

# *Stormwater Management Criteria Recharge*

**Black Creek Pioneer Village  
April 26, 2012**

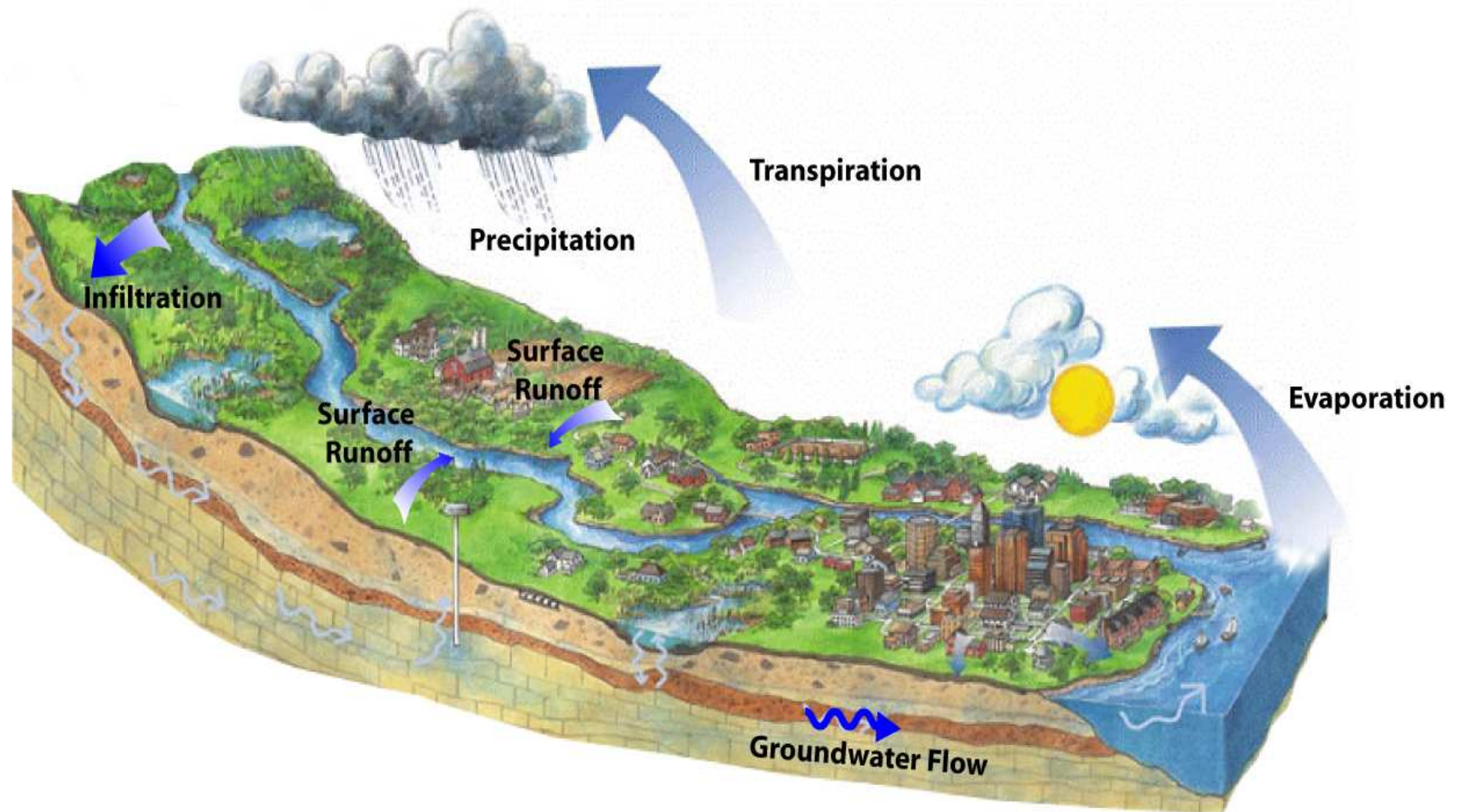


Credit Valley  
Conservation

# Overview

- Hydrologic Cycle
- Groundwater Recharge
- Effects of Urbanization on Recharge
- Recharge Assessment Approaches
- Mitigation Strategies
- Challenges and Opportunities

# The Hydrologic Cycle



# Groundwater Recharge

- Replenishment of the groundwater system
- Primary source of baseflow for many watercourses;
- Supports sensitive ecosystems
- Source for drinking water supplies across Ontario

## Effects of Urbanization on Recharge

- Urbanization increases impervious surface areas, which can reduce recharge
- Urbanization can lead to changes in the spatial distribution of recharge
- Decreased recharge can lead to:
  - Lower aquifer water levels
  - Reduced baseflow
  - Changes in watercourse thermal regime
- Urbanization can lead to changes in recharge water quality

