



Long Point Causeway Bridge Replacement

2023 MEA Conference & AGM - Sarnia/Lambton

November 17, 2023
Bradley Dufour

Agenda

1. Land Acknowledgement
2. Safety Moment
3. Project Team
4. Project Summary
5. Conclusion



Land Acknowledgement

Traditional and treaty lands of the
Anishinaabe, Neutral, and
Haudenosaunee peoples.



Safety Moment

Working in and Around Water

- Identify hazards along edges and within the watercourse.
- Identify safe access/exit points.
- Wear proper PPE for the site, including PFD when water levels are above the waist.
- Ensure retrieval equipment is nearby.
- Have a spotter.



Project Team



- Rural single-tier municipality.
- Located on the north shore of Lake Erie in Southwestern Ontario.
- Population of 67,490.



Mike King, Director of Engineering
Adam Cave, Project Manager
Parsons - Contract Administrator
Arianne Cowx
Kim Arnold
Sean Fraser

 <https://www.norfolkcounty.ca>



Project Team



- Founded in 1994 and based in Woodstock
 - Bridge Reconstruction/Rehabilitation
 - Construction Management
 - Design-Build
 - General Contracting
 - Aggregates
- Quality, timeline, and professional and environmental safety.
- Safe working conditions for employees.
- Environmentally responsibility and professional construction management for clients.

 <https://www.sierraconstruction.ca>



Project Team



Sierra Bridge, founded in 2017



Eric Carriere
Nick Angeloni
Phil Elliott

Sub-contractors:

- Allan's Excavating
- ASI Marine
- Dufferin Concrete and Asphalt
- Jim Granger Excavating
- Royal Fence
- Salit Steel
- Soletanche Bachy Canada
- Stubbe's Precast
- Waterford Sand and Gravel



Project Team



LEA Consulting Ltd.

- In operation since 1953
- Canadian-based, employee-owned
- Planning, design, and CA services
 - Transportation Planning
 - Municipal and Highway Services
 - Bridge and Building Design
 - Environmental
 - ITS / Infrastructure Security
 - Contract Administration

