Road ecology: Tools to help achieve sustainable growth

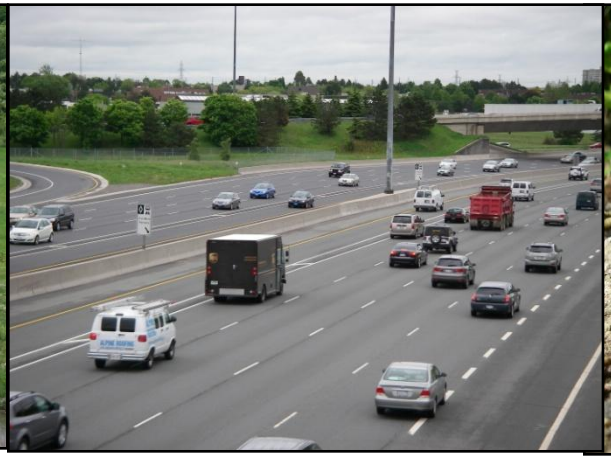
Protecting Biodiversity From the Threats of Roads

ROYAL ONTARIO MUSEUM

toronto ZOO

Road Ecology

Study of the interaction of organisms and the environment as they relate to roads and transportation networks.


Ontario Road Ecology Group

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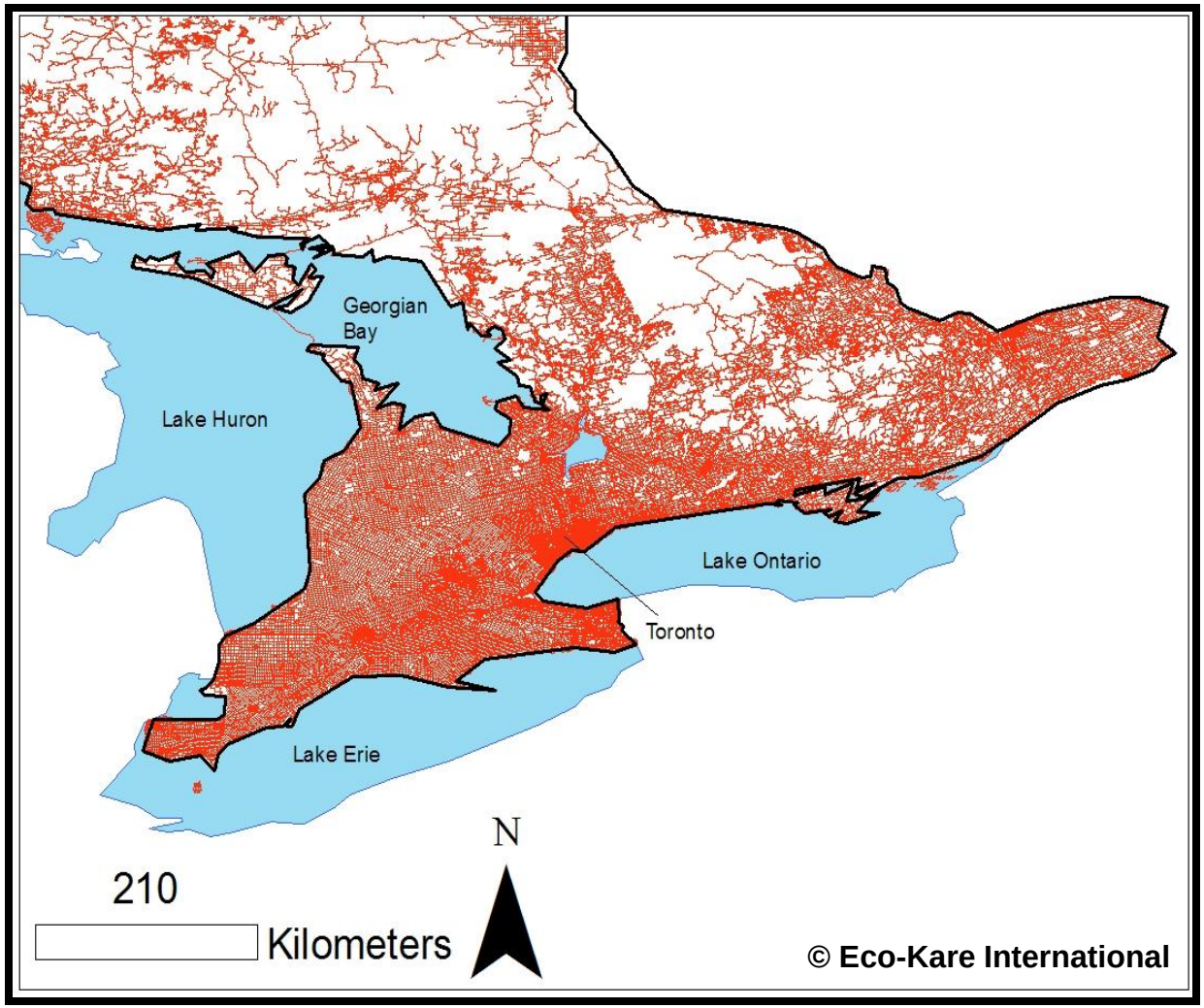
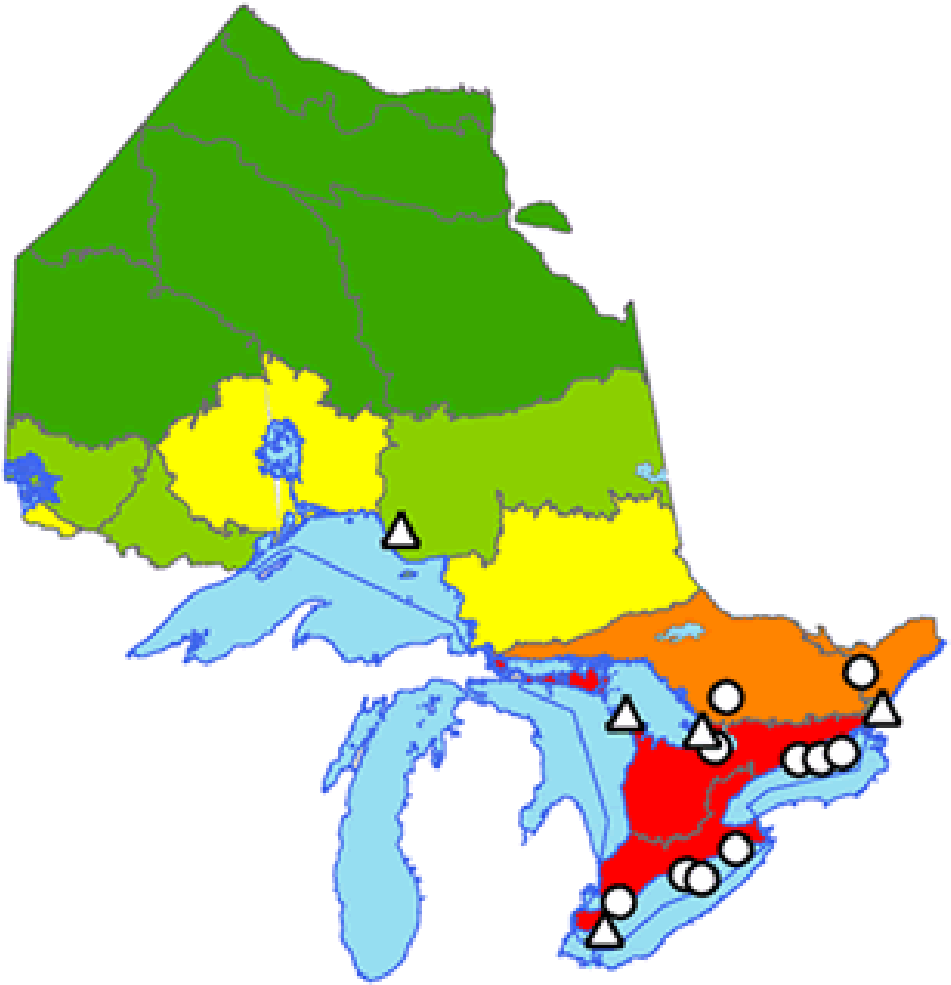
Southern Ontario Road Network



Species At Risk Richness



- Very High
- High
- Medium
- Low
- Very Low

- National Wildlife Areas
- National Parks

MTO Statistics

- WVC: 1 every 37 minutes
- 1/16 collisions is a WVC
- WVC ↑ annually

- 2006:14,482 collisions were reported

many more go unreported

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Wildlife Road Mortality Studies

- 1000 Islands Pkwy
- Long Point Causeway
- Heart Lake Road, Brampton
- Rouge Park
- Various CAs

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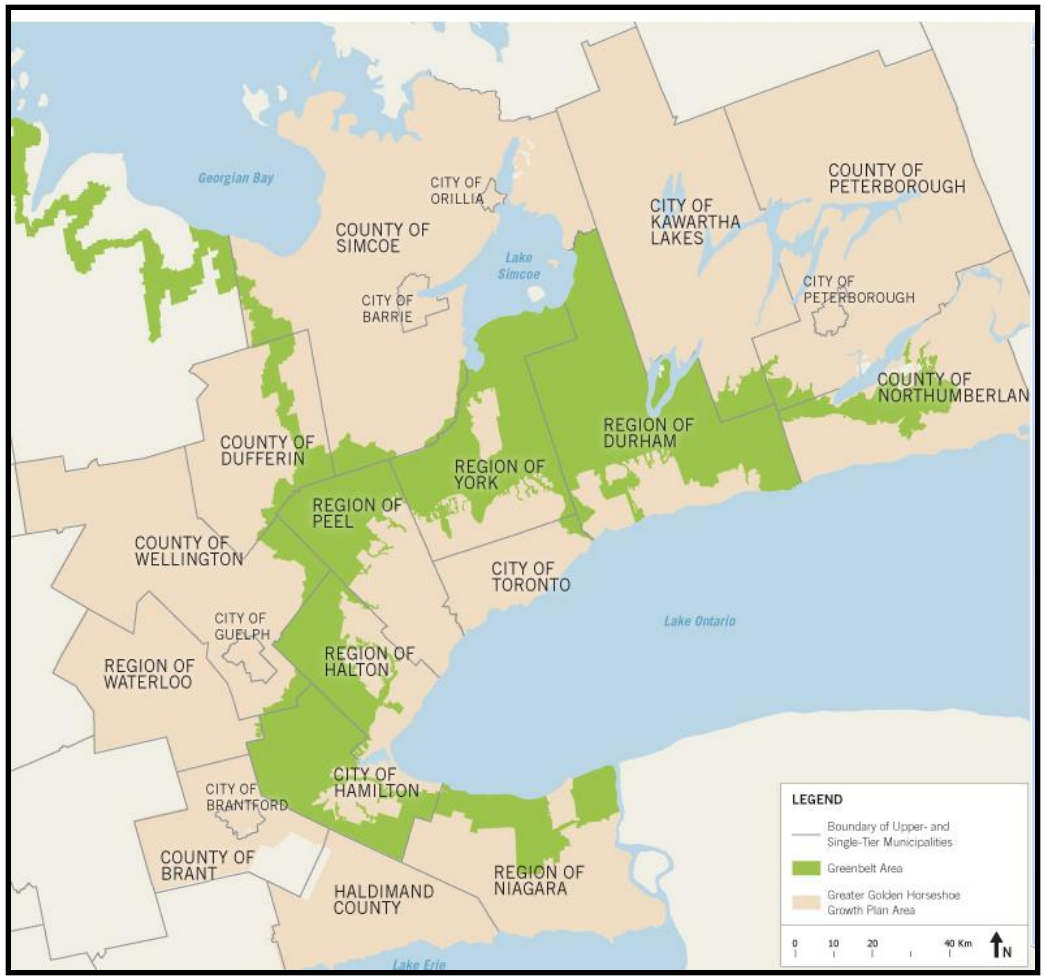
Greater Golden Horseshoe

