

# Curriculum Vitae

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## Shannon Maureen Sterling

*Director of Dalhousie Hydrology Research Group*

*Associate Professor, Earth Sciences, Faculty of Science, Dalhousie University*

### Personal Information

Citizenship	• Canadian and Irish
Birthplace	• North Vancouver, British Columbia, Canada
Language	• English and French
Mailing Address	• Department of Earth Sciences, 1459 Oxford St., Dalhousie University, Halifax, Nova Scotia, Canada, B3H 4R2
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### Education and Training

Ph.D.	• <b>Duke University</b> , 2005, Department of Earth and Ocean Sciences, Nicholas School of the Environment and Earth Sciences. Thesis title: “The impact of Global Land Cover Transformation on the Land-Atmosphere Fluxes of the Water and Carbon Cycles”. Supervisory committee: Drs. Stuart Rojstaczer, William Schlesinger, Robert Jackson
Post Doctoral Fellow	• <b>Université de Paris VI</b> , 2005-2007. UMR 7619 Sisyphe, Hydrologie Appliquée, Paris, France. Marie Curie Post-doctoral research fellow: Topic: Influence du changement d'occupation des terres sur l'hydrologie continentale. Supervisors Drs. Agnès Ducharne and Jan Polcher
M.Sc.	• <b>University of British Columbia</b> , 1997, Physical Geography. Thesis title: “Lithological controls on the magnitude and frequency of debris torrents in Northern Vancouver Island”. Supervisor Dr. Olav Slaymaker
B.Sc. Hons.	• <b>McGill University</b> , 1993, Physical Geography. Thesis title: “Sediment-Trapping Efficiency of the Helley-Smith Bedload Sampler in a Gravel-Bed River”. Supervisors Drs. Michael Church and Michel Lapointe.

### Recognitions

2019	Keynote Speaker for Gordon Research Conference on Catchment Science, June 23-28, Proctor Academy NH, USA. Landscape Evolution over Space and time
2017-18	Science Atlantic Distinguished Speaker, Atlantic Canada Lecture Tour
2014-15	Best Environmental Science Professor, as elected by students at Dalhousie University
2011-12	Best Environmental Science Professor, as elected by students at Dalhousie University
2005-2007	Marie Curie Intra-European Post-Doctoral Fellow
2004-2006	Government of France – Embassy of the United States Chateaubriand Fellowship Award
2001-2005	Graduate Student Fellowship, Duke University
2003-2004	Duke Graduate School Fellowship for International Research
1993-1995	NSERC Post-Graduate Scholarship

## Current Research Interests

### Topics

- **Large-Scale Hydrology.** Anthropogenic impact on global evapotranspiration and runoff, with particular emphasis on land cover change.
- **Catchment Hydrology.** Freshwater chemistry in acidified environments, effectiveness of mitigation efforts, acidic episodes.

## Employment History

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| 2015-ongoing | • <b>Associate Professor</b> , with tenure. Department of Earth Sciences, Dalhousie University. July 1, 2015-ongoing.   |
| 2009-15      | • <b>Assistant Professor, Tenure Track</b> , Department of Earth Sciences, Dalhousie University. Cross-appointed to Environmental Science, Dalhousie University. July 1, 2013-June 30, 2016.  |
| 2005-07      | • <b>Marie Curie Intra-European Post-Doctoral Fellow</b> , UMR 7619 Sisyphe, Université de Paris VI (Pierre et Marie Curie) Paris, France. (Supervisors: Dr. Agnes Ducharne, Ghislain de Marsily and Jan Polcher)   |
| 1996-2000    | • <b>Geoscientist and Project Manager</b> , Northwest Hydraulic Consultants, North Vancouver, BC. Invited to become Principal of the company in 2000. Wrote proposals, designed and implemented Integrated Watershed Assessment Plans for three large watersheds (>200 km <sup>2</sup> ) in Northern British Columbia. Designed a provincial effectiveness monitoring pilot study for Watershed Restoration. Supervised 5-8 technical staff (Supervisor: Ken Rood). |
| 1994-98      | • <b>Forest Hydrology Consultant</b> for BC Ministry of Forests, Research Division, Nanaimo, BC.  |

## Selected Publications

An asterisk identifies members of my research group.

