



# ECOLOGICAL OFFSETTING IN THE CATARAQUI REGION

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Presentation of Research Study and Draft Recommendations

# The Project Team



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Thank you to Mike Dakin, Janelle Treash, and Hailey Esdon for their time and contributions to this project

Thank you to our faculty advisors Drs. John Meligrana and Graham Whitelaw for their time and guidance

# Agenda

20 minutes

1

**Project Introduction**

2

**Research Methods and Key Findings**

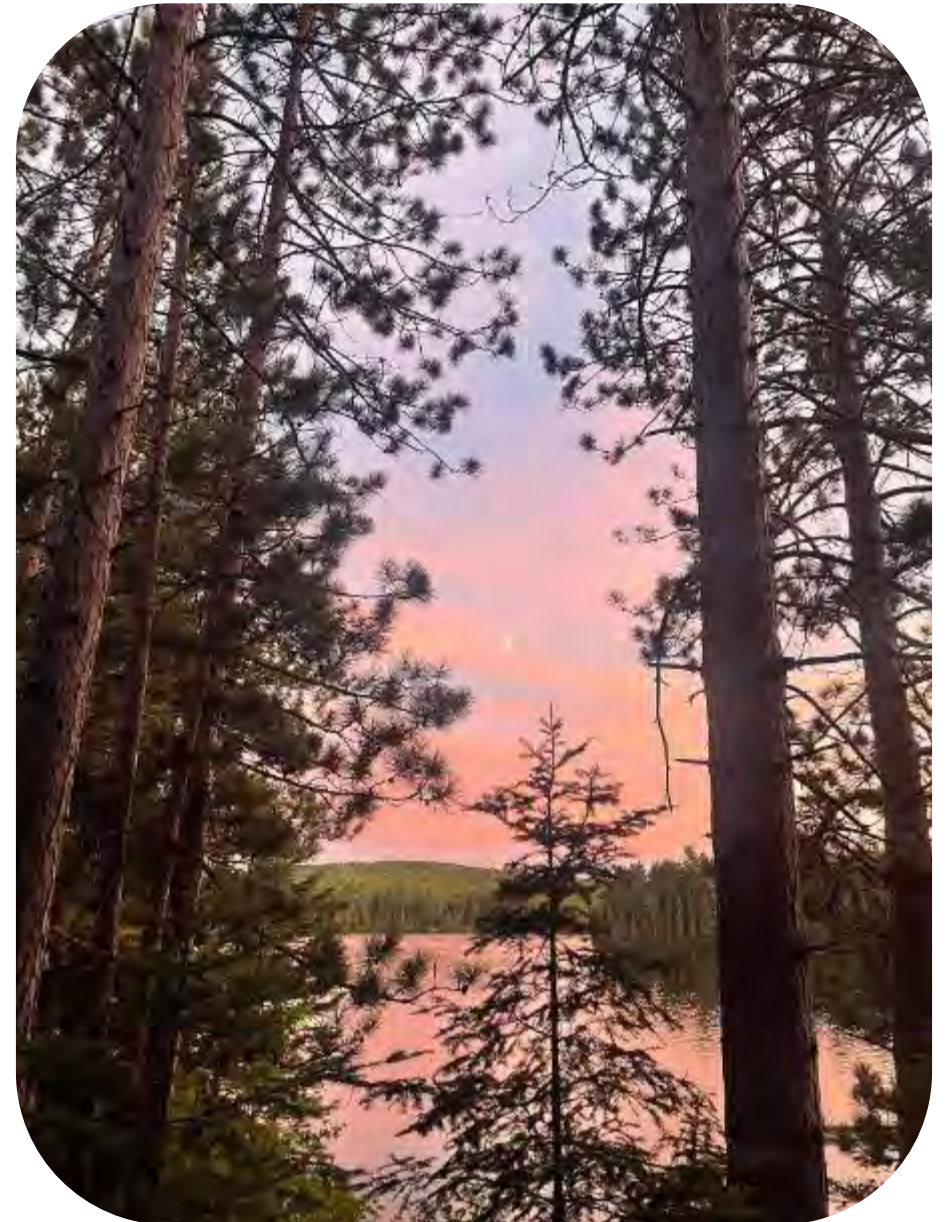
3

**Recommendations**

4

**Conclusion**

The project team is available to answer questions following the presentation





# PROJECT INTRODUCTION

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Purpose

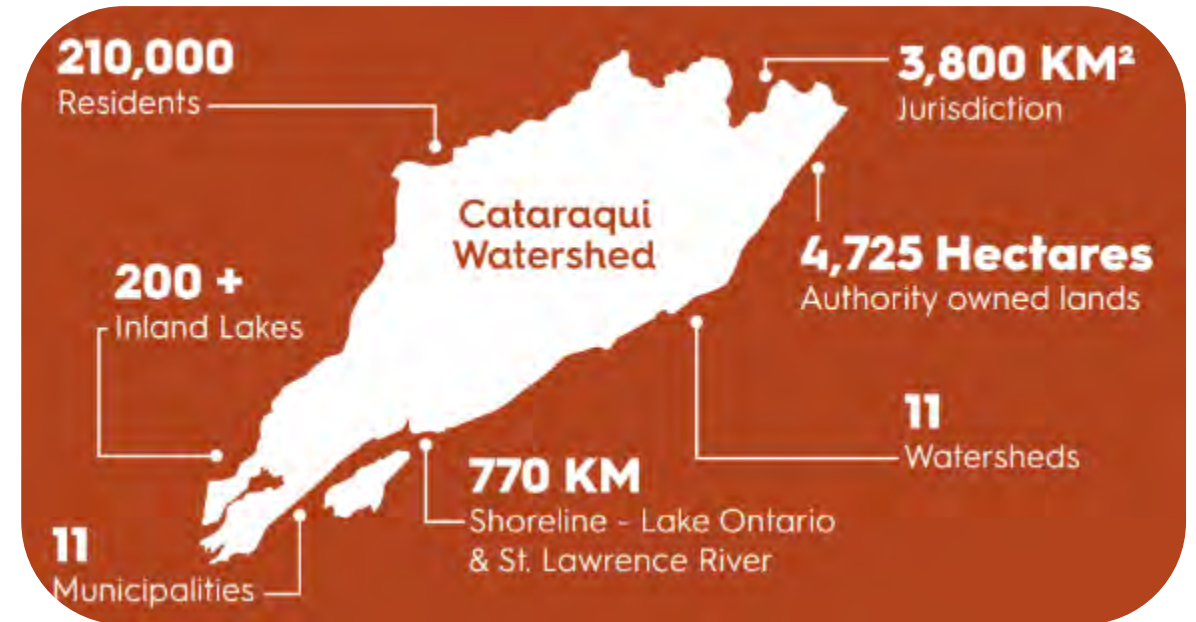
Research Question  
& Objectives

# Purpose

To outline considerations for the potential development of an ecological offsetting policy framework for the Cataraqui Region.

