
EXECUTIVE SUMMARY

Blanding's Turtles nest in the granular shoulders of roadways, burying eggs beneath the ground surface. Visual detection of nests is not possible. Highway rehabilitation can damage or destroy eggs from May 21 to October 31. This project brought together the Ontario Ministry of Transportation (MTO), an engineering firm (McIntosh Perry Consulting Engineers [MP]), and two non-profit wildlife conservation organizations (Working Dogs for Conservation [WD4C] and Scales Nature Park) with the shared goals of species conservation and improved mitigations measures for road improvement work. **McIntosh Perry Consulting Engineers is the organization being nominated for the TAC Environmental Achievement Award.**

Detection dogs from the non-profit organization Working Dogs for Conservation [WD4C] were trained in Ontario to locate Blanding's Turtles nests, a federally and provincially listed Species at Risk, along roadways. This work contributes directly to environmental protection during road infrastructure renewal and conservation of species at risk turtles. It provides transportation practitioners with a tool to detect the nests of Blanding's Turtles, expands the number of working days during the construction season, enables conservation of this Species at Risk (SAR), minimizes disposable costs typically applied via temporary exclusion fence, and achieves compliance with legislation.

1.0 SUMMARY OF THE ACTIVITY UNDERTAKEN TO PROTECT AND ENHANCE THE ENVIRONMENT: PROJECT OBJECTIVES, SOLUTIONS AND ACHIEVEMENTS

What were the client's objectives for the project?

To design and administer a pilot research program, in support of a capital construction project, to explore alternative mitigation measures to protect the eggs of Blanding's Turtles (*Emydoidea blandingii*) from harm during highway construction projects. Blanding's Turtles frequently build nests and bury their eggs along the granular shoulder of Ontario roadways. The turtles conceal their nests so well they are virtually impossible to detect visually. Under Ontario's *Endangered Species Act (ESA, 2007)* it is prohibited to harm or destroy a Blanding's Turtle or its eggs (i.e. during road construction). This presents two options:

- Install temporary silt fencing to prevent turtles from accessing and nesting within the shoulder of the road prior to the start of the turtle nesting period (May 15th), or
- If temporary silt fencing cannot be installed by May 15th, delay the road construction/improvement project until after October 1 to ensure all eggs have hatched.

The project research was focused on achieving compliance with the ESA, reducing throw-away costs associated with silt fencing, conserving Blanding's Turtle eggs and increasing the available working days to deliver capital construction projects. It represents *the first effort to train detection dogs* in a controlled environment *to locate the eggs and nests of Blanding's Turtles in the wild for protection and/or relocation*. The project's specific objectives were to investigate mitigation measures that conserve species at risk (SAR);

expand working days for capital contract program delivery; and help MTO meet its legislative requirements under the *Endangered Species Act* (ESA, 2007).

What contribution was made to the protection and enhancement of the environment?

Protection of the environment was achieved by training dogs to detect the nest and eggs of Blanding's Turtles to conserve this species during transportation capital construction projects. By retaining the eggs on the landscape (i.e. in situ conservation) the species is able to maintain population levels. ***Enhancement*** of the environment is achieved by following a new process during a transportation project;

1. Deploy dogs to detect a Blanding's Turtle nest;
2. A biologist unearths the eggs;
3. Transport the eggs to a wildlife rehabilitation facility (i.e. ex situ conservation)
4. Incubate the eggs in controlled conditions;
5. Hatch the eggs indoors without predators present and
6. Release the hatchling turtles back to their wetland habitat adjacent to the collection site!

This allows for enhancement of the environment by increasing the survival rate of hatchling turtles by protecting them during their vulnerable incubation period when they are normally exposed to predators (i.e. racoons, foxes, coyotes, skunks, etc.).

Using conservation dogs enables a transportation project to be flexible in steps taken to conserve Blanding's Turtles. Once the dogs detect a turtle nest, the transportation professional is given the choice to either;

1. Protect the nest in place and modify activities around the nest until the eggs hatch;
- OR
2. Relocate the eggs to a wildlife rehabilitation centre and continue with planned activities.

Both approaches raise the quality of the environment by conserving Blanding's Turtles. This species has a limited distribution in Canada and the United States. ***Both approaches lead to increasing the population levels of this Species at Risk turtle and contributes to the conservation of this species.*** This species is long-lived (70+ years), doesn't lay eggs until a female is in their teens or twenties, and thus survival of each egg is critical to the survival of this species. This approach provides transportation professionals with the tool to conserve Blanding's Turtle in alignment with their project goals and timelines. It should be noted that this approach could be applied to other Species at Risk to support transportation projects.