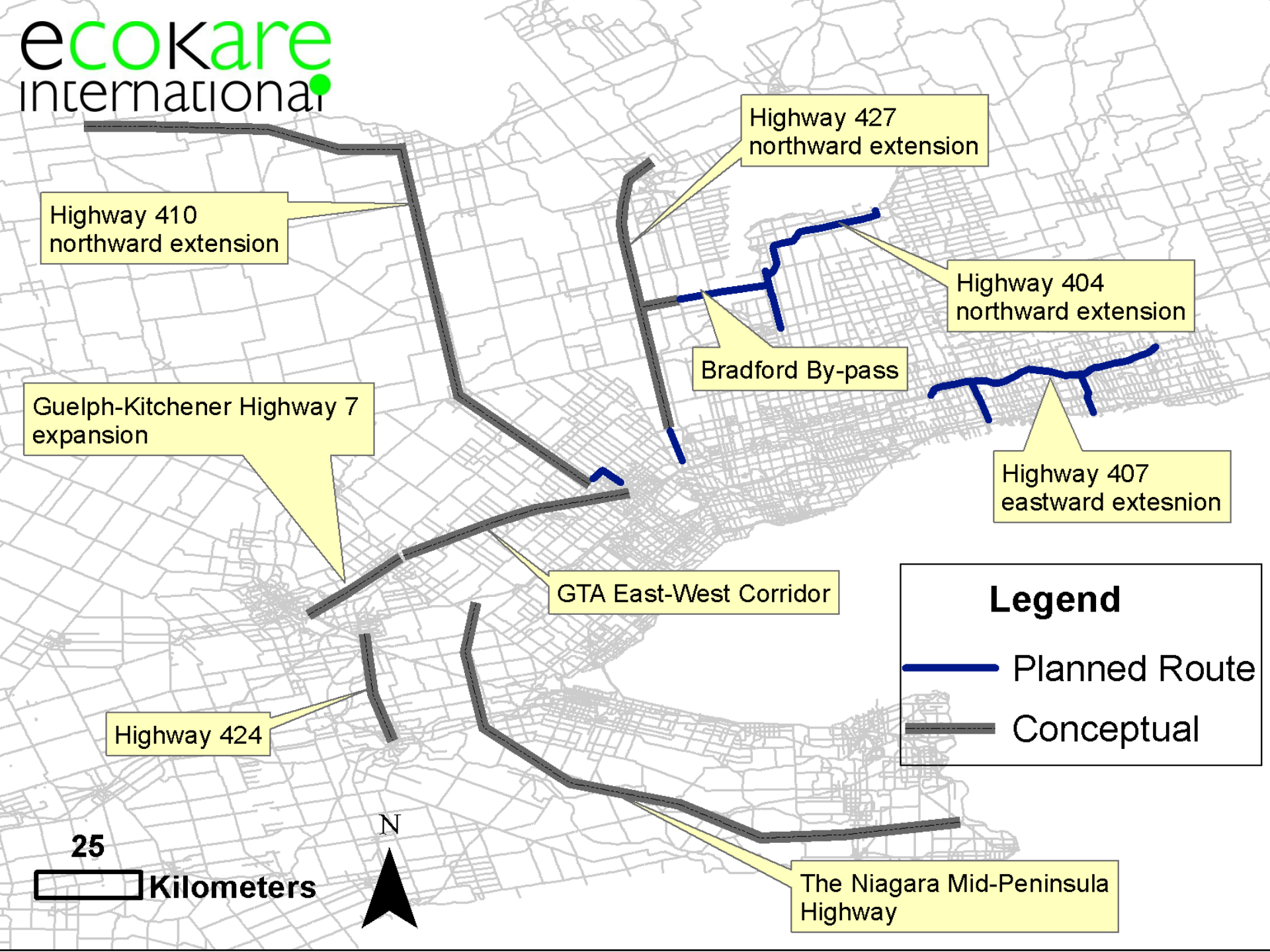


PLACES TO GROW

BETTER CHOICES. BRIGHTER FUTURE.

The Places to Grow Act, 2005
and Transition Regulation

Ontario


ecokare international
Highway 427 northward extension
Highway 410 northward extension
Highway 404 northward extension
Bradford By-pass
Guelph-Kitchener Highway 7 expansion
Highway 407 eastward extesnion
GTA East-West Corridor
Legend
Planned Route
Conceptual
Highway 424
N
25
Kilometers
The Niagara Mid-Peninsula Highway

HABITAT LOSS

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Habitat Loss

- Fragmentation
- Degradation
  - Litter
  - Noise
  - Light
  - Chemical
  - Heat
  - Vibration
  - Spread of Invasive Species

DIRECT MORTALITY

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Wildlife/Vehicle Collisions

- Loss of biodiversity
- Motorist safety
- High cost (insurance, damages)

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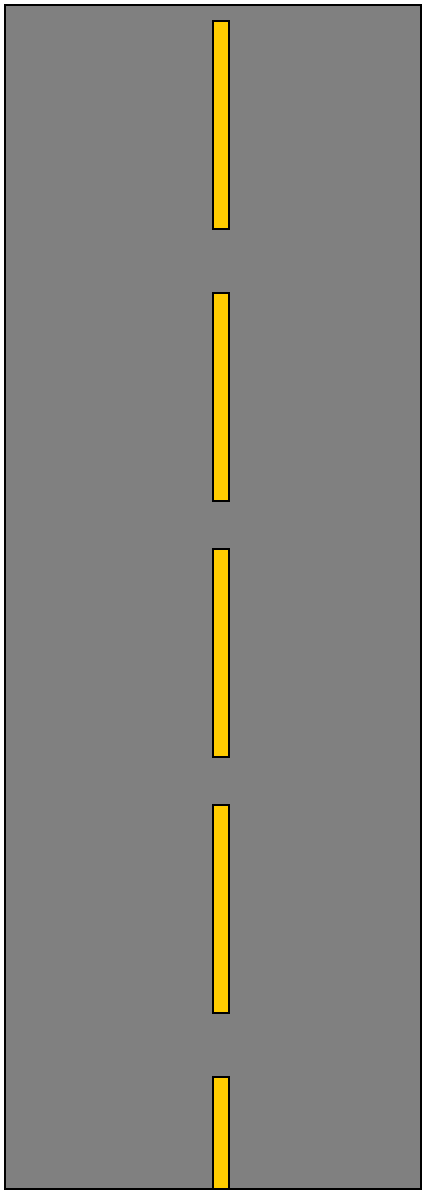

INACCESSIBILITY

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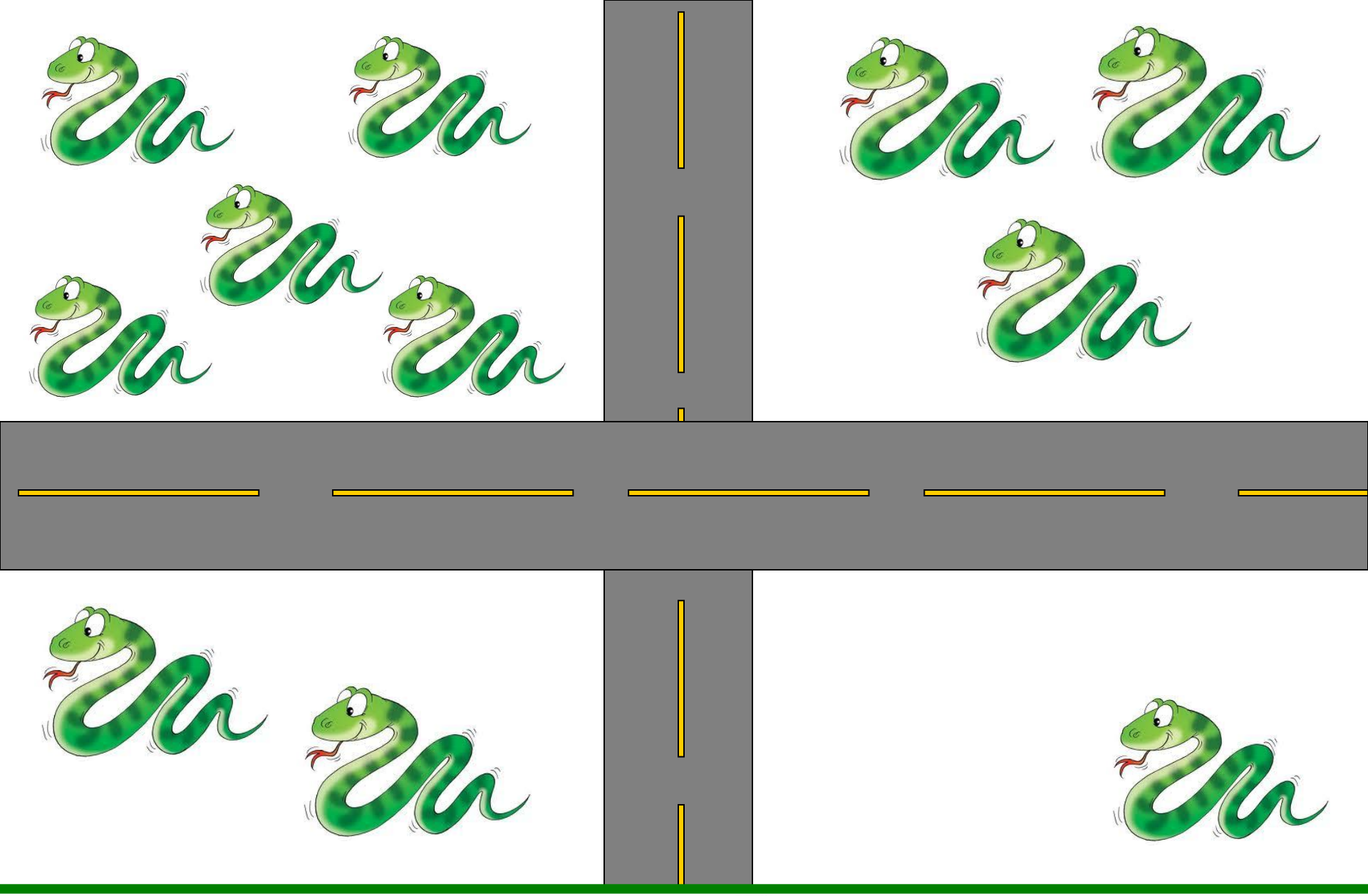

POPULATION SUBDIVISION

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Lonesome George

Extirpation/Extinction

Endangered Species Act

ESA: Implementation

Streamlined Approaches for New Activities to Benefit Species

Standardized Condition Approach: For certain types of activities, where overall benefit permit conditions have been well established, activities could proceed without an ESA approval, provided that individuals or businesses follow rules established in regulation, which may include registration with MNR, that are designed to benefit the species and to draw on the experience MNR has had with standard overall benefit permit conditions.
Proposed examples of this Standardized Condition Approach would be as follows:

Road improvement activities with the protection of reptiles and amphibians and benefits provided through the installation of fencing and improved passage.

