Nathan C. Manion

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EDUCATION

Ph.D., Queen's University *2010-2017*

Department of Geography & Planning

Title**: Towards improved life-cycle assessment of agricultural systems: geographical perspectives on multi-scale challenges in the context of bioenergy feedstock production**

- Critically evaluated ISO 14040 and 14044 standards for their ability to measure supply chains that are integrated with environmental systems;
- Identified gaps in existing LCA methods where changes to data collection and management could improve the accuracy of results, particularly when small-scale and site-specific dynamics are considered;
- Demonstrated that bioenergy LCAs that use common functional units or evaluate similar products may not be comparable due to underlying differences in the spatial and temporal scales of the data they use;
- Developed a unique modular multi-scale approach to performing LCAs, combining empirical models with traditional emission factors and variable input data;
- Performed an LCA of short-rotation coppice (SRC) willow in southwestern Ontario using a modular multi-scale approach;
- Performed supplementary research for Lafarge Canada as part of using biomass to lower emissions for concrete production, and participated in several other research networks including Biofuel Net, the Bioconversion Network, and OMAFRA

M.Sc., Queen's University *2005-2007*

Department of Biology

Determining the distribution and fate of mercury in sediments of the Cataraqui River at Kingston, Ontario

- Integrated quantitative and qualitative research methods to evaluate current and historic contamination of mercury in the Cataraqui River near brownfields in Kingston, Ontario. Research results were the first to show the distribution of mercury in sediments, and more importantly that brownfields and former industrial properties were both historic and ongoing sources of mercury to the river;
- Contributed to policy changes by the City of Kingston that resulted in shoreline rehabilitation projects and guidance for future brownfield development in the area.

B.Sc. (Honours) Biology, Queen's University *1999-2003*

WORK & RESEARCH EXPERIENCE

Founder, Principal Researcher
Greenscale Inc. *Jan 2021 – Present*

- Founder and lead researcher at Greenscale Inc., a company dedicated to providing life cycle sustainability services and solutions for businesses, government, and individuals.
- Municipal projects to date have included Climate Change Action Planning and GHG Inventory reports for clients such as the City of Kingston and Lanark County, a corporate emissions reduction feasibility report, and a review of low-carbon industrial park development options.
- Research projects have included an LCA screening study of building envelope technologies, development of a handbook with the Federation of Canadian Municipalities to assist municipalities with Climate Change Action planning, Carbon Footprint and LCA of mining operations, and LCA of green concrete structures.

Post-Doctoral Researcher
Queen's University, Department of Geography & Planning *March 2021 – Present*

- Part-time researcher in the Renewable Energy Deployment and Implementation (REDi) lab under Dr. Warren Mabee.
- Working on enhanced forest inventories for the Canadian forest sector to establish better links between forest tissue attributes, geography, and biomass supply chains in Canada.
- Perform research looking at the life cycle assessment of food systems.

Freelance Research Consultant, Life Cycle Assessment & Sustainability
Feris Build Tech *Nov 2019 – Mar 2020*

- Provide life cycle and sustainable development research services, data analysis, and report writing for a green building design start-up
- Provide sustainability and life cycle analysis for Feris technology and builds
- Ensure Feris technology is used in accordance with industry standards and relevant to governing bodies and building codes

Net Zero *July 2019 – Jan 2021*

- Provide life cycle assessment research and back-end development of life cycle databases for a startup company working on developing a carbon accounting app.
- Guide backend development of app LCA calculations to ensure it complies with appropriate carbon accounting methods and guidelines

Limestone Analytics *Nov 2017-Mar 2018*

- Researcher and co-author of a report to the United States Agency for International Development (USAID) on best practice methods for inclusion of ecosystem service valuation in cost-benefit analysis of international development projects.
- Researched performance monitoring of international development education program outcomes in Zimbabwe aimed at improving girls' access to post-secondary education.

