

**DON MCKENZIE**

RESEARCH LANDSCAPE ECOLOGIST

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**EDUCATION**

**University of Washington, College of Forest Resources, Seattle, WA**

Ph.D., Landscape Ecology, June 1998

M.S., Forest Biometrics, December 1994

**University of California at Berkeley, Berkeley, CA**

B.A., Anthropology and Psychology, June 1974

**RESEARCH INTERESTS**

Climatic change and its effects on disturbance regimes, species responses, and air quality in protected areas; paleological fire studies, controls on fire regimes, and scaling relationships; forest biogeography and climatic variability; fire severity and spatial patterns.

**PROFESSIONAL EXPERIENCE**

Research Landscape Ecologist, US Forest Service, 2002-

Research Scientist, University of Washington, 1998-2002

**UNIVERSITY AFFILIATION**

**University of Washington**

School of Environmental and Forest Sciences: Affiliate faculty

JISAO-CSES Climate Impacts Group: Principal investigator for forest ecosystems

**VIDEOS**

**McKenzie, D.** 2014. Fire on landscapes and middle-number systems: complexity writ large? Santa Fe Institute seminar series, May 2014.

<http://www.santafe.edu/research/videos/play/?id=8cb77a5b-f8c8-49ae-8c17-305161e96c>.

**McKenzie, D.** 2014. Joint Fire Science “Wildfire lessons learned” webinar. Smoke consequences of new wildfire regimes. <http://youtu.be/nW1JCoOfirE>.

**PUBLICATIONS IN REVIEW OR PREPARATION**

Keane, R.E., **D. McKenzie**, D.A. Falk, E.A.H. Smithwick, C. Miller, and L.-K.B. Kellogg. (in review). Representing climate, disturbance, and vegetation interactions in landscape models. *Ecological Modelling*.

Halpern, C.B., J.A. Antos, **D. McKenzie**, and A.M. Olson. (in review). Legacies of conifer influence and fire mediate biotic interactions and community reassembly following tree removal from grasslands. *Journal of Applied Ecology*.

Kennedy, M.C., and **D. McKenzie**. (in review). Model evaluation identifies uncertainties and tradeoffs in complexity when fire is integrated with hydro-ecological projections. Chapter in

*Natural Hazard Uncertainty Assessment: Modeling and Decision Support*. AGU Books, New York.

**McKenzie, D.**, and J.S. Littell. (in prep). Climate change and the eco-hydrology of fire: why our area-burned predictions are wrong. *Ecology Letters* or *Ecological Applications*.

Ramirez, M.I., **D. McKenzie**, L. Brower, and L. Fink. (in prep). Forest cover and microclimate in the Monarch Butterfly Biosphere Reserve: implications for viable overwintering populations under climate change. *Conservation Biology*.

#### **PUBLICATIONS IN PRESS**

**McKenzie, D.**, and A.H. Perera. (in press). Modeling wildfire regimes in forest landscapes: abstracting a complex reality. Chapter 4 in Perera, A.H., T.K. Rimmel, and L.J. Buse, *Modeling and Mapping Forest Landscape Patterns*, Springer, Dordrecht, The Netherlands.

#### **PUBLICATIONS**

**McKenzie, D.**, U. Shankar, R.E. Keane, E.N. Stavros, W.E. Heilman, D.G. Fox, and A.C. Riebau. 2014. Smoke consequences of new fire regimes driven by climate change. *Earth's Future*. DOI 10.1002/2013EF000180.

Cansler, C.A., and **D. McKenzie**. 2014. Climate, fire size, and biophysical setting control fire severity and spatial pattern in the northern Cascade Range, USA. *Ecological Applications* 24:1037-1056.

French, N.H.F., **D. McKenzie**, T. Erickson, B. Koziol, M. Billmire, K.A. Endsley, N.K. Yager Scheinerman, L. Jenkins, M.E. Miller, R.D. Ottmar, and S.J. Prichard. 2014. Modeling regional-scale wildland fire emissions with the Wildland Fire Emissions Information System. *Earth Interactions* 18 (Paper 16).

Stavros, E.N., J. Abatzoglou, **D. McKenzie**, and N.A. Larkin. 2014. Regional projections of the likelihood of very large wildland fires under a changing climate in the contiguous Western United States. *Climatic Change* 126:455-468.

Stavros, E.N., **D. McKenzie**, and N.A. Larkin. 2014. The climate-wildfire-air quality system: interactions and feedbacks across spatial and temporal scales. *WIREs Climate Change* doi: 10.1002/wcc.303.

