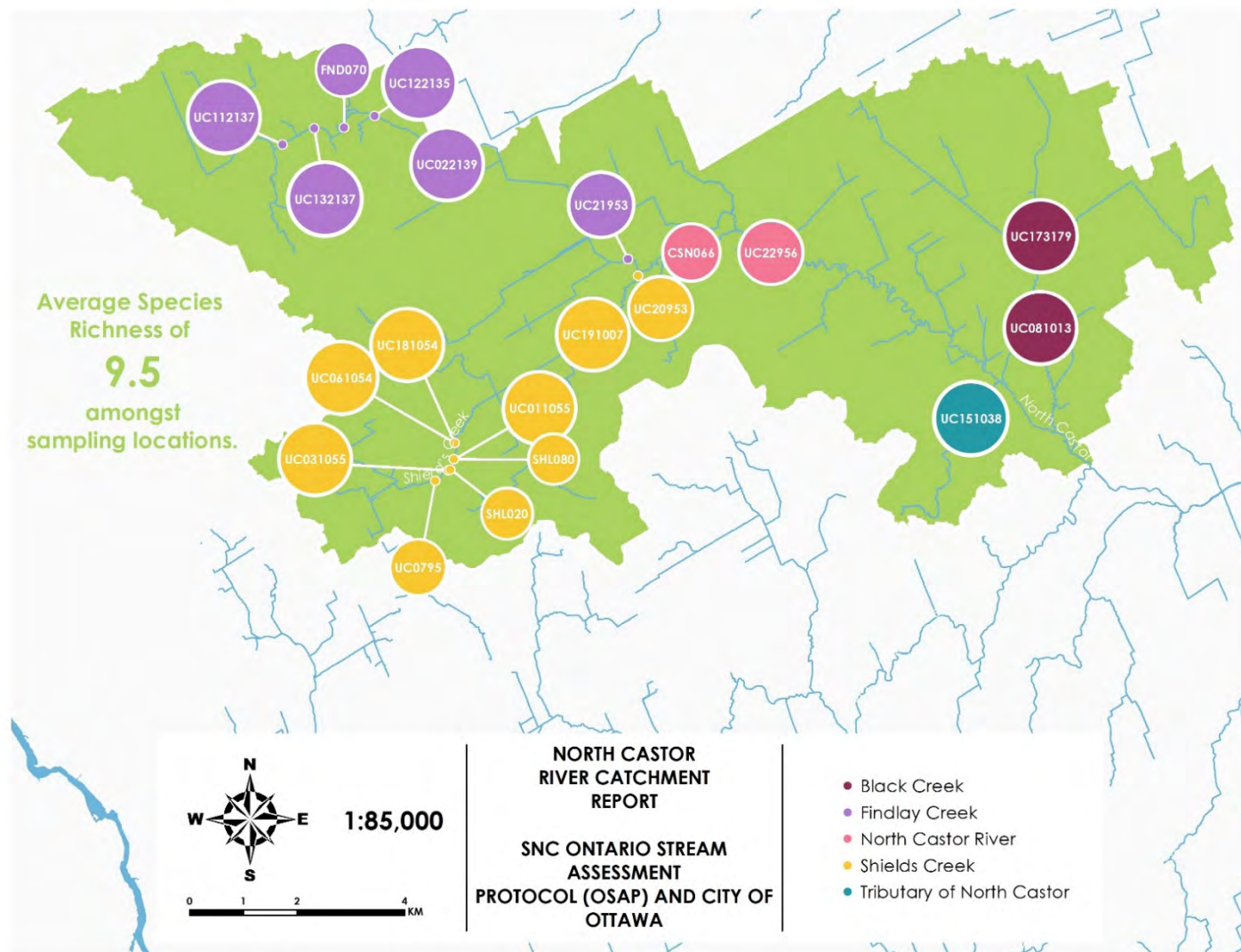
Water Quality Monitoring – Water Temperature



Average maximum daily water temperature at each site monitored along the North Castor River and its tributaries for June-September 2018



