

CURRICULUM VITAE

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Education

Ph.D. 2004 Forestry, University of Toronto
Title: Predicting forest fire occurrence in the province of Ontario
B.Sc.H. 1990 Physics, Queen's University at Kingston

Professional employment history

Research Scientist Forest fire behaviour and climate change, Great Lakes Forest Centre, Canadian Forest Service. 2005-present
Physical Scientist Forest fire behaviour and climate change. Great Lakes Forest Centre, Canadian Forest Service, Canadian Forest Service 1996-2005
Physical Scientist Forest fire behaviour and ecology. Petawawa National Forestry Institute, Canadian Forest Service, Canadian Forest Service 1990-1996

Research areas

Dr. Wotton's current research focus involves developing process based models of fuel moisture exchange, fire ignition and spread that can be applied by fire management agencies throughout Canada. This work, in part, involves development of models for the Canadian Forest Service's Canadian Forest Fire Danger Rating System (CFFDRS), a system used operationally throughout Canada and a growing number of countries around the world. His previous research has focused on the projection of climate change impacts on fire activity and management in Canada using of fire danger and fire occurrence models. Dr. Wotton works closely with fire management agencies from across Canada in the application of the results of his research and the CFFDRS into daily fire management operations.

Training Activities

Dr Wotton is stationed at the University of Toronto, within the Faculty of Forestry, where he supervises graduate students interested in the physical aspects of forest fire science, serves on graduate advisory committees of graduate students studying forestry, teaches an annual full term course he developed on fire danger rating and fire behaviour to both undergraduate and graduate students, and guest lectures in other undergraduate and graduate level classes.

Selected Professional activity

- National representative on Western Centre for Wildland Fire Research Advisory Committee (University of Alberta) (2010-2012)
- Output coordinator of Canadian Forest Service's Modernization of the Canadian Forest Fire Danger Rating System research program.(2009-present)
- Conference Program Chair – Wildland Fire Canada 2010
- Member of scientific advisory committee – VIth International Conference on Forest Fire Research (2010)
- Chair and member of the International Association of Wildland Fire's Graduate Scholarship Committee (2008 to 2013)
- Adjunct professor in the Faculty of Forestry, University of Toronto (2006-present)
- Associate Editor of the International Journal of Wildland Fire (2000 to 2010)
- Canadian Forest Service's representative on the Canadian Interagency Forest Fire Committee Science and Technology Working Group. (2004-2007)
- Member of the Canadian Council of Forest Minister's Core Team developing the Canadian Wildland Fire Strategy (2004-2006)
- Invited to sit on panel for the US government Quadrennial Fire and Fuels review (2004)
- Given numerous invited talks, keynotes and workshops at international conferences
- External examiner on numerous Doctoral defense committees from within Canada and internationally

Publications

- Kidnie S and Wotton BM (2015) Characterization of the Fuel and Fire Environment in Southern Ontario's Tallgrass Prairie. *International Journal of Wildland Fire* (Published online Sept 2015).
- Thompson D, Studens J, Krezek-Hanes C, Wotton BM (2015) The impact of root exclusion on duff moisture and fire danger. *Canadian J. Forest Research* 45(8) 978-986
- Johnston D.C., Turetsky M.R., Benscotter, B.W. and Wotton B.M. (2015) Fuel load, structure and fire behaviour in forested boreal bogs. *Canadian Journal of Forest Research* 45(7) 888-899
- Schiks, T., Thompson, D, Wotton, BM, (2015) Short-term effects of mastication on fuel moisture and thermal regime of boreal fuel beds. *Canadian J Forest Research* 45(7):867-876
- Lukenbach MC , Hokanson KJ, Devito KJ, Kettridge N, Thompson DK, Moore PA, Wotton BM, Petrone RM, Waddington JM (2015) Hydrological controls on deep burning in a northern forested peatland. *Hydrological Processes* DOI:10.1002/hyp.10440.
- Kettridge, N., Turetsky, M. R., Sherwood, J. H., Thompson, D. K., Miller, C. A., Benscotter, B. W., Flannigan M.D, Wotton, B.M. Waddington, J. M. (2015). Moderate drop in water table increases peatland vulnerability to post-fire regime shift. *Nature: Scientific Reports*, 5. DOI:10.1038/srep08063