 <https://www.lea.ca>



Project Team



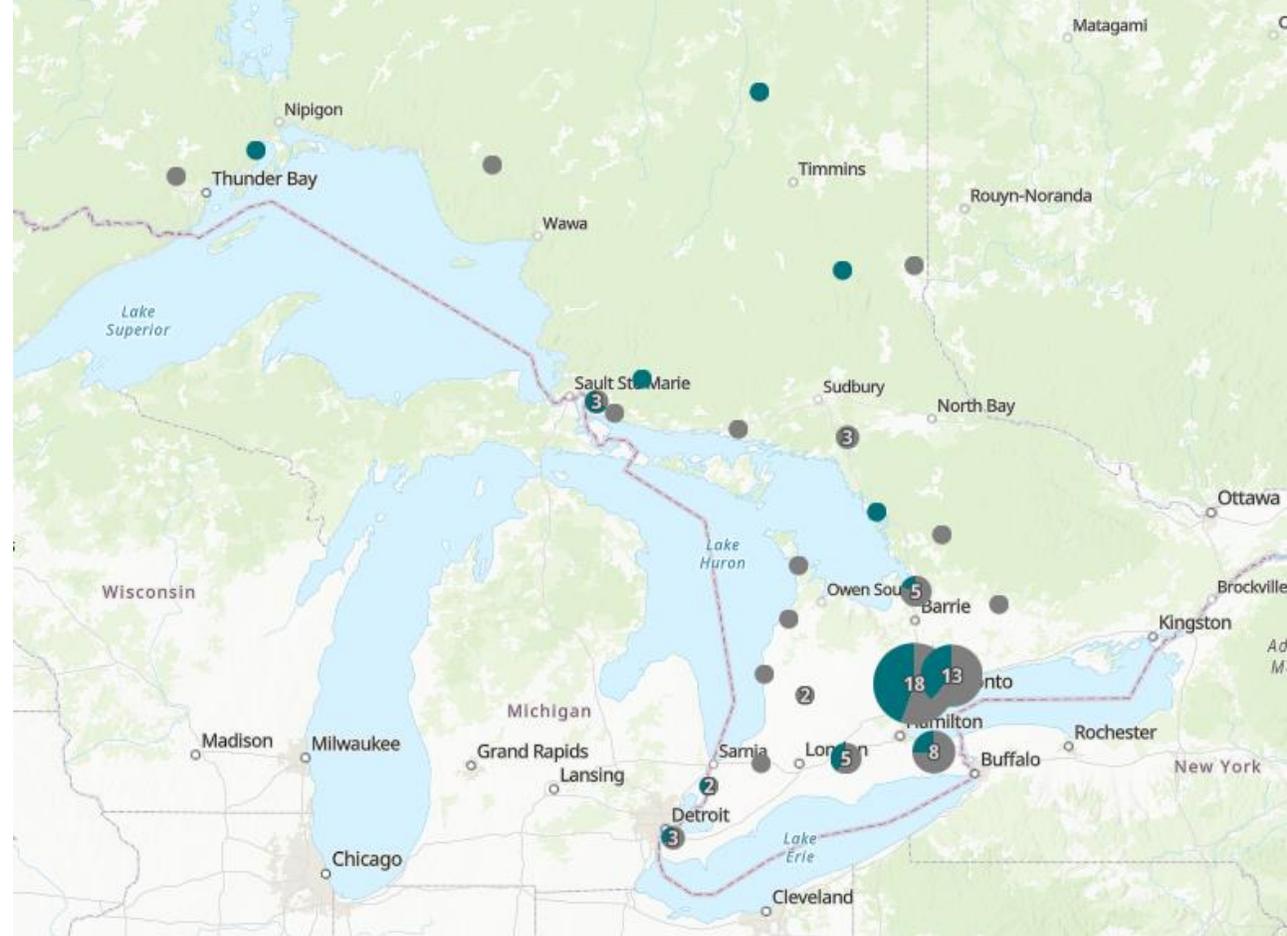
Environmental Team - 2019



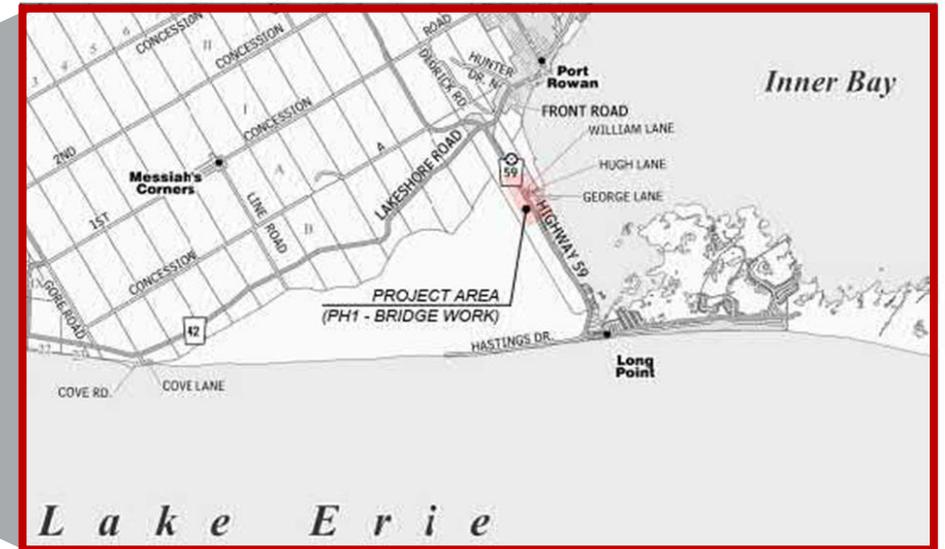
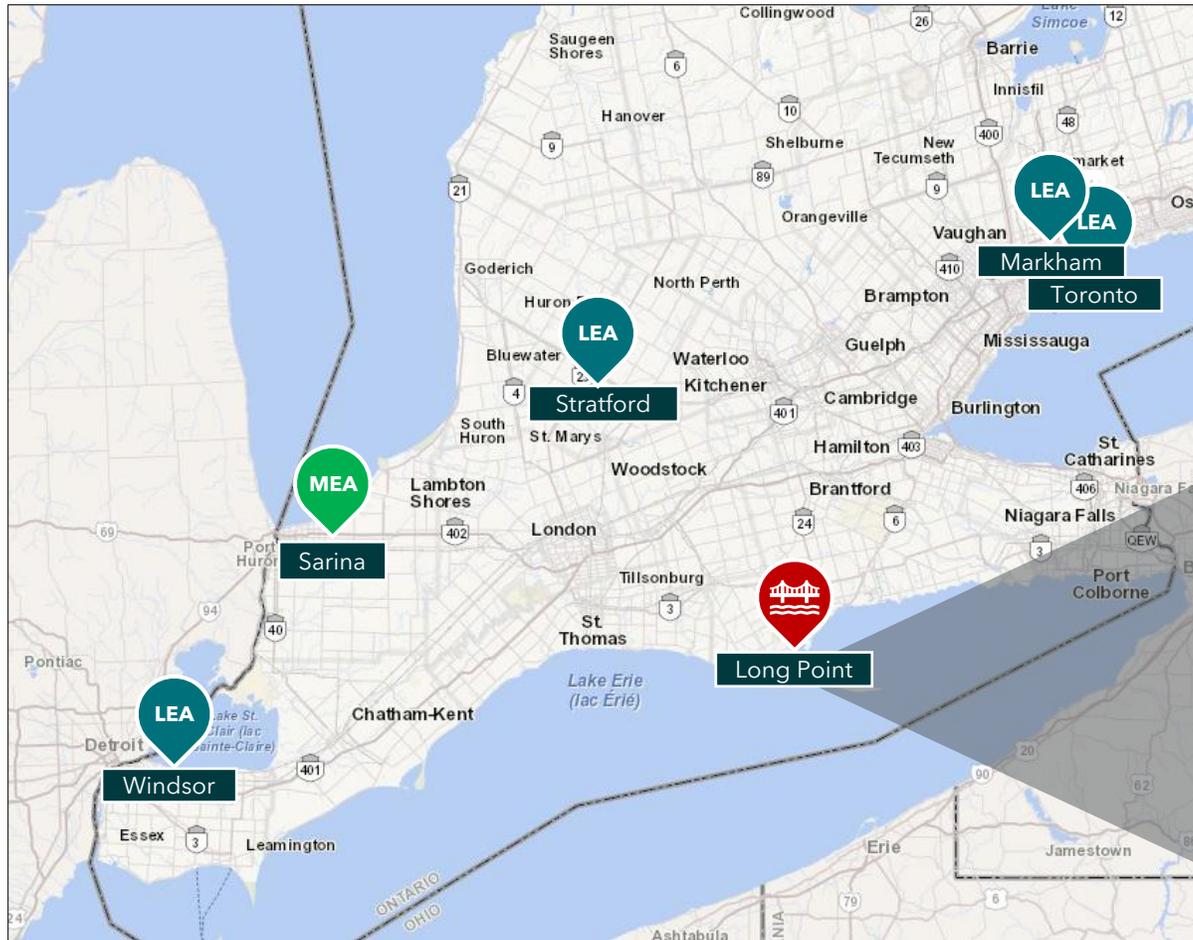
10 staff - Planners, Biologists, Ecologists, Excess Soils

