Tony Robert Walker, BSc (Hons), MPhil, PhD, EP

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EXPERTISE

My research, teaching and professional practice cover a wide range of biophysical sciences related to resource and environmental management and closely reflect Dalhousie's priority research areas in oceans, energy and the environment including:

- Monitoring human impacts (industrial pollution) on the natural world
- Remediation of contaminated sites
- Ecological risk assessment (ERA)
- Environmental effects monitoring (EEM)
- Environmental impact assessment (EIA)
- Management of natural resources (including in the Arctic and Antarctic)
- Aquaculture site selection and management
- Quantitative and qualitative experimental research design
- Air pollution impacts on ecosystems
- Climate change impacts and adaptation
- Nutrient cycling

EDUCATION

- **NSERC Post-Doctoral Research Fellowship, 2003-2006,** Dalhousie University, Department of Oceanography (2003-2006) collaborating with Dr. Jon Grant and Dr. Paul Hill.
    - Aquaculture site planning, environmental assessments and coastal zone planning in Guysborough County funded by Atlantic Canada Opportunities Agency (ACOA) and Canada's Research Network in Aquaculture (AquaNet) (4 published papers).
    - Canadian Arctic Shelves Exchange Study (CASES) funded by Natural Sciences and Engineering Research Council of Canada (NSERC) studying river-ocean coupling in the Mackenzie River Delta and Beaufort Sea (6 published papers).

- **Doctor of Philosophy (PhD) Biology, 2003,** University of Nottingham, UK (1998-2003)
  Thesis: "*Pollution in the Pechora Basin, North-Eastern European Russian Arctic*"
  A doctoral research project that required a broad understanding of environmental pollution issues and contamination in the Russian Arctic resulting from coal, oil and gas industrial activities (11 published papers).

- **Master of Philosophy (MPhil) Biology, 1993,** University of Essex, UK (1990-1993)
  Thesis: "*Benthic Microbial Ecology in Antarctic Coastal Sediments*"

Annual budgets of carbon and nutrient cycling in Antarctic marine sediments were studied during a 15 month continuous field study in the Antarctic (6 published papers).

- **Bachelor of Science (BSc with Honours) Biology, 1989,** University of Portsmouth, UK (1986-1989)
  Honours thesis project involved an aquaculture based growth study of thick-lipped grey mullet using different diet treatments.

TEACHING EXPERIENCE

- Assistant Professor (Limited Term Appointment) and Master of Resource and Environmental Management (MREM) Internship Director, School of Resource and Environmental Studies (SRES), Faculty of Management, Dalhousie University teaching the following courses across four degree programs (Master of Environmental Studies [MES], MREM, Bachelor of Management and the International Development Studies Master's program [IDS MA]) – Fall 2014 and Winter 2015:
  - ENVI5035 / INTD5002 - *Research Design and Methods* (9 students)
  - ENVI5501 - *MREM Internship* (26 students)
  - ENVI5508 - *Project Report in Resource and Environmental Management* (27 students)
  - ENVI5505 / MGMT4505-1 - *Biophysical Dimensions of Resource and Environmental Management* (26 students)
  - MGMT2702 - *Resource and Environmental Management* (135 students)
  - ENVI 5050 Special topics course in *Pollution Abatement: Monitoring, Mitigation and Management* (9 students)
  - ENVI5049 – *Directed Study / Special Topics Course* – Adaptive Management Approaches to Bird and Bat Monitoring for Industrial Wind Turbine Development in Canada (1 student)

- Attended a *Creating a Teaching Dossier* workshop, Killam Library, Dalhousie University, May 2015.

- Assistant Professor (limited term appointment), SRES, Faculty of Management, Dalhousie University. Guest Lecturer for the following Fall 2014 / Winter 2015 courses:
  - ENVI5509 - *Graduate Seminar – Research in a Consulting Context*
  - ENVI5001 - *Environmental Assessment - Environmental Impact Assessment: A Consultants Perspective*
  - MGMT3701 - *Environment and Resource Problem Solving I - Community as a Living Lab - The Use of biophysical information in decision making in Halifax Harbour*

- Sessional Professor teaching ENVI5505 / MGMT4505-1 - *Biophysical Dimensions of Resource and Environmental Management* to students in the MREM program - Winter 2011, 2012 and 2013 at SRES, Faculty of Management, Dalhousie University.

- OCEA4335.03 / 5335.03 - *Environmental Impacts in Marine Ecosystems*, Department of Oceanography, Dalhousie University. Taught classes during 2004, 2005 and 2006. Lectures included: coastal eutrophication; elemental fluxes, benthic impacts, remote sensing using satellite imagery for interpretation of biophysical geography; discussions of research papers with graduate and undergraduate students on remote sensing; food webs and biodiversity.

- Guest Lecturer for ENVS4001 - *Environmental Assessment - Panel Discussion*, Environmental Programs, Dalhousie University (Winter 2012).

- Natural History Lecturer for Princess Cruises in Antarctica and South America during January and February 2010. Lecture topics included: Impacts of the Southern Ocean Fishery on Seabirds of Antarctica: Management and Mitigation Options; Four Years in the Antarctic, Part 1: Signy Island;

Four Years in the Antarctic, Part 2: Bird Island; The Adventures of an Antarctic Seal Scientist; The Natural History of Pack-ice Seals; Early Antarctic polar exploration including the establishment of the British Antarctic Survey; Natural History of the Falkland Islands.

- Highly Qualified Personnel (HQP) training experience gained by mentoring graduate and undergraduate students at Dalhousie University and the University of Nottingham, UK.

- Mentoring skills gained whilst supervising and managing junior and intermediate HQP at Dillon, Public Works and Government Services Canada (PWGSC) and Jacques Whitford in resource and environmental management.

SERVICE AND ACTIVITY *(SRES, Dalhousie University)*

- **MREM Internship Director (2014/2015)**
- **Directed Reading (ENVI 5049) Supervisor (2015)**
  - **Jason Parise,** "*Adaptive Management Approaches to Bird and Bat Monitoring for Industrial Wind Turbine Development in Canada*".
- **MREM Academic (Internship) Adviser (2015)**
  - **Alexandra Denis –** *Environmental Assessment Summer Student, Environmental Assessment Branch, Nova Scotia Environment.*
  - **Afolabi Opanubi –** *Archaeological Field Assistant, Cultural Resource Management.*
  - **Jeffery Janes** – *Environmental Scientist, Stantec.*
  - **Shauna Pettipas –** *Environmental Scientist, Dillon Consulting Limited.*
  - **Brenden Blotnicky –** *Program Coordinator, Summerhill.*
  - **Jiawei Gao –** *Research Assistant, Coastal Management for Local Municipalities, Ecology Action Centre.*
- **Chair for MES thesis defence (2015)**
  - **Francois Bregha**, "*Contextualizing the impact of ocean acidification on veliger growth for three commercially important bivalve molluscs*".
- **Chair for MES thesis defence (2014)**
  - **Christine Stortini**, "*Marine climate change vulnerability assessment development, uses, and limitations as a tool for climate adaptation*".
- **MREM Project Report Coordinator (2014)**
- **Academic Advisor for MREM Final Project Reports (2014)**
  - **Karine Duffy,** "*Applying the Open Standards for the Practice of Conservation within Species at Risk in Canada using MiradiTM: An Adaptive Management Tool*".
  - **KeeganBalcom,** "*Sustainability Opportunities of 14 Wing Greenwood*".
  - **Madeleine Crowell** – "*Diverting CFLs: Extended producer responsibility in Nova Scotia's solid waste management strategy*".
  - **Shajini Jeganmohan,** "*Transportation Planning in Nova Scotia: the case of highway development and compensation*".
  - **Jason Parise,** "*Wind Development in Canada: Public perceptions, setbacks and future development*".
  - **Jessica Hiltz,** "*Linear Infrastructure and Environmental Conditions: Analysis of National Energy Board decisions and future direction*".

SCHOLARLY CONTRIBUTIONS

Links are available to my ***ResearchGate*** and ***Google Scholar*** profiles

All Citations – 918	h-index – 15	i10-index – 17
Citations since 2010 – 367	h-index – 12	i10-index – 14

Refereed Publications *Underline - Denotes training of highly qualified personnel / mentoring of graduate students; * - Denotes interdisciplinary research*

1. Hoffman, E., Bernier, M., Blotnicky, B., Golden, P.G., Janes, J., Kader, A., Kovacs-Da Costa, R., Pettipas, S., Vermeulen, S., **Walker**, T.R. (submitted) Discrepancy of Public Perception and Environmental Management at a Pulp and Paper Facility: A Canadian Case Study. *Environmental Management.*

2. **Walker**, T.R., Bernier, M., Blotnicky, B., Golden, P.G., Janes, J., Hoffman, E., Kader, A., Kovacs-Da Costa, R., Pettipas, S., Vermeulen, S., (submitted) Harbour divestiture in Canada: Passing the buck or Passing the buck. *Marine Policy.*

3. ***Walker**, T.R., Willis, R., Leroy, M., MacLean, B., Appleton, R., McMillan, S., Wambolt, N., Gray, T., Smith, M. (2015) Ecological Risk Assessment of Sediments in Sydney Harbour, Nova Scotia, Canada. *Soil and Sediment Contamination: An International Journal.* DOI: 10.1080/15320383.2015.982244.