The CRCA is considering the development of an ecological offsetting policy due to:

- Development pressures on constrained sites
- Development of ecological offsetting policies by other conservation authorities and municipalities
- Increasing use of Ministerial Zoning Orders (MZOs)



(CRCA, 2020)

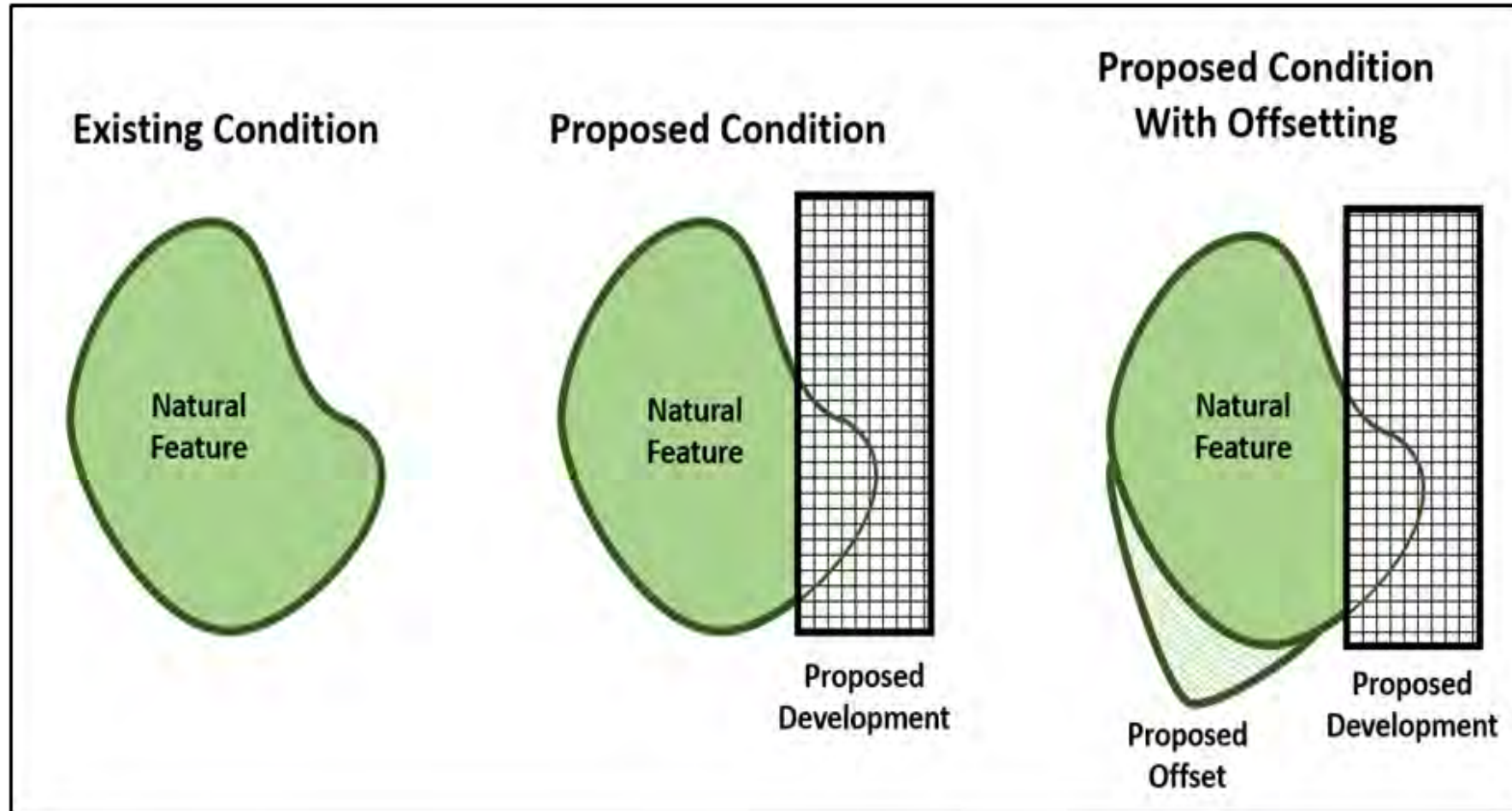
# Research Question & Objectives

How can ecological offsetting be best applied within the Cataraqui Region?

## Objectives

1. Provide review of current laws, regulations, and policies which may impact the implementation of an ecological offsetting program in the Cataraqui Region
2. Identify and synthesize current best practices, challenges, and opportunities in ecological offsetting policy
3. Identify the circumstances where it may be appropriate to consider ecological offsetting as a land use planning tool in the Cataraqui Region
4. Recommend appropriate offsetting methods and best practices in the development of an ecological offsetting policy framework