Fisheries Communities





Benthic Invertebrates



Emerging dragonfly at a sampling location

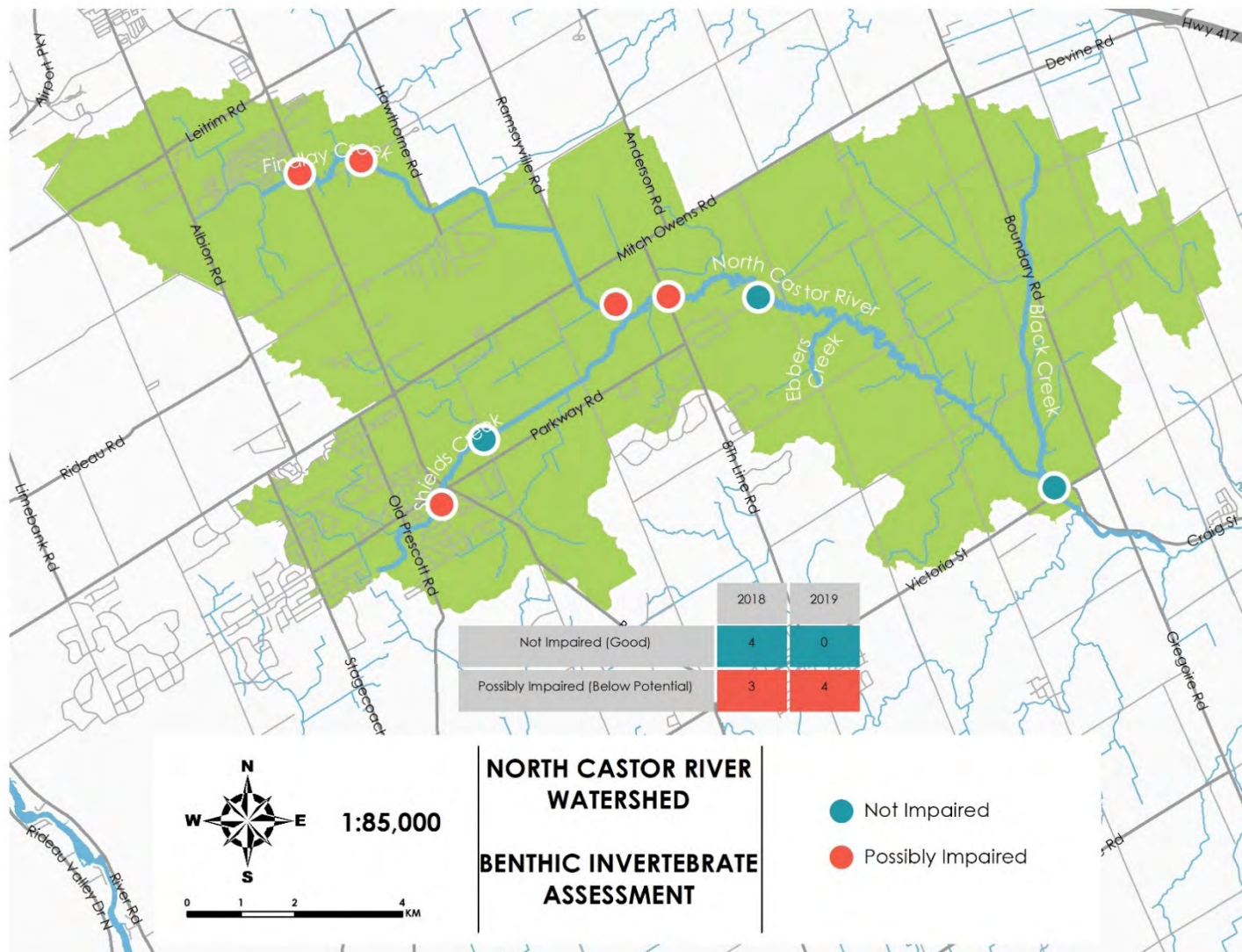
- Provincial Methodology:
Ontario Benthos
Biomonitoring Network
- Reference Condition
Approach to test stream
condition