Ontario

EBR #0117696

Recovery Strategies

2.3 Approaches to Recovery

Table 3. Approaches to recovery of the Jefferson Salamander in Ontario

Priority	Objective Number	Broad Approach/ Strategy	Specific Steps	Measurable Outcomes
Urgent	4	Habitat protection	• Work with planning authorities to encourage integration of the habitat regulation into official plans and other relevant planning processes	• Percentage of the reviewed official plans that integrate protection of the areas prescribed in the habitat regulation

- Mitigate Road Mortality – Threat Priority: Urgent/Critical

Special Initiatives

In This Section

- Ontario Species at Risk Home
- What's at risk in Ontario?
- What's at Risk in My Area?
- Action We're Taking
- What you can do
- Planners, Developers & Resource Professionals
- Organizations and Associations
- Landowners and Farmers
- Field Notes
- Learning Resources
- Permits & Other Authorizations

Planners, Developers & Resource Professionals

How to incorporate species at risk into what you do

Whether you help to plan, manage, consult on or work directly on projects or operational activities, your role is to keep things on track. That includes knowing how the Endangered Species Act may apply to your situation, how it may influence your planning, and what steps to take to make sure your plans comply with it.

Since the act is comprehensive and covers over 200 species, figuring out how it applies may not always seem simple. Situations vary by activity and species, but also by location and season in relation to species' breeding, migration and other life stages. That's why your best resource is practical guidance, both from this website and the Ministry of Natural Resources. Ministry staff can help you understand how the act applies to different scenarios and develop localized strategies that make the most sense for your activity and the species.

July 2013

thestar.com
INSIGHT

News / Insight

How a turtle toppled Prince Edward County wind turbines

Former premier Dalton McGuinty could never have imagined the Blanding's turtle would thwart his dream of a wind-driven green economy in Ontario.

On July 3rd and Environmental Appeal Tribunal revoked the approval of Gilead Power's Ostrander Point wind turbine project, concerned of damage to the habitat of the Blanding's turtle.

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Road Ecology: Locally

- Goals – Sustainable Growth
- Recognize importance of:
  - Connectivity
  - Biodiversity
  - Resilient ecosystems
  - Watershed health
  - Economical value
  - Community value
    - Sense of well being, safe
    - Property value

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Legislation

- Federal:
  - Species at Risk Act
  - Fisheries Act
  - Migratory Birds Conservation Act
  - Canadian Environmental Assessment Act
- Provincial:
  - Endangered Species Act
  - Conservation Authority Act
  - Provincial Policy Statement
  - Greenbelt Plan
  - Oak Ridges Moraine
  - Places to Grow Act C.P.
- Regional Official Plans
- Environmental Assessments

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Applying Road Ecology

- Identify **target species** and characterize the landscape from the species' movement perspective;

- Predict and prioritize where **mitigation** should be focused to enhance wildlife movement; and

- Provide guidance on appropriate mitigation, management and **monitoring** measures

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Road Ecology Tools

Ontario Road Ecology Group

ROYAL ONTARIO MUSEUM

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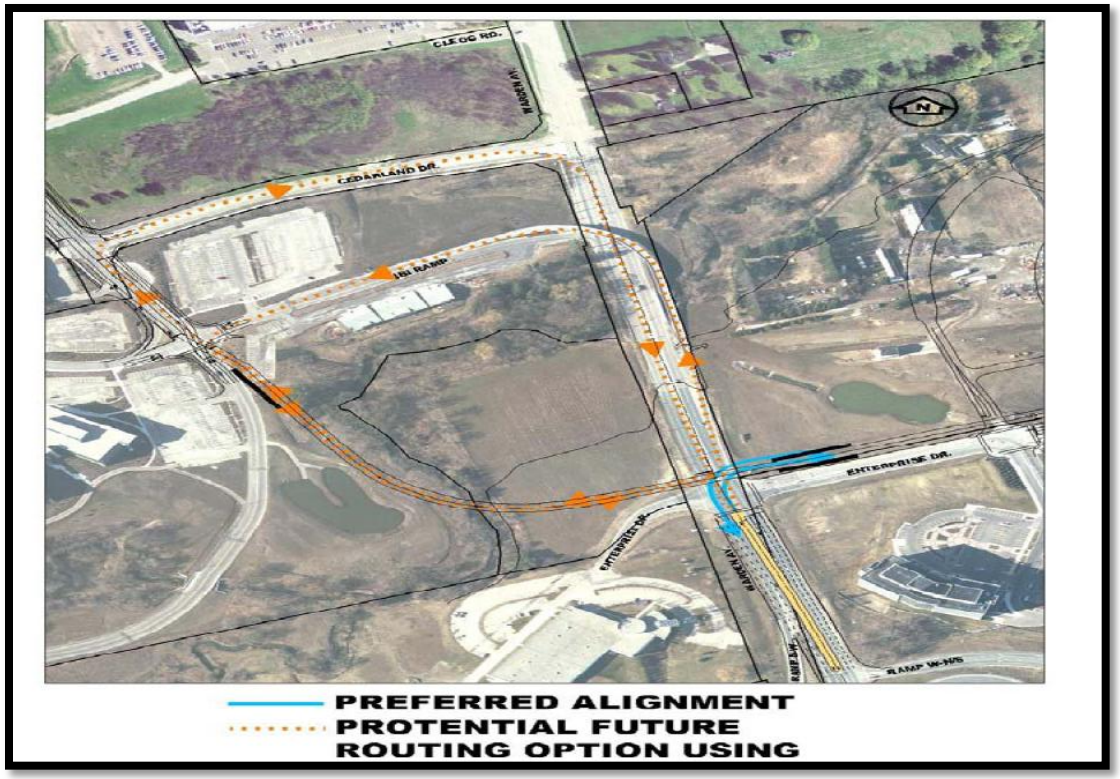
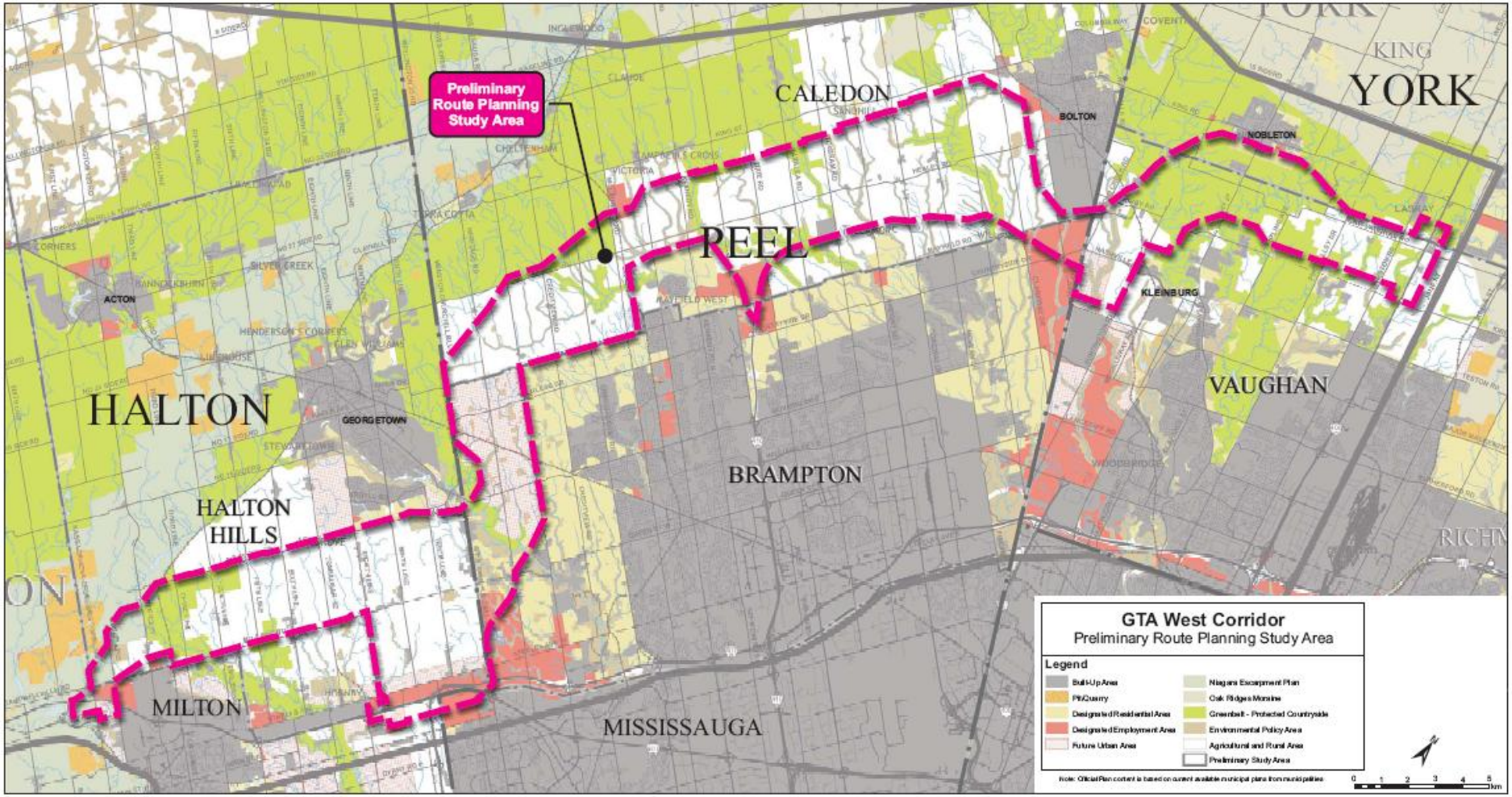
Road Design Elements

- Route Alignment/Technically Preferred Route



GTA West

GTA West Corridor
Environmental Assessment
Terms of Reference and Environmental Assessment Study