- Work across the province
 - EA studies
 - Natural heritage studies
 - Transportation, transit, and land development markets
 - Excess soils QP studies and support
 - Construction management and compliance support

Check us out on StoryMaps!



Project Location



Existing Road

- Long Point Causeway was constructed in 1957.
- 2-lane north-south arterial road.
- Ontario's South Coast Scenic Route.
- Poor pavement and substandard safety and operational conditions.
- Attractive for tourists.



Existing Road Cont.

- Physical barrier.
- Basking and nesting reptiles.
- Known hotspot for wildlife mortality.
- Long Point Causeway Improvement Project:
 - Open grate ACO tunnels, concrete box culverts and the bridge promote wildlife passage.
 - Measures in place to reduce mortalities:
 - Static signage
 - Digital signage
 - Exclusionary fencing



Existing Bridge

- Originally constructed in 1959.
- Eligible for designated under the *Ontario Heritage Act* - unique example of a simple timber trestle.
- Total deck length of 32.9 m and an overall width of 11.3 m with two-lane asphalt surface.
- Last rehabilitated in 1997.
- 2016 OSIM - major rehabilitation or replacement within 1-5 years.
- Emergency repairs completed in 2018 in response to extended deflection.



The Causeway was constructed with wooden bridges. The longest bridge spanning Big Creek is shown here.



EA Study

- Schedule B Municipal Class EA completed in 2019.
- 'Long List' and 'Short List' developed for bridge replacement alternatives.
- Preferred Alternative:
 - **Horizontal alignment shift 7 m to the west to accommodate staged construction.**
 - No change in vertical alignment to maintain driveways - maintains existing navigational clearance.



Existing Environment



- Long Point Causeway is adjacent to the Big Creek National Wildlife Area (NWA).
 - 771 ha of mostly wetland (95%)
 - Big Creek Unit (615 ha)
- Big Creek NWA is part of the Long Point World Biosphere Reserve (designated by UNESCO in 1996).
- Big Creek Canadian Important Bird Area.
- Local habitat available for **21** provincially/ federally protected Species at Risk.