- Adriaan J. Teuling, Emile de Badts, Femke A. Jansen, Richard Fuchs, Joost Buitink, Anne J. Hoek van Dijke, and Shannon M Sterling. (2018). Climate change, re-/afforestation, and urbanisation impacts on evapotranspiration and streamflow in Europe. *Hydrology and Earth System Sciences*. hess-2018-634 Submitted
- Frail-Gauthier\*, J.L., Mudie, P.J., Baker, E., Romanuk, T. and Sterling, S. (2018). Use of Carbon and Nitrogen stable isotopes to examine patterns of food web structure and function in salt marshes of Atlantic Canada. *Estuarine, Coastal and Shelf Science*. Submitted.
- Ronny Meier, Edouard L. Davin, Quentin Lejeune, M. Hauser, Yan Li, B. Martens, Natalie M. Schultz, Shannon M. Sterling, and W. Thiery. (2018). Evaluating and improving the Community Land Model's sensitivity to land cover. *Biogeosciences*. 15: 1–27.
- Björnerås, C., Weyhenmeyer, G.A., Cicendajeva, M., Evans, C.D., Gessner, M.O., Green, W.R., Grossart, H.-P., Kangur, K., Kokorite, I., Kortelainen, P., Kratz, T.K., Laudon, H., Lehtoranta, J, Monteith, D.T., Noges, P., Oulehle, F., Råike, A., Riise, G., Rusak, J.A., Sire, J., Sterling, S.M., Kritzberg, E.S. (2017). Global increase of iron concentrations in freshwaters. *Global Biogeochemical Cycles*. 2017GB005749R
- Goulden, T., Jamieson, R., Hopkinson, C., Sterling, S.M., 2016. Sensitivity of DEM, slope, aspect and watershed attributes to LiDAR measurement uncertainty. *Remote Sensing of Environment*, 179, pp. 23–35
- Keys, K., Sterling, S.M. Guan, Yue\*, 2015. Using historic soil survey data to map soil erosion hazard for land-use planning in Nova Scotia. *Canadian Journal of Soil Science*, 95: 299–304.
- Clair, T., Pelletier, N., Bittman, S., Leip, A., Arp, P., Moran, M.D., Dennis, I., Niemi, D., Sterling, S.M., Drury, C., Yang, J., 2014. Interactions between reactive nitrogen and the

- Canadian landscape: a budget approach. *Global Biogeochemical Cycles*. 2014GB004880.
- Sterling, S.M., Garroway, K., Guan, Y.\*, Ambrose, S.M.\*, Horne, P.\*, Kennedy, G., 2014. A new watershed assessment framework for Nova Scotia: a high-level, integrated framework for regions without a dense network of monitoring stations, *Journal of Hydrology*, Special issue on "Incorporating water resources in integrated urban and regional planning" HYDROL16026. Accepted July 28, 2014.
- Creed, IF, Jones, J, Buttle, J, Adams, M, Beall, F, Booth, E, Campbell, J, Clow, D, Elder, K, Green, M, Grimm, NB; Miniati, C, Ramlal, P, Saha, A, Sebestyen, S, Spittlehouse, D, Sterling, S.M., Williams, M, Winkler, R, Yao, H, 2014. Changing forest water yields in response to climate warming: Results from long-term experimental watershed sites across North America. *Global Change Biology*, GCB-14-0050. DOI: 10.1111/gcb.12615. Accepted March 2, 2014.
- Goulden, T., Jamieson, R., Hopkinson, C., Sterling, S.M., 2014, Sensitivity of hydrological outputs from SWAT to DEM spatial resolution. *Photogrammetric Engineering and Remote Sensing*. 13-072. Accepted February 13, 2014.
- Goulden, T., Hopkinson, C., Jamieson, R., Sterling, S.M., 2014. Sensitivity of watershed attributes to spatial resolution and interpolation method of LiDAR DEMs in three distinct landscapes. *Water Resources Research* 50(3), 1908-1927. DOI: 10.1002/2013WR013846R. Accepted January 9, 2014.
- Sterling, S.M., A. Ducharme, J. Polcher, 2013. Impact of land cover change on the terrestrial water cycle. *Nature Climate Change*, doi: 10.1038/NCLIMATE1690, April 2013.
- Sterling, S.M., and A. Ducharme, 2008, Comprehensive data set of global land cover change for land surface model applications, *Global Biogeochem. Cycles*, 22, GB3017, doi:10.1029/2007GB002959.
- Sterling, S.M., O. Slaymaker, 2006. Lithologic control of debris torrent occurrence. *Geomorphology*, 86 (3-4), 307-319.
- Sterling, S.M., M. Church, 2002. Sediment trapping characteristics of a pit trap and the Helley-Smith sampler in a cobble gravel bed river. *Water Resources Research*, 38 (8), 11
- Rojstaczer, S., S.M. Sterling, and N. Moore, 2001. Human appropriation of photosynthesis products. *Science*, 294, pp. 2549-2552.