2.0 DEGREE OF INNOVATION SHOWN TO ADDRESS AN ENVIRONMENTAL ISSUE

Traditionally silt fence (i.e. geotextile fencing) is installed in a work area prior to nesting period of Blanding's Turtle in effort to exclude turtles from entering and nesting within the work area. Silt fence has several limitations which include:

- It can be difficult for a transportation agency to tender work prior to the turtle nesting season;
- It is often installed incorrectly, reducing its effectiveness as a reptile exclusion barrier;
- Project location may contain entrance driveways and other features which do not allow for installation of a long, continuous fence need for exclusion of turtles;
- Terrain may be too rocky which prevents effective silt fence installation;
- It can be difficult to get a tender issued in time for silt fence installation (i.e. prior to turtle nesting season) and
- It is costly to install long stretches of silt fence (i.e. @ \$15/m x 5000 m = \$75,000).

This pilot research represents *the first effort to train detection dogs* in a controlled environment *to locate the eggs and nests of Blanding's Turtles in the wild for protection and/or relocation*. It is believed that this has the potential to offer vast improvements over the current paradigm of silt fence by:

- reducing throw-away costs associated with silt fencing;
- meeting project schedules and allowing detection dog work to happen alongside project milestones;
- conserving Blanding's Turtle eggs and
- increasing the available working days to deliver capital construction projects for transportation projects.

Does the design represent an innovative approach? Was there a unique combination of materials and/or equipment?

This project was innovative because it was the first time that detection dogs were used for road improvement projects in Ontario and it was the first time that detection dogs were used to locate species at risk (SAR) turtle nests in Ontario. This ground-breaking approach aimed to conserve species, provide jobs in Ontario, and reduce the cost of environmental mitigation measures. *This project brought together the Ontario Ministry of Transportation (MTO), an engineering firm (McIntosh Perry), and two non-profit wildlife conservation organizations (Working Dogs for Conservation [WD4C] and Scales Nature Park) with the shared goals of species conservation and improved mitigation measures for road improvement work.* This unique pairing of organizations helped to achieve a shared goal of turtle conservation during transportation infrastructure improvement.

What solutions were applied to meeting the project objectives?

McIntosh Perry Consulting Engineers (MP) were retained by MTO to design and carry out a research project, in support of a transportation capital construction project, aimed at training detection dogs to locate eggs and nests of Blanding's Turtles. The project's principal activities included:

- **Immigration:** Coordinated immigration of professional dog trainers/scientist-biologists from the American non-profit organization ***Working Dogs for Conservation (WD4C)***. WD4C scientist/biologists are world leaders in applying the science of detection dogs to locate conservation targets.
- **Collaboration:** Assembled a team of professionals from MP, WD4C and Scales Nature Park (Scales) to carry out the research. Scales is an education and outreach centre based in Orillia, Ontario that is dedicated to the conservation of Ontario's amphibians and reptiles.
- **Research:** Carried out the research project under a very constrained schedule (the Blanding's Turtle nesting period is May 21 to July 15).
- **Documentation:** Project documentation included a formal report and a summary video which can be online at; <https://www.youtube.com/watch?v=d6hsyycX4kw>

How well did the firm use its internal resources, experience and expertise?

MP brings extensive expertise in detail design and design-build, having delivered numerous culvert replacement, bridge design, roadway reconstruction projects across Ontario. From this experience, the MP team has a comprehensive understanding of the link between the physical road infrastructure and the natural environment. We understand road ecology is the interface between the construction zone and aquatic species. *The MP team was aware of the limitations of current Species at Risk turtle mitigation measures and identified to MTO the need to review innovative approaches. MP spawned the concept of using conservation dogs, and proposed the study to MTO.*

McIntosh Perry applied the full extent of its engineering, environmental and human resources staff expertise to allow this project to be successfully completed. Specifically, to get the WD4C experts into Canada, MP staff had to access the Government of Canada online Employer Portal to submit the Offer of Employment, pay the Employer Compliance Fee and obtain the Offer of Employment Number (a requirement for the Work Permit application; NATFA exemption under Code T23). McIntosh Perry partnered with Scales Nature Park to conduct the training at their facility, obtain access to Blanding's Turtle eggs and have Scales employees handle turtle eggs throughout the research project. MP coordinated with Scales and WD4C to plan a four (4) week dog training program.

What were the outstanding engineering achievements?

One of the most interesting features of this project was the effort made by engineers to reduce and mitigate the potential impacts of engineering and construction. This research project was a collaboration between a government agency, an engineering consulting firm and two environmental conservation organizations.

It demonstrates how diverse interests can collaborate in finding solutions to environmental challenges that can benefit Ontarians, conserve Species at Risk, and create jobs. The research provided insights into turtle ecology and the science of deploying detection dogs in a unique biological and engineering challenge. **The project demonstrated that detection dogs can detect Blanding's Turtle eggs and their nests.** While the result of the research was not a "field ready" team of dogs able to detect nests 100% of the time, the work conducted over a short period in 2016 did demonstrate proof of concept and the dogs' likely ability to detect Blanding's Turtle nests at a higher rate with further training.

What role did project management play in successfully completing the project?

Project management allowed the project to be successfully implemented on a very tight timeline. Activities undertaken included: coordinating the immigration process to allow the American dog handlers to undertake temporary work in Canada; obtaining approvals to undertake this work in accordance with the *Endangered Species Act*; securing a training facility to undertake the research; and coordinating and administering the research project.

