



RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

GLENN CUNNINGTON, Ph.D.(Candidate), M.Sc., B.Sc.(Hons), Dipl. F.W.
Senior Terrestrial Ecologist and Species at Risk Specialist

CAREER AND ACADEMIC HISTORY

2011 – Present	Senior Terrestrial Ecologist and Species at Risk (SAR) Specialist, RiverStone Environmental Solutions Inc.
2010 – 2011	Species at Risk Agreements and Permitting Coordinator, Peterborough and Bancroft District OMNR
2010	Species at Risk Biologist, Bancroft District, Ontario Ministry of Natural Resources
2006 – Present	Ph.D.(Candidate) Carleton University, Road and Landscape Ecology
2006 – 2010	Teaching Assistant, Ecology & Conservation Biology, Carleton University
2003 – 2009	Private Ecological Consultant
2004 – 2006	M.Sc., Trent University, Watershed Ecosystem Ecology
2004 – 2006	Teaching Assistant, Limnology, Trent University
2002 – 2004	B.Sc.(Hons), Trent University, Conservation Biology
2002 – 2006	Program Coordinator, Eastern Hog-nosed Snake Research Program
2001 – 2002	Program Coordinator, Eastern Fox Snake Research Program
1999 – 2001	Diploma, Sir Sandford Fleming College, Fish and Wildlife Technician

PROFESSIONAL EXPERIENCE

The following is a partial list of project experience from 2003 - 2011.

Ecological Site Assessments & Environmental Impact Studies/statements

- Development of 17(2)(c) Permit under the *Endangered Species Act, 2007* for proposed subdivision in **Town of Uxbridge**; *for private client*; **Key Tasks**: identification of Species at Risk (SAR) habitat on lands proposed for subdivision; development of avoidance, overall benefit, and associated monitoring plans for Bobolink
- Application for exemption under the *Endangered Species Act, 2007* for proposed private driveway crossing of a creek in **Town of Whitchurch-Stouffville**; *for private client*; **Key Tasks**: identification of Species at Risk (SAR) on lands proposed for private driveway; identification of previous planning provisions for Red Side Dace
- Environmental Impact Study in the **Town of Uxbridge**; *for private client*; **Key Tasks**: Wildlife species sightings and description of potential habitat for wildlife, including habitat of Species at Risk and species of Conservation Concern, provide design recommendations for wildlife crossing structures, data management, mapping and report preparation
- Species At Risk Assessment for property on Georgina Island in, **Regional Municipality of York**; *for private client*; **Key Tasks**: identification of SAR habitat and significant natural heritage features, analysis of impacts potentially resulting from the development of a small cottage.

- Scoped Environmental Impact Study on Lake of Bays in the **Township of Lake of Bays**; *for private client*; **Key Tasks:** identification of SAR habitat and significant natural heritage features, mapping, report preparation, analysis of impacts potentially resulting from the development of a small cottage
- Ecological Site and Impact Assessment for property on Georgian Bay in the **Township of The Archipelago**; *for Township of The Archipelago*; **Key Tasks:** identification of SAR habitat and significant natural heritage features; analysis of impacts potentially resulting from proposed single-lot severance
- SAR Assessment for property in Honey Harbour, **Georgian Bay Township**; *for private client*; **Key Tasks:** identification of SAR habitat and impact assessment of dredging activities proposed to maintain water access to a developed lot
- Environmental Impact Study in the **Town of Gravenhurst**; *for private client*; **Key Tasks:** Wildlife species sightings and description of potential habitat for wildlife, including habitat of Species at Risk and species of Conservation Concern to assess the properties potential for development as a residential education centre.
- Species At Risk Assessment for property on North Muldrew Lake in, **Township of Gravenhurst**; *for private client*; **Key Tasks:** identification of SAR habitat and significant natural heritage features, analysis of impacts potentially resulting from proposed severance.
- Wildlife Scan for stormwater management pond in the **Town of Richmond Hill**; *for private client*; **Key Tasks:** assessment of habitat for Species at Risk, species of conservation interest, and other wildlife, identification of activities that may result in a negative impact on existing wildlife and recommendation of mitigation measures.
- Environmental Impact Statement for property in the **Town of Gravenhurst**; *for private client*; **Key Tasks:** Identification of significant natural heritage features, wildlife species sightings and description of potential habitat for wildlife, Species at Risk assessment and data management to support the development of a single residence on an existing lot
- Environmental Impact Statement for property in the **Town of Gravenhurst**; *for private client*; **Key Tasks:** Identification of significant natural heritage features, wildlife species sightings and description of potential habitat for wildlife, Species at Risk assessment and data management to support the rezoning of an existing lot
- Impact Assessment for private road crossing crown land in the **Township of the Archipelago**; *for private client*; **Key Tasks:** Identification of significant natural heritage features, wildlife species sightings and description of potential habitat for wildlife, Species at Risk assessment, data management, mapping and report writing in support of a proposed road crossing crown land to access a private lot
- Ecological Site and Impact Assessment for property on Georgian Bay in the **Township of The Archipelago**; *for Township of The Archipelago*; **Key Tasks:** identification of SAR habitat and significant natural heritage features; analysis of impacts potentially resulting from proposed single-lot severance
- Environmental Impact Statement for property in the **Town of Huntsville**; *for private client*; **Key Tasks:** Species at Risk assessment, identification of potential habitat for wildlife, identification of significant natural heritage features, data management and mapping to support a proposed severance
- Boating Impact Assessment for a bay on Lake Joseph in the **Township of Muskoka Lakes**; *for private client*; **Key Tasks:** document and quantify boating activity, analysis of boating carrying capacity, report writing.
- Species At Risk Assessment for Provincial Park in the **Town of Wasaga Beach**; *for Ainley and Associates*; **Key Tasks:** develop mitigation methodology for the installation of a water main extension under Ontario Parks Property, determined timing windows and best management practices to reduce effects of construction on local eastern hog-nosed snake population in Wasaga Beach area of Simcoe County
- Species At Risk Assessment for multiple locations in **Simcoe County**; *for Ontario Ministry of Natural Resources*; **Key Tasks:** complete habitat assessment and field surveys for eastern hog-nosed snake, and massasauga rattlesnake to determine persistence of species and habitat at locations of historical observation