Stavros, E.N., J. Abatzoglou, N.A. Larkin, **D. McKenzie**, and A. Steel. 2014. Climate and very large wildland fires in the contiguous western USA. *International Journal of Wildland Fire* 23:899-914.

Cansler, C.A., and **D. McKenzie**. 2014. Burn severity and severity patterns in the northern Cascade Range, Washington. *Mountain Views* 8:14-17.

French, N.H.F., **D. McKenzie**, R.D. Ottmar, J.L. McCarthy, R.A. Norheim, N. Hammermesh, and A.J. Soja. 2014. A US national fuels database and map for calculating carbon emissions from wildland and prescribed fire. Pages 522-529 in Fourth Fire Behavior and Fuels Conference Proceedings. Raleigh, NC, Feb 18-22, 2013, and St. Petersburg, Russia, July 1-4, 2013.

Raymond, C.L., and **D. McKenzie**. 2013. Temporal carbon dynamics of forests in Washington, U.S.: implications for ecological theory and carbon management. *Forest Ecology and Management* 310:796-811.

Raymond, C.L., and **D. McKenzie**. 2013. Comparing algorithms for estimating foliar biomass of conifers in the Pacific Northwest. USDA Forest Service Research Paper PNW-595, Pacific Northwest Research Station, Portland, OR.

Iverson, L.R., and **D. McKenzie**. 2013. Tree-species range shifts in a changing climate – detecting, modeling, assisting. *Landscape Ecology* 28:879-889.

Wilsey, C.B., J.J. Lawler, E.P. Maurer, **D. McKenzie**, P.A. Townsend, R. Gwozdz, J.A. Freund, K. Hagmann, and K.M. Hutten. 2013. Tools for assessing climate impacts on fish and wildlife. *Journal of Fisheries and Wildlife Management* 4:220-241.

**McKenzie, D.**, and M.C. Kennedy. 2012. Power laws reveal phase transitions in landscape controls of fire regimes. *Nature Communications* doi: 10.1038/ncomms1731.

Raymond, C.L., and **D. McKenzie**. 2012. Carbon dynamics of forests in Washington, U.S: projections for the 21<sup>st</sup> century based on climate-driven changes in fire regime. *Ecological Applications* 22:1589-1611.

**McKenzie, D.**, N.H.F. French, and R.D. Ottmar. 2012. National database for calculating fuel available to wildfires. *EOS Transactions* 93:57-58.

Cansler, C.A., and **D. McKenzie**. 2012. How robust are burn severity indices when applied in a new region? Evaluation of alternate field-based and remote-sensing methods. *Remote Sensing* 4:456-483.

Evans, S.A., C.B. Halpern, and **D. McKenzie**. 2012. The roles of forest structure and substrate in the diversity and abundance of forest-floor bryophytes in mature coniferous forests of western Washington, U.S.A. *The Bryologist* 115:278-294.

Peterson, D.L., and **D. McKenzie**. 2012. Understanding and adapting to new stress complexes in forest ecosystems. In W. Rodgers (ed.), *Climate Change: A Reader*. Carolina Academic Press, Durham, NC.

**McKenzie, D.**, C. Miller, and D.A. Falk, eds. 2011. *The Landscape Ecology of Fire*. Dordrecht, The Netherlands, Springer Ltd.

**McKenzie, D.**, C. Miller, and D.A. Falk. 2011. Toward a theory of landscape fire. Chapter 1 in **McKenzie, D.**, C. Miller, and D.A. Falk, eds. 2011. *The Landscape Ecology of Fire*. Dordrecht, The Netherlands, Springer Ltd.

**McKenzie, D.**, and M.C. Kennedy. 2011. Scaling laws and complexity in fire regimes. Chapter 2 in **McKenzie, D.**, C. Miller, and D.A. Falk, eds. 2011. *The Landscape Ecology of Fire*. Dordrecht, The Netherlands, Springer Ltd.

**McKenzie, D.**, C. Miller, and D.A. Falk. 2011. Synthesis: landscape ecology and changing fire regimes. Chapter 12 in **McKenzie, D.**, C. Miller, and D.A. Falk, eds. 2011. *The Landscape Ecology of Fire*. Dordrecht, The Netherlands, Springer Ltd.

**McKenzie, D.**, and J.S. Littell. 2011. Climate change and wilderness fire regimes. *International Journal of Wilderness* 17:22-27,31.