# What is Ecological Offsetting?





# RESEARCH METHODS AND KEY FINDINGS

Site  
Observations

Legislative  
Review

Literature  
Review

Comparative  
Case Study  
Analysis



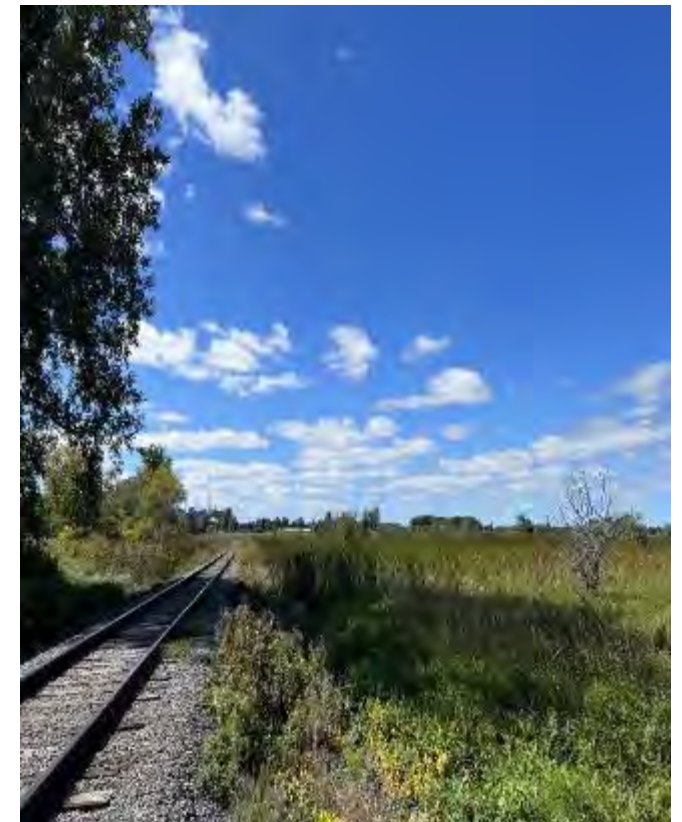
# Site Observations



**John Counter Blvd.  
Expansion**



**Ducks Unlimited - Hwy 401 (Hwy 38)**



**Trailhead Place**

# Legislative Review

|  |   |  |
|--|---|--|
| Approval Authority                                   | Municipal   | Conservation Authority   |
| Potential Application of Offsetting                  | Any natural heritage features not protected by other applicable policies                    | Any regulated feature specified in the <i>Conservation Authorities Act</i>                       |
| Current Offsetting Policy                            | No existing offsetting policies identified in Cataraqui Region                              | None identified  |
| Potential <i>More Homes Built Faster Act</i> Effects | Prevents CA from reviewing or commenting on applications made under the <i>Planning Act</i> | CA cannot consider "pollution" or "conservation of land" as rationales for requesting offsetting |

# Literature Review

Themes identify the major challenges and considerations of offsetting policies



14 themes were identified and organized into 3 groups

Technical and  
Governance

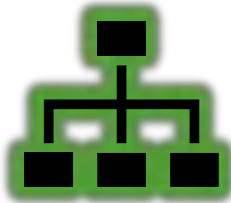
Social

Ethical

# Technical and Governance



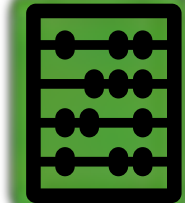
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Mitigation  
Hierarchy



Eligibility



Currency



Equivalence



Location



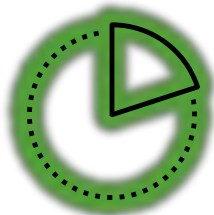
Time Lag



Longevity



Uncertainty



Offset Ratio



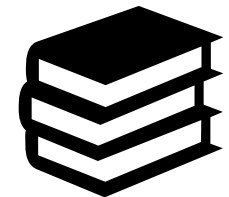
Monitoring  
Outcomes &  
Compliance



Consultation



Planning with  
Indigenous  
Peoples

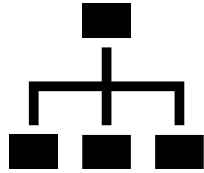


Ethics

# Social



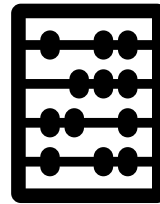
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Net Gain



Mitigation  
Hierarchy



Eligibility



Currency



Equivalence



Location



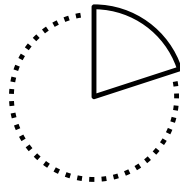
Time Lag



Longevity



Uncertainty



Offset Ratio



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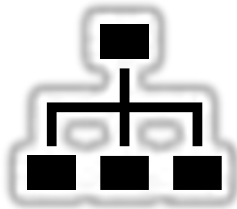


Ethics

# Ethical



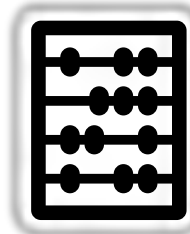
No Net Loss /  
Net Gain



Mitigation  
Hierarchy



Eligibility



Currency



Equivalence



Location



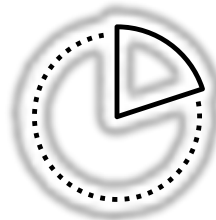
Time Lag



Longevity



Uncertainty



Offset Ratio



Monitoring  
Outcomes &  
Compliance



Consultation



Planning with  
Indigenous  
Peoples



Ethics

# Literature Review

Documented significant challenges and failures with past and existing offsetting policies

Provided reasoning to proceed with caution

Considerations and best practices to minimize risks associated with offsetting and improve outcomes

# Comparative Case Study Analysis

13 Cases

| Conservation Authorities (7) | Municipalities (6)     |
|------------------------------|------------------------|
| Credit Valley                | County of Peterborough |
| Nottawasaga Valley           | City of Peterborough   |
| Toronto and Region           | York Region            |
| Hamilton                     | City of Markham        |
| Otonabee Region              | City of London         |
| Niagara Peninsula            | City of Brampton       |
| Lake Simcoe Region           |                        |

Case examples were compared to determine the spectrum of approaches currently being implemented



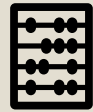
# Comparative Case Study Analysis

## Conservation Authority

## Theme

## Summary of Key Finding

**Toronto &  
Region  
Conservation  
Authority**



Currency

Ecosystem function and land area are independently considered when determining replacement requirements for offsetting projects

**Hamilton  
Conservation  
Authority**



Eligibility

Offsetting is only permitted for MZO or provincially or municipally lead infrastructure projects




**Credit Valley  
Conservation  
Authority**



Monitoring/  
Compliance

Monitoring reports are to be uploaded into compensation database to help inform future compensation decisions and implementation plans