Benthic macroinvertebrate - Caddisfly



Benthic Invertebrates





Stewardship and Land Management Opportunities

Prioritization of Projects

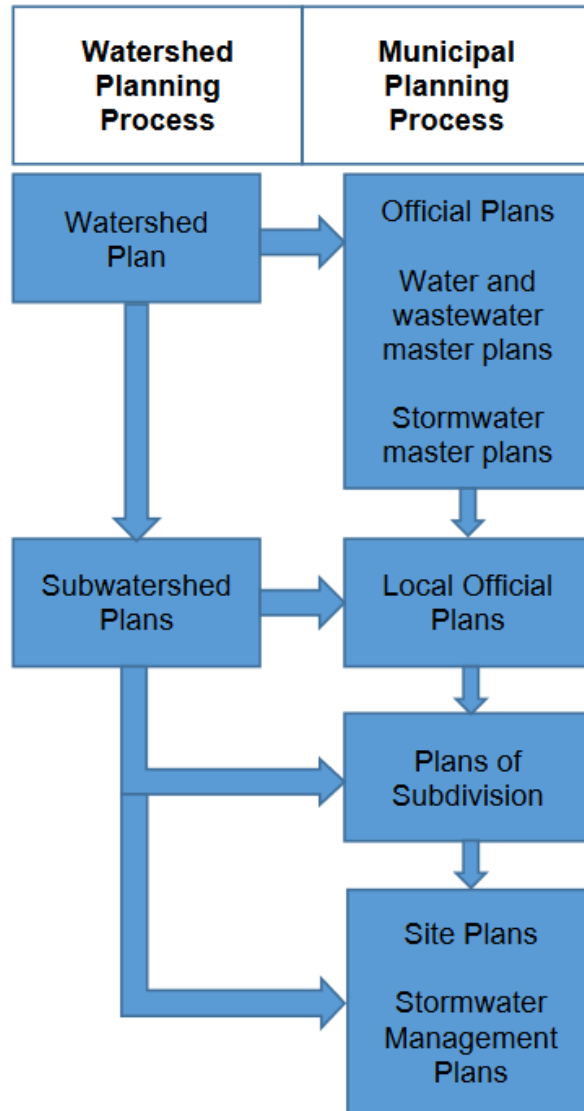
1. Protect Habitat

2. Remove Migration Barriers

3. Restore Watershed Processes (sediment control, erosion, riparian zones)

4. Provide Instream Habitat Enhancements

- Past projects, objectives, and opportunities assessed
- New opportunities identified to match current land use and future land use predictions



- Address data and monitoring gaps
 - Road salts
 - Water budgets
 - Climate change
 - Wetland evaluation and delineation
- Guide the City of Ottawa through the creation of a Subwatershed Plan for the North Castor River



Monitoring to Action – Ecological Restoration



Before – Culvert Crossing, North Castor River

- Opportunities identified in the field
- Prioritized
- Funding secured through grants and partners

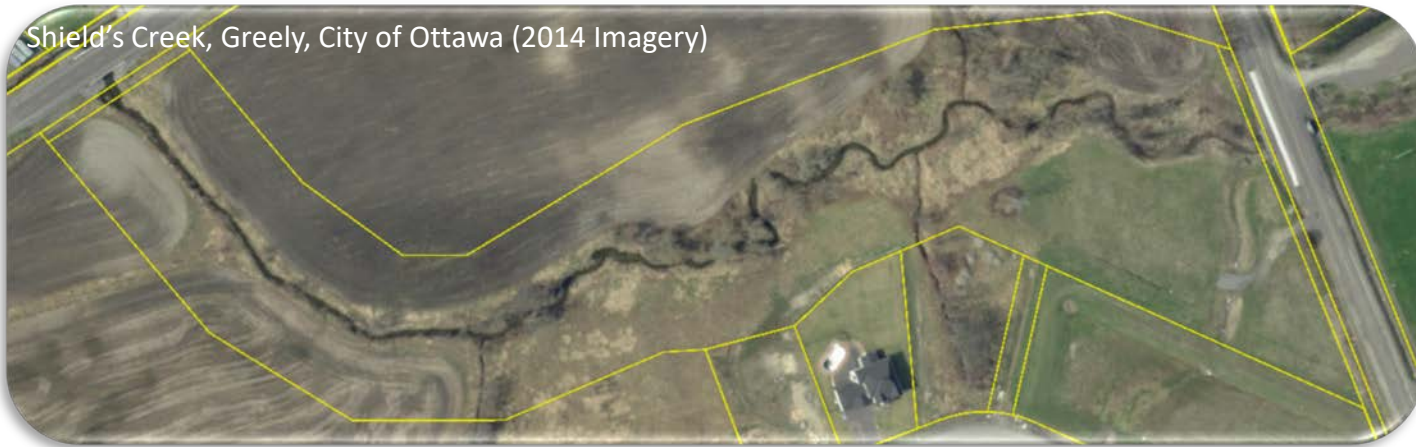
After – Culvert Crossing, North Castor River



- Integrated development and review of projects
- Continued monitoring



Monitoring to Action – Ecological Restoration



- Natural space reclaimed, 850 trees and shrubs planted, 110 large caliper trees, erosion control, increase biodiversity, pollinator meadow habitat, outreach with students, presentations to community

Our Local Environment, We're in it Together.



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