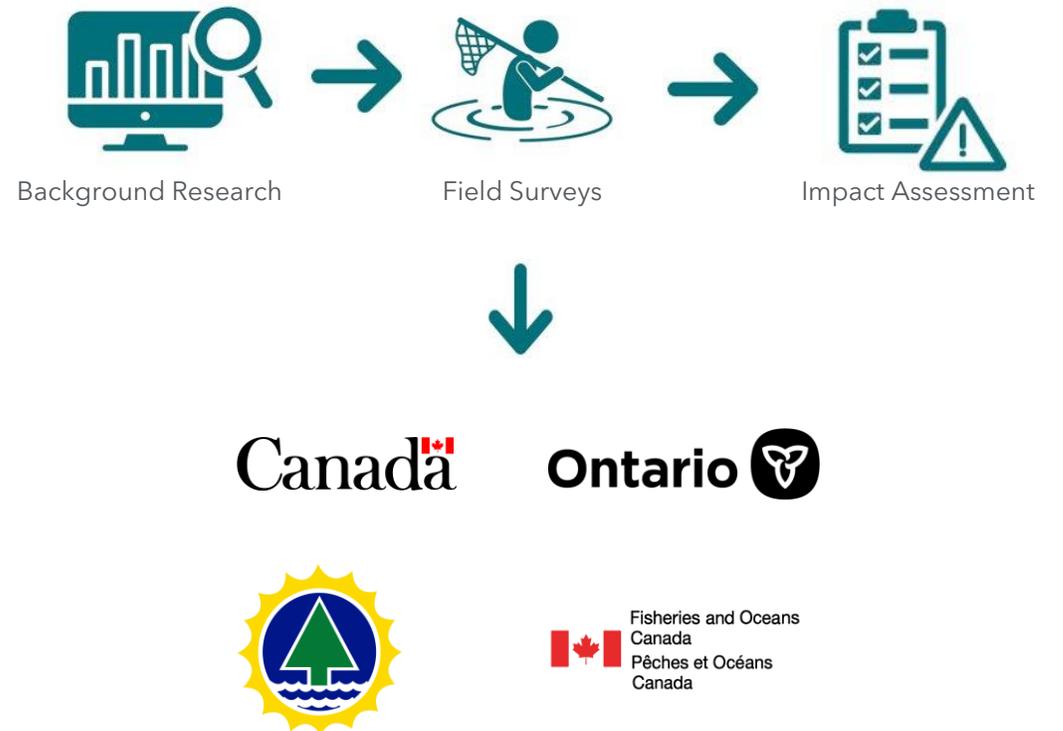


LONG POINT
BIOSPHERE
— REGION —



Project Approvals/Permits

- **Permanent loss of habitat resulting from the horizontal alignment shift.**
 - *Species at Risk Act* – federally protected aquatic species.
 - *Species at Risk Act/Canada Wildlife Act* – work in the NWA.
 - *Endangered Species Act* – provincially protected aquatic/terrestrial species.
 - *Conservation Authorities Act* – LPRCA.
 - *Canada Wildlife Act* – work in the NWA.



Tender Innovation

- Issued for tender in June 2020.
- Individual References and Experience Forms formed a part of the bid - Environmental Specialist and Qualified Biologist.
- SP - Environmental Management Plan.
- Focus on adaptive management and collaboration between LEA and Sierra.
- **370+** daily inspections completed in April 2021 - February 2023 during active construction.



Public Works
Engineering

Request for Tender
Long Point Causeway Bridge Replacement

Request for Tender No.: **PW-E-20-50**

Submission Deadline: **Tuesday, June-09-20**
before 2:00:00 PM local time

Parsons Inc.
540 Bingham Centre Drive, Suite 101
Kitchener, ON N2B 3X9

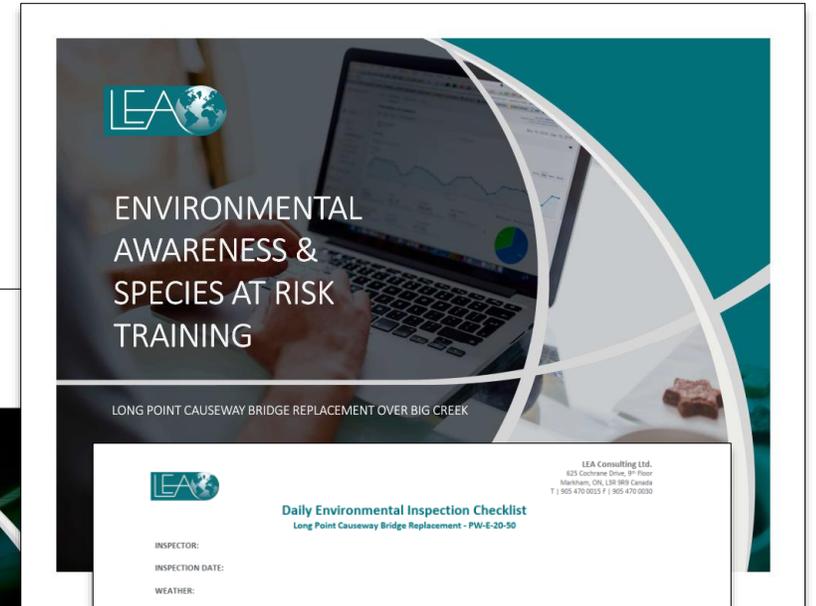
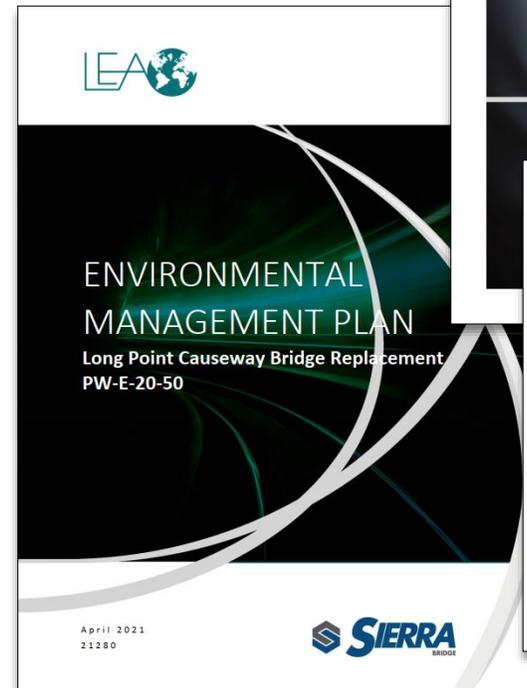
Rev. 02/20

6. Individual Reference and Experience Form – Appendix E

Completed and signed Individual Reference and Experience Form – Appendix E including Senior Supervisory Staff, Environmental Specialist, Qualified Biologist, and Qualified Fisheries Biologist to be employed on this contract.

Environmental Management Plan

- Comprehensive document that considered all environmental factors and incorporated.
- Environmental Awareness, Training and Competency.
- Protocols and processes for incident reporting and communications.
- Development of environmental inspection checklist.