- Thompson D, Wotton M, Waddington M (2015) Heat transfer and the initiation of organic soil combustion during wildfire in forested wetlands. *International J Wildland Fire* DOI:10.1071/WF12121
- Schiks T, Wotton BM (2014) Modifying the Canadian Fine Fuel Moisture Code for masticated surface fuels. *International J. Wildland Fire* 25(1) 79-91 DOI: 10.1071/WF14041
- Schiks T, Wotton BM (2014) Assessing the probability of sustained flaming in masticated fuel beds. *Canadian Journal of Forest Research* 45(1) 68-77, doi: 10.1139/cjfr-2014-0294
- Woolford DG, Dean CB, Martell DL, Ji Guo C, Wotton BM. (2014) Lightning-caused Forest Fire Risk in Northwestern Ontario, Canada is Increasing and Associated with Anomalies in Fire-Weather. *Environmetrics* 25(6) 406-416. DOI: 10.1002/env.2278
- Pluscinski, McCaw, Gould, Wotton (Accepted December 2014) Predicting the number of daily human-caused bushfires to assist suppression planning in south west Western Australia. *International Journal of wildland Fire* 23(4) 520-531 DOI: 10.1071/WF13090
- Gould JS, Patriquin MN, Wang S, McFarlane B, Wotton B (2013) Economic evaluation of research to improve the Canadian forest fire danger rating system. *Forestry*, 86 (3): 317-329. doi:10.1093/forestry/cps082
- Flannigan MD, Cantin AS, de Groot W, Wotton BM, Newbery A, Gowman LM (2013) Global wildland fire season severity in the 21st century. *Forest Ecology and Management* 294, 54-6. doi:10.1016/j.foreco.2012.10.022
- Savage, D., Wotton, B.M., Martell, D.L., and Woolford, D.G. (2012). The impact of uncertainty concerning historical burned area estimates on forest management planning. *Forest Science* 59(5) 578-588. DOI: 10.5849/forsci.11-081
- Linn R, Anderson K, Winterkamp J, Brooks A, Wotton M, Dupuy, J-L, Pimont F, Edminster C. (2012) Incorporating field wind data into FIRE-TEC simulations of the International Crown Fire Modeling Experiment (ICFME): preliminary lessons learned. *Canadian Journal Forest Research*.42(5):879-898
- Waddington JM, Thompson DK, Wotton BM, Quinton WL, Flannigan MD, Benschoter BW, Baisley SA and Turetsky MR (2012) Examining the utility of the Canadian Forest Fire Weather Index System in Canadian boreal peatlands. *Canadian Journal of Forest Research* 42: 47-58.
- Wotton BM, Gould JS, McCaw WL, Cheney NP, Taylor SW (2012) Flame temperature and residence time of fires in dry eucalypt forest. *International Journal of Wildland Fire* 22(3) doi: 10.1071/WF10127.
- Podur J and Wotton BM (2011) Defining fire spread event days for fire growth modeling. *International Journal of Wildland* 20(4) 497-507
- Savage DW, Martell DL, Wotton BM (2011) Forest Management Strategies for Dealing with Uncertainty Due to Fire When Managing Two Forest Seral Stages. *Canadian Journal of Forest Research*. 41(2) 309-320
- Benschoter B, Thompson D, Waddington JM, Wotton BM, Flannigan MD, de Groot WJ, Turetsky M (2011) Smouldering consumption in peatland *International Journal of Wildland Fire* 20(3), 418-429.