Ontario

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Habitat Analysis

- Wetland/Woodlot – proximity to road, level
- Stream Crossing
- Valley Crossing

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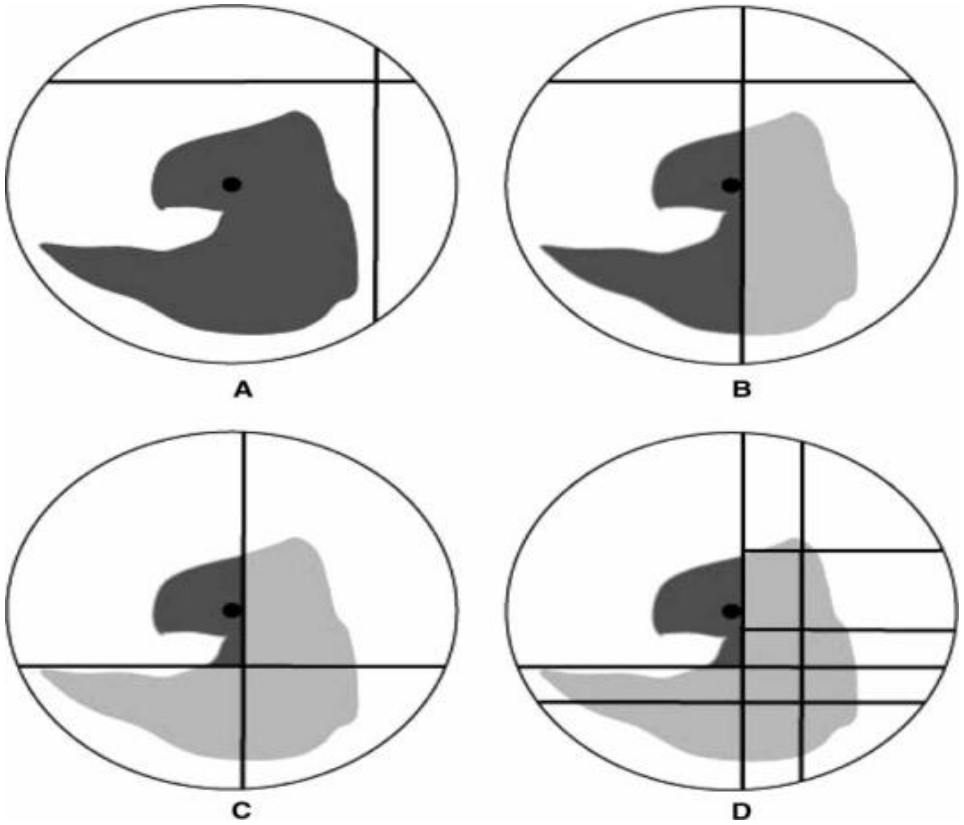
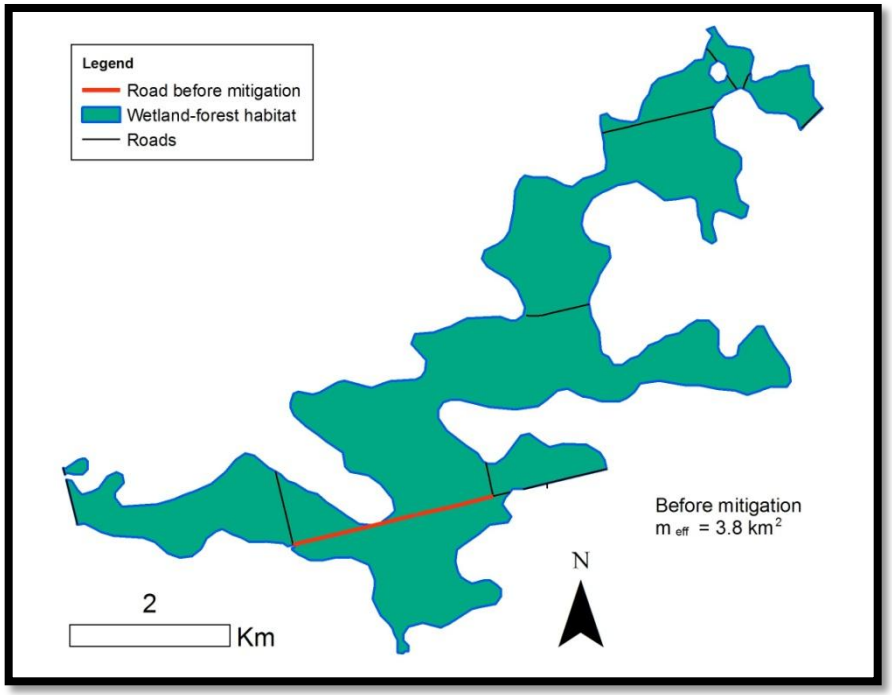
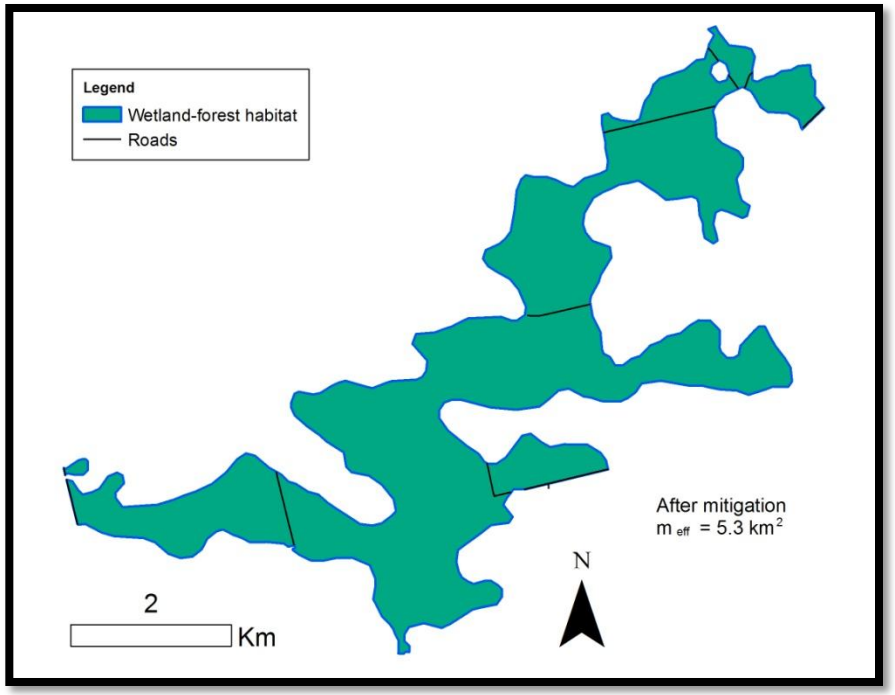
Accessible Habitat Analysis