# Comparative Case Study Analysis

| Municipality           | Theme  | Summary of Key Finding  |
|------------------------|--|---|
| City of London         | <br>Uncertainty | Incorporates adaptive management and climate resiliency measures into offsetting project plans  |
| County of Peterborough | <br>Longevity   | Offsetting projects will be recognized and protected through related Official plan amendments, zoning by-law amendments and/or site plans, as applicable  |
| York Region            | <br>Location   | Hierarchy of locational considerations for offsetting projects:<br><ol style="list-style-type: none"><li>(1) Within the development area;</li><li>(2) Within the Subwatershed/local municipality;</li><li>(3) Within the watershed;</li><li>(4) Within the Region</li></ol> |



# RECOMMENDATIONS

Ecological Offsetting as a  
Land Use Planning Tool

**5 Recommendations**

Offsetting Methods and  
Best Practices

**16 Recommendations**

# Ecological Offsetting as a Land Use Planning Tool

**We will review the following recommendations:**

**1**

**2**

**3**

**4**

**5**

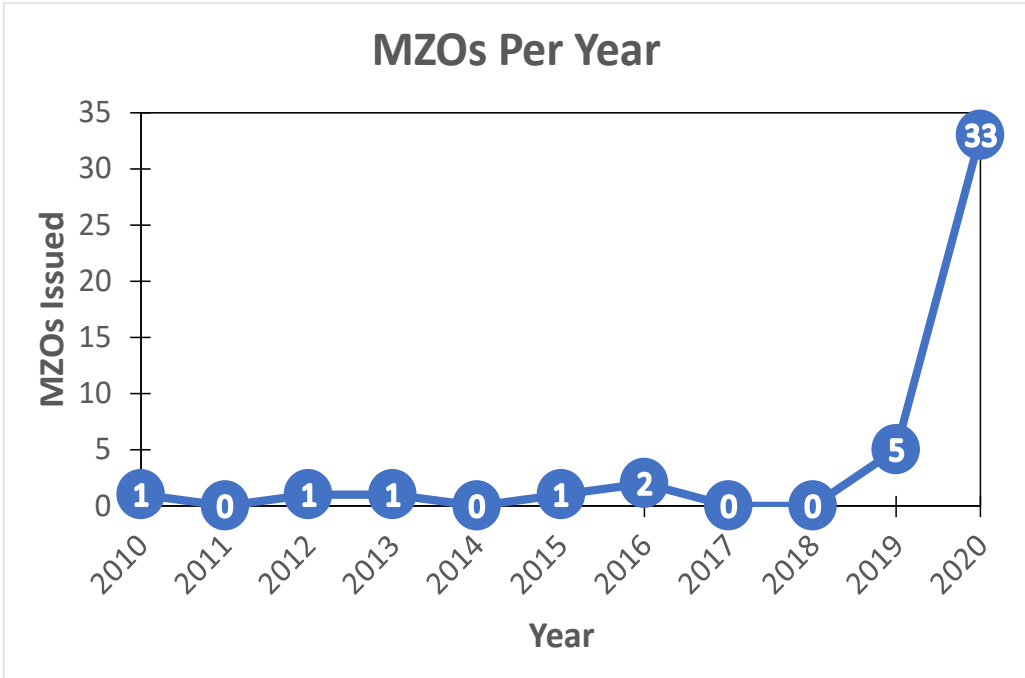
# Ecological Offsetting as a Land Use Planning Tool

**1** The CRCA should only consider offsetting in the instance of an MZO issued by the Province, or a provincial or municipal public infrastructure development.

In current policy context, CRCA may only consider offsetting for MZOs and infrastructure

For MZOs, offsetting may be the only option to mitigate impact

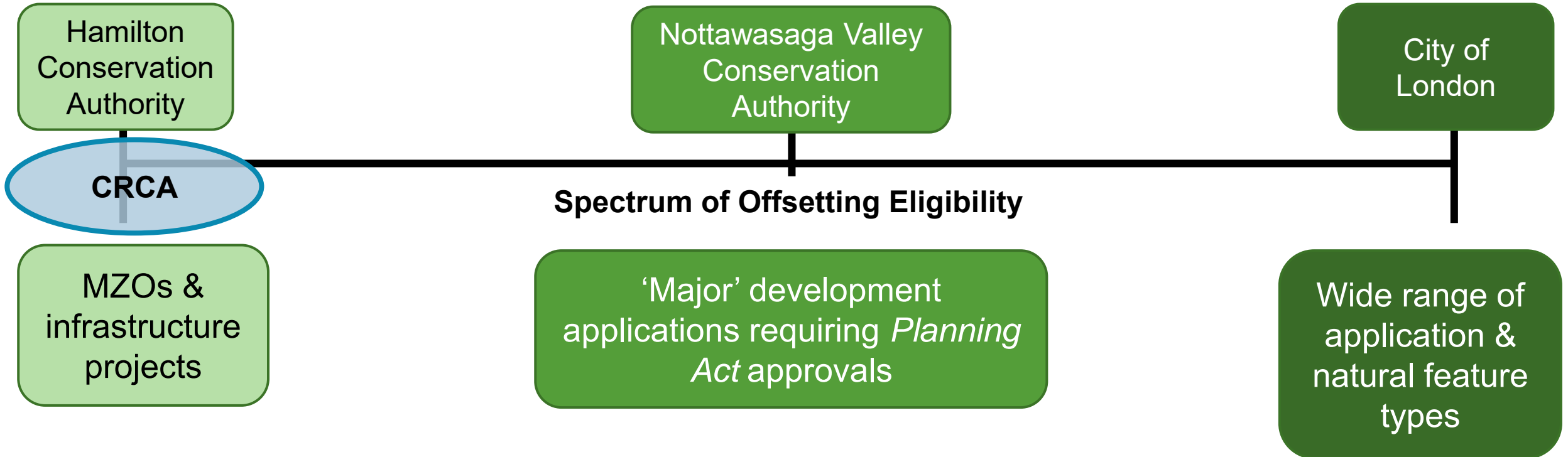
Municipalities should not supervise offsets for their own infrastructure projects



(Gray, 2020)

# Ecological Offsetting as a Land Use Planning Tool

**1** The CRCA should only consider offsetting in the instance of an MZO issued by the Province, or a provincial or municipal public infrastructure development.



## Ecological Offsetting as a Land Use Planning Tool

2

Engage with municipalities in Cataraqui Region to help decide whether to consider offsetting, and which natural features should be eligible.