- Braun WJ, Jones BL, Lee JSW, Woolford DG, Wotton BM (accepted May 2010) Forest Fire Risk Assessment: An Illustrative Example. *Journal of Probability and Statistics*. Volume 2010, doi:10.1155/2010/823018
- Savage DW, Martell DL, Wotton BM (2010) The Evaluation of Two Risk Mitigation Strategies for Dealing with Fire-Related Uncertainty in Timber Supply Modelling. *Canadian Journal of Forest Research* 40:1136-1154, doi10.1139/X10-065
- Podur, J and Wotton BM. (2010) Will climate change overwhelm fire management capacity? *Ecological Modelling* 221, 1301-1309
- Wotton BM, Nock CA, Flannigan MD. (2010) Forest Fire occurrence and climate change in Canada. *International Journal of Wildland Fire*. 19(3) 253-271.
- Weise DR, Wotton BM (2010) Wildland–urban interface fire behaviour and fire modelling in live fuels. *International Journal of Wildland Fire* 19(2), 149-152
- Flannigan, M.D., Krawchuk, M.A., de Groot, W,J, Wotton,B,M, Gowman L,M, (2009) Global wildland fire and climate change. *International Journal of Wildland Fire*, 18(5) 483-507.
- Zhou, L., Braun J, Woolford D, Wotton BM. (2009) A Simulation Study of Predicting Flush Date. *Communications in Statistics - Simulation and Computation* 38(5): 1071-1082. DOI: 10.1080/03610910902785738
- Woolford D, Stanford, DA, Kulperger, RJ Boychuk, D and B.M. Wotton (2009) Erlangian Approximations for the Transient Analysis of a Fluid Queue Model for Forest Fire Perimeter. *INFOR* 47(4) 305-317.
- Wotton, B.M (2009). Interpreting and using outputs from the Canadian Forest Fire Danger Rating System in research applications. *Environmental and Ecological Statistics*.16(2), 107-131
- Girardin MP, Wotton BM (2009) Summer moisture and wildfire risks across Canada. *Journal of Applied Meteorology and Climatology*, 48: 517-533
doi:10.1175/2F2008JAMC1996.1
- Flannigan, M.D., Stocks, B.J., Turetsky, M.R. and Wotton, B.M. 2008. Impact of climate change on fire activity and fire management in the circumboreal forest. *Global Change Biology* 14, DOI: 10.1111/j.1365-2486.2008.01660.x
- Wotton, B.M. and Beverly, J.L. 2007. Stand specific litter moisture content calibrations for the Canadian Fine Fuel Moisture Code. *International Journal of Wildland Fire* 16(4):463-472
- Beverly J.L. and Wotton, B.M. 2007. Modelling the probability of sustained flaming: predictive value of fire weather index components compared with observations of site weather and fuel moisture conditions. *International Journal of Wildland Fire* 16(2):161-173.
- Flannigan, M.D., Amiro, B.D., Logan, K.A., Stocks, B.J., and Wotton B.M. 2005. Forest Fire and Climate Change in the 21st Century. *Mitigation and Adaptation Strategies for Global Change*. DIO: 10.1007/s11027-005-9020-7
- Wotton B.M. and Martell, D.L. 2005. A lightning fire occurrence model for Ontario. *Canadian Journal of Forest Research* 35(6): 1389-1401.
- Wotton, B.M., Stocks, B.J. and Martell, D.L. (2005). An index for tracking sheltered forest floor moisture within the Canadian Forest Fire Weather Index System. *International Journal of Wildland Fire* 13 (2): 169-182.

- Amiro, B.D.; Logan, K.A.; Wotton, B.M.; Flannigan, M.D.; Todd, J.B.; Stocks, B.J.; Martell, D.M. (2005). Fire weather index system components for large fires in the Canadian boreal forest. *International Journal of Wildland Fire*, 13(1):391-400
- Stocks, B.J.; Alexander, M.E.; Wotton, B.M.; Steffner, C.N.; Flannigan, M.D.; Taylor, S.W.; Lavoie, N.; Mason, J.A.; Hartley, G.R.; Maffey, M.E.; Dalrymple, G.N.; Blake, T.W.; Cruz, M.G.; Lanoville, R.A. 2004. Crown fire behaviour in a northern jack pine-black spruce forest. *Canadian Journal of Forest Research*, 34: 1548-1560.
- Taylor, S.W.; Wotton, B.M.; Alexander, M.E.; Dalrymple, G.N. 2004. Variation in wind and crown fire behaviour in a northern jack pine – black spruce forest. *Canadian Journal of Forest Research*, 34:1561-1576.
- de Groot, W.J.; Bothwell, P.M.; Taylor, S.W.; Wotton, B.M.; Stocks, B.J.; Alexander, M.E. 2004. Jack pine regeneration and crown fires. *Canadian Journal of Forest Research*, 34:1634-1641.
- Girardin, M-P.; Tardif, J.; Flannigan, M.D.; Wotton, B.M.; Bergeron Y. 2004. Trends and periodicities in the Canadian Drought Code and their relationships with atmospheric circulation for the southern Canadian boreal forest. *Canadian Journal of Forest Research*, 34(1): 103-119
- Wotton, B.M.; Martell, D.L.; Logan, K.A. 2003 Climate change and people-caused forest fire occurrence in Ontario. *Climatic Change*, 60: 275-295.
- Stocks, B.J.; Mason, J.A.; Todd, J.B.; Bosch, E.M.; Amiro, B.D.; Flannigan, M.D.; Martell, D.L.; Wotton, B.M.; Logan, K.A.; Hirsch, K.G. (2003) Large forest fires in Canada, 1959-1997. *J. Geophysical Research*. (D) 108, 8149, doi:10.1029/2001JD000484.
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- Skinner, W.R.; Martell, D.L.; Stocks, B.J.; Wotton, B.M.; Flannigan, M.D.; Todd, J.B. (2002) A 500 mb synoptic wildland fire climatology from large Canadian forest fires, 1959-1996 *Theoretical and Applied Climatology*, 71:157-169.
- Amiro, B.D.; Stocks, B.J.; Alexander, M.E.; Flannigan, M.D.; Wotton, B.M. (2001) Fire, climate change, carbon and fuel management in the Canadian boreal forest. *International Journal of Wildland Fire*, 10(3,4): 405-413.
- Ward, P.C.; Tithecott, A.G.; Wotton, B.M. (2001). Reply—A re-examination of the effects of suppression in the boreal forest. *Canadian Journal of Forest Research*, 31: 1467-1480.
- Flannigan, M.; Campbell, I.; Wotton, M.; Carcaillet, C.; Richard, P.; Bergeron, Y. 2001. Future fire in Canada's boreal forest: paleoecology results and general circulation model - regional climate model simulations. *Canadian Journal of Forest Research*, 31: 854-864.
- Amiro, B.D.; Todd, J.B.; Wotton, B.M.; Logan, K.A.; Flannigan, M.D.; Stocks, B.J.; Mason, J.A.; Martell, D.L.; Hirsch, K.G. (2001). Direct carbon emissions from Canadian forest fires, 1959 to 1999. *Canadian Journal of Forest Research*, 31(3): 512-525.
- Dale, V.H.; Joyce, L.A.; Neilson, R.P.; Ayres, M.P.; Flannigan, M.D.; Hanson, P.J.; Irland, L.C.; Lugo, A.E.; Peterson, C.J.; Simberloff, D.; Swanson, F.J.; Stocks,