Eigenbrod *et al*. 2008

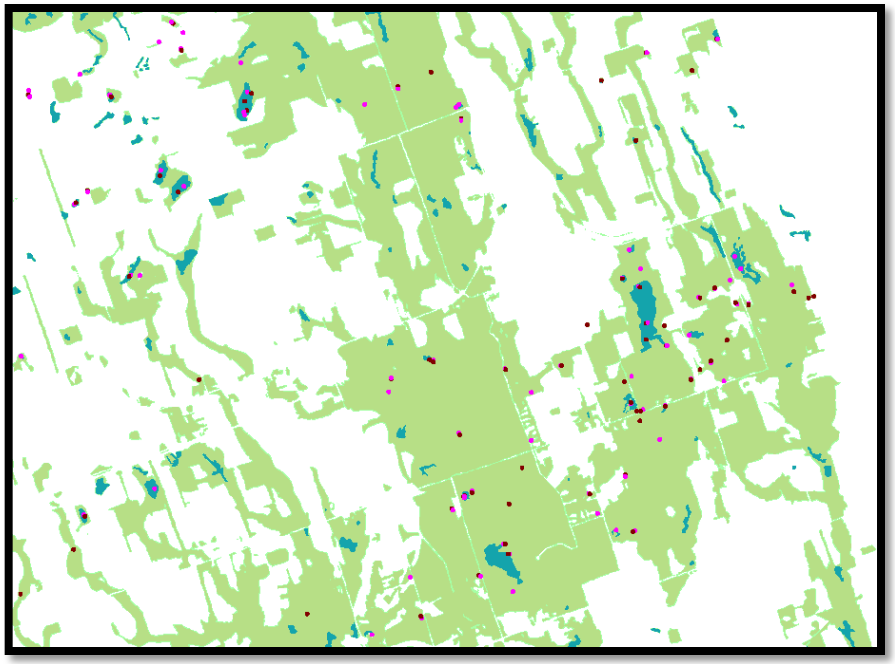
Effective Mesh Size

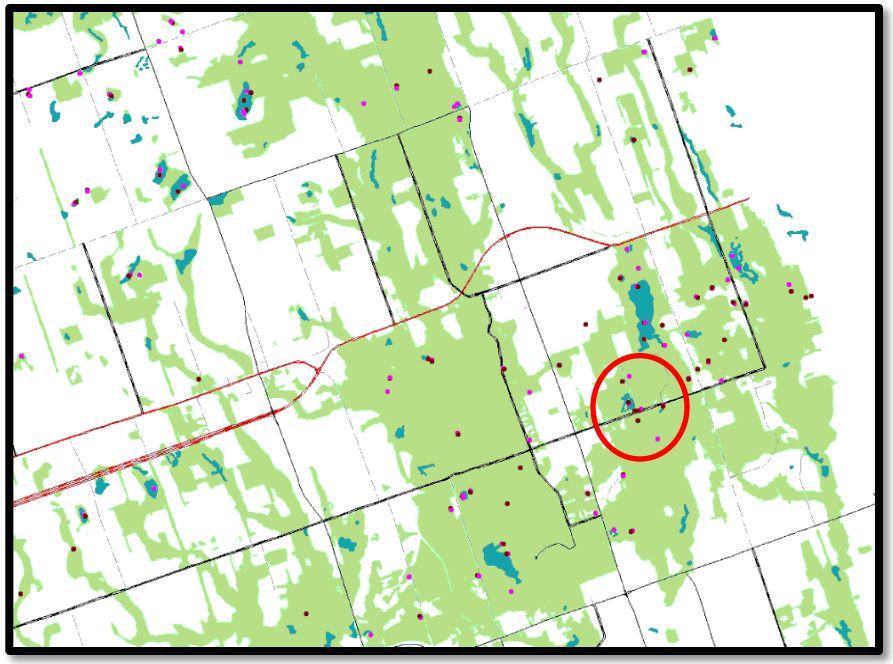




Jaeger 2000

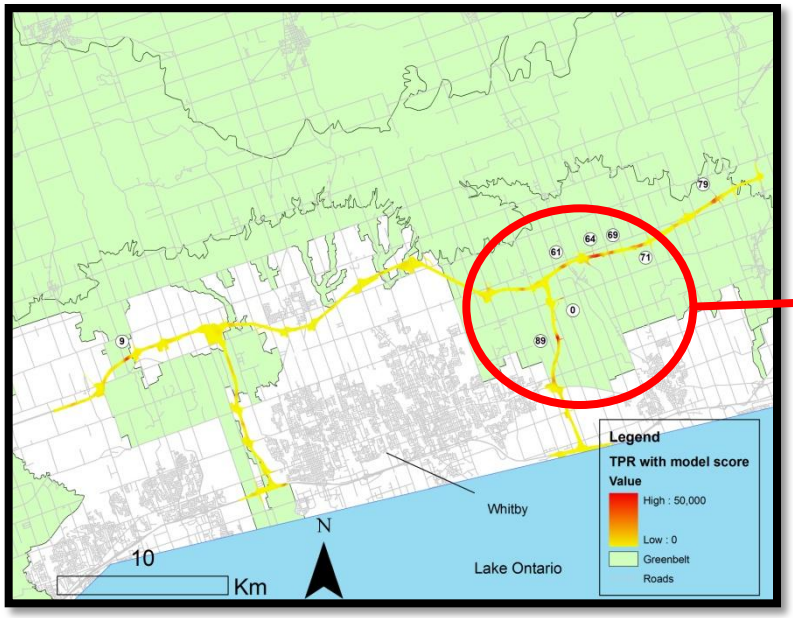
GIS Mapping

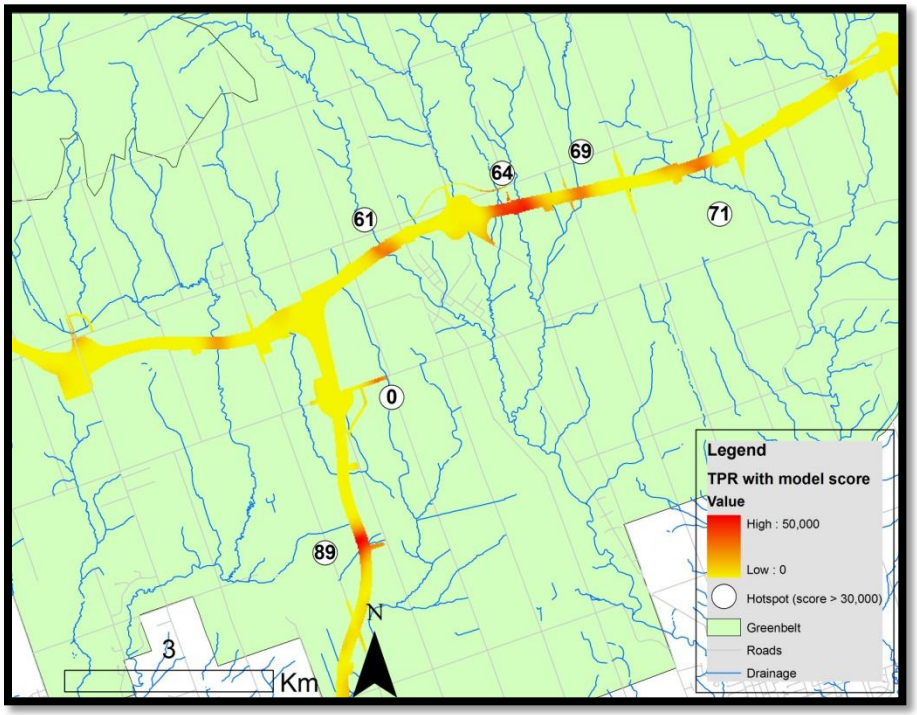




Natural cover & Species points + Road Barrier Effect = Priority Mitigation Sites

GIS Analysis





ecokare international

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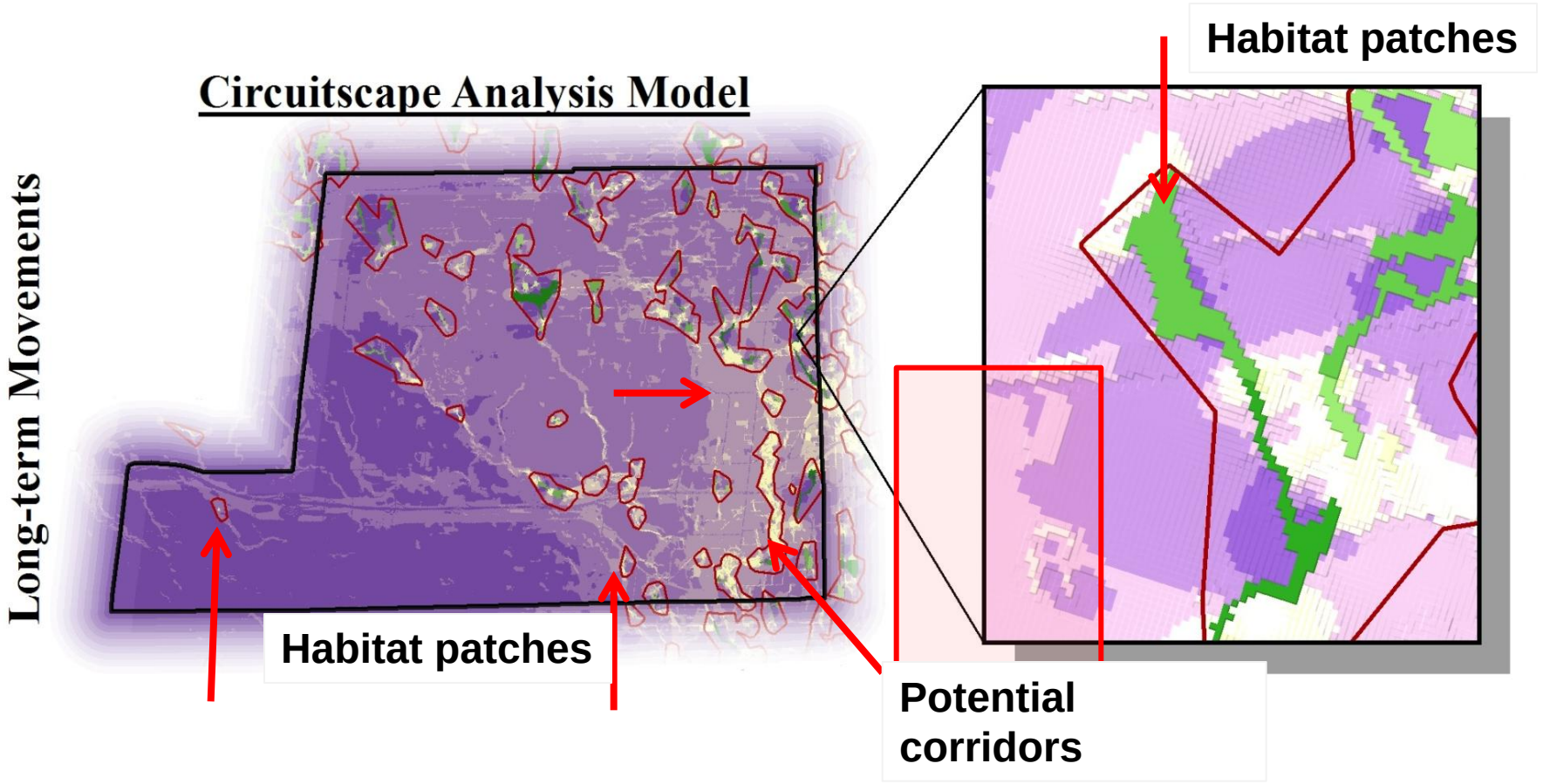
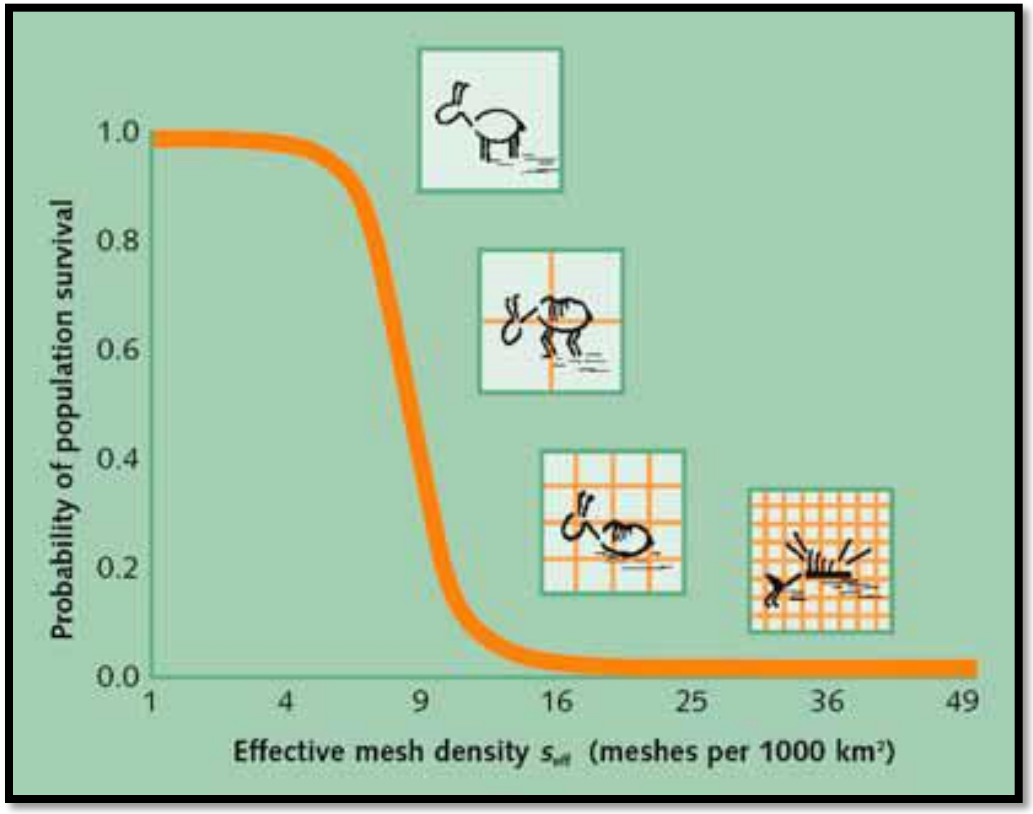
Movement Probability Analysis