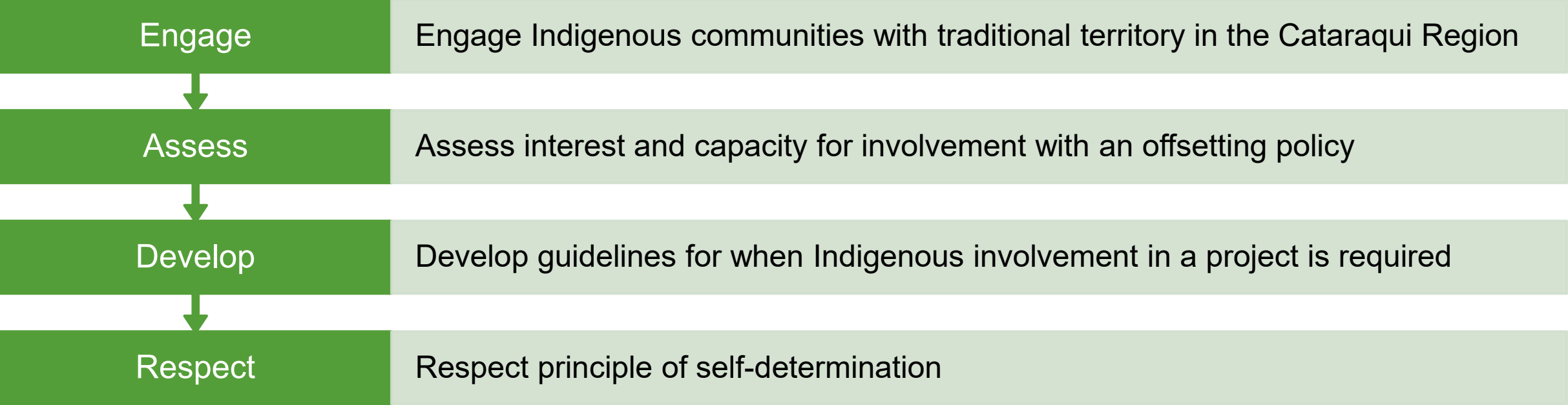
Municipalities must decide if offsetting is an appropriate tool

Offsetting is inherently risky

Each municipality has a distinct natural heritage system and unique considerations

# Ecological Offsetting as a Land Use Planning Tool

**3** Develop and deploy an engagement plan to enable collaboration with Indigenous communities and support meaningful engagement and relationship building.





# Ecological Offsetting as a Land Use Planning Tool

**4** Develop and deploy an engagement plan for public and stakeholder consultation.



Consultation should occur throughout the development of an offsetting policy



Consultation should determine how public consultation should occur for individual offsetting projects

# Ecological Offsetting as a Land Use Planning Tool

**5** Develop a formal ecological offsetting policy and integrate this into CRCA's existing planning and permitting policies.

After engagement, create an offsetting policy and implementation guideline

Update existing planning and permitting policies to enable ecological offsetting



(CRCA, 2021)

# Offsetting Methods and Best Practices

**We will review recommendations:**

6

7

8

11

17

18

20

# Offsetting Methods and Best Practices

6

**Require no net loss of natural heritage system area, ecosystem structure and functions, and sociocultural value, with a preference for net gain.**

# Offsetting Methods and Best Practices

6

Require no net loss of natural system area, ecosystem structure and functions, and sociocultural value, with a preference for net gain.

**Natural Heritage System Area**

- Area within the natural system
- Natural system → all natural features / areas and identified restoration areas of potential natural features

# Offsetting Methods and Best Practices

6

Require no net loss of natural heritage system area, ecosystem structure and functions, and sociocultural value, with a preference for net gain.

## Ecosystem Structure and Functions

- Structure → Vegetation, soil type, topography, physical characteristics
- Function → Natural processes which produce ecosystem services

# Offsetting Methods and Best Practices

6

Require no net loss of natural heritage system area, ecosystem structure and functions, and sociocultural value, with a preference for net gain.

## Sociocultural Value

- Social and cultural value associated with natural features
- Determined through engagement and based on local knowledge

# Offsetting Methods and Best Practices

**6**

**Require no net loss of natural heritage system area, ecosystem structure and functions, and sociocultural value, with a preference for net gain.**

Measure baseline conditions at the impact and offset site through EIS

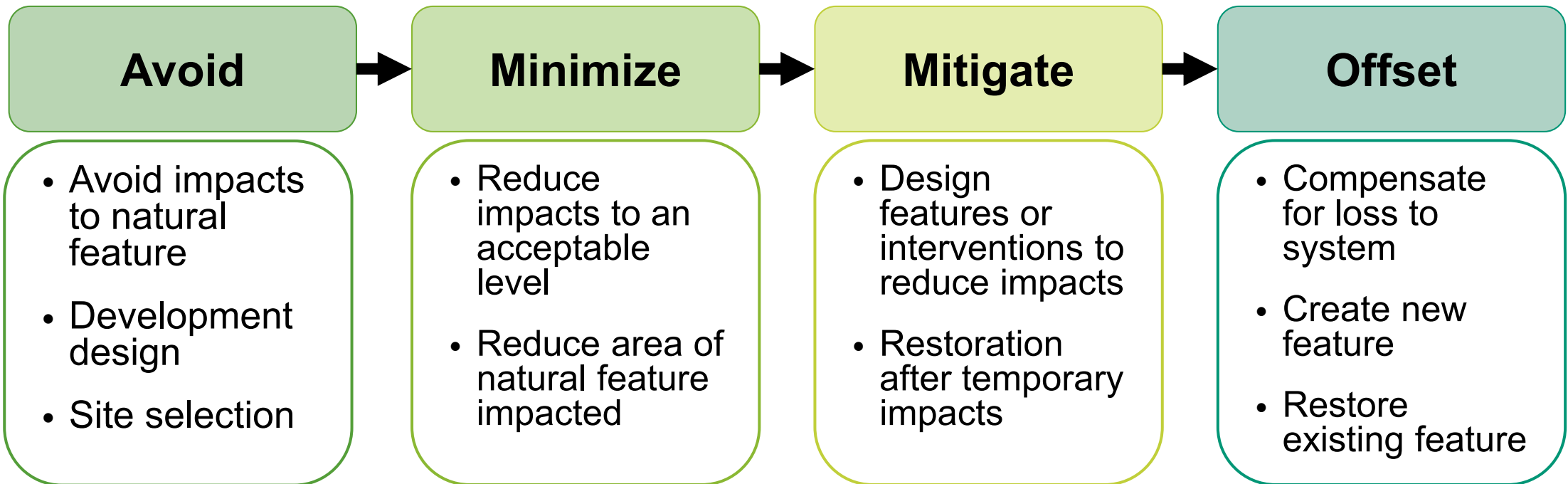
Establish clear timeline for an offset to achieve no net loss