4. Hudson, L. N., Newbold, T., Contu, S., Hill, S. L. L., Lysenko, I., […] **Walker**, T. R., […] and Purvis, A. (2014), The PREDICTS database: a global database of how local terrestrial biodiversity responds to human impacts. *Ecology and Evolution*. 4(24): 4701-4735. DOI: 10.1002/ece3.1303.

5. ***Walker**, T.R., Grant, J., Weise, A.M., Mckindsey, C.W., Callier, M.D., Richard, M. (2014) Influence of suspended mussel lines on sediment resuspension in Great-Entry Lagoon, Magdalen Islands (Québec, Canada). *Aquaculture*. 433: 450-457. DOI: http://dx.doi.org/10.1016/j.aquaculture.2014.07.006.

6. **Walker**, T.R. (2014) Environmental Effects Monitoring in Sydney Harbour During Remediation of One of Canada's Most Polluted Sites: A Review and Lessons Learned. *Remediation*. 24: 103-117. DOI: 10.1002/rem.21397.

7. **Walker**, T.R., MacAskill, D. (2014) Monitoring water quality in Sydney Harbour using blue mussels during remediation of the Sydney Tar Ponds, Nova Scotia, Canada. *Environmental Monitoring and Assessment*. 186:1623-1638. DOI: 10.1007/s10661-013-3479-6.

8. **Walker**, T.R., MacAskill, D., Weaver, P. (2013) Legacy contaminant bioaccumulation in rock crabs in Sydney Harbour during remediation of the Sydney Tar Ponds, Nova Scotia, Canada. *Marine Pollution Bulletin*. 77: 412-417. DOI: http://dx.doi.org/10.1016/j.marpolbul.2013.09.036.

9. **Walker**, T.R., MacAskill, D., Weaver, P. (2013) Blue mussels (Mytilus edulis) as bioindicators of stable and improving water quality in Sydney Harbour during remediation of the Sydney Tar Ponds, Nova Scotia, Canada. *Water Quality Research Journal of Canada*. 48: 358-371. DOI: 10.2166/wqrjc.2013.014.

10. **Walker**, T.R., MacLean, B., Appleton, R., McMillan, S., Miles, M. (2013) Cost effective sediment dredge disposal policy options for small craft harbours in Canada. *Remediation*. 23: 123-140. DOI: 10.1002/rem.21371.

11. **Walker**, T.R., MacAskill, D., Weaver, P. (2013) Environmental Recovery in Sydney Harbour, Nova Scotia: Evidence of Natural and Anthropogenic Sediment Capping. *Marine Pollution Bulletin*. 74: 446-452. DOI: http://dx.doi.org/10.1016/j.marpolbul.2013.06.013.

12. **Walker**, T.R., MacAskill, D., Rushton, T., Thalheimer, A.H., Weaver, P. (2013) Monitoring effects of remediation on natural sediment recovery in Sydney Harbour, Nova Scotia. *Environmental Monitoring and Assessment*. 185: 8089-8107. DOI: 10.1007/s10661-013-3157-8.

13. Grant, J., **Walker**, T.R., Hill P.S., Lintern, D.G. (2013) BEAST-A portable device for quantification of erosion in intact sediment cores. *Methods in Oceanography*. 5: 39-55.
Most cited *Methods in Oceanography* article, extracted from Scopus (accessed May 12, 2015).
http://www.journals.elsevier.com/methods-in-oceanography/most-cited-articles/

14. **Walker**, T.R. (2012) Properties of selected soils from the sub-Arctic region of Labrador, Canada. *Polish Polar Research*. 33(3): 207-224. DOI: 10.2478/v10183−012−0013−4.

15. **Walker**, T.R. (2010) The use of lichens, snow and soil as biomonitors of contaminants in airborne particulate matter in North-eastern European Russia. In: *Urban Airborne Particulate Matter: Origins, Chemistry, Fate and Health Impacts.* (Eds.) F. Zereini, C.L. Wiseman. Springer, 790 p. Invited article contribution. ISBN: 978-3-642-12277-4.

16. *Mucci, A., Forest, A., Fortier, L., Fukuchi, M., Grant, J., Hattori, H., Hill, P., Lintern, G., Makabe, R., Magen, C., Miller, L., Sampei, M., Sasaki, H., Sundby, B., **Walker**, T.R., Wassmann, P. (2009) Chapter 7: Organic and Inorganic fluxes. In: *On Thin Ice: a synthesis of the Canadian Arctic Shelf Exchange Study (CASES).* (Eds.) L. Fortier, D. Barber, J. Michaud. Aboriginal Issues Press. 113-143.

17. **Walker**, T.R., Grant, J. (2009) Quantifying erosion rates and stability of bottom sediments at mussel aquaculture sites in Prince Edward Island, Canada. *Journal of Marine Systems*. 75: 46-55.

18. ***Walker**, T.R., Crittenden, P.D., Dauvalter, V.A., Jones, V., Kuhry, P., Loskutova, O., Mikkola, K., Nikula, A., Patova, E. Pomonorov, V.I., Pystina, T. Rätti, O., Solovieva, N., Stenina, A., Virtanen, T., Young, S.D. (2009) Multiple indicators of human impacts on the environment in the Pechora Basin, north-eastern European Russia. *Ecological Indicators*. 9: 765-779.

19. ***Walker**, T.R., Grant, J., Cranford, P., Lintern, D.G., Hill P.S., Jarvis, P., Barrel. J., Nozais, C. (2008) Suspended sediment and erosion dynamics in Kugmallit Bay and Beaufort Sea during ice-free conditions. *Journal of Marine Systems.* 74: 794-809.

20. **Walker**, T.R., Grant, J., Jarvis, P. (2008) Approaching freshet beneath land fast-ice in Kugmallit Bay on the Canadian Arctic Shelf: Evidence from sensor and ground truth data. *Arctic*. 61(1): 76-86.

21. **Walker**, T.R. (2008) Zinc accumulation in lichens due to industrial emissions around Vorkuta, northeast European Russia. *Polish Polar Research*. 28(2): 141-147.

22. **Walker**, T.R. (2007) Lichens of the boreal forests of Labrador, Canada: A checklist. *Evansia*. 24(3): 85-90.

23. ***Walker**, T.R., Habeck, O., Karjalainen, T.P., Virtanen, T., Solovieva, N., Jones, V., Kuhry, P., Pomonorov, V.I., Mikkola, K., Nikula, A., Patova, E. Crittenden, P.D., Young, S.D., Ingold, T. (2006) Perceived and measured levels of environmental pollution: interdisciplinary research in the subarctic lowlands of northeast European Russian. *Ambio*. 35(5): 220-228.

24. ***Walker**, T.R., Crittenden, P.D., Young, S.D., Prystina, T. (2006) An assessment of pollution impacts due to the oil and gas industries in the Pechora basin, north-eastern European Russia. *Ecological Indicators*. 6(2): 369-387.

25. **Walker**, T.R., Pystina, T.N. (2006) The use lichens to monitor terrestrial pollution and ecological impacts caused by oil and gas industries in the Pechora Basin, NW Russia. *Herzogia*. 19: 229-238.

26. **Walker**, T.R., Grant, J., Archambault, M-C. (2006) Accumulation of marine debris on an intertidal beach in an urban park (Halifax Harbour, Nova Scotia). *Water Quality Research Journal of Canada*. 41(3): 256-262.

27. *Archamault, M-C., Grant, J., **Walker**, T.R., Cranford, P., Canessa, R., Mamoser, M. (2005) Management of Aquaculture Site Selection via Regional Habitat Classification: Evaluating the use of Geographic Information Systems (GIS). In: *Canadian Coastal Conference 2005*, Conférence canadienne sur le littoral, Dartmouth, NS. 2005.

28. ***Walker**, T.R., Grant, J., Hill, P.S., Cranford, P., Lintern, D.G., Scofield, B. (2005) Measuring particle dynamics in Arctic and mussel aquaculture environments. In: *Canadian Coastal Conference 2005*, Conférence canadienne sur le littoral, Dartmouth, NS. 2005. 11 pp.

29. *Lintern, D.G., Hill, P.R., Solomon, S., **Walker**, T.R., Grant, J. (2005) Erodibility, sediment strength and storm resuspension in Kugmallit Bay, Beaufort Sea. In: *Canadian Coastal Conference 2005*, Conférence canadienne sur le littoral, Dartmouth, NS. 2005. 13 pp.

30. **Walker**, T.R. (2005) Distribution of oxygen, sulfides and optimum temperature for sulfate reduction in maritime Antarctic sediments. *Polish Polar Research*. 26(3): 215-230.

31. **Walker**, T.R. (2005) Vertical organic inputs and bio-availability of carbon in an Antarctic coastal sediment. *Polish Polar Research*. 26(2): 91-106.

32. **Walker**, T.R., Pystina, T.N. (2005) The first record of Ramalina obtusata in the Komi Republic, north-eastern European Russia. *Graphis Scripta*. 17: 48-51.

33. **Walker**, T.R. (2005) Comparison of anthropogenic metal deposition rates with excess soil loading from coal, oil and gas industries in the Usa Basin, NW Russia. *Polish Polar Research*. 26(4): 299-314.

34. McCafferty, D.J., **Walker**, T.R., Boyd, I.L. (2004) Using time depth light recorders to measure light levels experienced by a diving marine mammal. *Marine Biology*. 146: 191-199.