LEA Consulting Ltd.
625 Cochrane Drive, 9th Floor
Markham, ON L3R 9S3 Canada
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Daily Environmental Inspection Checklist

Long Point Causeway Bridge Replacement - PW-E-20-50

INSPECTOR: _____
INSPECTION DATE: _____
WEATHER: _____

Environmental Protection Measure	Compliance (Y, N, N/A)	Correction Action(s) Required	Comments
Erosion and Sediment Control			
All ESC measures properly installed and free from damage.			
No disturbed areas or stockpiles are unprotected.			
Decontaminating discharge treatment is set up as specified in the EMP.			
Measures as specified in the EMP are in place to prevent sediment from entering the watercourse when work is being conducted on platforms over the water.			
Rack check dams are properly installed and maintained as per OPSS 218-210.			
Fish and Fish Habitat Protection			
Only work required to occur in watercourses or on watercourse banks is being conducted in these areas.			

LEA CANADA | INDIA | AFRICA | MIDDLE EAST

EMP Objectives

1. Reduce Species at Risk and general wildlife road mortality.
2. Mitigate adverse impacts to wildlife habitat related to construction.
3. Reduce human wildlife encounters during construction.
4. Maintain ecological connection and avoid phenological disruptions.



Environmental Protection Design Innovation

- Use of steel sheet piles to provide wildlife exclusion (and flood protection).
- Multi-barrier approach for bridge work.



Challenges

- Private roads and driveways present within the project limits.
 - Permanent gaps in perimeter exclusion measures.
 - Maintained for residents to access their homes/cottages.
 - Noted increase in wildlife activity in these areas.
 - Increased focus of inspections and monitoring on these areas.
 - Communication with residents.



Challenges

- Silt fence barrier as wildlife exclusion and siltation control.
 - Road base was variable in composition and narrow shoulders.
 - Persistent wind and degradation.
 - Burrowing muskrats.
 - Increased monitoring, site specific adjustments.



Challenges

- Reversing flows in Big Creek.
- Variable discharge rates in Big Creek.
- Change in water levels.
 - Constant adjustments, anchoring and re-deployment of turbidity curtains.
 - Delays in work.



Challenges

- Narrow causeway and limited areas for staging and temporary works.
 - Excess material managed offsite.
 - Treatment of dewatering discharge.
 - Multi-barrier approach.



Challenges

- Invasive Phragmites.
 - Excess material managed offsite.
 - Completed in single and continuous operation.
 - Pervasive beyond ROW.

Clean Equipment Protocol for Industry

Inspecting and cleaning equipment for the purposes of invasive species prevention



 Invasive Species Centre
Centre for research and response

 Ontario

 ONTARIO INVASIVE PLANT COUNCIL



Fish and Wildlife Relocation

- Water depths and steep banks was an issue.
- Turbidity curtain issues - breaches and detachment.
- Wildlife relocation completed during 'sweeps' and on an as needed basis.



Challenges

- Coordination with Contract Administrator and regulators to communicate concerns and progress - compliance with permits and approvals.
- Regular meetings and site visits by regulators.
- Sharing Inspection Reports and Wildlife Encounter Reports.



LEA Consulting Ltd.
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Markham, ON, L3R 9R9 Canada
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Wildlife Encounter Report Long Point Causeway Bridge Replacement - PW-E-20-50

Encounter Information	
Name of Observer	
Date	
Location	
Species/Description	
Nature of Interaction	
Status (alive/dead/injured):	
Behaviour:	
Measures Implemented	
Notification	

toronto ZOO

SNAKES OF ONTARIO IDENTIFIER
An identification guide to the Eastern Massasauga Rattlesnake and other Ontario snakes

Recovery through education and conservation.

This guide will help you identify the Eastern Massasauga Rattlesnake and other snakes in Ontario. The Massasauga is one of five Ontario snakes with black heads. Snakes on this identifier are grouped by appearance: blotched, striped, and no pattern. When you see a snake, look at its size and pattern. When it has blotches, stripes, or no pattern.

Snakes are illustrated at common life size. These snakes are not found in all Ontario regions. Consult a Field Guide for more details in your area. The size of snakes include U.S. populations as listed in: Conrad, Roger and Joseph T. Collins 1988. A Field Guide to Reptiles and Amphibians of Eastern and Central North America, 4th edition. Houghton Mifflin Co., Boston.

For information on rattlesnake workshops, or the Toronto Zoo's Rattlesnake Education Programme write to: Toronto Zoo - Rattlesnake 2824 Old Finch Ave. Toronto, ON, Canada M1S 5E2 or e-mail: education@torontozoo.on.ca Visit the Massasauga Rattlesnake Recovery Team website: www.massasauga.ca

Eastern Milksnake
Lampropeltis triangulum
• 81.90 cm; record 102.1 cm
• Cream, tan, or light grey with red or dark brown black bordered blotches on back alternating with blotches along each side
• Young have red blotches bordered in black
• Blotch on neck may appear 'Y' or 'V' shaped
• Belly whitish with black checkerboard pattern
• Scales smooth, single anal scale
• Lays eggs
• SPECIES AT RISK

Eastern Hog-nosed Snake
Heterodon platirhinos
• 51-84 cm; record 115.6 cm
• Large dark blotches down back alternating with smaller blotches along sides
• When threatened, approach neck to display darker neck pattern and will roll over to play dead
• Can exist in several colour phases: blotched phase, plain grey, green-brown or even black
• Thick head
• Tail held with upturned snout
• Belly yellow or grey or greenish grey pattern
• Underneath of tail lighter colour than body
• Scales keeled, anal scale divided
• Lays eggs
• SPECIES AT RISK