Natural heritage system objectives used to identify opportunities or requirements for net gain



# Offsetting Methods and Best Practices

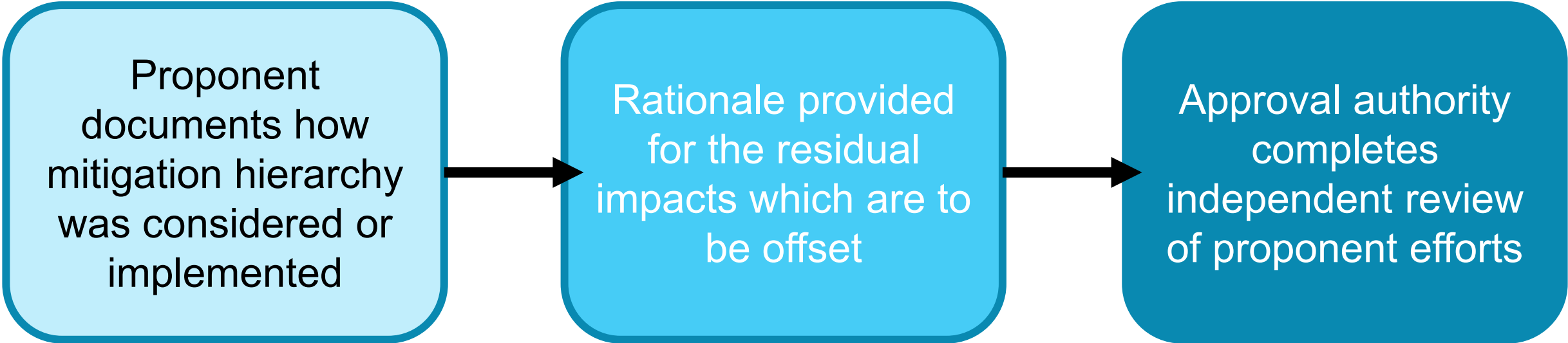
**7** Project proponents required to demonstrate compliance with each step of the mitigation hierarchy.



# Offsetting Methods and Best Practices

**7** Project proponents required to demonstrate compliance with each step of the mitigation hierarchy.

Applying the mitigation hierarchy in the approvals process



## Offsetting Methods and Best Practices

8

**Develop a complete list of natural heritage feature types which are eligible and ineligible for offsetting based on the qualities of vulnerability, irreplaceability, and cultural significance.**

## Offsetting Methods and Best Practices

8

Develop a complete list of natural heritage feature types which are eligible and ineligible for offsetting based on the qualities of vulnerability, irreplaceability, and cultural significance.

### Vulnerability

- Susceptibility of ecosystem to current and future threats
- Rarity of ecosystem in local context

## Offsetting Methods and Best Practices

8

Develop a complete list of natural heritage feature types which are eligible and ineligible for offsetting based on the qualities of vulnerability, irreplaceability, and cultural significance.

### Irreplaceability

- Is the recreation or restoration of ecosystem realistic?
- Can this be done within an acceptable timeframe?

# Offsetting Methods and Best Practices

8

Develop a complete list of natural heritage feature types which are eligible and ineligible for offsetting based on the qualities of vulnerability, irreplaceability, and cultural significance.

## Cultural Significance

- Does the feature provide cultural services or hold cultural significance?
- Informed through engagement and local understanding

# Offsetting Methods and Best Practices

8

Develop a complete list of natural heritage feature types which are eligible and ineligible for offsetting based on the qualities of vulnerability, irreplaceability, and cultural significance.