- B.J.; and Wotton, B.M. (2001). Climate change and forest disturbances. *Bioscience*, 51:723-734.
- Flannigan, M.D.; Stocks, B.J.; and Wotton, B.M. (2000). Forest fires and climate change. *Science of the Total Environment*, 262(3): 221-229.
- Wotton, B.M.; McAlpine, R.S.; Hobbs, M.W. (1999). The effect of fire width on fire behaviour. *International Journal of Wildland Fire*, 9(4): 247-253.
- Flannigan, M.D.; Wotton, B.M.; and Ziga, S. (1998). A study on the interpolation of fire danger using radar precipitation estimates. *International Journal of Wildland Fire*, 8(4): 217-225.
- Flannigan, M.D.; Bergeron, Y.; Engelmark, O.; and Wotton, B.M. (1998). Future wildfire in circumboreal forests in relation to global warming. *Journal of Vegetation Science*, 9: 469-476.
- Thompson, I.D., Flannigan, M.D. Wotton, B.M. and Suffling, R. (1998). The effects of climate change on landscape diversity: an example in Ontario forests. *Environmental Monitoring and Assessment*, 49:213-233.
- Stocks, B.J., Fosberg, M.A., Lynham, T.J., Mearns, L., Wotton, B.M., Yang, Q., Jin, J-Z., Lawrence, K., Hartley, G.R., Mason, J.A., and McKenney, D.W. (1998). Climate change and forest fire potential in Russian and Canadian boreal forests. *Climate Change*, 38(1): 1-13.
- Weber, M.G.; McAlpine, R.S.; Wotton, B.M.; Hobbs, M.W. (1995). Prescribed burning and disk trenching effects on early plantation performance in eastern Ontario, Canada. *Forest Ecology and Management*, 78: 159-171
- Wotton B.M. and Flannigan, M.D. 1993. Length of the fire season in a changing climate. *Forestry Chronicle*, 69: 187-192
- McAlpine R.S. and Wotton B.M. 1993. the use of fractal dimension to improve wildland fire perimeter predictions. *Canadian Journal of Forest Research*, 23:1073-1077.
- Flannigan, M.D. and Wotton B.M. 1991. Lightning ignited forest fires in Northwestern Ontario. *Canadian Journal of Forest Research*, 21(3):277-287.
- Flannigan, M.D. and Wotton B.M. 1989. A study of interpolation methods for forest fire danger rating in Canada. *Canadian Journal of Forest Research*, 19:1059-1066.