Director & Principal Investigator
Sustainable Energy Applied Research Centre, St. Lawrence College *July 2018 – Mar 2020*

- Principal investigator on two research projects while also managing between three and five full-time employees, six part-time students, and six volunteer students.
- Projects include life cycle evaluation of sustainable building designs, redesign of greenhouse for northern Ontario First Nations communities, system testing of solar PV technologies and inverters, small-scale wind, grey water, and hydrogeological sensors.

Director
Sustainable Living Centre, St. Lawrence College *July 2018 – July 2019*

- Advised on the design and operation of the new Sustainable Living Centre, a collaborative space between industry, business, communities, and education in order to advance sustainable building design and construction skills in post-secondary education.
- Co-wrote a proposal to the Association of Sustainable Education and helped the college achieve bronze certification through the inclusion of new research projects
- Started a speaker series to connect students with emerging industry & technologies
- Developed college curriculum and workshops to transition existing skilled trades and technology streams towards emerging sustainable building approaches
- Wrote a strategic framework proposal to integrate research activities with both the Sustainable Living Center and broader college-wide strategies and policies.

Post-Doctoral Researcher
Queen's University, Department of Geography & Planning *Aug 2017-June 2018*

- Lead researcher in the Renewable Energy Deployment and Implementation (REDi) lab
- Researched areas such as improving life-cycle assessment standards of environmental systems, issues of scale when assessing infrastructure and energy development projects, and improved modular approaches to integrating LCA data.

Research Assistant
Queen's University, Department of Geography & Planning *Summers, 2011-15*

- Co-authored the chapter "Environmental Pillar" in the report "Lafarge Green Fuels Protocol" for Lafarge Cement Corp and the Asia-Pacific Partnership on Clean Development & climate. Other contributors to the chapter included the Ministry of the Environment, the WWF, and Dr. Warren Mabee.
- Was a team member (HQP) of a research group within the Bioconversion Network (NSERC) tasked with updating deliverables on process economics, co-products and scale up of using lignocellulosic feedstocks for bioenergy in Canada. Other callaborators on the project included Terry McIntyre (Environment Canada), Jack Saddler (UBC), Mark Stumborg (Agriculture and Agri Food Canada) and Dr. Warren Mabee. Co-authored five reports on the progress of the group as project milestones were achieved.
- Team member (HQP) of a research group within BioFuelNet (NEC) where I presented updates on the progress of the life cycle assessment tool we were developing at the FIBRE conference in Cornwall, ON in 2013. Work started in the Bioconversion network is continuing under this BioFuelNet research group.

Research Associate
Analytical Services Unit, Queen's University *May-Aug 2008-09*

- Led a team of five researchers, a helicopter pilot and engineer, and a full-time bear monitor on a two-week field work expedition to Resolution Island, Nunavut to engage in a long-term monitoring project in partnership with INAAC and National Defense.
- Sampled plants, soils, monitoring wells, landfills, watershed barriers, and hydrocarbon land-farms to evaluate the effectiveness of remediation efforts that ceased 3 years earlier.
- Responsible for directing research assistant work, co-ordinating helicopter trips to and from the island in addition to short- and long-line extraction of contaminated soil, ensuring staff safety on a polar bear migratory route, and coordinating meals.

Research Technician
Analytical Services Unit (ASU), Queen's University *2003-08*

- Tested soil, water and air samples, for a range of environmental contaminants, including PCB's, hydrocarbons, metals, phenolics, organics, phosphorous and nitrates at a CALA (formerly CAEAL) accredited lab.
- Assisted with fieldwork & research projects in the Canadian Arctic at Resolution Island and Cape Dyer, abandoned military bases formerly part of the DEW (Distance Early Warning) line. Tested soil & water for PCB's and hydrocarbons onsite. Helped construct barriers to remove PCB's & hydrocarbons from surface water runoff, and was involved with an experimental hydrocarbon land-farm, designed to remediate hydrocarbon-contaminated soil using microbial degradation.