Provincially Significant Wetlands and Costal Wetlands



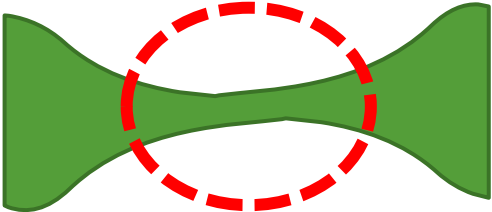
Bogs and fens



Rare vegetation communities



Watercourses



Part of ecological corridor or linkage

Additional features to be considered based upon local context

# Offsetting Methods and Best Practices

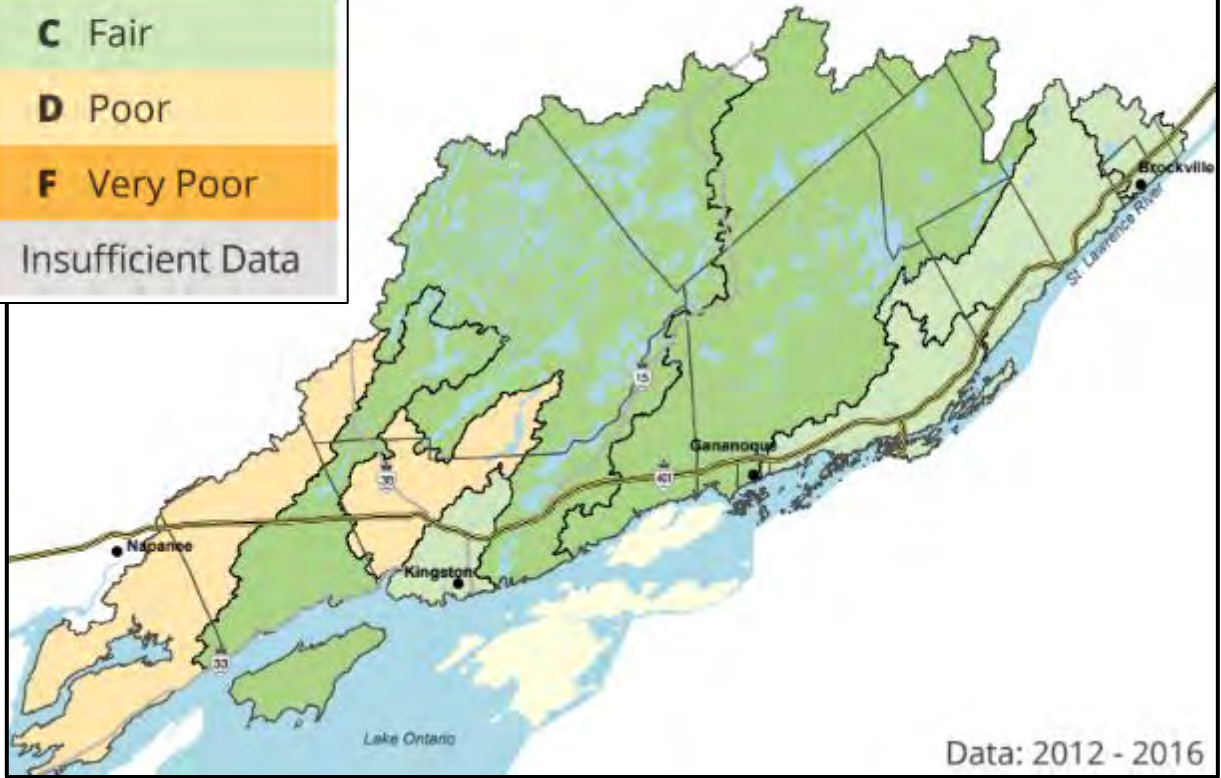
11

**Establish an offset site selection hierarchy to guide preferred location of offset project sites.**

- Provide compensation for local system and people impacted
- Integrate with natural heritage system strategy and conservation objectives

| GRADING |                   |
|---------|-------------------|
| A       | Excellent         |
| B       | Good              |
| C       | Fair              |
| D       | Poor              |
| F       | Very Poor         |
|         | Insufficient Data |

**Forest Conditions in the Cataraqui Region**





# Offsetting Methods and Best Practices

11

**Establish an offset site selection hierarchy to guide preferred location of offset project sites.**

- Located as close as possible to the impact site...
- Consider the following hierarchy:



(CRCA, 2013)

On-site of development impacts

Sub-watershed

Municipality

Watershed

# Offsetting Methods and Best Practices

11

**Establish an offset site selection hierarchy to guide preferred location of offset project sites.**

Offset sites should also be...

Connected to natural system

Capable of supporting ecosystem function to be offset

Location selection must balance proximity with desirable natural system outcomes

# Offsetting Methods and Best Practices

**17** A monitoring program which identifies the required frequency, duration, and scope of monitoring activities to be completed should be established prior to offset approval.

**18** Monitoring of the offset feature(s) to be conducted until the feature(s) achieves the objectives of the offsetting agreement.

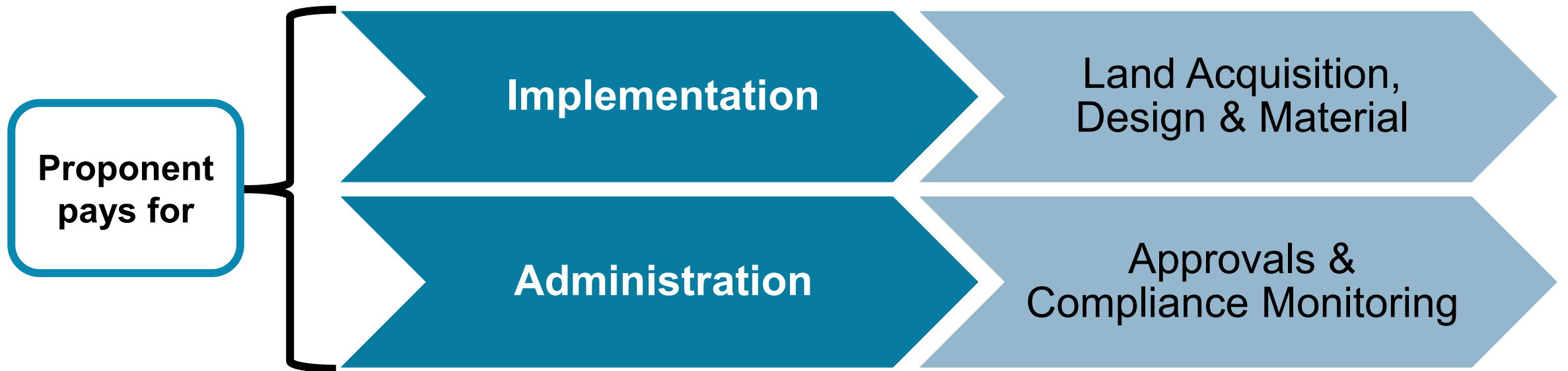
- Ensure offset achieves no net loss or net gain (as required)
- Common monitoring sequence:



# Offsetting Methods and Best Practices

**20** Offsetting projects should be led and fully paid for by the proponent with project approvals and compliance monitoring by the regulator.

## Full cost recovery model



# Offsetting Methods and Best Practices

**We have reviewed recommendations:**

1

2

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# CONCLUSION

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## Methods

**Site Observations**  
**Legislative Review**  
**Literature Review**  
**Comparative Case Study Analysis**

**Ecological Offsetting  
as a Land Use  
Planning Tool**

**5 Recommendations**

**Offsetting Methods  
and Best Practices**

**16 Recommendations**



Thank You

Are there any questions?