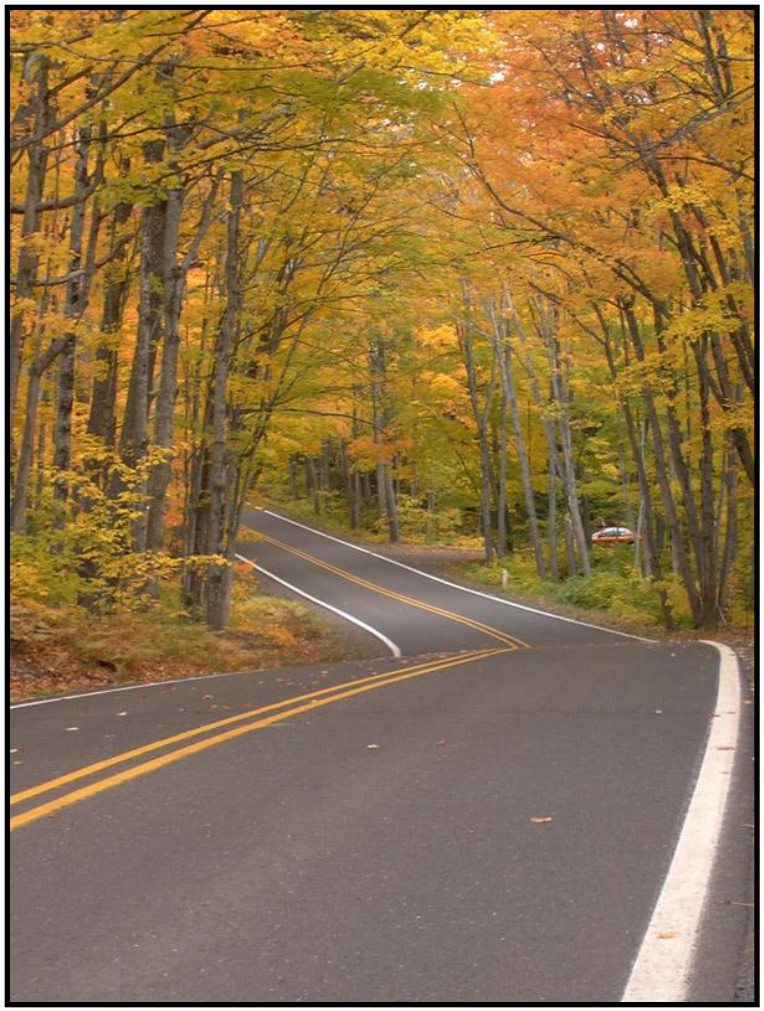


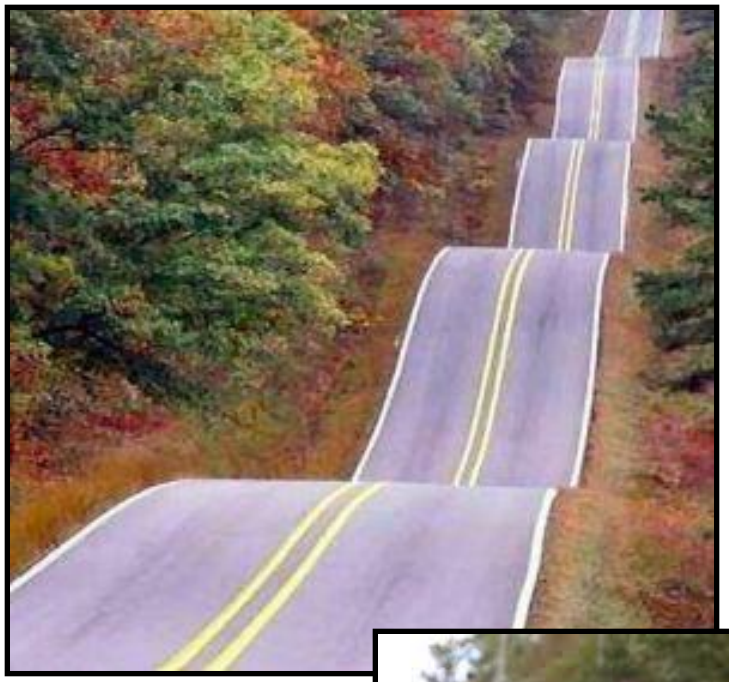
Population Mortality Thresholds



Jaeger and Holderegger 2005

Road Design





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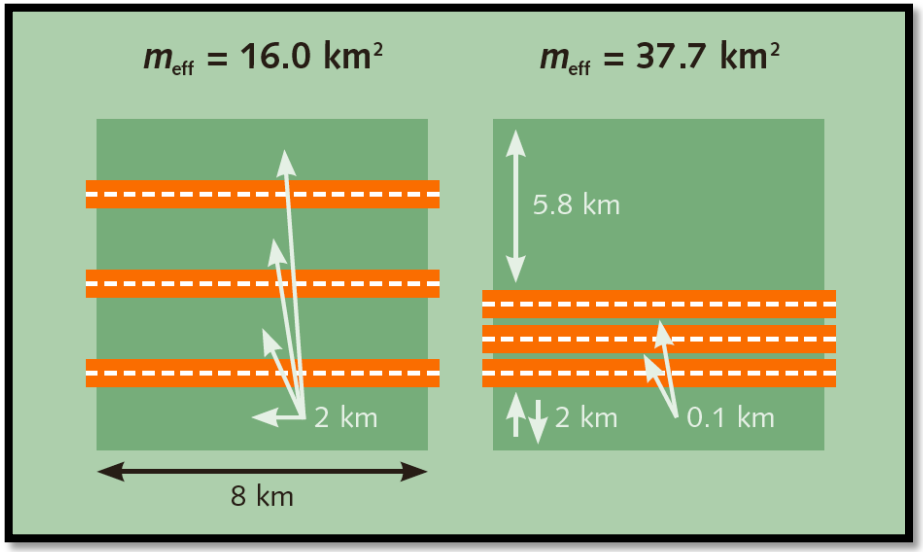
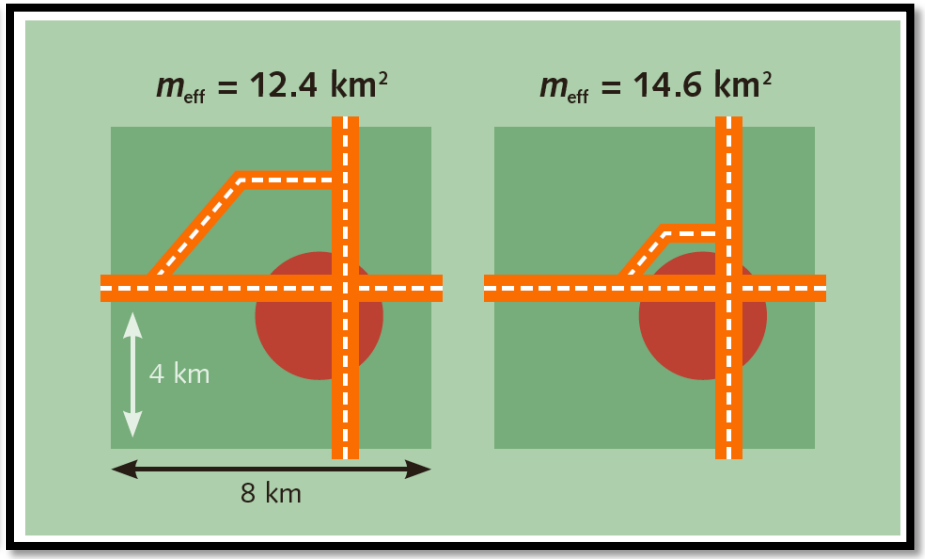
Road Design

- Route Bundling
- By-pass Placement





Jaeger and Holderegger 2005

Mitigation Options

- Avoid new road construction
- Retrofit existing roads
- Collect data → Road Closures

Mar 12, 2013 | Vote 0 0

Burlington to close King Road for salamander crossing

The dates are now set for the 2013 temporary closure of a portion of King Road to permit a safer breeding season for the endangered Jefferson Salamander.

Bruce Zvaniga, the city's director of transportation services, announced Monday that the closure will run from March 18 to April 8.

The road will be closed from the escarpment to Mountain Brow Road using concrete barricades behind portable barricades.

City council committed last year to closing the identified portion of the road every spring for three weeks to allow the endangered salamanders to cross King Road to get to their breeding pools safely.

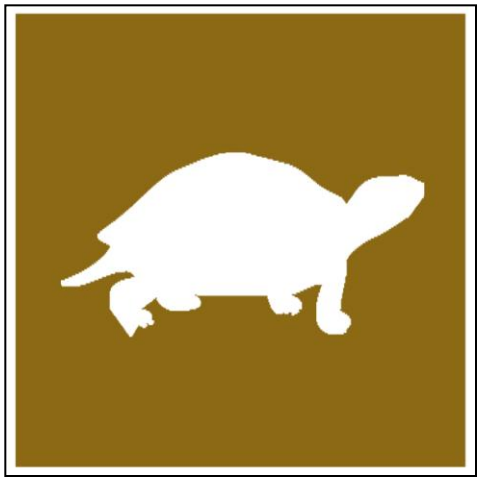
Conservation Halton says there are approximately 100 Jefferson Salamanders living in the King Road area.

SALAMANDER CROSSING
Photo courtesy of Hamilton Conservation Authority
Burlington is closing King Road for three weeks to facilitate the breeding of the endangered Jefferson Salamander.

The city estimates the closure will cost approximately $1,500.

Burlington Post

Signage/Raise Awareness



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Speed Limits and Bumps

Curb/Median Design

Fencing and Ecopassages

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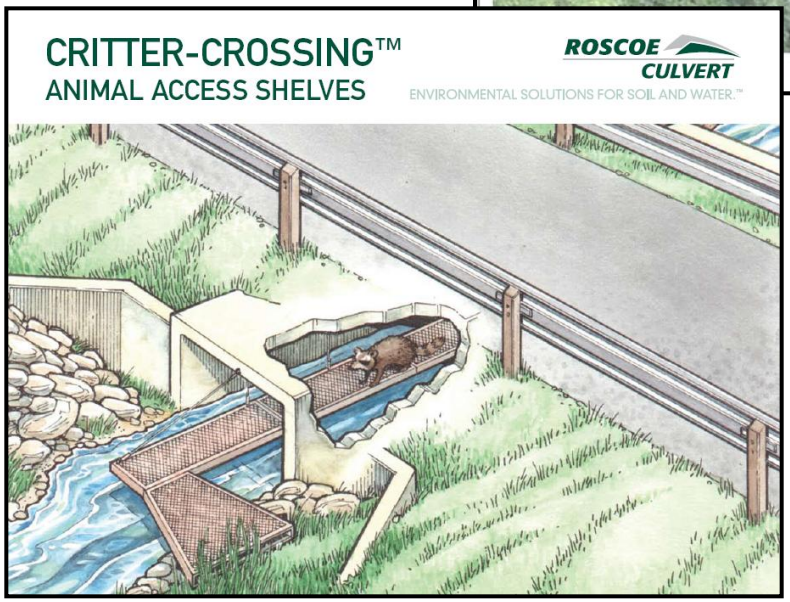
Engineering Considerations

- Approach
- Aspect Ratio
- Line of Sight
- Light
- Moisture
- Bottom substrate
- Hydrology



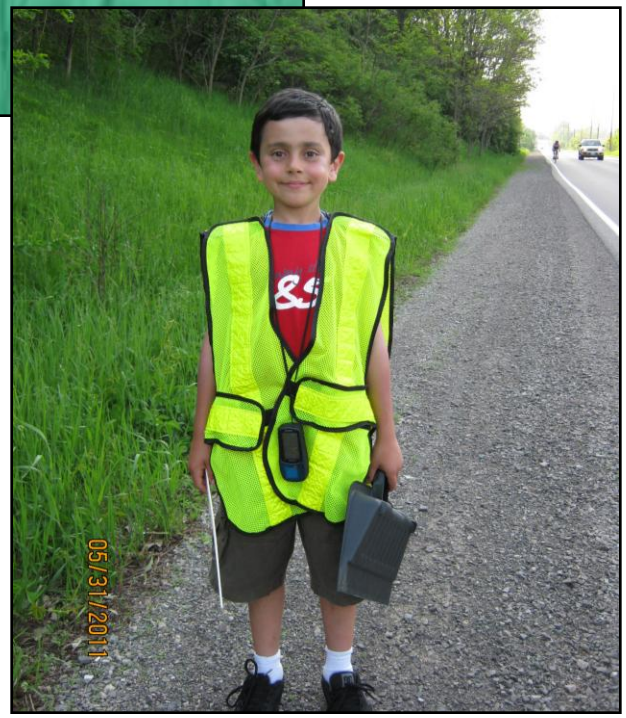
ESC

Always Question….

Does mitigation protect at the population level?

Monitor

Community Engagement



“The reaction was positive towards the road closure last year and shows how the community will support steps to protect the local environment,” said Rick Craven, Councillor, City of Burlington.