Littell, J.S., **D. McKenzie**, B.K. Kerns, S.A. Cushman, and C.B. Shaw. 2011. Managing uncertainty in climate-driven ecological models to inform adaptation to climate change. *Ecosphere* 2(9):102. doi:10.1890/ES11-00114.1.

Falk, D.A., E.K. Heyerdahl, P.M. Brown, C. Farris, P.Z. Fulé, **D. McKenzie**, T.W. Swetnam, A.H. Taylor, and M.L. van Horne. 2011. Multiscale controls of historical forest fire regimes: new insights from fire-scar networks. *Frontiers in Ecology and the Environment* 9:446-454.

Peterson, D.L., C.D. Allen, J.S. Baron, D.B. Fagre, **D. McKenzie**, N.L. Stephenson, A.G. Fountain, J.A. Hicke, G.P. Malanson, D.S. Ojima, C.L. Tague, and P.J. van Mantgem. 2011. Response of Western mountain ecosystems to climatic variability and change: a collaborative research approach. In J. Bellant and E. Beever (eds.), *Ecological Consequences of Climate Change: Mechanisms, Conservation, and Management*. Taylor and Francis, New York, NY.

French, N.H.F., William J. de Groot, L.K. Jenkins, B.M. Rogers, E. Alvarado, B. Amiro, B. de Jong, S. Goetz, E. Hoy, E. Hyer, R.E. Keane, **D. McKenzie**, Steven G. McNulty, B.E. Law, R.D. Ottmar, D.R. Pérez-Salicrup, J. Randerson, K.M. Robertson, and M. Turetsky. 2011. Model comparisons for estimating carbon emissions from North American wildland fire. *Journal of Geophysical Research* 116, G00K05, doi:10.1029/2010JG001469.

**McKenzie, D.**, F.A. Heinsch, and W.E. Heilman. 2011. Wildland Fire and Climate Change. U.S. Department of Agriculture, Forest Service, Climate Change Resource Center. <http://www.fs.fed.us/ccrc/topics/wildfire/index.shtml>.

**McKenzie, D.** 2010. The effects of climatic change and wildland fires on air quality in national parks and wilderness areas. *Fire Management Today* 70:26-28.

Kennedy, M.C., and **D. McKenzie**. 2010. Using a stochastic model and cross-scale analysis to evaluate controls on historical low-severity fire regimes. *Landscape Ecology* 25:1561-1573.

Littell, J.S., E.A. Oneil, **D. McKenzie**, J.A. Hicke, J.A. Lutz, R.A. Norheim, and M.M. Elsner. 2010. Forest ecosystems, disturbance, and climatic change in Washington State, USA. *Climatic Change* 102:129-158.

**McKenzie, D.**, D.L. Peterson, and J.S. Littell. 2009. Global warming and stress complexes in forests of western North America. In S.V. Krupa (ed.), *Developments in Environmental Science*, Vol. 8, Wild Land Fires and Air Pollution, A. Bytnerowicz, M. Arbaugh, A. Riebau, and C. Anderson (eds.). Amsterdam, The Netherlands: Elsevier Science, Ltd. pp. 319-337.

Kopper, K.E., **D. McKenzie**, and D.L. Peterson. 2009. The evaluation of meta-analysis techniques for quantifying prescribed fire effects on fuel loadings. USDA Forest Service Research Paper PNW-RP-582. Pacific Northwest Research Station, Portland, OR.

Littell, J.S., **D. McKenzie**, D.L. Peterson, and A.L. Westerling. 2009. Climate and wildfire area burned in western U.S. ecoregions, 1916-2003. *Ecological Applications* 19:1003-1021.

Baron, J.S., L. Gunderson, C.D. Allen, E. Fleishman, **D. McKenzie**, L.A. Meyerson, J. Oropeza, and N. Stephenson. 2009. Options for national parks and reserves for adapting to climate change. *Environmental Management* DOI 10.1007/s00267-009-9296-6.

Chen, J., J. Avise, B. Lamb, E.P. Salathé, C.F. Mass, A. Guenther, C. Wiedinmyer, J-F. Lamarque, S.M. O'Neill, **D. McKenzie**, and N. Larkin. 2009. The effects of global changes upon regional ozone pollution in the United States. *Atmospheric Chemistry and Physics* 9:1125-1141.

Littell, J.S., E.E. Oneil, **D. McKenzie**, J.A. Hicke, J.A. Lutz, R.A. Norheim, and M. McGuire Elsner. 2009. Forest ecosystems, disturbance, and climatic change in Washington State, USA. Chapter 7 in *The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate*, Climate Impacts Group, University of Washington, Seattle, Washington.