Research/Information Reports

- Kidnie, S.K., Wotton B.M., Droog W.N. 2010. Field Guide for Predicting Fire Behaviour in Ontario's Tallgrass Prairie. Elgin County Stewardship Council Special Publication. Ontario Ministry of Natural Resources, Aylmer, Ontario. 65 p.
- Tymstra, C.; Bryce, R.W.; Wotton, B.M.; Armitage, O.B. 2009. Development and structure of Prometheus: the Canadian wildland fire growth simulation Model. *Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, AB. Inf. Rep. NOR-X-417.*
- Wotton B.M., Alexander, M.E. and Taylor, S.W. (2009). Updates and revisions to the Canadian Forest Fire Behaviour Prediction System. *Nat. Res. Can., Can. For. Serv. Great Lakes Forestry Centre Info. Rep. GLC-10, 47 p.*
- Wotton, B.M. and Stocks, B.J. 2006. Fire management in Canada: vulnerability and risk trends. Pages 49 to 55 in *Canadian Wildland Fire Strategy: Background synthesis, analysis, and perspectives*. K.G Hirsch and P Fuglem (editors). Canadian Council

- of Forest Ministers. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta.
- Stocks, B.J. and Wotton, B.M. 2006. The history of forest fire science and technology in Canada and emerging issues relevant to the Canadian Wildland Fire Strategy. Pages 89-95 in *Canadian Wildland Fire Strategy: Background synthesis, analysis, and perspectives*. K.G Hirsch and P. Fuglem (editors). Canadian Council of Forest Ministers. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta.
- Born, W., Fuglem, P., Hirsch, K.G., Stocks, B.J., Taudin-Chabot, P., Wang, S., Wotton, B.M. 2006. *Canadian Wildland Fire Strategy: summary report of the best practices workshop*. Pages 83-87 in *Canadian Wildland Fire Strategy: Background synthesis, analysis, and perspectives*. K.G Hirsch and P. Fuglem (editors). Canadian Council of forest Ministers. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. (*authors are alphabetical*)
- Wotton, B.M.; Logan, K.A. and McAlpine, R.S. 2005. Climate change and the future fire environment in Ontario: fire occurrence and fire management impacts. Ontario Ministry of Natural Resources Climate Research Report CCRR-01.32p.
- Alexander, M.E., Steffner, C.N., Mason, J.A., Stocks, B.J., Hartley, G.R., Maffey, M.E., Wotton, B.M., Taylor, S.W., Lavoie, N., and Dalrymple, G.N. 2004. Characterizing the jack pine-black spruce fuel complex of the International Crown Fire Modelling Experiment (ICFME). Canadian Forest Service, Information Report NOR-X-393. 49pp

Theses

- Wotton, B.M. 2004. Predicting forest fire occurrence in Ontario. Ph.D. Thesis. University of Toronto.

Book chapters

- de Groot, W. J., Wotton, B. M., & Flannigan, M. D. (2015). Wildland Fire Danger Rating and Early Warning Systems. Chapter 11 in *Wildfire Hazards, Risks, and Disasters* D. Patton (editor), Elsevier Inc. , pp 207-228.
- Flannigan, M.D., Gowman, L.M., Wotton, B.M. Krawchuk, M.A., de Groot, W.J. and Stocks, B.J. (2013). Modelling future wildland fire in the Circumboreal. Chapter 15. *Vegetation Fires and Climate Change*. Edited By J.G. Goldammer. Kessel Publishing House pp. 209-224.
- Fujioka, FM, Gill, A.M, Viegas, D.X., Wotton, B.M.,(2009) Fire Danger and Fire Behaviour Modeling Systems in Australia, Europe, and North America. Chapter 21 (pages 471-497) in *Wildland Fires and Air Pollution*, A. Bytnerowicz, M. Arbaugh, C. Andersen and A. Riebau (eds). Elsevier, Amsterdam, The Netherlands. ISSN: 1474-8177/DOI:10.1016/S1474-8177(08)00021-1
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Conference papers (excluding abstract only submissions)

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- Wotton B.M. (2009) A grass moisture model for the Canadian Forest Fire Danger Rating System. Paper 3-2 in Proceedings 8th Fire and Forest Meteorology Symposium. Kalispell, MT Oct 13-15, 2009.
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- Wotton, B.M. (2005) Prediction of forest fire occurrence in the province of Ontario, Canada. Proceedings of the Fifth NRFID Symposium November 30-December 2, 2005 p 118-132.
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- McAlpine. R.S., Wotton B.M. (1993). Chaos on the fireline. Pages 506-510. In *Proceedings of the 12th Conference of Fire and Forest Meteorology*. October 26-28, 1993. Jekyll Island, Georgia.