Textbook Researcher
Kingston, Ontario *May-Aug 2008*

- Performed research for revisions to the toxicology textbook: Wright, D.A. & P.M. Welbourn. 2002. Environmental Toxicology: a textbook for universities. Cambridge University Press. 630 pp.
- Provided suggestions on how to update sections associated with toxicological modeling.

Water Quality Technician
Cataraqui Conservation Authority, Kingston *May-Aug 2003*

- Tested and sampled water across the authority's watershed for the Ministry of the Environment's (MOE) water monitoring program. Conducted field work for the Millhaven Creek Low-Flow pilot study: one of seven tributaries chosen by the MOE to study the effects of water levels in tributaries on ecosystem health and anthropogenic use and demand. Measured flows & physical characteristics, & observed flora, fauna, & benthic macroinvertebrates at points along the stream as an indicator of water quality & stream health.

POST-SECONDARY TEACHING EXPERIENCE

Assistant Professor
Queen's University, Department of Geography & Planning *Jan-Apr 2018*
- Responsible for curriculum, lectures, evaluation, and supervision of three teaching assistants for the course "Biogeography" (GPHY 207) – course enrollment was 60 students and involved three one-hour lectures each week, and two-hour labs bi-weekly.

Teaching Fellow
Queen's University, Department of Geography & Planning *Sep-Dec 2015*
- Responsible for curriculum, lectures, evaluation, and supervision of three teaching assistants for the course "Forests as a Global Resource" (GPHY 104) – course enrollment was 115 students and involved three one-hour lectures each week.

Assistant Professor
Loyalist College, Biosciences & Technology Department, *2008-15*
- Responsible for curriculum, lectures, evaluation, and design of seven college courses:
- ENVR 3005 Environmental Assessment & Planning *Winter 2009-15*
- BIOS 1002 Comparative Plant Physiology & Botany *Winter 2008-09*
- ENVR 2004 Hydrogeology & Soils *Winter 2009*
- CHEM 3002 Organic Chemistry & Chromatography *Fall 2008*
- CHEM 3004 Physical Chemistry *Winter 2009*
- CHEM 1000 General Chemistry *Fall 2008*
- BIOS 2009 Forensic Science *Fall 2008*

Undergraduate Tutor
Kingston, Ontario *Jan-Apr 2015*
- Tutored a fourth-year geography undergraduate student with learning disabilities in four courses: Water Resources (GPHY 104), Geographies of Canada (GPHY 250), Arctic & Periglacial Environments (GPHY 304), and Principles of Biogeography (GPHY 207).

Teaching Assistant
Queen's University *2005-13*
- GPHY 314 Climate Change *Fall 2010-13*
- GPHY 102 Earth System Science *Winter 2011-12*
- GPHY 317 Soils, Environment, and Society *Fall 2010*
- GPHY 304 Arctic & Periglacial Environments *Winter 2010*
- ENSC 471 Environmental Analysis Methods *Spring 2004-07*
- BIOL 103 Introduction to Biology *Fall/Winter 2005-07*
- BIOL 338 Animal Physiology *Winter 2006*

FELLOWSHIPS & AWARDS

- Research HQP, BioFuelNet NCE *2015-17*
- Research HQP, NSERC Bioconversion Network *2010-16*
- OMAFRA, University of Guelph *2010-12*
- OGS Scholarship *2012*
- R.S. McLaughlin Fellowship *2011*
- Department of Geography Merit Award *2011*
- Department of Geography Fellowship *2010*

GRADUATE STUDENT SUPERVISION

- Served as Co-Supervisor to the following graduate students:

Name, years, degree	**Title of Project**	**Present Position**
DeLoyde, C. 2016-, Ph.D.	The Role of Natural Heritage Systems and Ecosystem Services in Climate Change Mitigation	*Completing degree*
Malo, L. 2014-16, M.Sc.	Anticipating climate-induced changes to forest cover in Ontario and the implications for future bioenergy development	Political Researcher (Energy Policy) – New Democratic Party of Canada
Taylor, AR. 2014-16, M.Sc.	Applying life cycle assessment to analyze the environmental sustainability of public transit modes for the City of Toronto	Transportation Planner (Transit and Rail) at AECOM
McCallum, M. 2013-15 M.A.	Employment associated with Renewable and Sustainable Energy Development in the Kingston Region	Socio-economic and community Engagement Specialist, Hemmera, B.C.
Blair, MJ. 2011-13, M.Sc.	Development of forest biorefining in Canada: overcoming the feedstock barrier	Ph.D. Student, Queen's University
Hamilton, K. 2006-07, B.Sc.	Metal levels in sediment and water from a series of lakes along the Cataraqui River System	Environmental Law & Policy Program, Faculty of Law, University of Victoria

GRANTS

1. **Funding Agencies**: Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), University of Guelph
   Title: Life cycle Analysis Framework and Model for Assessing Life Cycle Impacts and Environmental Sustainability of Ontario Agricultural Feedstocks for bioenergy.
   Project Description: Funding to address the need for a tool to assess and manage the life cycle impacts of feedstocks for bioenergy in Ontario, particularly corn stover, miscanthus, and willow biomass. Project involved developing a framework for a LCA model for primary agriculture based on ISO 14040/14044 LCA standards
   Amount: Year 1: $57,000, Year 2: $49,000, Year 3: $30,000 (Sept 2009 – Aug 2012)
   Role: Team Member (Highly Qualified Personnel) along with Claudia Wagner Riddle (Project Leader), Warren Mabee, Steven Young, Bill Deen, Goretty Dias, Naresh Thevathasan, Terry McIntyre, Linda Pim, Tim Martin, Susantha Jayasundara, and Kumudinie Kariyapperuma

2. **Funding Agency:** Bioconversion Network**,** Natural Sciences and Engineering Research Council of Canada (NSERC)
   Title: Life cycle and economic analysis of lignocellulosic biomass conversion
   Project Description: Project theme includes the process economics, co-products, and scale-up of using lignocellulosic biomass feedstocks for bioenergy pathways. Project group focused life cycle assessment (LCA) of feedstock production and linked with economic tools as well as comparisons with evaluating fores-based feedstock systems.
   Role: Team Member (Highly Qualified Personnel) along with Warren Mabee (Project Leader), Terry McIntyre, Jack Saddler, Mark Stumborg, Brad Saville, Emma Master, Yaman Boluk, and Jamie Stephen.

3. **Funding Agencies**: NSERC, OCE
   Title: Life cycle Analysis and Performance Evaluation of Feris Building System Technology.
   Project Description: An evaluation of Feris building system technology. A building that has gone through a legit building permit process will be constructed on St. Lawrence College campus and evaluated over an 8 month period.
   Amount: Year 1-2: $50,000 (July 2018 – July 2020)
   Role: Principle Investigator along with Garrett Sills (Research Assistant), Shawn Curry (Research Assistant), and Katherine Greene (Research Student)

4. **Funding Agencies**: OCE
   Title: Performance evaluation of Ridgeblade wind turbine system in a residential setting.
   Project Description: Performance monitoring of The Power Collective's Ridgeblade wind turbine system on a residential test building on St. Lawrence College campus, next to a residential neighbourhood.
   Amount: Year 1-2: $25,000 (January 2018 – July 2020)

Role: Principle Investigator along with Garrett Sills (Research Assistant), Shawn Curry (Research Assistant), and Rick Rooney (Technical Expert)

5. **Funding Agencies**: OCE
Title: Redesign of northern Ontario greenhouse
Project Description: Redesign project in coordination with ASM Innovations from Thunder Bay to help create a northern greenhouse for Ontario First Nations communities.
Amount: Year 1-2: $25,000 (December 2018 – March 2020)
Role: Technical expert along with Miles Wilson (Principle Investigator), Shawn Curry (Research Assistant), and Garrett Sills (Research Assistain)

PUBLICATIONS

Published Articles

Bahman Kashi, B., Simpson, D., Simón, C., Higgins, M., **Manion, NC**, Bruner, A. (2019). Integrating Ecosystem Values into Cost-Benefit Analysis: Recommendations for USAID and Practitioners. Prepared for USAID, Washington D.C. 81pp.