- Species At Risk Assessment of **Trent Severn Waterway**; *for Parks Canada*; **Key Tasks**: Conducted habitat assessment and field surveys for eastern hog-nosed snake, Blanding’s turtle and musk turtle to determine persistence of species and habitat at locations of historical observation

Species at Risk Habitat Modeling

- **Predictive habitat mapping of potential habitat for Blanding’s turtle, spotted turtle, musk turtle, eastern hog-nosed snake, American ginseng, flooded jellyskin, pale bellied frost lichen and butternut (2010)** in Bancroft District, *Ontario Ministry of Natural Resources, Bancroft District Office*
- **Critical habitat for eastern hog-nosed snakes (*Heterodon platirhinos*) (2007)** at a provincial and selected regional scales; *Ecological Integrity Branch, Parks Canada (2007)*
- **Identification of eastern hog-nosed snake habitat and assessment of quality (2006)**, in Wasaga Beach, ON, *Ontario Parks and Ontario Ministry of Natural Resources, Midhurst District Office*

Additional Species at Risk Experience

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| Dec 10 – April 11 | <p>Species at Risk Agreements and Permitting Coordinator, Ontario Ministry of Natural Resources, Peterborough and Bancroft Districts</p> <ul style="list-style-type: none"> • Managed agreements and permits for aggregates and waterpower under the Provincial Endangered Species Act (ESA 2007). • Conduct preliminary screening of waterpower generating facilities to determine eligibility for agreements/permits under ESA 2007 • Acted as a Regulatory Liaison between Ministry of Natural Resources and waterpower owner/operators • Reviewed Class Environmental Assessments and permit applications |
| May 10 – Dec 10 | <p>Species at Risk Biologist, Ontario Ministry of Natural Resources, Bancroft District</p> <ul style="list-style-type: none"> • Conducted field surveys and site assessments for species at risk. • Developed survey strategies and methodologies to conduct site assessments of over 9000 ha of land identified as areas of interest. • Reviewed Class Environmental Assessments and permit applications |

Peer Review and Literature Reviews

- Peer Review of Environment Impact Statement for Planning Application in **Township of Severn**; *for Township of Severn*; **Key Tasks**: evaluation of issues pertaining to Species at Risk
- Literature Review pertaining to the need to protect large natural areas in **District of Muskoka**; *for Muskoka Watershed Council*; **Key Tasks**: gathering and critically evaluating previous research, report writing.
- Peer Review of a mitigation strategy for road development in Town of Ottawa; *for Dillon Consulting Limited*; **Key Tasks**: evaluation and development of population monitoring methodology for Blanding’s Turtle, provide wildlife crossing structure design considerations
- Peer Review of primary scientific literature; *for Journal of Applied Ecology, Acta Oecologica, European Journal of Wildlife Research, Global Biology and Biogeography*
- **Scientific Advisor** for the eastern hog-nosed snake survey of C.F.B. Petawawa by Ontario Resource Management Group (2006 – 2007)

Research-focused Experience

The following is a partial list of research-focused project experience.