**McKenzie, D.**, and J.S. Littell. 2009. Climate change, fire, insects, and disturbance interactions: adaptation challenges in the West. *Mountain Views* 3:3-6.

**McKenzie, D.**, C.L. Raymond, and S.C. Cushman. 2008. Modeling understory vegetation and its response to fire. Chapter 15, pp.391-414, in J. Millsbaugh and F.R. Thompson III (eds.), *Models for Planning Wildlife Conservation in Large Landscapes*. Burlington, MA: Academic Press.

Kellogg, L.-K.B., **D. McKenzie**, D.L. Peterson, and A.E. Hessler. 2008. Spatial models for inferring topographic controls on low-severity fire in the eastern Cascade Range of Washington, USA. *Landscape Ecology* 23:227-240.

Heyerdahl, E.K., **D. McKenzie**, L.D. Daniels, A.E. Hessler, J.S. Littell, and N.J. Mantua. 2008. Climate drivers of regionally synchronous fires in the inland Northwest (1651–1900). *International Journal of Wildland Fire* 17:40-49.

**McKenzie, D.**, and A.E. Hessler. 2008. A neutral model for low-severity fire regimes. Pages 139-149 in M. Narog, compiler, *Proceedings of the 2002 Fire Conference: Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States*, December 2–5, 2002, San Diego, California.

**McKenzie, D.**, C.L. Raymond, L.-K.B. Kellogg, R.A. Norheim, A.G. Andreu, A.C. Bayard, K.E. Kopper, and E. Elman. 2007. Mapping fuels at multiple scales: landscape application of the Fuel Characteristic Classification System. *Canadian Journal of Forest Research* 37:2421-2437.

Falk, D.A., C. Miller, **D. McKenzie**, and A.E. Black. 2007. Cross-scale analysis of fire regimes. *Ecosystems* 10:809-823.

Cushman, S.A., **D. McKenzie**, D. L. Peterson, J.S. Littell, and K.S. McKelvey. 2007. Research agenda for integrated landscape modeling. USDA Forest Service General Technical Report RMRS-GTR-194. Rocky Mountain Research Station, Fort Collins, CO.

**McKenzie, D.**, and C.D. Allen. 2007. Climate change and disturbance regimes in western North America. *EOS Transactions* 88(21):227.

**McKenzie, D.**, S.M. O'Neill, N. Larkin, and R.A. Norheim. 2006. Integrating models to predict regional haze from wildland fire. *Ecological Modelling* 199:278-288.

**McKenzie, D.**, A.E. Hessler, and L.-K.B. Kellogg. 2006. Using neutral models to identify constraints on low-severity fire regimes. *Landscape Ecology* 21:139-152.

**McKenzie, D.**, S.M. O'Neill, N. Larkin, and R.A. Norheim. 2006. How will climatic change affect air quality in parks and wilderness? In: D. Harmon, ed. *Proceedings of the 2005 George Wright Society Annual Meeting*, Philadelphia, PA.

**McKenzie, D.**, S.M. O'Neill, N. Larkin, and R.A. Norheim. 2006. Simulating regional haze from wildland fire emissions in the western USA. Pages 128-130 in Price, M.F., ed. *Global Change in Mountain Regions*. Sapiens Publishing, Duncow, UK.

Wiedinmyer, C., B. Quayle, C. Geron, A. Belote, **D. McKenzie**, X. Zhang, S.M. O'Neill, and K.K. Wynne. 2006. Estimating emissions from fires in North America for air quality modeling. *Atmospheric Environment* 40:3419-3432.

Hessler, A.E., J. Miller, J. Kernan, and **D. McKenzie**. 2006. Mapping wildfire boundaries from binary point data: comparing approaches. *Professional Geographer* 59:87-104.

Raymond, C.L., L.-K.B. Kellogg and **D. McKenzie**. 2006. Mapping fuels on the Okanogan and Wenatchee National Forests. Pages 293-304 in P.L. Andrews and B.W. Butler (editors). *Fuels*

management - how to measure success: conference proceedings. March 28-30, 2006, Portland, OR. Proceedings RMRS-P-41. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Halpern, C.B., **D. McKenzie**, S.A. Evans, and D.A. Maguire. 2005. Early responses of forest understories to varying levels and patterns of green-tree retention. *Ecological Applications* 15:175-195.