3.0 COST IMPLICATIONS ASSOCIATED WITH THE INITIATIVE

The cost implications of this new mitigation measure have yet to be fully quantified. ***The dogs proved that they can detect Blanding's Turtle eggs, nests and nest material.*** The dogs can currently conduct slow, detailed searches of small areas. Additional training in 2017 has the potential to increase the dogs' detection distance, speed of searches and the amount of area that could be searched on a daily basis. The pilot research project in 2016 was the equivalent cost of 13,000 m of silt fence (i.e. the amount that would typically be installed on one capital construction project). However, cost isn't just measured in terms of direct dollars within the project budget as measured by dollars. Costs can also be measured indirectly by how a project benefits the larger community in terms of economic, environmental and social impacts. For example, the cost to deploy dogs could be measured in the increased working days in a construction season when a segment of roadway has been deemed free of turtle eggs by the dogs. This is particularly valid for temperature-dependent operations such as paving that can't extend into the fall when freezing temperatures prohibit work.

What kind of beneficial effects did the project have on the community?

- **Economic:** The project shows the possibility of expanding the working days of an engineering-construction project to ensure planned highway improvements can proceed, providing jobs for Ontarians. It also demonstrates a means of reducing the costs of environmental mitigation without compromising their integrity or efficacy during road improvement projects. This will allow greater fiscal efficiency of federal, provincial, and municipal transportation improvement projects.
- **Environmental:** This alternative mitigation measure seeks to increase the working days available for road improvement projects in Ontario. Doing so provides Ontarians with jobs. By contributing to the conservation of Blanding's Turtle in Ontario, this research project demonstrates that road improvement projects can have positive impacts for the conservation of Ontario's rich biodiversity. It shows that engineering, environmental, and economic goals and activities can be mutually

supportive. This research promotes the Ontario Ministry of Transportation's compliance with the *Endangered Species Act* during the *Environmental Assessment* process and during infrastructure renewal activities.

- **Social:** This work strived to expand the available working days for construction and ensure continued job opportunities for Ontarians while sustaining continued enjoyment of Ontario's natural environment. Ontarians want to see the conservation of species at risk. This research ensures that at-risk species continue to be a feature of the province's landscape where they perform ecological services (i.e. turtles clean water in wetlands, waterbodies, etc.) and provide interest and enjoyment now and for generations to come.

4.0 TRANSFERABILITY AND APPLICATION OF THE INITIATIVE TO THE TRANSPORTATION COMMUNITY

The use of trained detection dogs has the potential to make a positive impact to the transportation community in areas where turtles are present. This technique could be applied by municipal, provincial and federal agencies responsible for maintaining and creating transportation infrastructure. As turtles commonly nest along transportation corridors this initiative has tremendous potential to benefit many organizations. Conservation dogs have the potential to detect other biological targets to assist the transportation industry in meeting their legislative and agency commitments towards the protection and enhancement of the environment.

5.0 IDENTIFY THE ORGANIZATION BEING NOMINATED

McIntosh Perry Consulting Engineers is the organization being nominated for this Environmental Achievement Award.

Appendix A: Photographs and Video

All photographs and videos presented have been captured/edited by Matt Wheeler, ecologist at McIntosh Perry.

A video of the project titled “*Blanding's Turtle Nest Detection Using Conservation Dogs*” can be viewed on YouTube at: <https://www.youtube.com/watch?v=TeDLskHna-s>

Table 1: A summary of the detection dogs that were trained to recognize the scent of Blanding’s Turtle eggs and nests.


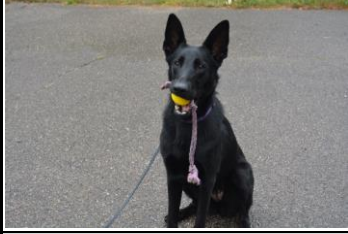


Dog	Name	Breed	Years of Exposure to Scent Work for Various Purposes Prior to Turtle Egg/Nest Training	Number of Targets in Scent Repertoire Prior to Turtle Egg/Nest Training
	Lily	Labrador retriever	8	11
	Rue	German shepherd	3	5
	Wicket	Labrador retriever mix	11	30
	Tia	German shepherd	9	11



Figure 1: A photograph of a Blanding's Turtle.



Figure 2: Lily [canine] searching the shoulder of the road and detecting Blanding's Turtle eggs.



Figure 3: Lily sits down to alert to the handler that she has found the nest of a Blanding's Turtle.



Figure 4: Lily is rewarded with a ball for finding a Blanding's Turtle nest.



Figure 5: Rue [canine] searching the ROW for a Blanding's Turtle nest along road shoulder on July 11, 2016.



Figure 6: Eleven Blanding's Turtle eggs were unearthed from a wild nest on July 11, 2016 and brought to Scales Nature centre to be incubated in controlled conditions.