Stewardship to Solutions

Toronto and Region Conservation for The Living City

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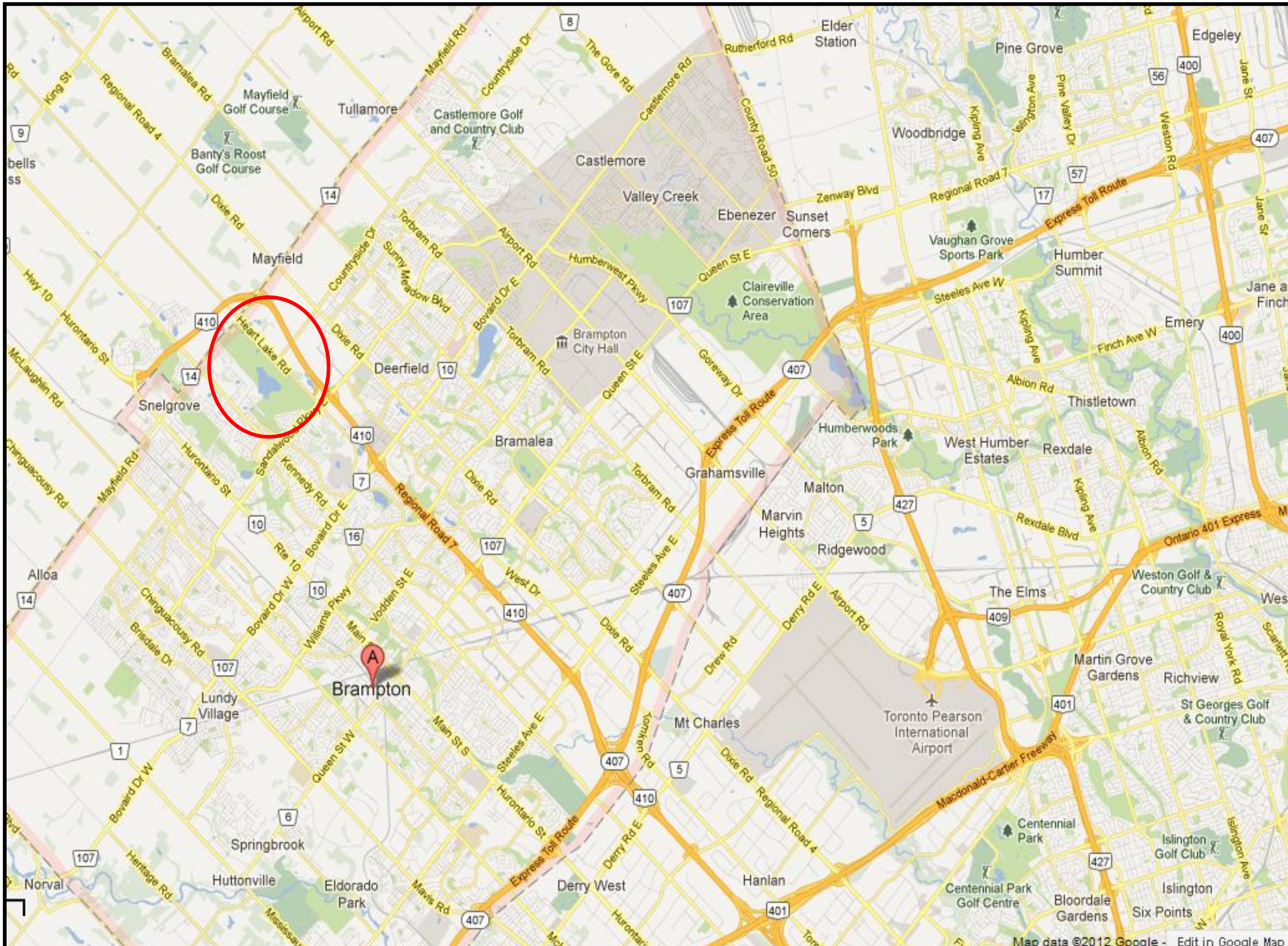

Brampton
Mayfield
Snelgrove
Deerfield
Bramalea
Castlemore
Valley Creek
Ebenezer
Sunset Corners
Tullamore
Woodbridge
Malton
Grahamsville
Toronto Pearson International Airport
Heart Lake Rd
Map data ©2012 Google


410
410
Heart Lake Rd
Heart Lake Rd N
Scouts
Canada Brampton
District

2 lane road bisecting PSW

The Process

May 2010

4 DOR PTs

Reported

OREG,TRCA, City of Brampton
Site Visit & Sign Placed

The Process

March 2011

Front Page Article

Community Meeting: > 70 Attended

Volunteers Recruited

BRAMPTON GUARDIAN

Corpse counters needed

Bramptonians can help protect the many frogs, turtles and snakes that hop, crawl and slither across Heart Lake Road every spring—by documenting the ones that didn't make it.

The Toronto Zoo is looking for volunteer "citizen scientists" in Brampton to help collect data this spring.

A section of Heart Lake Road, between Mayfield Road and Sandalwood Parkway, has been tagged for this first-of-its-kind wildlife monitoring project, being organized by the Ontario Road Ecology Group (OREG) at the Toronto Zoo.

Residents interested in volunteering their time to scientifically collect data on how many frogs, turtles and snakes die on the marsh-flanked roadway are invited to an information meeting Wednesday, March 30, 7 to 9 p.m. at Loafer's Lake Recreation Centre, 30 Loafer's Lake Lane.

Death Valley. Bramptonians can help protect the many frogs, turtles and snakes that hop, crawl and slither across Heart Lake Road every spring— by documenting the ones that didn't make it. The Toronto Zoo is looking for volunteer "citizen scientists" in Brampton to help collect data this spring. *Submitted photo*

The information on just how many are killed and where they are trying to cross will be used to find local solutions, and can even be applied nationally or globally, according to Mandy Karch, OREG co-ordinator.

Because the road bisects conservation land and marshy areas, there is a large number of casualties along that stretch every year. Last spring, six painted turtles were found dead on Heart Lake just in one day, and that fact caught the attention of OREG.

The Toronto and Region Conservation Authority (TRCA) and City of Brampton will supply the equipment needed to do the monitoring, and will work with Karch to train the volunteers and share the collected data.

Karch said similar monitoring projects may be undertaken in other parts of the province if the local project is successful.

"We're hoping to expand this to other municipalities and other local groups," Karch said.

OREG is an organization comprised of government and non-governmental scientists, educators and transportation planners, who work together to raise awareness about the threats of roads to biodiversity in Ontario and to research and apply solutions.

The solutions don't have to be too elaborate, according to Karch.

"A culvert that's already in place for hydrology can be very easily and very inexpensively converted into a crossing for wildlife, so there are very simple solutions," she said.

Culverts under the road are also very easily incorporated into a road resurfacing project or road widening, but the information has to be available to justify a crossing.

"Collecting data is critical," she said.

The monitoring starts in spring when snakes, frogs and turtles start to wake up, and move from their overwintering site to their feeding and reproducing ground, Karch said.

"So that (May) is a real key movement time," Karch said. "For turtles, June again is a key movement time because the females start looking for nesting areas. Species like snapping turtles and blanding's, they'll walk up to 16 kilometres in search of an appropriate nesting site."

In the fall, they are on the move again, moving from their "active" wetlands to an overwintering site.

"Particularly for snakes, October is a very critical movement period when we see a lot of mortality, unfortunately," Karch said.

She said the group is focusing on the species that are becoming extinct because of "road mortality."

With declining habitat availability and climate change, I think globally there's a decline in amphibians, so I think Canada is very lucky to have our population so we should really invest in their protection preemptively before they (are on the endangered species list)," she said.

For more on road ecology, visit the OREG's website is at www.torontozoo.com/conservation/RoadEcologyGroup.asp.

TORONTO AND REGION Conservation for The Living City

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Ontario Road Ecology Group www.torontozoo.com/conservation

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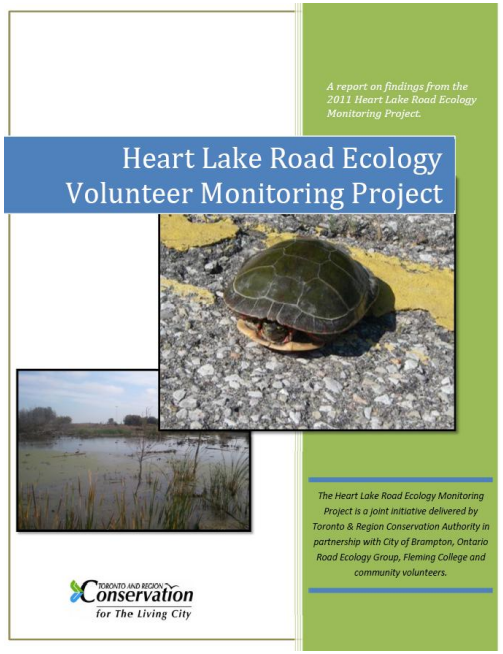
The Process

May - October 2011

Trained Volunteers

Collected Data

Reported



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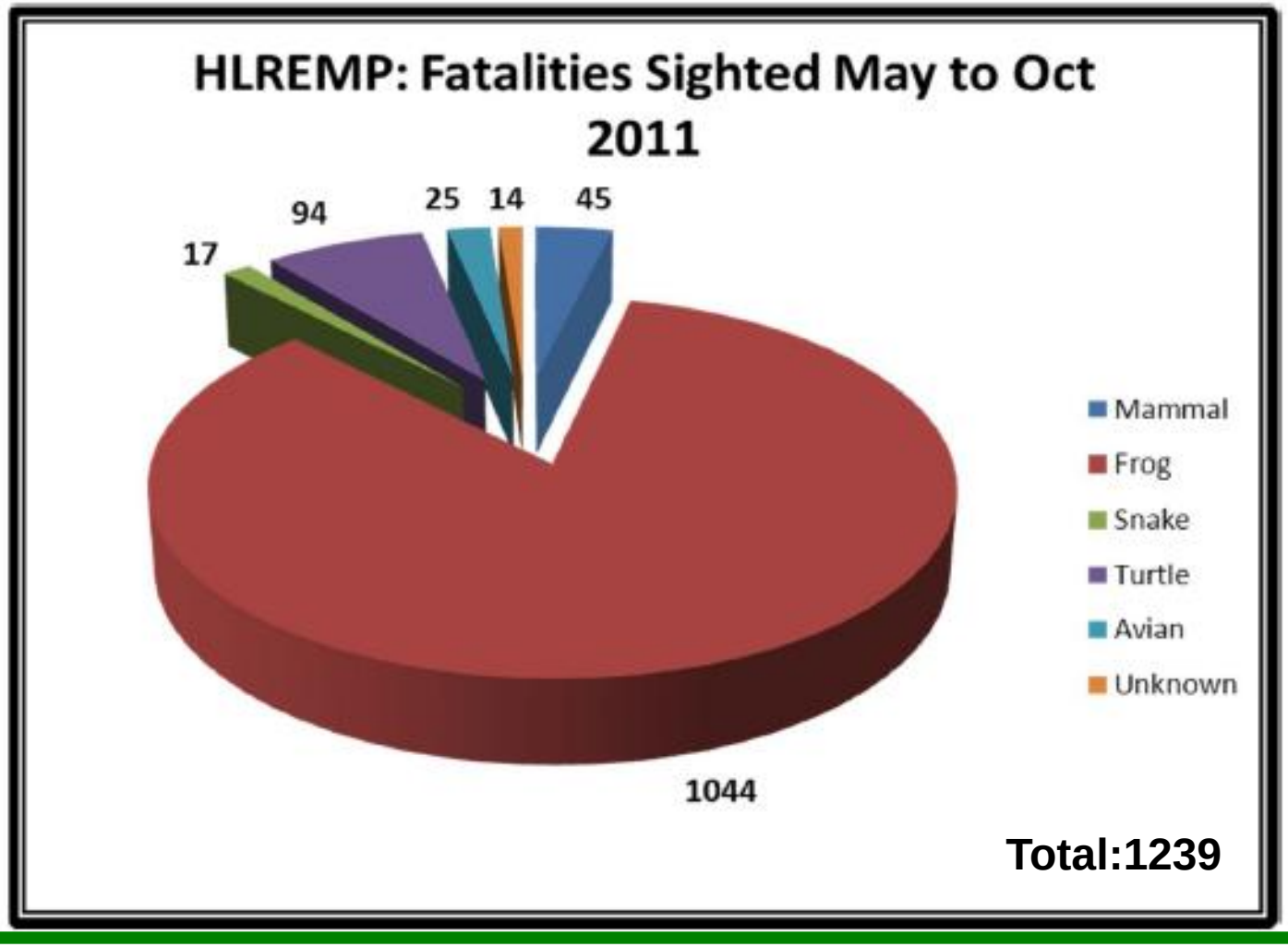
Findings