Northern Watersnake
Nerodia sipedon sipedon
• 81-107 cm; record 145.5 cm
• Well patterned blotches have reddish brown regular blotches down back with row of alternating blotches along each side
• At least of body, some blotches extend as saddles over back and on to sides
• Pattern on side individuals may be observed so that they appear black or brown
• Belly cream with irregular rim of reddish half moon crescents
• Usually found in or near water
• Scales keeled; anal scale divided
• Gives birth to live young

Lake Erie Watersnake
Nerodia sipedon insularum
• 81-106 cm; record 145.5 cm
• A sub-species of the more widespread Northern Watersnake
• Range from uniformly grey with no markings to dark grey brown with some banding
• Only found at western end of Lake Erie and on Pelee and surrounding islands
• Belly whitish yellow to grey
• Scales keeled; anal scale divided
• Gives birth to live young
• SPECIES AT RISK

Eastern Massasauga Rattlesnake
Sistrurus catenatus
• Ontario's only venomous snake
• 47-76 cm; record 100.3 cm
• One to brownish grey with darker blotches along back and several rows of alternating blotches along sides. Blotches edged in white
• Fit on each side of head between eye and nostril
• Distinct engorged belly
• Tail thick, squarish; does not taper to a point like other snakes
• Does not always rattle a warning; rattle on pattern and remaining motionless to go undisturbed
• Thick head; often found coiled
• Belly dark
• Scales keeled; single anal scale
• Gives birth to live young
• SPECIES AT RISK

Juvenile Foxsnake
Pantherophis gloydi
• Grey with reddish-brown blotches edged in black
• Dark bar across snout from eye to jaw
• Community museum for education

Eastern Foxsnake
Pantherophis gloydi
• 91-127 cm; record 170.1 cm (large snake)
• Yellow-brown with large brown or black blotches on back that become with smaller blotches along sides
• May have red brown head
• Belly yellow with black checkerboard pattern
• Scales evenly keeled; anal scale divided
• Lays eggs
• SPECIES AT RISK



CANADA | INDIA | AFRICA



Species at Risk

- Eastern Foxsnake nesting within the existing abutments.
- Basking Blanding's Turtles.
- Incidental observations and reporting.
- Identification, delineation and protection of turtle nests within the work area.
- Collaboration with other partners - federally funded project to monitor road mortality.
- Protocols and procedures to capture, handle, relocate, and treat injured individuals.