- Sep 06 – Present **Ph.D. Carleton University, Dept. of Biology** – investigated effects of traffic noise on amphibian reproductive behaviour and efficacy of culverts as a means to reduce road mortality
- Conducted vocalization and live trapping surveys of anuran amphibians
 - Gathered recordings of amphibian vocalizations at sites with various levels of traffic noise
 - Analyzed recordings for variations in vocalizations acoustic properties
 - Installed and monitor drift fencing arrays
 - Conducted road kill surveys
- Apr 04 – Aug 06 **M.Sc. Trent University, Dept. of Biology** – developed spatially explicit models of biotic and abiotic variables that affect ground surface temperature and habitat quality for eastern hog-nosed snakes.
- Gathered field data on microhabitat and macrohabitat use by hog-nosed snakes
 - Collected large scale, high resolution thermal data
 - Developed models to determine variables associated with thermal habitat quality for hog-nosed snakes.
- Apr 02 – Aug 06 **Eastern Hog-nosed Snake Research Program in Wasaga Beach Provincial Park - Program Co-ordinator**
- Conducted radio telemetry and mark recapture study
 - Developed research and field protocols
 - Utilized GPS to accurately map snake locations and habitat features to later incorporate them into a spatial database (ArcView 3.2)
 - Trained and supervised field technicians
- Sep03 – May 04 **Peterborough District, Ontario Ministry of Natural Resources – Conservation Intern**
- Conducted population and dietary assessment of young of the year walleye populations in the Kawartha Lakes.
 - Gathered samples through boat electro-fishing
 - Processed fish for morphometric, demographic and stomach contents data
 - Conducted statistical data analysis and produced figures to disseminate results
- Apr 02 – Aug 06 **Eastern Foxsnake Research Program in Awenda Provincial Park - Program Co-ordinator**
- Designed and implemented a radio telemetry study of the spatial ecology of foxsnakes
 - Developed animal care and research protocols
 - Utilized GPS to accurately map snake locations and habitat features incorporating them into a spatial database for analysis

Peer Reviewed Publications

- Summers, P., G.M. Cunnington and L. Fahrig. 2011. Are negative effects of roads on breeding birds caused by traffic noise? *Journal of Applied Ecology* 48: 1527-1534
- Cunnington, G.M. and L. Fahrig. 2010. Effects of traffic noise on behaviour of five species of North American anurans. *Acta Oecologia* 36: 463-470

- Cunnington, G.M., J. Schaefer, J.E. Cebek and D. Murray. 2008. Correlations of Biotic and Abiotic Variables with Ground Surface Temperature: An Ectothermic Perspective. *Ecoscience* 15(4): 472 – 477.
- Cunnington, G. and J. Cebek. 2005. Mating and nesting behaviour of the eastern hognose snake (*Heterodon platirhinos*) in the northern portion of its range. *American Midland Naturalist* 154:474 – 478.
- Cunnington, G.M. and L. Fahrig. In Review. Alteration of vocalizations by anurans compensates for negative effects of traffic noise on reproductive success. *Animal Conservation*.
- Cunnington, G.M. and L. Fahrig. In Prep. Effectiveness of culverts as a means of reducing anuran road mortality. *Journal of Wildlife Management*
- Cunnington, G.M. J. Cebek and J. Schaefer. In Prep. Temperature as habitat: Modeling thermal habitat for eastern hog-nosed snakes. *Journal of Wildlife Management*
- van der Ree, R., van der grift, E., Jaeger, J., Fahrig, L., Francisco C., Cunnington, G.M., Findlay, S., Houlahan, J., Klar, N. In Prep. Beyond passage use: How to evaluate effectiveness of road mitigation for wildlife populations. *Environmental Monitoring and Assessment*

Theses

- Cunnington, G.M. *In Prep*. Mate attraction and mortality: Mitigating the effects of roads on anurans. Doctorate of Philosophy Thesis, Carleton University, Ottawa.
- Cunnington, G.M. 2006. Biotic and abiotic variables that alter ground surface temperature and habitat quality for eastern hog-nosed snakes (*Heterodon platirhinos*). Masters of Science Thesis, Trent University, Peterborough, Ontario.
- Cunnington, G. 2004. Modeling habitat use by eastern hog-nosed snakes (*Heterodon platirhinos*) in Wasaga Beach Provincial Park, Ontario. Undergraduate Thesis, Trent University, Peterborough, Ontario.

Reports and Articles

- Ashpole, S., G.M. Cunnington, D. Harvey, B. Howes, P. Nantel, R. Pither, and J. Row. 2007. Critical Habitat Workshop. Canadian Amphibian and Reptile Conservation Network.
- Cunnington, G. 2005. Conservation and Management of Eastern Hog-nosed Snakes in Wasaga Beach, Ontario. Ontario Ministry of Natural Resources.
- Cunnington, G. and K. Willson. 2001. Eastern Fox Snake Research Program Research Annual Summary Report. Ontario Ministry of Natural Resources, Midhurst District.
- Cunnington, G. 2001. Eastern Fox Snake/Hog-nosed Snake Research Programs: Field and Laboratory Protocols. Awenda Provincial Park.