Manion, NC. (2019). OWA Measures its Carbon Footprint. The Woodlander, 96: 16-17

Blair, J, Calvert, K, **Manion**, **NC**, Earley, S, and WE Mabee (2013) Linking Analysis of Material Flow and Markets to Inform Canadian Forest Biorefinery Development. Journal of Science and Technology for Forest Products and Processes 3(5): 6-15.

Manion, **NC**, Campbell, L, and A Rutter (2010) Historic Brownfields and Industrial Activity in Kingston, Ontario: Assessing Potential Contributions to Mercury Contamination in Sediment of the Cataraqui River. Science of the Total Environment 408: 2060-2067

Manion, **NC** (2009) Kingston's Inner Harbour and the Historical Background of Some Selected Sites. In P. Welbourn, H. Cleghorn, J. Davis and S. Rose (Eds.). The Story of Brownfields and Smart Growth in Kingston Ontario: From Contamination to Revitalization. (pp. 157 – 164). Kingston, ON: Classroom Complete Press.

Manion, **NC** (2009) Case Study – Kingston Gas Works and the K-Rock Centre, Kingston, ON. In P. Welbourn, H. Cleghorn, J. Davis and S. Rose (Eds.). The Story of Brownfields and Smart Growth in Kingston Ontario: From Contamination to Revitalization. (pp. 216 – 225). Kingston, ON: Classroom Complete Press.

Technical Industry Reports

Beneteau, A., Curry, S., Kettlewell, H., Reed, J., **Manion, N.C**. (2019). Sustainability report of J.E. Agnew Foods Service Offices. Prepared for J.E. Agnew Foods Service Offices, Kingston, Ontario, Canada.

Beneteau, A., Curry, S., Kettlewell, H., Reed, J., **Manion, N.C**. (2019). Energy Conservation & Demand Management (CDM) Report, 2019. Prepared for Lennox & Addington County General Hospital, Napanee, Ontario, Canada.

Smith, M., Curry, S., **Manion, NC**. (2018). Evaluating solar PV, peak tracking, and energy storage alternatives as part of energy management strategies for medium-sized commercial building: Determining best economic use in a net-metering environment in Brantford, Ontario. Prepared for Linden Power Inc.

Kariyapperuma, K, Dias, G, **Manion**, **NC**, Wagner-Riddle, C, and WE Mabee (2012) Life cycle analysis framework and model for assessing life cycle impacts and environmental sustainability of Ontario agricultural feedstocks for bioenergy. Final report – OMAFRA Project # 200013, 63 pp.

Mabee, WE, **Manion**, **NC**, Mirk, J, and E Jaggard (2011) Lafarge-Queen's Energy Report. Interim Report #2. Prepared for Rob Cumming, Lafarge Cement Corp.

Textbook Publications

Manion, NC (2013) ENVR 3005 – Environmental Assessment & Protection: Online Textbook & Courseware. Loyalist College, Belleville, ON.

Forthcoming Journal Articles

Manion, NC, and WE Mabee (202X) Improving life-cycle assessment (LCA) of dynamic environmental systems: Geographical perspectives in the context of bioenergy. Canadian Geographer, *In preparation*.

Manion, NC, and Mabee, WE (202X) Systematic Review of Life Cycle Assessments for Bioenergy Feedstock Production: Assessing Variation in Geographical Attributes of Inputs, Boundaries, & Results, *In preparation*.