35. **Walker**, T.R., Crittenden, P.D., Young, S.D. (2003) Regional variation in the chemical composition of winter snowpack and terricolous lichens in relation to sources of acid emissions in the Usa River Basin, northeastern European Russia. *Environmental Pollution*. 125: 401-412.

36. **Walker**, T.R., Young, S.D., Crittenden, P.D., Zhang, H. (2003) Anthropogenic metal enrichment of snow and soil in Northeastern European Russia. *Environmental Pollution*. 121: 11-21.

37. McCafferty, D.J., Boyd, I.L., **Walker**, T.R., Taylor, R.I. (1999) Can marine mammals be used to monitor oceanographic conditions? *Marine Biology*. 134: 387-395.

38. McCafferty, D.J., Boyd, I.L., **Walker**, T.R., Taylor, R.I. (1998) Foraging responses of Antarctic fur seals to changes in the marine environment. *Marine Ecology Progress Series*. 166: 285-299.

39. Boyd, I.L., McCafferty, D.J., Reid, K., Taylor, R., **Walker**, T.R. (1998) Dispersal of male and female Antarctic fur seals. *Canadian Journal of Fish and Aquatic Sciences*. 55: 845-852.

40. **Walker**, T.R., Boyd, I.L., McCafferty, D.J., Huin, N., Taylor, R.I., Reid, K. (1998) Seasonal occurrence and diet of leopard seals, Hydrurga leptonyx at Bird Island, South Georgia. *Antarctic Science*. 10(1): 75-81.

41. Boyd, I.L., McCafferty, D.J., **Walker**, T.R. (1997) Variation in foraging effort by lactating Antarctic fur seals: response to simulated increased foraging costs. *Behavioural Ecology and Sociobiology*. 40: 135-144.

42. **Walker**, T.R., Reid, K., Arnould, J.P.Y., Croxall, J.P. (1997) Marine debris surveys at Bird Island, South Georgia 1990-1995. *Marine Pollution Bulletin*. 34(1): 61-65.

43. **Walker**, T.R., Taylor, R. (1996) Entanglement of Antarctic fur seals Arctocephalus gazella in man-made debris at Bird Island, South Georgia during the 1995 winter and 1995/96 pup-rearing season. SC-CAMLR-XV/BG/5. Hobart, Australia.

44. Boyd, I.L., **Walker**, T.R., Poncet, J. (1996) Status of Southern Elephant seals, Mirounga leonina at South Georgia. *Antarctic Science*. 8(3): 237-244.

45. Nedwell, D.B., **Walker**, T.R. (1995) Sediment-water fluxes of nutrients in an Antarctic coastal sediment: influence of bioturbation. *Polar Biology*. 15: 57-64.

46. Nedwell, D.B., **Walker**, T.R., Ellis-Evans, J.C., Clarke, A. (1993) Measurements of seasonal rates and annual budgets of organic carbon fluxes in an Antarctic coastal environment at Signy Island, South Orkney Islands, suggest a broad balance between production and decomposition. *Applied and Environmental Microbiology*. 59(12): 3989-3995.

47. Nedwell, D.B., **Walker**, T.R., Ellis-Evans, J.C. (1993) Adaptation and activity of the benthic microbial community in an inshore coastal sediment at Signy Island, South Orkney Islands. In: *Proceedings of British Antarctic Survey Antarctic Special Topic Award Scheme Symposium*. Edited by R.B. Heywood. 127-131.

48. Nedwell, D.B., **Walker**, T.R., Ellis-Evans, J.C. (1993) Benthic microbial activity and organic degradation in an Antarctic coastal sediment. In: *Trends in Microbial Ecology*. Edited by R. Guerrero and C. Pedrós-Alió. Spanish Society for Microbiology. 41-44.

Publications in Preparation

1. Hudson, L.N., Newbold, T., Contu, S., Hill, S.L.L., Lysenko, I., […] **Walker**, T.R., […] and Purvis, A. (in prep.) The public release and use of the PREDICTS database: a global database of how local terrestrial biodiversity responds to human impacts. To be submitted in *Ecology and Evolution*.

2. **Walker**, T.R., Grant, J. (in prep.) Metal concentrations in sediment, lobster and mussel tissues downstream from historical gold mine tailings. To be submitted in *Marine Pollution Bulletin*.

3. Parise, J., **Walker**, T.R. (in prep.) Adaptive Management Approaches to Bird and Bat Monitoring for Industrial Wind Turbine Development in Canada. To be submitted in *Renewable Energy* or *Energy Policy.*

4. MacAskill, D., **Walker**, T.R., Oakes, K. (in prep.) Forensic PAH Assessment of the Sydney Tar Ponds and the Surrounding Environment Using PAH Fingerprint Analysis. To be submitted in *Soil and Sediment Contamination: An International Journal.*

Theses

1. **Walker**, T.R. (2003) *Pollution in the Pechora Basin, North-Eastern European Russia*. Unpublished Ph.D. Thesis, Environmental Studies, University of Nottingham, UK. pp. 181.

2. **Walker**, T.R. (1993) *Benthic Microbial Ecology in Antarctic Coastal Sediments*. Unpublished M.Phil. Thesis, Biology, University of Essex, UK. pp. 115.

Selected Environmental Management Reports

1. Dillon (2014) Final Ecological Risk Assessment and Sediment Sampling in Quidi Vidi Harbour, Newfoundland and Labrador. Submitted to Public Works and Government Services Canada (PWGSC) on behalf of Transport Canada. (***Walker**, T.R., senior ecological scientist*).

2. Dillon (2014) Final Preliminary Quantitative Ecological Risk Assessment and Sediment Sampling in Sydney Harbour, Nova Scotia. Submitted to Public Works and Government Services Canada (PWGSC) on behalf of Transport Canada. (***Walker**, T.R., senior ecological scientist*).

3. Dillon (2013) Final Marine Report for Year 3 Construction. Submitted to the Sydney Tar Ponds Agency (STPA). (***Walker**, T.R., senior scientist leading Marine Environmental Effects Monitoring Program (MEEMP) in Sydney Harbour*).

4. Dillon (2012) Boat Harbour Treatment Facility Monitoring Review: Analysis and Future Monitoring Recommendations (Final Report) October 2012. Submitted to the Joint Environmental and Health Monitoring Committee (JEHMC). (***Walker**, T.R., senior ecological scientist*).

5. Dillon (2012) Final Marine Report for Year 2 Construction. Submitted to the Sydney Tar Ponds Agency (STPA). (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

6. Dillon (2012) Sydney Harbour, Nova Scotia – Water Quality Monitoring Program Final Report. Submitted to Public Works and Government Services Canada (PWGSC) (***Walker**, T.R., senior scientist and project manager of water quality monitoring during $35 million harbour dredging project*).

7. Dillon (2011) Final Marine Report for Year 1 Construction. Submitted to the Sydney Tar Ponds Agency (STPA). (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

8. Dillon (2011) Marine Sediment Sampling Program Summary Letter Marine Program – Year 2 Construction Sydney Tar Ponds, Sydney, Nova Scotia. Letter report submitted to the STPA. (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

9. Dillon (2010) Environmental Effects Monitoring and Surface Water Compliance Monitoring Program Pre-Construction/Baseline Report (Final). Submitted to the STPA. (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

10. Dillon (2010) Maritime Forces Atlantic (MARLANT) Operation Area Management Plan, for Formation Safety and Environment (FSE), Department of National Defence. Submitted to DND. (***Walker**, T.R., senior marine scientist).*

11. Dillon (2009) Draft Intertidal Benthic Community Monitoring. Submitted to the STPA. (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

12. Dillon (2009) Final Crab Tissue (Hepatopancreas) Monitoring Protocol - Crab Tissue Monitoring. Submitted to the STPA. (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

13. Dillon (2009) STPA Project Environmental Effects Monitoring Program and Sydney Harbour Dredging and Terminal Project: Rationalization for continuing with existing program (Plan A) or relocating marine

sampling stations as part of a contingency plan (Plan B). Submitted to the STPA. (***Walker**, T.R., senior scientist leading MEEMP in Sydney Harbour*).

14. Dillon (2009) CEAA Environmental Impact Assessment Screening for Highway 113. Submitted to the Nova Scotia Environment (NSE) on behalf of Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR). (***Walker**, T.R., senior environmental scientist*).

15. Dillon (2008) CEAA Environmental Impact Assessment Screening for Highway 104 - Port Hastings to Port Hawkesbury. Submitted to NSE on behalf of NSTIR. (***Walker**, T.R., senior environmental scientist*).

16. Dillon (2008) Environmental Impact Assessment Conditions of Approval, Baseline Marine Surveys for a Proposed Liquefied Natural Gas project, Goldboro, NS. Submitted to NSE on behalf of Maple LNG. (***Walker**, T.R., senior environmental scientist*).

17. Jacques Whitford (2007) Ecological Land Classification Survey, Labrador, NL. Submitted to Newfoundland and Labrador Hydro. (***Walker**, T.R., senior environmental soil scientist*).

Media Outreach

1. Invited by the *Halifax Media Co-op* (Miles Howe) to comment about the Boat Harbour Effluent Treatment Facility and potential remediation options available for *'cleaning up Boat Harbour'*. May 2015.

2. Invited by Charlotte White (a UK based journalist) to comment about the impact pollution has on climate change for an article to appear in *The Ecologist*. May 2015.