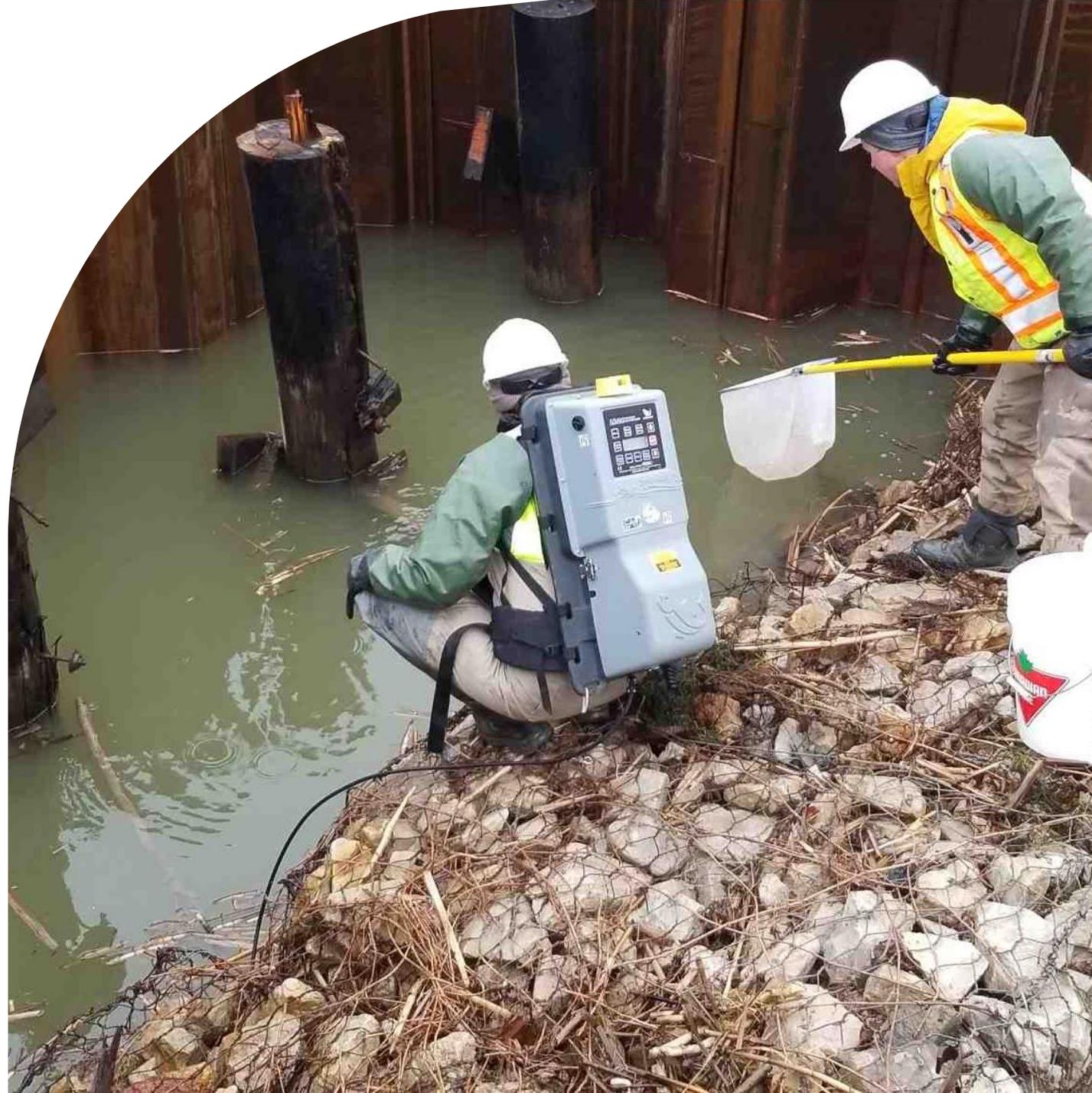
Indigenous Community Participation

- Periodic monitors on site to review work operations ensuring protection of the environment.
- Coordinated concerns and issues that were observed/raised.
- Archaeological considerations:
 - Excavations along the causeway.
 - Smith Marsh habitat compensation construction.
 - Net anchors



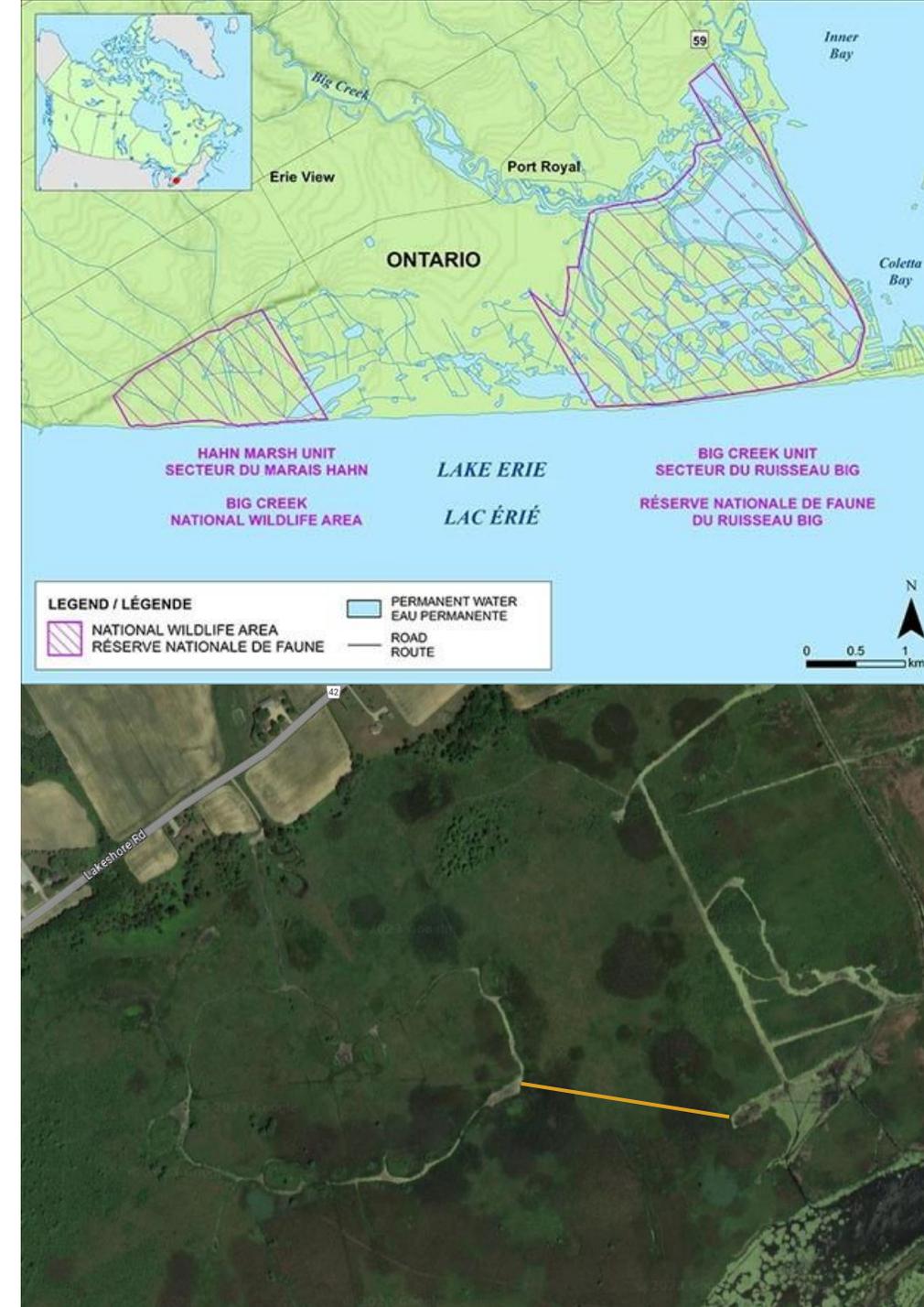
Regulatory Agency

- Coordinated site reviews with DFO during construction.
 - Permit compliance review and audit.
 - Ensure conditions of approval were effectively implemented and maintained.
- **Challenge:** maintain consistency for regulatory staff new to the file.