# ECOLOGICAL OFFSETTING IN THE CATARAQUI REGION

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Presentation of Research Study and Draft Recommendations

Edward Wang, Jacob Slevin, Jeffrey Tweedle, Noah Perron, Safia Khan, & Vincent Wen

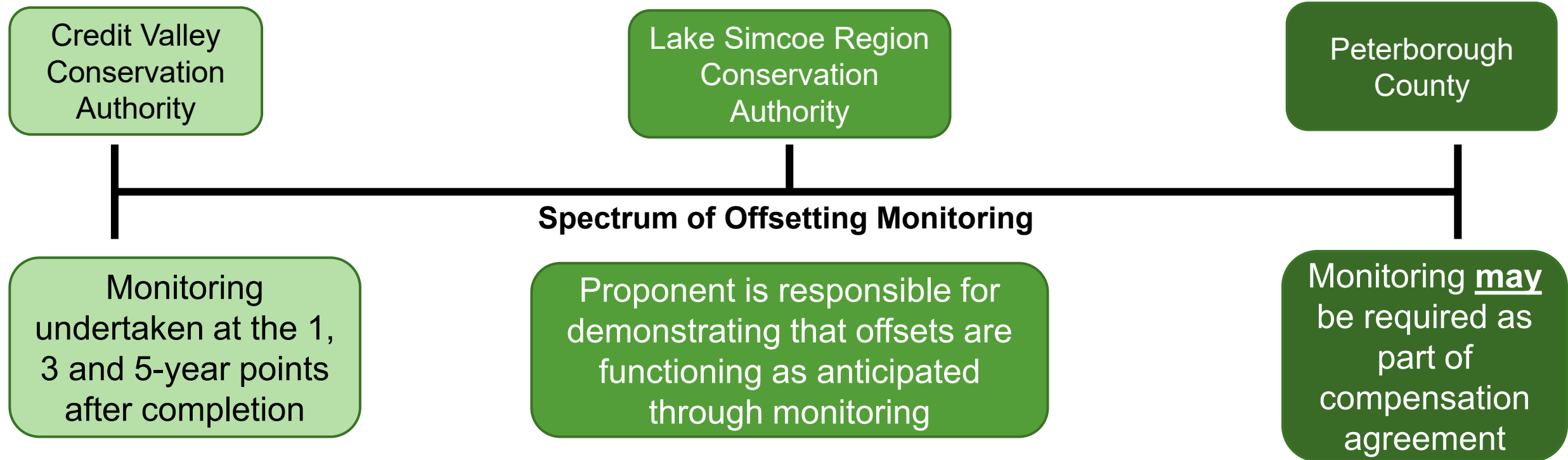
# Comparative Case Study Analysis

Municipal Official Plans Reviewed for Offsetting policies:

| Region/ Upper Tier Municipalities |            |                              | Single Tier Municipalities |              |              |
|-----------------------------------|------------|------------------------------|----------------------------|--------------|--------------|
| Durham                            | Dufferin   | Lanark                       | Brant                      | St. Thomas   | Peterborough |
| Halton                            | Elgin      | Middlesex                    | Brandford                  | Windsor      | Barrie       |
| Niagara                           | Essex      | Northumberland               | Chatam-Kent                | Bellville    | Orillia      |
| Peel                              | Grey       | Oxford                       | Haldimand                  | Quinte West  | Cornwall     |
| Waterloo                          | Haliburton | Perth                        | Hamilton                   | Smiths Falls | Guelph       |
| York                              | Huron      | Peterborough                 | Kawartha Lakes             | Prescot      |              |
| Bruce                             | Lambton    | Prescott & Russel            | Norfolk                    | London       |              |
| Renfrew                           | Simcoe     | Stormont, Dundas & Glengarry | Ottawa                     | Stratford    |              |
| Wellington                        |            |                              | Prince Edward              | St. Mary's   |              |



# Comparative Case Study Analysis



# Comparative Case Study Analysis

Approaches to applying replacement ratios:

## Site Specific Ratios

Examples: CVCA, TRCA & City of London

- Common in policies that require compensation for land area and ecological function
- Land area ratio might be fixed, but the ratio to replace ecological function is dependent on what is lost
- The more function lost, the greater the replacement ratio required

## Fixed Ratios

Examples: NVCA & LSRCA

- Common in policies that only require land area to be compensated for
- Ratios remain the same for all compensation projects
- Different ratios for specific natural features types (Ex: 3:1 for wetlands & 2:1 for woodland)

## Offsetting Methods and Best Practices

8

**Develop a complete list of natural heritage feature types which are eligible and ineligible for offsetting based on the qualities of vulnerability, irreplaceability, and cultural significance.**

Align with federal, provincial, and municipal policies and regulations

Based on local environmental conditions, natural heritage system health, and social connection to feature types

# Offsetting Methods and Best Practices

13 Offset area ratios greater than 1:1 should be used to account for uncertainty and time lag in the restored natural feature reaching the required ecological function.

For feature creation and restoration portion of offset

**Uncertainty** Offset actions have risk of failure

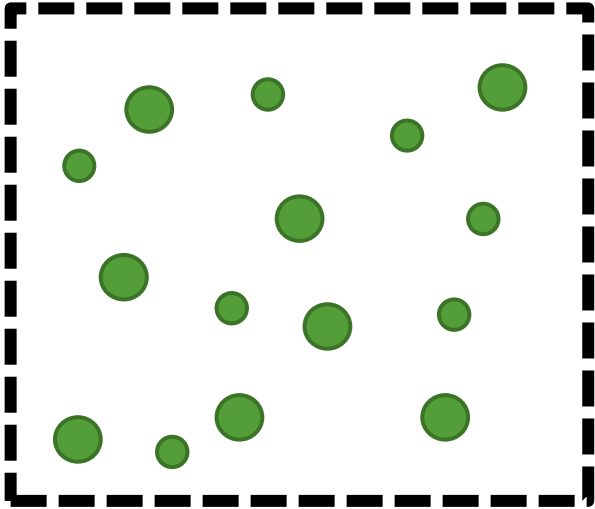
**Time Lag** Created or restored natural features take time to mature

# Offsetting Methods and Best Practices

**13** Offset area ratios greater than 1:1 should be used to account for uncertainty and time lag in the restored natural feature reaching the required ecological function.

Utilize basal area offset ratio for treed ecosystems

| Basal Area<br>(m <sup>2</sup> /ha) | Offset Ratio<br>(offset area : impact area) |
|------------------------------------|---|
| 0 - 10                             | 1 : 1                                       |
| 10.1 - 20                          | 3 : 1                                       |
| 20.1 - 30                          | 5 : 1                                       |
| 30.1 - 50+                         | 8 : 1                                       |



1 hectare area

● Tree cross-section

# Offsetting Methods and Best Practices

**16** Offsets should be established and designed to exist in perpetuity with the appropriate legal protections established to protect the offset feature in the long-term.

- Permanence of offset to reflect permanence of development impacts
- Design to function and be protected in perpetuity
- Options for protection...

**Conveyance of land**

**Conservation easement**

**Zoning and Official Plan designation**