3. Invited speaker at the 2013 Halifax Oceans Film Festival to lead a discussion about the film documenting the Antarctic tooth-fishery in the Ross Sea, Antarctica. '*The Last Ocean'*. June 2013. http://internationaloceaninstitute.dal.ca/FilmFest.htm

4. **Walker**, T.R., Grant, J., Archambault, M-C. (2007) Accumulation of marine debris on an intertidal beach in an urban park (Halifax Harbour, Nova Scotia). *The Ecological Monitoring and Assessment Network (EMAN)*. 5: 7-8.

5. **Walker**, T.R. (2006) Aquanet Highly Qualified New Scientists. In: *Northern Aquaculture Special Supplement*. p. 10.

6. **Walker**, T.R. (1995) Eagle on Bird Island. *Cycle Touring and Campaigning*. Feb. 26-27.

7. **Walker**, T.R. (1995) Home is Bird Island with penguins, seals and just two humans. *Chronical Advertiser*. Sep 6.

Conference and Workshop Presentations

- **Walker**, T.R. *Environmental Effects Monitoring in Sydney Harbour During Remediation of One of Canada's Most Polluted Sites: A Review and Lessons Learned*. Bedford Institute of Oceanography, Ocean and Ecosystem Science Seminar Series, Dartmouth, Canada, May, 2015. **Seminar**
- **Walker**, T.R. *Environmental Effects Monitoring in Sydney Harbour During Remediation of One of Canada's Most Polluted Sites: A Review and Lessons Learned*. May Research Day, Dalhousie University, Halifax, Canada, May, 2015. **Platform**
- **Walker**, T.R. et al. *Environmental Recovery in Sydney Harbour, Nova Scotia: Evidence of Natural and Anthropogenic Sediment Capping*. 11th annual Sustainability and Environmental Research Symposium, Dalhousie University, Halifax, Canada, Mar. 2015. **Poster**

- **Walker**, T.R. *Environmental Effects Monitoring in Sydney Harbour During Remediation of One of Canada's Most Polluted Sites: A Review and Lessons Learned*. Canadian Land Reclamation Association (CLRA) / Atlantic Reclamation Conference (ARC), Wolfville, Oct. 2014. http://atlanticclra.ca/about-arc-2014/ **Platform**
- **Walker**, T.R., et al. *Legacy contaminant bioaccumulation in rock crabs in Sydney Harbour during remediation of the Sydney Tar Ponds, Nova Scotia, Canada.* Coastal Zone Canada (CZC) 2014 International Conference: Our Coasts: Legacies and Futures, Halifax, June, 2014. http://www.czca-azcc.org/czc-zcc2014/home.htm **Platform**
- **Walker**, T.R., et al. *Environmental Recovery in Sydney Harbour, Nova Scotia: Evidence of Natural and Anthropogenic Sediment Capping.* CZC 2014 International Conference: Our Coasts: Legacies and Futures, Halifax, June, 2014. http://www.czca-azcc.org/czc-zcc2014/home.htm **Poster**
- Recoskie, R., **Walker**, T.R., Windsor, T. *Going Off the Deep End: Characterizing Deep Sediment in the Owen Sound Harbour Applying COA Framework and Risk Assessment Principles* 2014 RPIC Federal Contaminated Sites National Workshop, Ottawa, Ontario, April, 2014. http://www.rpic-ibic.ca/en/events/federal-contaminated-sites-fcs-national-workshop/2014-fcs-national-workshop/schedule-at-a-glance-2/schedule-at-a-glance-6#sthash.XT66seXz.dpuf **Platform**
- **Walker**, T.R., et al. *Environmental Recovery in Sydney Harbour, Nova Scotia: Evidence of Natural and Anthropogenic Sediment Capping.* 40th Annual Aquatic Toxicity Workshop, Moncton, New Brunswick, Canada, Oct. 2013 **Poster**
- **Walker**, T.R., et al. *Blue mussels (Mytilus edulis) as bioindicators of stable water quality in Sydney Harbour during remediation of the Sydney Tar Ponds, Nova Scotia, Canada*' 40th Annual Aquatic Toxicity Workshop, Moncton, New Brunswick, Canada, Oct. 2013 **Platform**
- **Session chair** Sublethal Endpoints. 40th Annual Aquatic Toxicity Workshop, Moncton, New Brunswick, Canada, Oct. 2013
- **Walker**, T.R. et al. *Assessing Sydney Tar Ponds Remediation and Natural Sediment Recovery in Nova Scotia, Canada*. In: Seventh International Conference on Remediation of Contaminated Sediments. Dallas, Texas. Battelle. 443 p. Feb. 2013. http://conferences.battelle.org/sediments/pdfs/abstractcollection.pdf **Poster**
- Invited speaker at the 2013 Halifax Oceans Film Festival to lead a discussion about the film documenting the Antarctic tooth-fishery in the Ross Sea, Antarctica. 'The Last Ocean'. June 2013. http://internationaloceaninstitute.dal.ca/FilmFest.htm **Platform**
- Pictou Landing First Nation (PLFN). Presentation of the results and recommendations of the community consultation and monitoring report review related to the Boat Harbour Treatment Facility, PLFN community, Feb. 2013 **Platform**
- **Walker,** T.R., et al. *Sediment and Water Quality Indicators: Case Study Evaluation of Remedial Activities at the Sydney Tar Ponds and Natural Recovery Rates of Sediments in Sydney Harbour, NS*. Canadian Land Reclamation Association (CLRA) / Atlantic Reclamation Conference (ARC), Sydney, Sep. 2012 http://www.atlanticclra.ca/clra37/index.html **Platform**
- **Walker**, T.R. et al. *Sydney Tar Ponds Remediation Environmental Effects Monitoring - Surface Water* Canadian Land Reclamation Association (CLRA) / Atlantic Reclamation Conference (ARC), Sydney, Sep. 2012 **Platform**
- **Walker**, T.R. et al. *Marine Environmental Effects Monitoring (EEM), Year 3 Construction Marine Environmental Effects Monitoring Program (MEEMP)*, Sydney Tar Ponds Agency (STPA), Sydney, Mar. 2012 **Platform**
- **Walker**, T.R. et al. *Marine EEM, Results of Year 2 Construction Marine Environmental Effects Monitoring Program (MEEMP)*, STPA, Sydney, Nov. 2011 **Platform**
- **Walker**, T.R. et al. *Environmental Effects Monitoring of remediation activities: Case study in Sydney Harbour,* RemEast2011 Site Remediation Conference, Environmental Services Association of Nova Scotia (ESANS), Jun. 2011 **Platform**
- XXXI SCAR Open Science Conference for the themed session: 22 Climate and ecosystem changes in the Antarctic Peninsula region, Accepted poster titled, 'A rise in Antarctic global awareness can bring

about increased environmental impacts from eager tourists', Buenos Aires, Argentina, Aug. 2010. Due to lack of travel funds I was unable to attend this conference
- Invited to represent and participate in signing a letter of Agreement between the Canadian Polar Commission and the Instituto Antártico Argentino respecting the furthering of polar research between Canada and Argentina, Buenos Aires, Argentina, Aug. 2010. Due to lack of travel funds I was unable to attend this prestigious signing
- *Is Sustainable Energy Resource Development in the Arctic Achievable?* Sustainability and Environmental Research Symposium, Dalhousie University, Mar. 2008 **Poster**
- **Walker**, T.R. *Marine EEM, Results of Year 1 Construction MEEMP*, STPA, Sydney, 2010 **Platform**
- **Walker**, T.R. *Marine EEM, Results of Baseline MEEMP*, STPA, Sydney, 2009 **Platform**
- **Event Organiser** Marine Environmental Sciences Information Session, Museum of Natural History, Halifax, 2009 **Platform**
- **Walker**, T.R. Is Sustainable Energy Resource Development in the Arctic Achievable? 4th Annual Sustainability and Environmental Research Symposium, Dalhousie University, Mar. 2008 **Poster**
- Ecological Monitoring and Assessment Network (EMAN) Winnipeg, Canada, Nov. 2006 **Platform**
- **Walker**, T.R., et al. *Accumulation of marine debris on an intertidal beach in an urban park (Halifax Harbour, Nova Scotia).* 22nd Eastern Canadian Symposium on Water Quality Research, Montreal, QC, Canada, Nov. 2006 **Platform**
- Saint Mary's University, Oct. 2006 **Environmental Departmental Seminar**
- **Walker**, T.R., et al. *Erosion rates of sediments and suspended particulate matter in Kugmallit Bay and Beaufort Sea during ice-free conditions*. 35th Annual Benthic Ecology Meeting, Quebec, QC, Canada, Mar. 2006 **Platform**
- Dalhousie University, Department of Biology, Canada, Mar. 2006 **Departmental Seminar**
- **Walker**, T.R., et al. *Erosion rates of sediments and suspended particulate matter in Kugmallit Bay and Beaufort Sea*. Second CASES data workshop, Winnipeg, MB, Canada, Feb. 2006 **Platform**
- Near shore Marine Ecological Monitoring Workshop, Dartmouth, NS, Canada, Feb. 2006 **Platform**
- Canadian Coastal Conference, (2 Arctic papers), Dartmouth, NS, Canada, Nov. 2005 **Platform**
- **Walker**, T.R., et al. *Management of Aquaculture Site Selection via Regional Habitat Classification: How Does Regional Sensor Data on Sediment Habitat Compare to Direct Sediment Sampling?* Fifth annual Aquanet scientific Conference. Victoria, BC, Canada, Oct. 2005 **Platform**
- Archambault, M-C., Grant, J., **Walker**, T.R., et al. *Management of Aquaculture site selection via regional habitat classification: Evaluating the use of Geographic Information Systems (GIS).* Fifth annual Aquanet scientific Conference. Victoria, BC, Canada, Oct. 2005 **Platform**
- Dalhousie University, Department of Oceanography, Canada, Feb. 2005 **Departmental Seminar**
- Hydro acoustic Assessment Workshop, Biosonics, Seattle, USA, Jan. 2005 **Workshop**
- **Walker,** T.R., et al. *Measuring particle dynamics on the Mackenzie shelf.* Environmental Research Symposium, Dalhousie University. Nov. 2004. **Poster**
- **Walker**, T.R., et al. *Measuring particle dynamics on the Mackenzie shelf.* First CASES data workshop, Montreal, Canada, Oct. 2004 **Workshop**
- Biennial Benthic Workshop, St. Andrews Biological Station, NB, Canada, Oct. 2004
- Carrying capacity of mussel aquaculture in Magdalen Is. Workshop, ISMER, Rimouski, QC, Sep. 2004 **Platform**
- Bedford Institute of Oceanography, Dartmouth, NS, Canada, May 2004 **Platform**
- Dalhousie University, Oceanography Conference, Dalhousie University, Mar. 2004, 2005, 2006, 2007 **Platform**
- SPICE Workshop, Kola Science Centre, Apatity, Russia, Apr. 2001 **Workshop**
- SPICE Workshop, University of Lapland, Rovaniemi, Finland, Apr. 1999, 2000 **Workshop**
- TUNDRA Workshop, University of Lapland, Rovaniemi, Finland, Apr. 2000 **Workshop**
- Rotary Club, Mansfield, UK, 1998, 1999 **Platform**
- TUNDRA Workshop, University of Nottingham, Nottingham, UK, Dec. 1999 **Workshop**