Manion, NC, and Mabee WE (202X) Life Cycle Analysis of Willow Biomass Feedstock in southwestern Ontario: Demonstration of a Multi-Scale Modular Structuring Approach. *In preparation.*

SELECTED CONFERENCE PARTICIPATION

Manion NC (2020) Net-zero building gaps & opportunities: perspectives from skilled trades education & research, Harrison Hot Springs, B.C., Canada, 25 February 2020

Manion NC (2019) Net-zero homes and the skilled trades gap: How we are training the next generation of builders, Kingston, Ontario, Canada, 3 February 2019

Manion NC (2018) Net-zero homes and the skilled trades gap: How we are training the next generation of builders, Thunder Bay, Ontario, Canada, 17 July 2018

Mabee WE, Ghafghazi S, Milley P, **Manion NC**, Blair MJ (2016) Policy barriers to developing the Canadian bioeconomy. BioFuelNet Advanced Biofuels Symposium, Vancouver, Canada, 8 July 2016

Mabee WE, Blair MJ, Ghafghazi S**, Manion NC**, Malo L, Milley P, Stephen JD, Taylor AR (2015) Hewers of wood: Capturing value from Canada's investment in advanced biofuels. American Association of Geographer's Annual Meeting, Chicago, USA, 22 April 2015.

Manion NC, Mabee WE (2014) Taming Dynamic Challenges in Multi-Scale Life Cycle Assessments – The Potential of Integrated Modular Frameworks to Improve Sustainability Assessments of Bioenergy Production Chains. NSERC Bioconversion Network 5th Annual General Meeting, 4 June 2014

Mabee WE, Blair MJ, Ghafghazi S, Milley P, **Manion NC**, Stephen JD (2014) A changing landscape for biofuels. BioFuelNet Advanced Biofuels Symposium, Ottawa, Canada, 28 May 2014

Manion NC, Mabee WE (2013) Time & Technology: Improving the Reliability of Dynamic LCA Results in Bioenergy Feedstocks. NSERC Bioconversion Network, 4th Annual General Meeting, Cornwall, Ontario, 14-15 May 2013

Mabee WE, Blair J, Benzie A, Calvert K, Earley S, **Manion NC**, Milley P, Stephen J (2013) The changing geographies of biorefining: how technological advances might influence development of the sector in Canada. Paperweek Canada 2013, Montreal, Canada, 6 February 2013

Manion NC, Mabee WE (2012) Life cycle impacts of feedstock production for biorefining: Comparing 4 feedstocks in a Southern Ontario setting. NSERC Bioconversion Network Annual Meeting, 9 June 2012

Manion NC, Mabee WE (2012) A dynamic life cycle model for assessing biomass sources. NSERC Bioconversion Network Annual Meeting, 8 June 2012

Mabee WE, Stephen JD, Calvert K, **Manion NC**, Milley P, Blair MJ (2012) Forests, energy and the zero-carbon economy. BIOFOR Conference, Thunder Bay, Canada, 14 May 2012

Mabee WE, Stephen JD, Calvert K, **Manion NC**, Earley S, Blair MJ, Benzie A (2012) The impact of biofuel policy on forest feedstock availability in OECD countries. 34th Symposium on Biotechnology for Fuels and Chemicals, New Orleans, USA, 30 April 2012

Mabee WE, Calvert K, **Manion NC**, Earley S (2012) The changing geographies of biorefining: How technological advances and shifting policies are influencing industrial development. Association of American Geographers Annual General Meeting, New York, USA, 25 February 2012

Mabee WE, Calvert K, Earley S, **Manion NC**, Stephen JD (2012) Building Ontario's bioeconomy: The interface between renewable energy policy and technologies. 9th Canadian Cropgrowers Association and Annual Meeting, London, Canada, 11 January 2012

Mabee WE, Calvert K, **Manion N**, Stephen JD, Earley S (2011) Building Ontario's Bioeconomy: Challenges and Opportunities. Harnessing Biomass II, North Bay, Canada, 23 November 2011

Mabee WE, Calvert K, **Manion NC**, Stephen JD, Earley S (2011) Circular economies and Canada's forest sector. Greening Work in a Chilly World Conference, University of Toronto/York University, 18 November 2011

Mabee WE, Calvert K, **Manion NC**, Stephen JD, Wood T (2011) Biorefining in Canada: the need for a comprehensive energy policy, the role of biofuels within it, and within the broader sustainability framework. Designing Law and Policy for the Transition to Sustainable Energy: the case for Biofuels. University of Ottawa, Ottawa, Canada, 10 June 2011

Mabee WE, Calvert K, **Manion N**, Wood T (2011) Biorefining opportunities in Ontario. SWITCH Open Meeting, Kingston, Canada, 3 June 2011.