HLREMP: Fatalities Sighted May to Oct 2011
94
25
14
45
17
1044
Mammal
Frog
Snake
Turtle
Avian
Unknown
Total:1239

Solutions

- ✓Flush culverts ~ Completed Summer 2012 by the City.
  - *Brampton Environmental Planning and Advisory Committee passed the motion in Dec. 2011 after TRCA presented the HLREMP findings.*

Solutions

- All future development along HLR be required to install mitigation (*e.g. fencing to culverts*)
  - *Recommendation supported by City of Brampton Works & Transportation and TRCA.*

Solutions

- Install fencing & ecopassages

© Rick Levick

©ACO Wildlife

Next Steps…

- Meet with City of Brampton engineers

Explore the Options…

1. Retro-fit existing culverts?
   - Find
   - Location
   - Submerged
   - Small
   - CSPs

2. Research ecopassage design

- Considerations: PSW, sinking road, climate

A Brief Review of Installed ACO Wildlife Guidance Systems in Canada

Prepared by OREG 2013

- 5 (ON, AB, QC, + 1 in U.S.)
- Perform well in N.A. climate
- Wildlife move through

©ACO Wildlife

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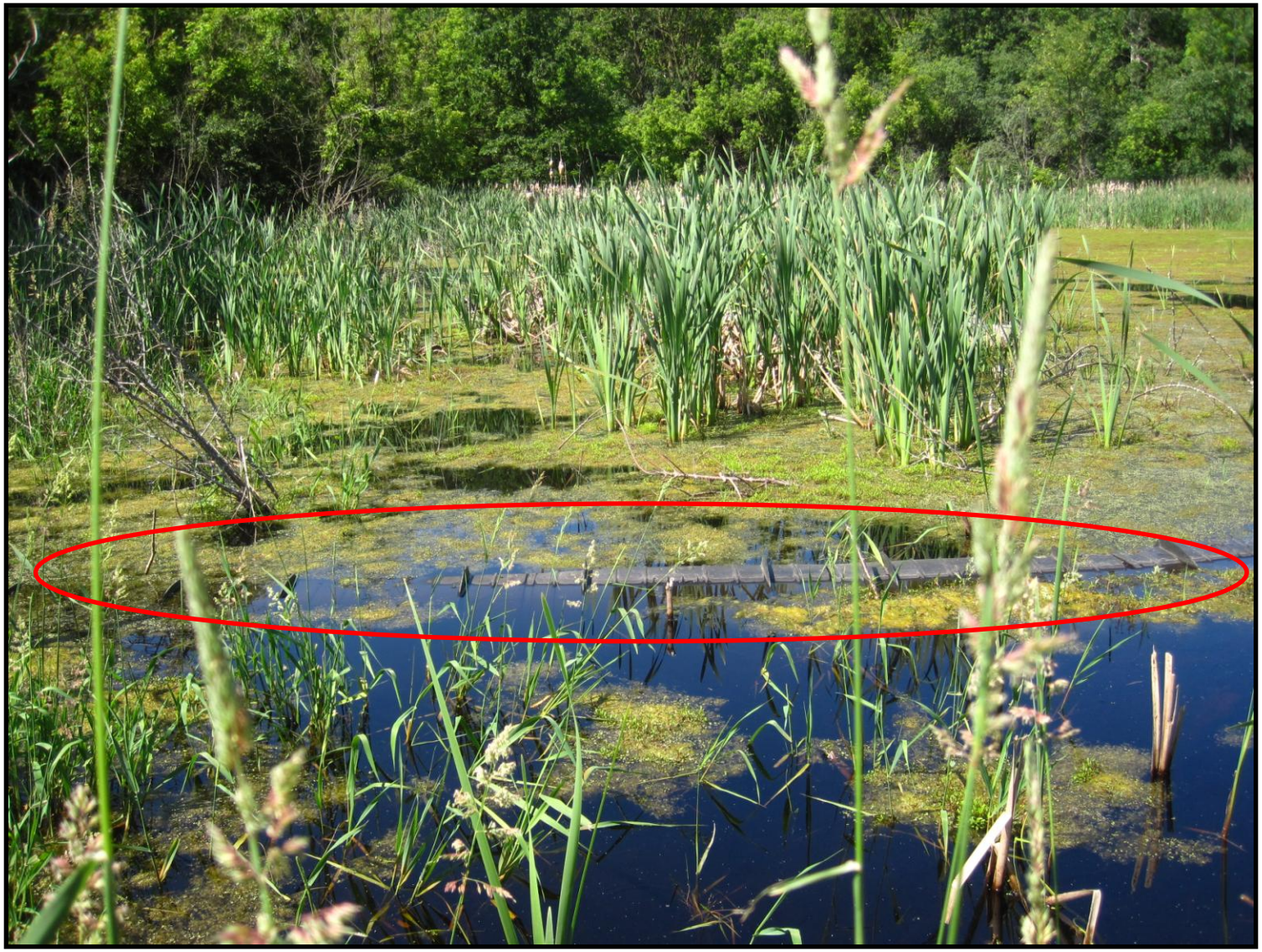

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2013 Successes

- ✓Mitigation is in the ground (w/ protocol)
- ✓Continued WVC data collection
- ✓Wildlife camera trials
- ✓Explore habitat creation

Toronto and Region Conservation for The Living City

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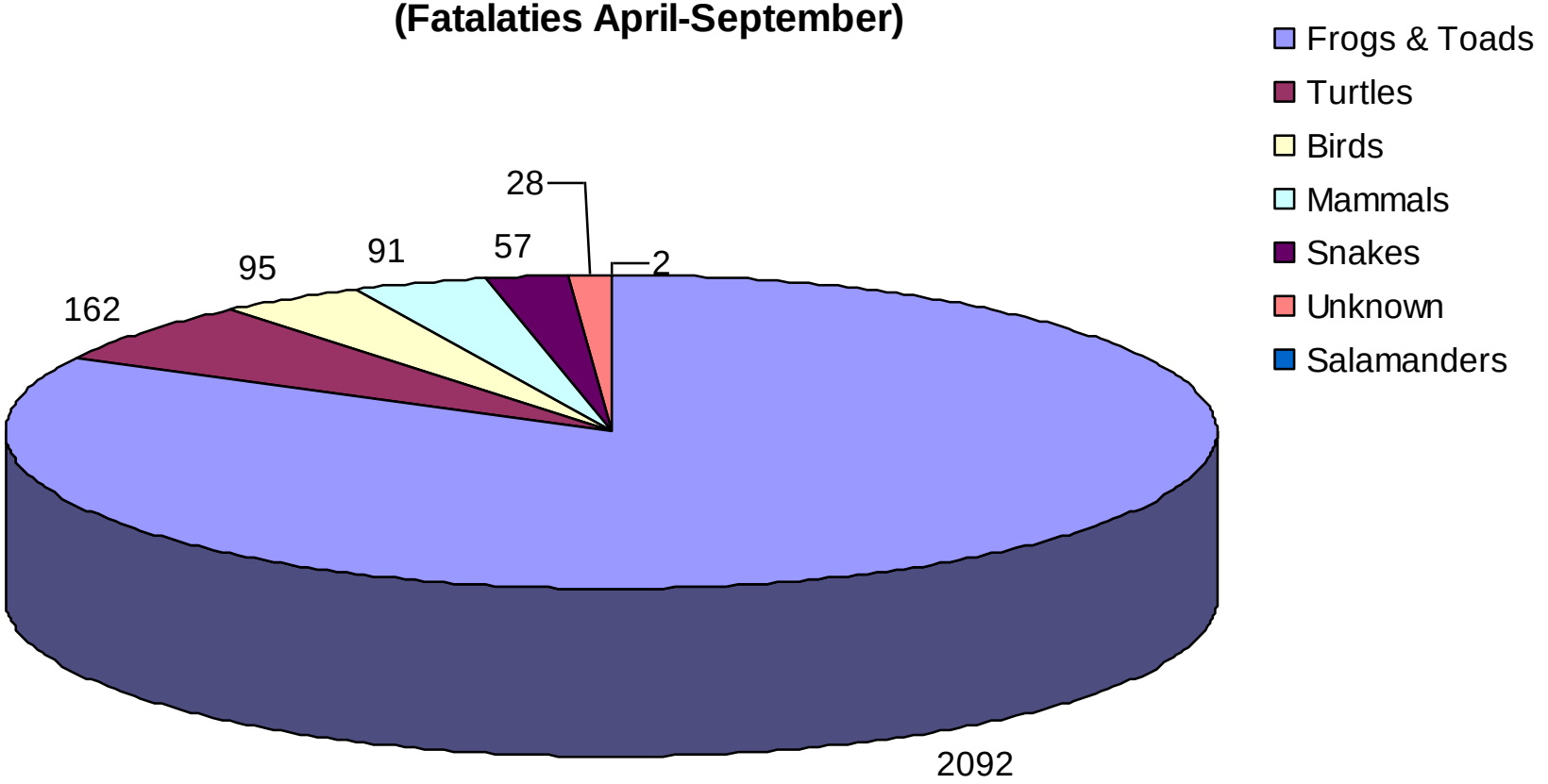
Heart Lake Road Ecology Volunteer Monitoring Project 2013
(Fatalaties April-September)



"If you kill 5% of adult turtles each year above the normal rate of mortality, the population will go extinct. It's inevitable."
Ron Brooks

Total = 2527

Toronto and Region Conservation for The Living City

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ROM Royal Ontario Museum

Next Steps…

- Ecopassage study for 2014
- Work with project partners
  - Budget
  - Material, Installation, Methods, Timing
- Maintenance & Monitor

Thank You…

- Vince D'Elia, TRCA Project Manager
- Casey Cook, TRCA Technical Assistant
- Alana Zibrowski, OREG Field Researcher
- Bob Noble, Citizen Scientist
- HLREMP Volunteers, Leo O'Brien
- City of Brampton
- ACO Systems Ltd.

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Moving Forward

- Work within municipalities
  - Research, mitigation, monitoring
- Partner across regions/municipalities/NHSs

Partnerships

Measuring the Sustainability Performance of New Development

Goal: To establish Sustainable Design Guidelines as one set of planning tools to achieve healthy, complete sustainable communities in each city.

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Richmond Hill

VAUGHAN

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Ultimate Goals

1. Landscape connectivity across Ontario
2. Protect and recover biodiversity and SAR

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Thank You!

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