- TUNDRA Workshop, University of Utrecht, Netherlands, Dec. 1998 **Workshop**
- Nitrogen Cycling in European Estuaries Workshop, Denmark, Oct. 1996 **Workshop**
- Pack-Ice Seals Workshop, BAS, Cambridge, UK, Aug. 1996 **Workshop**
- Trends in Microbial Ecology Conference, Marine Benthic Ecology, Barcelona, Spain, Sep. 1993 **Platform**
- Antarctic Special Topic Symposium, Marine Benthic Ecology, Cambridge, UK, 1993 **Platform**

Research Grants, Projects and Awards

- SSHRC Research Development Fund – Application submitted May 2015, result pending (**$3500**)
- SSHRC Research Development Fund (Internal) Research Conference Travel Grant, 2014 (**<$1000**)
- QMX Gold Corporation (**$166,000**) Environmental Effects and Compliance Monitoring Program at the Snow Lake Gold Mine, Manitoba
- STPA (**$4,100,000**) Environmental Effects and Compliance Monitoring Program of Marine, Surface water and Groundwater media at the Sydney Tar Ponds
- PWGSC - (**$60,695**) Water Quality Monitoring - dredging operations in Sydney Harbour
- Emera Newfoundland & Labrador (ENL) - **($61,237**) Fish and Fish Habitat Surveys for Maritime Transmission Line in Cape Breton
- ACOA (**$131,673**) and AquaNet (**$131,673**) Aquaculture site planning, environmental assessments, and integrated coastal management and coastal zone planning in Guysborough County awarded to Dr. Jon Grant Oceanography Department
- NSERC (**$200,000**) Canadian Arctic Shelves Exchange Study (CASES) studying river-ocean coupling in the Mackenzie River Delta and Beaufort Sea in the Canadian Arctic awarded to Dr. Jon Grant, 2003-2006
- European Union (EU) £66,000 (**$132,000**) Sustainable Pechora In a Changing Environment and Society (SPICE) in the Russian Arctic awarded to Dr. Peter Crittenden, University of Nottingham, UK
- EU £125,000 (**$250,000**) Tundra degradation in the Russian Arctic (TUNDRA) in the Russian Arctic awarded to Dr. Peter Crittenden
- EU £225,000 (**$450,000**) Nitrogen Cycling In European estuaries (NICE) was a project funded by the EU under the framework of MAST III (Marine Science and Technology III) and ELOISE (European Land-Ocean Interaction Studies) awarded to Dr. Graham Underwood and Prof. David Nedwell, University of Essex, UK
- Natural Environment Research Council (NERC) Antarctic Special Topic Award £56,000 (**$112,000**) awarded to Prof. Dave Nedwell, University of Essex, UK, 1990-1993

Editorial Responsibilities

- Review editor for *Frontiers in Marine Science* for the topics *Marine Pollution* and *Marine Biogeochemistry* http://www.frontiersin.org/Marine_Science/about (2014-present)
- Editorial board *Ecological Indicators* http://www.journals.elsevier.com/ecological-indicators/editorial-board/ (2005-present)
- Editorial advisory board *Polish Polar Research* http://versita.com/ppr/editors/ (2005-present)

Ad-hoc Reviewer for 24 Scientific Journals

- Environmental Science and Pollution Research
- Journal of Environmental Management
- Environmental Monitoring and Assessment
- Marine Pollution Bulletin
- Estuarine, Coastal and Shelf Science
- Atmospheric Environment
- Journal of Marine Systems
- Frontiers in Marine Biogeochemistry
- Arctic
- Polar Research

- Frontiers in Marine Pollution
- Environmental Pollution
- Environmental Science and Technology
- Science of the Total Environment
- Marine Environmental Research
- Ecological Indicators
- Chemistry and Ecology
- Soil and Sediment Contamination
- Toxicological and Environmental Chemistry
- Journal of Environmental and Analytical Toxicology
- Biogeosciences
- Northeastern Naturalist
- Hydrobiologia
- Polish Polar Research

Reviewer for Funding Councils

- The Russian International Affairs Council (RIAC), the Review Board of the Russian Science Foundation (RSF) (2015)
- The Russian Science Foundation (RSF) in partnership with the New Eurasia Foundation (2011, spring 2013, fall 2013)
- National Center of Science and Technology Evaluation, Ministry of Education and Science, Republic of Kazakhstan (2011, 2012, 2013, 2014)
- National Science Foundation (2006)
- Netherlands Organisation for Scientific Research-Council for Earth and Life Sciences (2006)

Committee and Network Participation

- Registered Environmental Professional (ECO-Canada), 2014 -
- Canadian Land Reclamation Association, 2012-
- Canadian Polar Commission (CPC), 2010-
- Member of the College of Applied Biology, 2009-2012
- Registered Professional Biologist (R.P.Bio), 2009-2012
- President of the Ingliwood Condominium Board (volunteer position), 2008-2010
- On the Canadian Species at Risk Public Registry, 2008-
- Canadian Environmental Network (RCEN) member, 2008-
- Nova Scotia Environmental Network (NSEN) member, 2008-
- The Ecological Monitoring and Assessment Network (EMAN), 2006-
- British Antarctic Club Member, 2005-
- Subscribe to the Royal Canadian Geographical Society, 2005-
- Atlantic Coastal Zone Information Steering Committee (ACZISC), 2004-
- Network of Centres of Excellence of Canada (ArcticNet), 2004-
- Environmental Services Association of Nova Scotia (ESANS), 2006-
- Canada's Research Network in Aquaculture (AquaNet), 2004-2006
- Aquaculture Association of Nova Scotia (AANS), 2004-2006
- Canadian Arctic Shelves Exchange Study (CASES), 2003-2008
- Sustainable Pechora In a Changing Environment and Society (SPICE), 2000-2002
- Tundra degradation in the Russian Arctic (TUNDRA), 1998-2000
- The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), 1993-1996

International work and collaborations in the following countries

- Argentina
- Denmark
- El Salvador
- Finland
- Poland
- Russian Federation
- United Kingdom (UK)
- UK (Antarctica)

- France
- Kazakhstan
- Netherlands
- UK (Falkland Islands)
- USA

ACADEMIC AND PROFESSIONAL EXPERIENCE

Summary

2014 -	**Assistant Professor** (Limited Term Appointment), Dalhousie University
2011-2013	**Sessional Assistant Professor**, Dalhousie University
2007-2014	**Associate / Senior Environmental Scientist,** Dillon Consulting Limited
2006-2007	**Environmental Specialist (seconded),** Public Works and Government Services Canada
2006-2007	**Senior Scientist,** Jacques Whitford Environmental Limited
2003-2006	**NSERC Post-Doctoral Research Fellow,** Dalhousie University, Department of Oceanography
1998-2003	**Research Assistant,** University of Nottingham, Department of Biology, UK
1996-1997	**Research Officer,** University of Essex, Department of Biology, UK
1993-1996	**Zoological Assistant (Seal Ecosystem Sciences),** British Antarctic Survey, UK
1990-1993	**Research Officer,** University of Essex and British Antarctic Survey, UK

Teaching, Research and Environmental Management Contracts

Assistant Professor (Limited Term Appointment), School for Resource and Environmental Studies (SRES), Dalhousie University (http://sres.management.dal.ca) (Aug 2014 - Present)

- Delivered the following courses across four degree programs in SRES (MES, MREM, Bachelor of Management and the International Development Studies Master's program [IDS MA]):
  - ENVI5505 / MGMT4505-1 - *Biophysical Dimensions of Resource and Environmental Management* (26 students)
  - ENVI5035 / INTD5002 - *Research Design and Methods* (9 students)
  - ENVI5501 - *MREM Internship* (26 students)
  - ENVI5508 - *Project Report in Resource and Environmental Management* (27 students)
  - MGMT2702 - *Resource and Environmental Management* (135 students)
  - ENVI5050 - Special topics course in *Pollution Abatement: Monitoring, Mitigation and Management* (9 students)
  - ENVI5049 – *Directed Study / Special Topics Course* – Adaptive Management Approaches to Bird and Bat Monitoring for Industrial Wind Turbine Development in Canada (1 student)
- Advised students in MREM internships and MES projects
- Co-supervised several MREM Case Study group projects:
  - Rural Nova Scotia: Now and Moving Forward
  - Fuelling Change: Poop for Power
  - Salt Cavern Natural Gas Storage in Nova Scotia
  - Implementing a Carbon Tax in Nova Scotia
  - Mink Farming in Nova Scotia
  - Building Prosperity – Shipbuilding in Halifax
- Engaged in School-level administrative work
- Student ratings for my course instruction scored favourably with my peers within SRES....