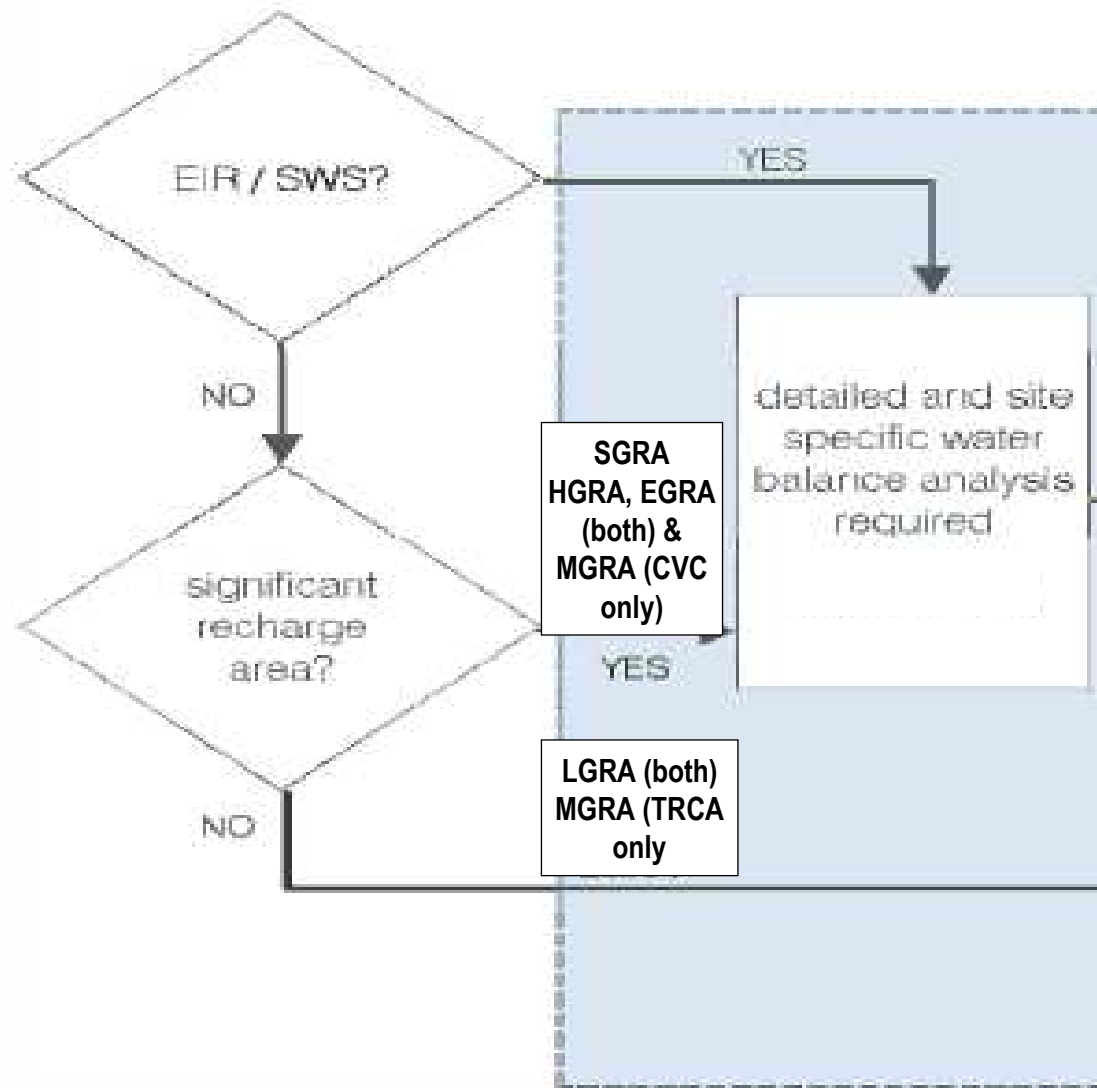
# Recharge Assessment: Regional Scale

- Done by Conservation Authorities
- Use surface water and groundwater flow models to simulate the natural water cycle.
- Models developed for watershed studies and water budgets under the *Clean Water Act, 2006*
- Updated by Conservation Authorities, as required
- Identifies sensitive recharge features:
  - SGRA (Significant Groundwater Recharge Areas)
  - HGRA (High volume Groundwater Recharge Areas)
  - EGRA (Ecologically significant Groundwater Recharge Areas)
  - MGRA/LGRA (Medium and Low volume Groundwater Recharge Areas)