Mabee WE, Calvert K, **Manion NC**, Wood T (2011) Moving ahead with biorefining opportunities in Canada's forest sector. BIO World Congress, Toronto, Canada, 9 May 2011

Mabee WE, Carpenter T, Mirck J, Calvert K, **Manion N**C, Wood T (2011) Biorefining and the forest economy. Knowledge Impact in Society (KIS) Showcase, Kingston, Canada, 12 April 2011

Mabee WE, Calvert K, **Manion N**, Mirck J, Stephen JD, Wood T (2010) Biomass-derived fuel for transportation. FCRC-NRC Fifth Annual Colloquium on Fuel Cell and Hydrogen Technologies, Kingston, Canada, 14 December 2010.

Mabee WE, Calvert K, **Manion N**, Mirck J (2010) Regional analysis of biofuel options. Bioenergy Australia Conference 2010, Sydney, Australia, 9 December 2010.

Mabee WE, Calvert K, **Manion N**, Mirck J, Wood T (2010) Regional analysis of biofuel options. Renewable Energy and Society - Matariki Network Workshop, Kingston, Canada, 6 November 2010.

Mabee WE, Calvert K, **Manion N**, Mirck J (2010) Regional analysis of biorefining. Genome BC SAC Meeting, Vancouver, Canada, 8 September 2010.

Mabee WE, Carpenter T, Mirck J, Calvert K, **Manion NC**, Wood T (2010) Biorefining and Ontario's renewable power portfolio. Ontario Network for Sustainable Energy Policy Conference, Niagara-on-the-Lake, Canada, 28 April 2010

Manion NC, Campbell L, Rutter A (2007) Determining the distribution, sources, and fate of mercury in sediment in the Cataraqui River at Kingston, Ontario. Queen's University School of Environmental Studies (SES) Seminar Series, October 11, 2007.

Manion NC, Campbell L, Rutter A (2007) The role of organic matter in the mobility and bioavailability of Hg: Determining sources and fate of Hg in sediments of the Cataraqui River at Kingston, Ontario. 34th Annual Aquatic Toxicity Workshop, Halifax, NS

Manion NC, Campbell L, Rutter A (2007) Trends in Mercury contamination and bioavailability from former industrial sites along the Cataraqui River at Kingston, Ontario, Canada. 2007 SCL/CCFR annual conference, Montreal, QC.

Hamilton K, Campbell L, Rutter A, **Manion NC** (2006) Metal levels in sediment and water from series of lakes along the lower Rideau River system. 21st annual Gananoque Conference on Environmental Sciences and Engineering

Manion NC, Campbell L, Rutter A (2006) Determination of Trends in Mercury Contamination in Sediment and Aquatic Biota in the Lower Cataraqui River at Kingston, Ontario. 8th International Conference on Mercury as a Global Pollutant, Madison, Wisconsin, USA

SERVICE TO PROFESSION

Manuscript Peer Review

- Limnology & Oceanography *2006-present*
- Water Environment Research *2011-present*

Conference Session Chair

27th Commerce and Engineering Environmental Conference *February 2017*

- Moderated panel discussion on "The Future of Energy in Canada".
- Panelists included Anne Halladay (Shell Canada), Lindsay Wiginton (Pembina Institute), and Alanna Komisar (MaRSdd).