## Invited Lectures and Seminars

- 2019 **Sterling, S.M.**, Invited Keynote Speaker, Gordon Research Conference, Catchment Hydrology, June 2019
- 2018 **Sterling, S.M.**, Atlantic Science Society, Distinguished Lecture Series Tour, University of New Brunswick, Acadia University, Dalhousie University, St. Mary's University
- Sterling, S.M.**, The Evolution of the Global Water Cycle, Metis Research Group, Université de Paris VI, March, 2018, Paris, France.
- 2017 **Sterling, S.M.**, 2017. Increasing aluminium concentrations in Rivers Recovering from Acidification. ENSAT, April 10, 2017, Toulouse, France.
- Sterling, S.M.**, 2017. Increasing aluminium concentrations in Rivers Recovering from Acidification. Metis Research Group, Université de Paris VI, January 10, 2017, France.
- 2015 **Sterling, S.M.**, 2015. Increasing aluminium concentrations over the past three decades in Kejimikujik National Park. Invited presentation. Canadian Geophysical Union (CGU)/ American Geophysical Union (AGU) Joint Meeting, Montreal, Quebec, May 5-7, 2015
- Sterling, S.M.**, 2015. Global Patterns of Evapotranspiration by Land-Cover Type: new insights from an observational database. Invited presentation. European Geophysical Union (EGU) General Assembly, Vienna, Austria, April, 13-19, 2015

- 2014 **Sterling, S.M.**, 2015. Water for our changing planet – lessons from the past century and the face of our future. Nova Scotia Institute of Science Public Lecture. February 2, 2015.
- Sterling, S.M.**, 2014. Understanding the extent and impacts of land-use/land-cover change on hydrology. Invited presentation. American Geophysical Union (AGU) Fall Meeting, San Francisco, December, 15-19, 2014.
- Sterling, S.M.**, 2014. Water Quality Monitoring for Restoration of Atlantic Salmon Populations. Invited Speaker to the Inner Bay of Fundy Planning Team, a committee struck under the Federal *Species at Risk Act*. Antigonish, Nova Scotia, April 15, 2014.
- Sterling, S.M.**, Guan Y\*, Horne, P\*, Ambrose, S.A\*, 2014. Increasing aluminium levels in Nova Scotia streams. Invited talk at the Nova Scotia Government Water Forum. March 21, 2014, Truro, Nova Scotia, Canada.
- Garroway, K., **Sterling, S.M.**, Guan Y.\*, Horne, P\*, Ambrose, S.A\*, 2014. The Nova Scotia Watershed Assessment Project. Invited talk at the Nova Scotia Government Water Forum. March 21, 2014, Truro, Nova Scotia, Canada.
- 2012 **Sterling, S.M.**, 2012. Relative forcing of anthropogenic alterations to the global water cycle. Earth and Environmental Science Seminar Speaker. Acadia University, January 23, 2012.
- Sterling, S.M.**, 2012 (invited). The Nova Scotia Watershed Assessment Project. SSHRC Integrated Water Innovation Forum. University of Alberta, August 9, 2012.
- Shelton, A.\* , S.M. Sterling, C. Conrad**, 2012 (invited). Can citizen-science water quality data be used to inform policy decisions? SSHRC Integrated Water Innovation Forum. University of Alberta, August 9, 2012.
- Garroway, K., **S.M. Sterling, P. Horne\***, G. Kennedy, 2012 (invited). The Nova Scotia Watershed Assessment Project. Canadian Water Resources Association Symposium on Freshwater management in Atlantic Watersheds and Municipalities, University of Moncton, NB, February 3<sup>rd</sup>, 2012.
- Sterling, S.M**, Garroway, K, 2012. Invited plenary speaker for the Annual General Meeting of the Registered Professional Foresters Association of Nova Scotia (RFPANS). Truro, NS, March 23, 2012 (delivered by K. Garroway).
- Sterling, S.M., Horne\*, P., G. Fielding\***, Garroway, K., G. Kennedy, 2012 (invited). Nova Scotia Watershed Assessment Program: 2<sup>nd</sup> Atlantic Canada Water Symposium and Planning Forum. March 23 2012, NSAC, Truro, NS, (delivered by K. Garroway).
- 2011 **Sterling, S.M.**, 2011. Invited Speaker. Human alteration of the Global Water Cycle through Land Cover Change and Implications for Climate. NSERC CREATE workshop in Climate Science invited Speaker at Saint Francis Xavier University, June 20, 2011.
- 2010 **Sterling, S.M.**, 2010. Human alteration of the global water cycle through land cover change. Department of Oceanography, Dalhousie University, May 21, 2010.
- Sterling, S.M.**, 2010. Human alteration of the global water cycle through land cover change. Department of Atmospheric Science, Dalhousie University, June 2, 2010.
- 2007 **Sterling, S.M.**, 2007. How global land cover change impacts the water system. Department of Geography, Cambridge University, Cambridge, UK, January, 18, 2007.