# Recharge Assessment: Site Scale

- Done by proponents
- Obtain recharge estimates from regional model
- Identify areas sensitive to recharge
- Scoped site-scale assessment
  - May be affected by design considerations
  - Test pits or boreholes,
  - Infiltration testing (Guelph and borehole permeameters, infiltrometer, percolation tests),

# Site Scale Assessment Process

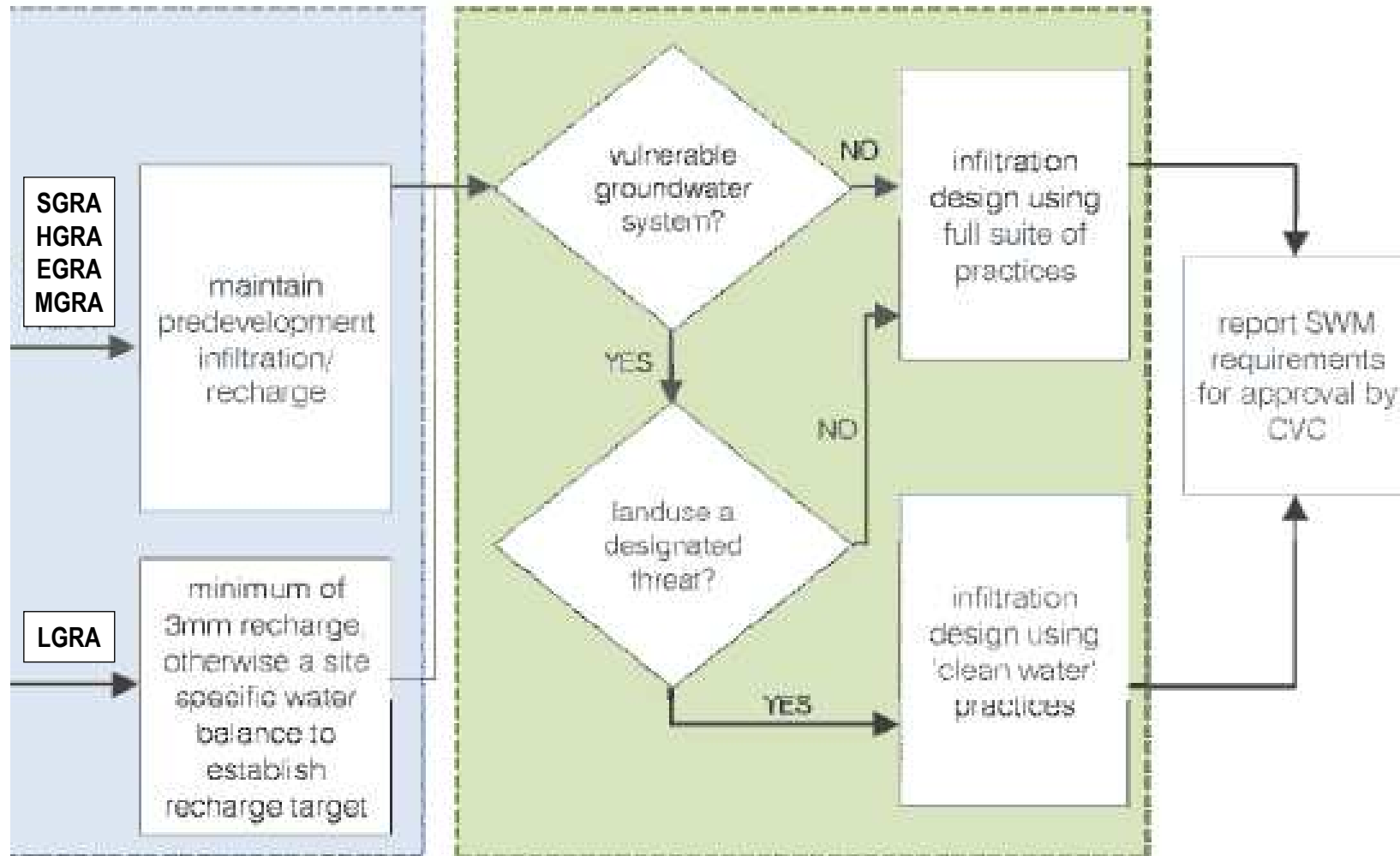




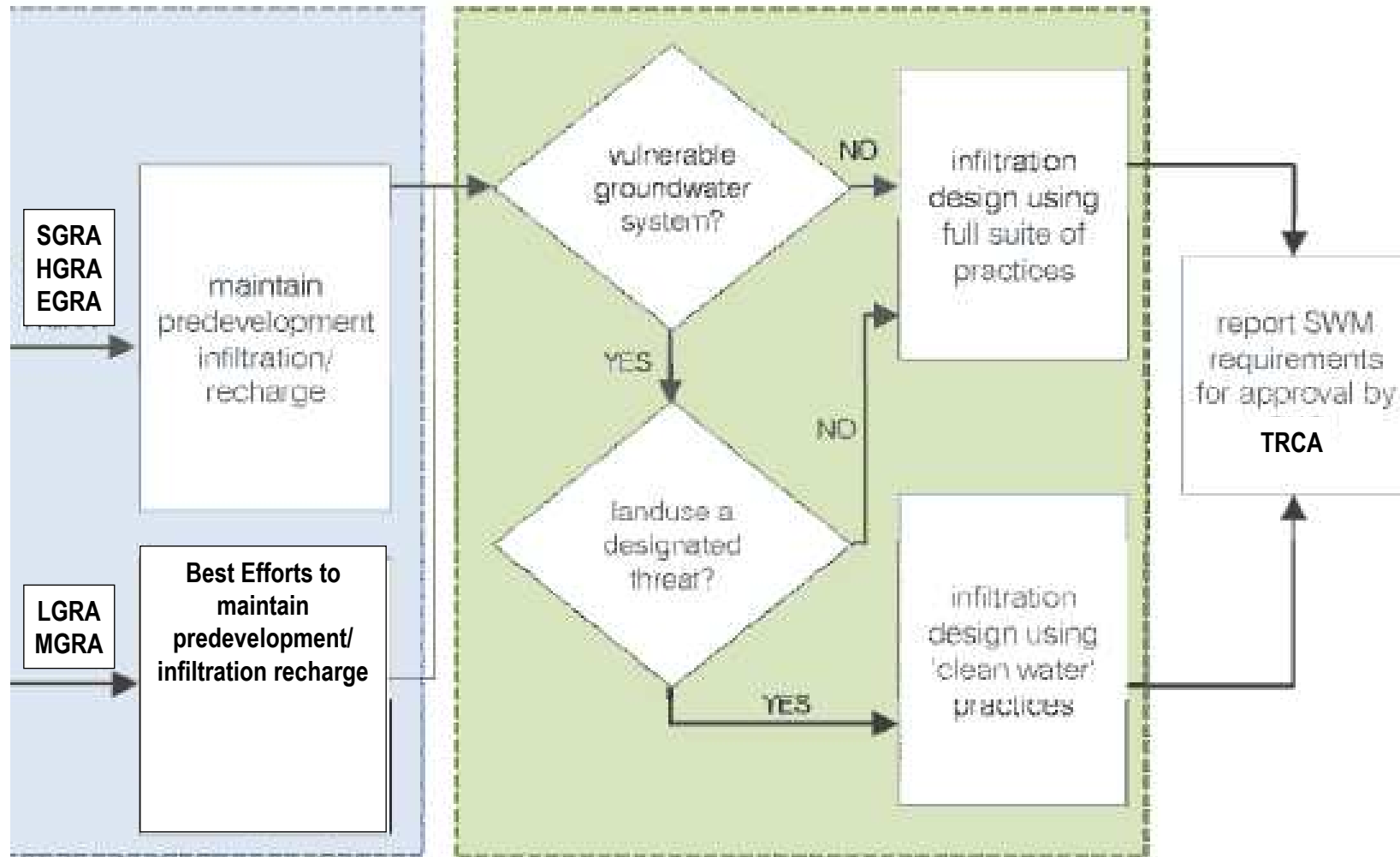
# Mitigation Strategies

- Tailored based on
  - Vulnerability of the landscape
  - Protection of drinking water systems, natural features and aquatic habitats
- Protection of areas most sensitive to recharge changes

# Mitigation Strategies - CVC



# Mitigation Strategies-TRCA



## Enhanced Recharge Challenges

- Slopes >20% and contributing catchment area slopes >15%;
- Seasonally-high water table elevations within 0.6 metres of the recharge facility invert
- Bedrock within 1 m of the recharge facility invert
- Soils with infiltration rates less than 15mm/hour (underdrains required)
- Landfill site(s) within 250 metres;
- Wetlands and associated hydric soils;
- Drinking water wells within 30 metres
- Karstic geologic settings

# Enhanced Recharge Opportunities

- Sandy surficial soils:
  - Lake Iroquois Sand Plain
  - Oak Ridges Moraine
  - Paris Moraine
- Low water table - greater than 1 m below recharge facility invert
- Flat or hummocky topography with slopes less than 15%
- More than 250 m from landfills, water wells, or cold water streams

# Questions?

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