Expert Panelist

Queen's University UC3 Forum *October 2019*

- Participated as an expert panelist at Queen's University's UC3 Forum on Climate Change and Climate Change solutions in Education
- Individuals on my panel included Paul MacLatchey (City of Kingston), Kristin Mullin (Sustainable Kingston), and Chief R. Donald Maracle (Chief, Tyendinaga), and Dr. Warren Mabee (Queen's University); moderated by City Councilor Bridget Doherty

COMMUNITY OUTREACH WORK

Urban Agriculture Club, Queen's University, Kingston, ON *2018-2019*

- Advisor to a new undergraduate start-up club at Queen's University looking to establish an urban agriculture club. Working the group on writing club policies, establishing strategic goals, and establishing working partnerships with the University community to facilitate both education and research spaces. In addition to creating working relationships with internal groups such as Four-Directions Aboriginal Centre, I also help to advise on engagement with charities & businesses in the larger Kingston community.

Oak Street Garden, Kingston, ON *2017-present*

- Volunteer consultant for a community garden in Kingston, ON to help establish an edible 'Food Forest' based on permaculture approaches. Currently working to create a working plan and coordinate with local groups such as Permaculture Kingston and local nurseries, and the Lemoine Point Conservation Authority.

Grow a Row, Kingston, ON *2010-11*

- Cultivated garden produce for donation to Grow a Row, which is a fresh food bank program aimed at providing fresh produce to income families.

Green Up!, Kingston, ON *2008*

- Volunteer at the annual Green Up! event held at Queen's University in Kingston,

Ontario. The one-day mini-conference is free to the Kingston Community & emphasizes topics such as renewable energy for homes, green lawn care, and other green initiatives for homeowners.

CONFERENCES ATTENDED

- CHBA Net Zero Home Leadership Summit, Harrison Hot Springs, BC *Nov 2020*
- Biomass North Conference, Thunder Bay, Ontario *Oct 2018*
- Ontario Sustainable Energy Association, Workshop, Toronto, Ontario *Sep 2018*
- Ontario Woodlot Association, AGM, Shakespeare, Ontario *Apr 2018*
- NSERC Bioconversion Network, Montreal, QC *Jun 2014*
- Fibre Network & NSERC Bioconversion AGM Conference, Cornwall, ON *May 2013*
- NSERC Bioconversion Network Workshop & AGM, Vancouver, BC *Jun 2012*
- Biomass for Energy Conference, Queen's University, Kingston, ON *May 2009-10*
- Green Building & Sustainability Conf., Loyalist College, Belleville, ON *Mar 2008*
- Biofibres & Sustainability Conference hosted by ELORIN, Trenton, ON *Aug 2008*
- Aquatic Toxicology Conference, Halifax, NS *Sep 2007*
- Global Conference on Mercury, Madison, Wisconsin *Aug 2006*
- Aquatic Toxicology Conference, Waterloo, ON *Oct 2005*

OTHER VOLUNTEER WORK

Ontario Woodlot Association
Ontario *Apr 2020 – May 2022*
- Member of the Executive Committee and the Business Development Committee

Oak Street Garden Food Forest
Kingston, Ontario *Aug 2006*
- Led a community group that lobbied the City of Kingston over a five year period to allow the creation of a food forest on downtown city land as part of an existing community garden. The project was approved a year ago, we broke ground in the fall of 2019, and planting commenced this spring. I remain an ongoing member of the group assisting them in a long-term research plan to look at carbon changes in soil.

Global Conference on Mercury
Madison, Wisconsin *Aug 2006*
Basketball Coach
Ontario Basketball Association & Regiopolis Notre-Dame High School *1999-2010*
- Coached rep. (OBA) and high school boys and girls (15 – 19 years old) basketball teams

PROFESSIONAL SKILLS & CERTIFICATION

Highly skilled with computer hardware and software, including:

- LCA software and databases such as SimaPro, Athena, Bionova One Click LCA, OpenLCA, and ecoinvent.
- Project management platforms such Microsoft Manager, Asana, Wrike, and Kanban
- Geographical information software such as ArcGIS and QGIS
- Software packages and operating systems such as, Word, Excel, Access, Powerpoint, Photoshop, Google Sketchup, DOS
- Modelling programs such as Stella, Landscape Architect, and Insight Maker
- Statistical software such as Sigmaplot and JMP

Other Skills:

- First Aid Training
- Pleasure Craft Operator's Card