Sessional Professor, SRES, Dalhousie University (http://sres.management.dal.ca) (winter terms 2011, 2012 and 2013)

- Taught the Biophysical Dimensions of Resource and Environmental Management (ENVI5505 / MGMT4505-1) course. This course is offered simultaneously with two other interdisciplinary courses in the Master of Resource and Environmental Management (MREM) program, the socio-political dimensions (ENVI5500) and law/policy dimensions (ENVI5205). These three courses focus

concurrently on contemporary issues to provide case-based examples of, biophysical, socio-political and law/policy dimensions and their integration. The course introduces students to techniques and tools employed in natural resource and environmental management projects to engage students in case-based problem solving learning to understand how biophysical information is utilized in assessing resource and environmental issues and how it contributes to effective decision-making. Environmental impact assessment, environmental site assessment, ecological risk assessment, environmental effects monitoring and adaptive environmental assessment, life cycle analysis and management tools were reviewed in a regional, national and international context using contemporary case study examples.

- The course focuses specifically on marine environmental issues reflecting my strong consulting and academic expertise in marine management and related issues.
- Co-supervised several group projects and assisted in organizing the annual MREM Case Study Group Presentation Workshops for 2011, 2012 and 2013:
    - Tidal In-Stream Energy Conversion Technology in the Bay of Fundy: A Case Study
    - Grey seal cull in the southern Gulf of St Lawrence
    - Expansion of salmon farming on the Eastern Shore of NS
    - The expansion of oil and gas exploration and production from Nova Scotia's offshore
    - Sydney Tar Ponds Remediation and Sydney Harbour Dredging
    - Addressing the Wreck of the *MV Miner*
    - Proposed open-net salmon Farm in St. Mary's Bay, Nova Scotia
    - Coyote Issue in Nova Scotia
    - The Management of Arsenic in Nova Scotia Groundwater
    - Food Security
    - Enhanced natural gas recovery through hydraulic fracturing in Nova Scotia
    - Management of biosolids in Nova Scotia
    - The Miller Lake Quarry: An Integrated Analysis
    - Community Forestry in Nova Scotia
- Student ratings for my course instruction scored favourably with my peers within SRES each year across all categories, averaging 4.3 in 2013; 4.7 in 2012; and 4.4 in 2011.

Associate / Senior Environmental Scientist, Dillon Consulting Limited (http://www.dillon.ca/) (Nov 2007 - Aug 2014, maintain professional practice as an *Interim Employee*)

- Lead and project manage all marine environmental services for a range of public and private sector clients across all national office locations (18 offices) for Dillon Consulting. Below are some examples of these marine related projects for which I am project manager (PM) or personally lead.
- ***Beaufort Regional Environmental Assessment Cumulative Effects Management Framework – Aboriginal Affairs and Northern Development Canada (AANDC)*** Project Manager and technical lead subcontracting to AMEC Environmental and Infrastructure to develop a comprehensive regionally-based Cumulative Effects Management (CEM) Framework which meets the needs of the Beaufort Regional Environmental Assessment (BREA) working group. The overall purpose of the project is to provide for consistency in the approach to project assessments in the Canadian Beaufort Sea region.
- ***Environmental Impact Assessments for the Maritime Transmission Link - Emera Newfoundland and Labrador*** Project Manager for a fish assessment and fish habitat study in Nova Scotia related to the development of the Maritime Transmission Link corridor on behalf of Emera Newfoundland and Labrador (ENL). We were sub-consultants to Sikumiut completing the fish habitat surveys for the Newfoundland portion of the Maritime transmission link. The results of this study became a component study for the Environmental Impact Assessment for the Maritime Transmission Link project.
- ***Environmental Effects Monitoring in Sydney Harbour - Sydney Tar Ponds Agency*** Senior marine scientist leading a five year $4.1 million marine Environmental Effects Monitoring (EEM) program in Sydney Harbour, NS on behalf of the Sydney Tar Ponds Agency (STPA). Developed and implemented

marine EEM for marine water and sediment chemical quality parameters, sediment toxicity testing, crab and mussel tissue chemical testing and condition indices, benthic invertebrate and intertidal surveys over the five year period in order to monitor compliance of the Sydney Tar Ponds site remediation project. The project complexity and high profile has attracted much media and stakeholder attention and my duties involve regular update presentations to representatives of federal and provincial regulators and the Environmental Management Committee (EMC). Some results have already been published in 6 publications in the *Environmental Monitoring and Assessment* (2 papers), *Marine Pollution Bulletin* (2 papers), *Water Quality Research Journal of Canada* (1 paper) and *Remediation* journal (1 paper).

- ***Environmental Impact Assessment for a liquid natural gas terminal, power generation plant, and power transmission line, El Salvador*** Senior environmental lead for all biophysical baseline inventories for an Environmental Impact Assessment for a $1 billion project for the construction of a liquid natural gas marine terminal and power generation plant in Acajutla, and the construction of a 50 km power transmission line to connect with the main transmission network within El Salvador. This project was complex in nature and involved extensive public consultation and environmental planning with funding from the the International Finance Corporation (IFC) which is a member of the World Bank, Wärtsilä in Finland and Energio del Pacifico in El Salvador.
- ***Environmental Effects and Compliance Monitoring Program - QMX Gold Corporation, Manitoba*** Senior environmental scientist and project manager leading the annual Environmental Effects and Compliance Monitoring Program at the Snow Lake Gold Mine, Manitoba.
- ***Water Quality Monitoring in Sydney Harbour - Public Works and Government Services Canada (PWGSC)*** Senior marine scientist and project manager leading the marine water quality monitoring program in Sydney Harbour during the $35 million harbour channel dredging project to accommodate post-Panamex container ships for the new container terminal at Sydport on behalf of Public Works and Government Services Canada (PWGSC).
- ***Dredge Disposal Options for Small Craft Harbours, NS - Department of Fisheries and Oceans and PWGSC*** Senior marine scientist for PWGSC to develop site specific dredge disposal options for Small Craft Harbours in NS. The majority of harbours in the Maritimes serve the commercial fishing and aquaculture industries. Each year the Department of Fisheries and Oceans - Small Craft Harbours (DFO-SCH) branch undertakes dredging activities to maintain access to many of its harbours, in turn sustaining coastal communities in NS. DFO-SCH experiences increased difficulty in finding appropriate locations for the disposal of dredge material due to recent changes in policy by Nova Scotia Environment (NSE) who now consider some traditional disposal methods no longer acceptable. My colleagues and I developed disposal options for approximately 30 SCH based on reviews of recent and historical marine sediment sampling programs (MSSP's) that document concentrations of chemical contaminants present in sediments. The primary focus was to review documents to identify dredge disposal options for these harbours, which are dredged annually for maintenance. We developed depth defined sampling protocols based on sediment physical characteristics and contaminant concentrations. We also developed a protocol for leachate testing for certain parameters when guidelines were exceeded to determine if material can be disposed of in less expensive regular landfill sites. The dredge disposal options report was developed through consultation with provincial (NSE) and federal regulators (e.g., Environment Canada, EC), as well as DFO-SCH managers throughout the Atlantic region. Results were published in the *Remediation* journal (1 paper).
- ***Ecological Risk Assessment and Sediment Sampling in Sydney Harbour - PWGSC on behalf of Transport Canada*** Senior marine scientist leading sediment sampling and ecological risk studies in Sydney Harbour. Transport Canada is divesting ownership of the harbour and studies were conducted to determine if unacceptable risks exist for marine organisms within the harbour. Surface marine sediment samples were collected and analyzed from the Sydney Harbour water lot to adequately characterise harbour sediments. A review of the historic data and associated contaminants was conducted and the following suite of parameters were analysed in sediment samples: grain size, PAHs, PCBs, total organic carbon, metals, AVS/SEM ratio, ammonia-N, redox,

sulphide, BTEX and petroleum hydrocarbons to properly characterize the harbour sediments and to support a preliminary quantitative ecological risk assessment. One marine chemistry component of the risk assessment was to conduct a PAH forensic ratio evaluation. Determining the origin of PAH contaminants in Sydney Harbour facilitates decision making on managing potential ecological risk associated with harbour sediments. Forensic source evaluation and, specifically, PAH forensic ratio evaluation provides a line of evidence tool used to understand the origin (i.e., petrogenic, pyrogenic or biogenic) of PAH contaminants present in waterlot sediments. Underwater video and digital photographic surveys were also conducted in order to characterise the benthic habitat of each sampling location, including the presence of sediment flora and fauna (1 paper).