## Service on Acidification Policy Committees

### Government

- **Chair, Southern Upland Acid Rain Mitigation Committee.** Invited by Federal Department of Fisheries and Oceans to lead a multi-stakeholder group (First Nations, Federal Government, Provincial Government, Community Groups, and Non-Governmental Organizations) tasked with identifying options and strategies to reverse the risk of extirpation of the Southern Upland Atlantic Salmon population in Nova Scotia (2013-2016)
- **Member, Southern Upland Planning Committee.** Invited by Federal Department of Fisheries and Oceans to serve in a multi-stakeholder group (First Nations, Federal

Government, Provincial Government, Community Groups, and Non-Governmental Organizations) tasked with identifying options and strategies to reverse the risk of extirpation of the Southern Upland Atlantic Salmon population in Nova Scotia. Bi-Annual Meetings (2013-present)

- **Member, Recovery Potential Assessment Review Committee** for Southern Upland Atlantic Salmon in Nova Scotia. My role was to inform decisions about recovery planning as required under the Canadian Species at Risk Act (SARA) (May 2012)

## Assessment and Reviewing Activities

Reviewer for Journals

- *Nature*, 2018
- *Nature Sustainability*, 2018
- *Nature Climate Change*, 2018
- *Science*, 2017-8
- *Global Change Biology*, 2016-7
- *Limnology and Oceanography*, 2014
- *Geoscientific Model Development (GMD)*, 2014
- *Hydrology and Earth System Sciences (HESS)*, 2014-2019
- *Science of the Total Environment*, 2013
- *Journal of Environmental Management*, 2009, 2011, 2012, 2013

Grants

- Reviewer for NSERC Discovery Grant Applications (Dec 2011 and Dec 2012)

## Professional Associations

Membership

- European Geophysical Union (EGU)
- American Geophysical Union (AGU)
- Canadian Geophysical Union (CGU)
- Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI)

## Service to Government

Government

- Publication of our research on the Nova Scotia Watershed Assessment Program in the Gulf of Maine Council (GoM) on the Marine Environment EcoSystem Indicator Partnership (ESIP Journal). The GoM Council was established by the Governments of Nova Scotia, New Brunswick, Maine, New Hampshire and Massachusetts (April 2013).
- Invited member of the international Gulf of Main Council on the Marine Environment EcoSystem Indicator Partnership Committee.
- Advised the Provincial Government (Nova Scotia Environment) on the Nova Scotia Water Strategy, particularly related to scientific needs required to implement the strategy (July 2009 – July 2010).

## Conference and Events Planning and Organization

International

- Convenor of Large Scale Hydrology Session, European Geophysical Union Annual Meeting, Vienna, Austria (2016-2017)
- Co-Convenor of session and Co-Chair of Oral session on Large Scale Hydrology, European Geophysical Union Annual Meeting, Vienna, Austria (2016-present)

National

- Session Co-Chair, Water Quality Monitoring Session, Canadian Water Resources Association National conference, St. John's Newfoundland (June 2011)

Regional

- Organizer and Host of Kejimikujik Ecohydrology Workshop, Dalhousie University (April 2011)
- Co-Organizer and Co-Host of the joint meeting of the Nova Scotia Water Strategy Implementation Committee and the Provincial Oceans Network, Dalhousie University (December 2011)