Gedalof, Z., P. Mote, **D. McKenzie**, and D.L. Peterson. 2005. Top-down controls on wildfire in the American West. Pages 33-43 in L. Taylor, J. Zelnik, S. Cadwallader, and B. Hughes (eds.), *Mixed Severity Fire Regimes: Ecology and Management*. Washington State University Cooperative Extension, Pullman, WA.

**McKenzie, D.**, Z.M. Gedalof, D.L. Peterson, and P. Mote. 2004. Climatic change, wildfire, and conservation. *Conservation Biology* 18:890-902.

**McKenzie, D.** 2004. La historia del fuego y su relación con el clima. Pages 13-28 in: L. Villers-Ruiz and J López-Blanco, eds. *Incendios forestales en México: métodos de evaluación*. Universidad Nacional Autónoma de México, México, DF.

**McKenzie, D.**, S. Prichard, A.E. Hessler, and D.L. Peterson. 2004. Empirical approaches to modelling wildland fire in the Pacific Northwest: methods and applications to landscape simulations. Chapter 7 in A.J. Perera, L. Buse, and M.G. Weber, eds., *Emulating Natural Forest Landscape Disturbances*. Columbia University Press, New York, NY.

Peterson, D.L., M.C. Johnson, J.K. Agee, T.B. Jain, **D. McKenzie**, and E.D. Reinhardt. 2005. Forest structure and fire hazard in dry forests of the western United States. USDA Forest Service General Technical Report PNW-GTR-628. Pacific Northwest Research Station, Portland, OR.

Hessler, A.E., **D. McKenzie**, and R. Schellhaas. 2004. Drought and Pacific Decadal Oscillation linked to fire occurrence in the inland Pacific Northwest. *Ecological Applications* 14:425-442.

**McKenzie, D.**, D.W. Peterson, D.L. Peterson, and P.E. Thornton. 2003. Climatic and biophysical controls on conifer species distributions in mountain forests of Washington State, USA. *Journal of Biogeography* 30:1093-1108.

**McKenzie, D.**, D.W. Peterson, and D.L. Peterson. 2003. Modelling conifer species distributions in mountain forests of the Pacific Northwest. *Forestry Chronicle* 79:253-258.

**McKenzie, D.**, A. Hessler, and D.L. Peterson. 2001. Recent growth in conifer species of western North America: assessing the spatial patterns of radial growth trends. *Canadian Journal of Forest Research* 31:526-538.

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**McKenzie, D.**, D.L. Peterson, and J.K. Agee. 2000. Fire frequency in the Columbia River Basin: building regional models from fire history data. *Ecological Applications* 10:1497-1516.

**McKenzie, D.**, C.B. Halpern, and C.R. Nelson. 2000. Overstory influences on herb and shrub communities in mature forests of western Washington, USA. *Canadian Journal of Forest Research* 30:1655-1666.

Peterson, D.L., S.J. Prichard, and **D. McKenzie**. 2000. Disturbance in Mountain Forests. In Price, M., ed. *Forests in Sustainable Mountain Development: a State-of-Knowledge Report for 2000*. CAB International, Oxford, England. Pages 51-59.

Schmoldt, D.L., D.L. Peterson, R.E. Keane, J.M. Lenihan, **D. McKenzie**, D.R. Weise, and D.V. Sandberg. 1999. Assessing the effects of fire disturbance on ecosystems: a scientific agenda for research and management. USDA Forest Service General Technical Report PNW-GTR-455.

**McKenzie, D.** and C.B. Halpern. 1999. Modeling understory shrub distributions in Pacific Northwest forests. *Forest Ecology and Management* 114:293-308.

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**McKenzie, D.,** D.L. Peterson and E. Alvarado. 1996. Predicting the effect of fire on large-scale vegetation patterns in North America. USDA Forest Service Research Paper PNW-489, Pacific Northwest Research Station, Portland, Oregon.

**McKenzie, D.,** D.L. Peterson and E. Alvarado. 1996. Extrapolation problems in modeling fire effects at large spatial scales: a review. *International Journal of Wildland Fire* 6:65-76.

Maguire, D.A., J.L.F. Batista and **D. McKenzie**. 1993. Horizontal structure of uneven-aged mixed-species forests modeled as an inhomogeneous Poisson process. Proceedings of the IUFRO conference on Spatial Stochastic Processes in Forestry.

#### **PROFESSIONAL MEMBERSHIPS**

International Association for Landscape Ecology  
Ecological Society of America