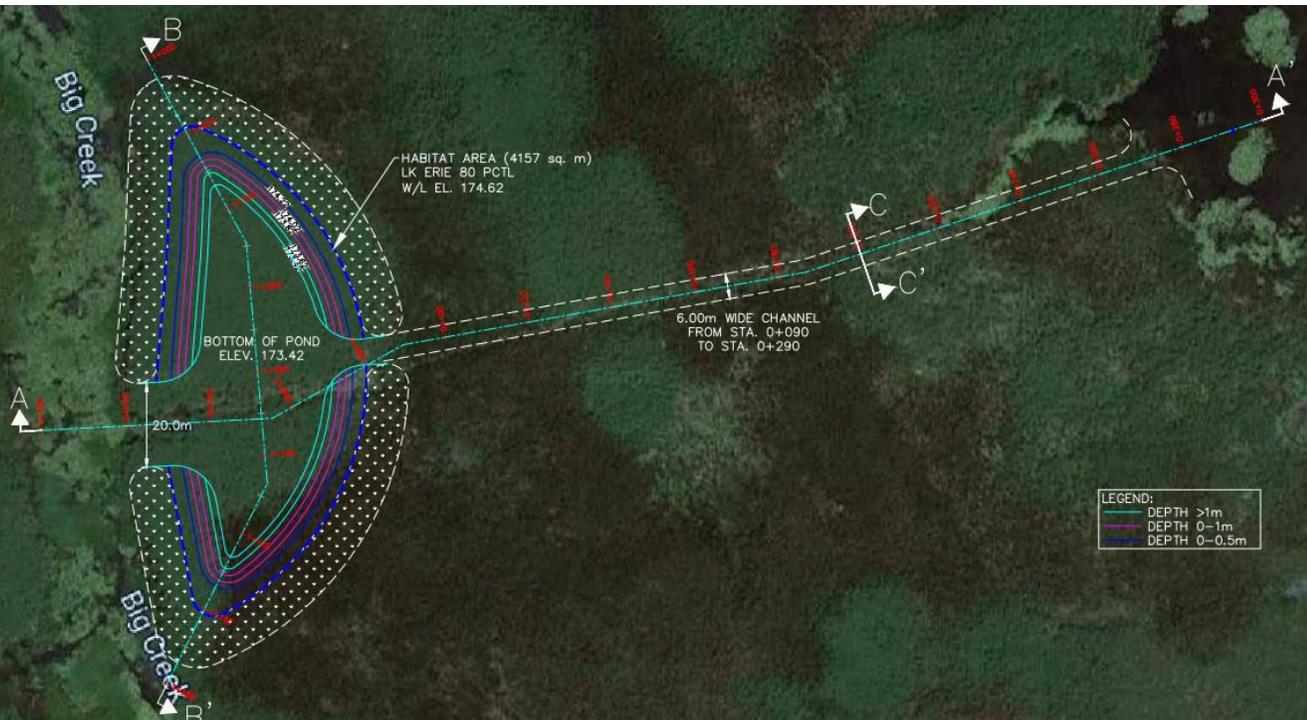
Habitat Compensation Monitoring - Hahn Marsh Unit

- Compensate for wetland loss at a 4:1 ratio resulting in 2,732 m² of enhancement in the Hahn Marsh Unit in the Big Creek NWA.
- 400 m x 7 m channel connecting two (2) ponds to improve connectivity.



Habitat Compensation Monitoring - Hastings Marsh

- Compensation of approximately 4,157 m² of wetland habitat at Hastings Marsh.
- 6 m wide channel.



Permanent Exclusion Fencing Design

- Constructability and maintenance issues identified by Sierra.
- Re-design completed - input from technical consultant.
- Included escape ramp.
- Effectively implemented to ensure primary objective was obtained - reduce Species at Risk/wildlife road mortality.



Keys to Success

- Vision of Norfolk County to ensure proper resources were allocated for environmental protection.
- Collaboration with the Norfolk County, Contract Administrator (Parsons), Sierra and LEA - with the same goal/outcome for success.
- Effective communication:
 - Clarify expectations early and often.
 - Pre-emptively identify risks and manage accordingly.
 - Adaptive management - responsive to changed conditions/operations.



Conclusion

- Unique project in sensitive environmental area.
- Novel approach put forward by Norfolk County.
- Sierra proactive and allocated resources.
- Active engagement and open communication between all parties and all levels.



An aerial photograph showing a two-lane asphalt road with a yellow center line and a metal guardrail on the left side. The road runs north-south through a vast wetland area. To the left of the road, there are large, irregularly shaped water bodies surrounded by marshy ground with patches of green and brown vegetation. To the right of the road, there is a cluster of residential buildings, including a large white house with a dark roof, several smaller structures, and a swimming pool. The surrounding landscape is a mix of green grass, brown reeds, and scattered trees. In the far distance, a flat horizon line is visible under a sky filled with large, white, fluffy clouds. The overall scene depicts a rural or semi-rural wetland environment.

Q&A

Thank you!