- ***Ecological Risk Assessment and Sediment Sampling in Quidi Vidi Harbour - PWGSC on behalf of Transport Canada*** Marine scientist leading sediment sampling and ecological risk studies in Quidi Vidi Harbour. Transport Canada is divesting ownership of the harbour and studies were conducted to determine if unacceptable risks exist for marine organisms within the harbour. Surface marine sediment samples were collected and analyzed to adequately characterise harbour sediments. The following suite of parameters were analysed in sediment samples: grain size, PAHs, PCBs, total organic carbon, metals, BTEX and petroleum hydrocarbons to properly characterize the harbour sediments and to support an ecological risk assessment. Underwater video and digital photographic surveys were also conducted in order to characterise the benthic habitat of each sampling location, including the presence of sediment flora and fauna.
- ***Sediment Sampling in Digby Harbour - PWGSC on behalf of Transport Canada*** Marine scientist leading sediment sampling studies in Digby Harbour.
- ***Community Consultation and Monitoring Review - Pictou Landing First Nation (PLFN) and Joint Environmental and Health Monitoring Committee (JEHMC)*** Senior ecological risk assessor leading a community consultation and monitoring study review related to the Boat Harbour Treatment Facility (BHTF) located in the Pictou Landing First Nation (PLFN) community. Boat Harbour was used to treat/discharge wastewater generated from the pulp and paper mill in Abercrombie Point since the 1960s. This study documented concerns of PLFN members with respect to potential human and ecological health risks associated with the BHTF and community concerns were incorporated into a comprehensive review of available information contained within an existing bibliography to identify chemicals that could be associated with the BHTF and the potential human and ecological health effects associated with exposure to these chemicals; and to identify types of information necessary to address PLFN community concerns associated with exposures to chemicals (e.g., types of testing programs including environmental media).
- ***Marine Sediment Sampling and Underwater Benthic Habitat Surveys in NS and NB - PWGSC, DFO and EC*** Senior marine scientist and project manager on numerous SCH-MSSPs and intertidal and underwater benthic habitat surveys in NS and NB on behalf of PWGSC, DFO and EC. Tasks include developing sampling programs, coordinating divers and sediment collections, bioassay and chemical analysis of sediments and subsequent assessment of the sediments by comparing them to appropriate guidelines for the disposal of sediments after dredging of harbours as well as assessing under water video for benthic habitat (e.g., fish habitat), including substrate type and flora and fauna composition and coverage along transects.
- ***Baseline Marine Surveys for a Proposed Liquefied Natural Gas project, Goldboro, NS - Maple LNG*** Senior scientist for a proposed liquefied natural gas (LNG) energy project located in Goldboro, NS. I collected pre-construction baseline marine and terrestrial biophysical data to address EA Conditions of Approval. Marine data were collected and interpreted to assess contaminant loading, particularly mercury and arsenic, in sediments, American lobster and Blue mussels, including a site characterization using underwater videography. Other biophysical data were collected including seasonal bird and seabird data.
- ***Aquaculture Environmental Assessments - Nova Scotia Department of Fisheries and Aquaculture*** Senior scientist and project manager leading the Environmental Assessment (EA) and aquaculture site development programs on behalf of Nova Scotia Department of Fisheries and Aquaculture

(NSDFA). These projects involve screening of new and expanding aquaculture operations which focus on water and sediment quality parameters.

- ***Offshore Oil Spill Monitoring - Water Quality and Sediment Quality Monitoring, Atlantic Towing Limited*** Project manager and senior marine specialist responsible for developing water quality and sediment quality monitoring program, collecting samples and reporting on the environmental effects of possible releases of oil from the sunken barge "*Shovelmaster*" which sank in 160 m of water 45 nautical miles south-west from the Nova Scotia coast on behalf of Atlantic Towing Limited. I developed and implemented a water quality monitoring plan and oil response plan. This project attracted media attention, and involved consultations with federal and provincial stakeholders, including the Department of Fisheries and Oceans (DFO), Canadian Coast Guard Maritimes, the Atlantic Regional Emergencies Team (REET), the NSDFA, Environmental Canada representatives, and consultation with representatives from the International Tanker Owners Pollution Federation Limited (ITOPF). The second phase of this project also involved a sediment sampling program to measure potential petroleum hydrocarbon and polycyclic aromatic hydrocarbon contamination in sediments and a second ROV inspection in 2013.
- ***Environmental Management Plan for East Coast Naval Marine Operating Areas - Defence Construction Canada and Department of National Defence*** Senior scientist for an Environmental Management Plan (EMP) for East Coast Naval Marine Operating Areas – Defence Construction Canada (DCC). Updated the Department of National Defence's (DND's) environmental database for the Navy's marine operating areas (East Coast Canada), and converted environmental data to an EMP and updated the EA. Developed guidance for military activities included addressing Atlantic and federal regulatory and DND requirements for environmental protection, mitigation and monitoring. Mitigation options were based on activities proposed and local environmental sensitivities, such as avoidance of marine protected areas, seasonal fishing activities, aquaculture operations and other marine stakeholders.
- ***Environmental Assessments for the Maritime Transmission Link - Emera Newfoundland and Labrador*** Project manager to collect biophysical baseline data to develop the EA for the Emera Newfoundland and Labrador (ENL) Maritime Transmission Link power project.
- ***Environmental Review Report, Pristine Power Inc.*** Senior reviewer for an Environmental Review Report for a proposed 350 MW natural gas-fired simple cycle electricity generation facility for the York Energy Centre in Ontario. Increased demand for energy, the need to get "off coal", and an aging energy infrastructure requires more intermediate energy generating capacity across Ontario.
- ***Environmental Management Plan, Invenergy Wind Canada*** Developed an Environmental Management Plan on behalf of Invenergy Wind Canada for a 78 MW wind farm project in the Municipality of Chatham-Kent, Ontario, southwest of Chatham on the north shore of Lake Erie.
- ***Environmental Impact Assessment, Olin Corporation*** Senior ecological risk assessor and environmental specialist working on an EIA and decommissioning conditions on behalf of Olin Corporation for the decommissioning of their Dalhousie chlor-alkali plant and Blair Malcolm Road Landfill sites.
- ***CEAA Environmental Impact Assessment Screening, NSTIR*** Senior environmental specialist working on the CEAA Environmental Impact Assessment Screening for Highway 104 - Port Hastings to Port Hawkesbury on behalf of Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR). Delivered a Class I CEAA Environmental Impact Assessment Screening for Nova Scotia Transportation and Infrastructure Renewal (NSTIR) for its proposed construction and operation of a new 100 series two-lane highway from Highway 105 at Port Hastings to Trunk 4 at Port Hawkesbury (6.8 km), completion of Trunk 4 Port Hawkesbury interchange, and upgrade of the Port Hastings rotary to a modern roundabout.
- ***CEAA Environmental Impact Assessment Screening, NSTIR*** Senior environmental specialist working on the CEAA Environmental Impact Assessment Screening for Highway 113 which will provide a more efficient means of travel for motorists between Highway 103 and Highway 102, that bypasses the Halifax Urban Core on behalf of NSTIR.

- ***CEAA Environmental Impact Assessment Screening, NSTIR*** Senior environmental specialist working on the CEAA Environmental Impact Assessment Screening for Highway 101 Phase V - Hortonville to Coldbrook on behalf of NSTIR.

Senior Environmental Specialist (seconded), Public Works and Government Services Canada (PWGSC) working with the Office of Greening Government Operations (OGGO) group (Nov 2006-Oct 2007)

- Seconded to PWGSC (from Jacques Whitford), as a senior environmental specialist on behalf of DND.
- Managed environmental sustainability and biophysical resource projects at CFB Gagetown, as part of a larger ($500 million) Sustainable Management Plan (SMP).
- Senior scientific advisor to DND developing management and monitoring plans for a range of water and biophysical resources, including aquatic, wetland and terrestrial habitats.
- Developed a Species at Risk field identification manual to protect endangered species at the Canadian Forces Base (CFB) Gagetown.
- Mediated between government, environmental non-government organizations (ENGOs) such as Ducks Unlimited, private sector and other stakeholders.

Senior Ecological Scientist, Jacques Whitford Environmental Limited, (May 2006-Oct 2007) which is now part of Stantec (http://www.stantec.com/default.htm)

- PM and senior scientist working in the Biophysical and Ecological Sciences Group for numerous large marine interdisciplinary and multidisciplinary environmental and risk assessment projects. Projects included benthic habitat surveys of Halifax Harbour for marine infrastructure projects, and conducting several EA's for the Halifax Port Authority, federal and provincial government agencies and private sector clients.
- Senior scientist on the proposed Lower Churchill Hydro electric energy project (e.g., Walker, 2007; Walker, 2012). As part of this comprehensive EA study I worked with Innu indigenous people on an Ecological Land Classification survey along the Churchill River in Labrador on behalf of Newfoundland and Labrador Hydro (2 published papers).

NSERC Post-Doctoral Research Fellow (PDF), Dalhousie University, Department of Oceanography (http://oceanography.dal.ca/index.html) (2003-2006)

- In the Department of Oceanography I was funded by two separate PDF grants:
    - Aquaculture site and coastal zone planning funded by Atlantic Canada Opportunities Agency (ACOA) and Canada's Research Network in Aquaculture (AquaNet) (4 published papers).
    - Canadian Arctic Shelves Exchange Study (CASES) funded by Natural Sciences and Engineering Research Council of Canada (NSERC) (6 published papers).
- Gained teaching experience in the Department of Oceanography teaching classes in the *Environmental Impacts in Marine Ecosystems* course (OCEA4335.03 / 5335.03).
- Studied mussel aquaculture site and coastal zone planning in the Maritimes as part of the co-funded ACOA and AquaNet project collaborating with Dr. Jon Grant. Worked in close partnership with the federal DFO, the provincial NSDFA, and AquaNet, to take a broader ecosystem-oriented view of the aquaculture environmental assessment system using spatial analysis. The study also used Global Information System (GIS) data and mapping software to enable better interpretation of the data. During this research I also studied marine benthic impacts associated with aquaculture developments. Helped co-write research grant applications which were successfully co-funded by ACOA and AquaNet.
- Studied river-ocean coupling in the Mackenzie River Delta and Beaufort Sea, as part of the CASES project collaborating with Dr. Jon Grant and Dr. Paul Hill (Dalhousie University). This research included three field campaigns in the Canadian Arctic including: research cruise on the Canadian Coast Guard icebreaker *Amundsen* sailing through the Northwest passage to stations in the Beaufort Sea; summer shore based field study based in Tuktoyaktuk, NT using small boats in the Mackenzie Delta; and a spring survey in the Mackenzie Delta to deploy equipment under landfast ice. Developed collaborations with government and national and international university partners (e.g., Bedford

Institute of Oceanography, Geological Survey of Canada and Université du Québec à Rimouski) demonstrated by my strong publication record. Specific marine affairs related to this Arctic research project included:

- Anthropogenic pollution of oil and gas developments in the Arctic marine environment, which will be particularly vulnerable under predicted climate change scenarios, where resource developments in the Arctic may cause significant impacts to the environment and Arctic communities
- Coastal and sediment erosion in the Arctic and impacts to Inuvialuit indigenous people
- Impacts of climate change on sea-ice extent and duration

Research Assistant, University of Nottingham (http://www.nottingham.ac.uk/biosciences/ah/), Division of Agricultural and Environmental Sciences, UK (1998-2003)

- My doctorate research was funded by two European Union (EU) projects, 'Tundra degradation in the Russian Arctic', (TUNDRA) and 'Sustainable Pechora In a Changing Environment and Society', (SPICE). The main focus of this research was to investigate pollution impacts from non-renewable energy resource industries, such as, coal, oil and gas in the Russian Arctic through environmental assessment of snow, lichen and soil chemistry and lichen biodiversity as indicators of pollution.
- Principle author on ten peer reviewed papers on this research, including two interdisciplinary papers integrating results of the TUNDRA and SPICE projects.
- This research was coupled with other interdisciplinary studies comparing quantitative results of biophysical sciences with social science results of local people's perceptions of pollution impacts. Pollution, climate change and Arctic issues were compiled in conjunction with Nenet traditional environmental knowledge (see Walker et al., 2006. Perceived and measured levels of environmental pollution: interdisciplinary research in the subarctic lowlands of northeast European Russian. Ambio 35: 220-228).
- These were interdisciplinary research projects collaborating with the Max Planck Institute for Social Anthropology, Germany; Finnish Forest Research Institute, University of Oulu and University of Helsinki, Finland; University College London, UK; Stockholm University, Sweden; Russian Academy of Sciences, Russian Federation; and the University of Aberdeen, UK (11 published papers).

Research Officer, University of Essex (http://www.essex.ac.uk/), Department of Biology, UK (1996-1997)

- Research project on 'Nitrogen Cycling In European estuaries', (NICE) collaborating with European universities. NICE was funded by the EU under the framework of MAST III (Marine Science and Technology III) and ELOISE (European Land-Ocean Interaction Studies). The NICE project studied the fate of anthropogenic nitrogen discharged into estuaries and coastal waters. Removal of nitrogen in coastal waters was quantified to evaluate how much nitrogen is transported from land to the sea. The importance of benthic primary producers, tidal amplitude and climate on nitrogen cycling was investigated.
- This was an interdisciplinary research project collaborating with University of Aarhus and National Environmental Research Institute, Denmark; University of Lisbon, Portugal; University of Gothenburg, Sweden; and the University of Parma, Italy.

Zoological Assistant, British Antarctic Survey (BAS) (http://www.antarctica.ac.uk/), UK (1993-1996)

- Conducted ecological research on higher predators (marine mammals and seabirds) using satellite tracking, radio telemetry and dive recorders to yield information about population dynamics arising from environmental change and over fishing of marine resources in the Southern Ocean whilst on Bird Island, South Georgia, Antarctica.
- Much of this research and long term environmental monitoring data of marine mammals and seabirds provided ecosystem indicators in the Antarctic to help better understand and manage fisheries to conserve the Antarctic marine ecosystem. Collection of this marine data helped in the practical implementation of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). The BAS carries out Long Term Monitoring and Survey (LTMS) work to

measure changes in Antarctic ecosystems and carry out research on the processes that drive them. Marine predators are thought to be sensitive to changes in ecosystem properties including changes brought about by natural ecosystem processes (such as climate variability), and those brought about by humans (such as fishing). Monitoring breeding populations of seabirds and seals are therefore an important part of the BAS LTMS programme.
- Research on Antarctic ecosystem sustainability arising from impacts of Antarctic tourism and overfishing in the Southern Ocean.
- Station manager at the Antarctic base on Bird Island, South Georgia.

Research Officer, University of Essex (http://www.essex.ac.uk/), Department of Biology, UK (1990-1993)
- This marine research was published in six peer reviewed papers and formed part of my Master of Philosophy (MPhil) degree which comprised a study of the benthic microbial ecology of Antarctic coastal sediments.
- Developed annual budgets of marine carbon and nutrient cycles in Antarctic coastal sediments via measurements of organic carbon mineralization, organic carbon deposition, bioturbation of benthic infuana and nutrient cycling in marine sediments during 18 months on Signy Island, Antarctica collaborating with the BAS.

SUMMARY OF SKILLS AND QUALIFICATIONS

- Demonstrated teaching experience primarily at the graduate, but also at the undergraduate level (e.g., ENVI5035; ENVI5501; ENVI5508; ENVI5505; MGMT4505-1; ENVI5050; ENVI5049; ENVS4001; OCEA4335.03; OCEA5335.03; MGMT2702; INTD5002)
- Strong research background in environmental sciences with demonstrated interdisciplinary collaborations with national and international academic institutions, government and private industry sector
- Extensive research publication record (e.g., journal articles, reports, proposals and popular publications)
- Effectiveness at soliciting research funding and managing large budgets through efficient time and budget development, management and control of large consulting project assignments
- Extensive administrative experience including project and environmental management; leadership and supervision of large interdisciplinary research and project teams
- Broad experience of marine science in the Arctic and Antarctic (e.g., coastal erosion in the Canadian Arctic; pollution in the Arctic; Antarctic tourism; exploitation of Antarctic fishery resources working with Convention on the Conservation of Antarctic Marine Living Resources [CCAMLR])
- Pleasure craft operator card and boat handling course (2005)
- Research cruise experience in the Antarctic, Northwest passage and Atlantic Canada
- Antarctic station manager at South Georgia (1995-96)
- *Canadian Environmental Assessment Act* (*CEAA*) orientation course (2006, 2012)
- Member of Association of Professional Biologist of Canada (2009-2012)
- Registered Professional Biologist (RPBio) (2009-2012)
- Red Cross First Aid and CPR (2012)
- BSAC Advanced diver equivalent to PADI Dive master (1990)
- Workplace Hazardous Materials Information System (WHMIS) (2013)
- Nova Scotia driving licence (2004)

EXTRACURRICULAR

Before becoming a father to boy and girl twins in 2013, my interests included: triathlon (Triathlon Nova Scotia age group winner in 2004, runner up in 2003); wildlife and landscape photography; backpacking and

hiking; cycle touring and mountain biking; sea-kayaking; skiing; organic vegetable gardening; cooking and eating local produce; home-brewing; bird watching; diabetes and active living awareness.

ACADEMIC REFERENCES

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- ***Dr. Jon Grant***
  NSERC-Cooke Industrial Research Chair in Sustainable Aquaculture, Department of Oceanography, Dalhousie University, Halifax, NS, B3H 4J1. (jon.grant@dal.ca, T: 902-494-2021, F: 902-494-3877).

- ***Devin MacAskill, P.Eng***.
  Program Development Scientist – Environment, Verschuren Centre for Sustainability in Energy & the Environment, Cape Breton University, 1250 Grand Lake Road, Sydney, NS B1P 6L2. (devin_macaskill@cbu.ca, T: 902-563-1386, F: 902-563-1360).

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  Senior Lecturer, Kilburn Building-2.44, School of Computer Science, The University of Manchester, Manchester, M13 9PL, UK. (simon.harper@manchester.ac.uk, T: +44(0)161 275-0599, F: +44(0)161 275 6213).