

## TANIA SCHOENNAGEL

Dept. of Geography and  
Institute of Arctic and Alpine Research (INSTAAR)  
University of Colorado  
Boulder, Colorado 80309-0260 USA  
Phone: 303.818.5166, Email: [tschoe@colorado.edu](mailto:tschoe@colorado.edu)  
<http://spot.colorado.edu/~schoenna>

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My research addresses the causes and consequences of wildfire and insect outbreaks in western forests. I conduct research at multiple spatial and temporal scales to examine: (1) disturbance dynamics and successional patterns, (2) effects of past climate variability and future climate change, and (3) ecological implications of forest and wildfire management policy. Much of my recent effort strives to integrate wildfire science into relevant policy and to address the impacts of climate change on the rising risks and costs of wildfire.

### EDUCATION

- University of Wisconsin-Madison.** Madison, Wisconsin.  
2003 Ph.D. Botany and Zoology, Advisors: Monica G. Turner and Donald M. Waller.  
1997 M.S. Conservation Biology and Sustainable Development, an interdisciplinary program within the Institute for Environmental Studies.  
1995 M.S. Geography.
- Dartmouth College.** Hanover, New Hampshire.  
1990 B.A. History.

### POSITIONS

- 2009- **Research Scientist.** Dept. of Geography and Institute of Arctic and Alpine Research (INSTAAR), University of Colorado-Boulder.
- 2006-2008 **David H. Smith Postdoctoral Fellow.** Dept. of Geography, University of Colorado-Boulder.  
Fire Risk and Forest Restoration in the Wildland-Urban Interface of the Colorado Front Range.  
Spatial assessment of fuel treatments across the western US.
- 2005-2006 **Research Associate.** Dept. of Geography, University of Colorado-Boulder.  
Climatic variation and disturbance interactions in subalpine Rocky Mountain forests.
- 2003-2005 **NSF Postdoctoral Fellow.** Dept. of Geography, University of Colorado-Boulder.  
Regional and local influences on climatically sensitive disturbance in the Rocky Mountains.

## PUBLICATIONS

- Chapman, TB, T Schoennagel, TT Veblen, KC Rodman. 2019. Still standing: recent patterns of post-fire conifer refugia in ponderosa pine forests of the Colorado Front Range. *In review*.
- Mietkiewicz, N., JK Balch, T Schoennagel, L. St. Denis, B. Bradley. 2019. Consequences of human-ignited wildfires in the US: from the Wildland-Urban Interface to wildlands. *In review*.
- McWethy, DB, T Schoennagel, PE Higuera, M. Krawchuk, BJ Harvey, EC Metcalf, C Schultz, C Miller et al. 2019. Rethinking resilience to wildfire. *Nature Sustainability* 2, 797–804 doi:10.1038/s41893-019-0353-8
- Higuera, P.E., A Metcalf, C Miller, B Buma, D McWethy, EC Metcalf, Z Ratajczak, C Nelson, B Chaffin, R Stedman, S McCaffrey, T Schoennagel, B Harvey, S Hood, C Schultz et al. 2019. Integrating subjective and objective dimensions of resilience in fire-prone landscapes. *BioScience* 69(5): 379-388. <https://doi.org/10.1093/biosci/biz030>
- Balch, J.K.; Schoennagel, T.; Williams, A.P.; Abatzoglou, J.T.; Cattau, M.E.; Mietkiewicz, N.P.; St. Denis, L.A. 2018. Switching on the Big Burn of 2017. *Fire*: 1, 17.
- Schoennagel, T., JK Balch, H Brenkert-Smith, PE Dennison, BJ Harvey, MA Krawchuk, N Mietkiewicz, P Morgan, MA Moritz, R Rasker, MG Turner, and C Whitlock. 2017. Adapt to more wildfire in western North American forests as climate changes. *Proceedings of the National Academy of Sciences*: 114 (18), 4582-4590. DOI: 10.1073/pnas.1617464114
- Johnstone, JR, CD Allen, JF Franklin, LE Frelich, BJ Harvey, PE Higuera, MC Mack, RK Meentemeyer, MR Metz, GLW Perry, T Schoennagel, MG Turner. 2016. Changing disturbance regimes, ecological memory, and forest resilience. *Frontiers in Ecology and the Environment*: 14 (7), 369-378.
- Schoennagel, T., P Morgan, JK Balch, PE Dennison, BJ Harvey, R Hutto, ME Krawchuk, MA Moritz, R Rasker, and C Whitlock. 2016. Insights from wildfire science: A resource for fire policy discussions. <https://www.frames.gov/partner-sites/wildfire-science-and-policy-working-group/home>
- Hart, S.J., Schoennagel, T., Veblen, T.T., and Chapman, T.B. 2015. Area burned in the western United States is not influenced by recent mountain pine beetle outbreaks. *Proceedings of the National Academy of Science* 112 (14) 4375-4380.
- Moritz, MA, E Batllori, RA Bradstock, AM Gill, J Handmer, PF Hessburg, J Leonard, S McCaffrey, DC Odion, T Schoennagel & AD Syphard. 2014. Learning to Coexist with Wildfire. *Nature*. doi:10.1038/nature13946.

- Sherriff RL, Platt RV, Veblen TT, Schoennagel T, Gartner MH. 2014. Historical, Observed, and Modeled Wildfire Severity in Montane Forests of the Colorado Front Range. ***PLoS ONE*** 9(9): e106971. doi:10.1371/journal.pone.0106971.
- Westerling, A., T. Brown, T. Schoennagel, T. Swetnam, M.G. Turner, T.T. Veblen. 2014. Climate and Wildfire in Western US Forests. In: Sample, V.A. and Bixler, R. P. (eds.). 2014. Forest Conservation and Management in the Anthropocene. ***USFS General Technical Report***. Fort Collins, CO: US Department of Agriculture, Forest Service. Rocky Mountain Research Station.
- Fleishman, E., J. Belnap, N. Cobb, C. Enquist, K. Ford, G. MacDonald, M. Pellant, T. Schoennagel, L. Schmit, M. Schwartz, S. van Drunick, A. Westerling, A. Keyser, and R. Lucas, 2013. Natural Ecosystems. Chapter 8, in: Garfin, G., A. Jardine, R. Merideth, M. Black, and S. LeRoy (eds.) 2013. ***Assessment of Climate Change in the Southwest United States: a Technical Report Prepared for the U.S. National Climate Assessment***. A report by the Southwest Climate Alliance. Washington, DC: Island Press. 506 pp.
- Chapman, T.B., T.T. Veblen, T. Schoennagel. 2012. Spatio-temporal patterns of mountain pine beetle activity in the southern Rocky Mountains. ***Ecology***. 93(10): 2175-2185. <http://www.esajournals.org/doi/abs/10.1890/11-1055.1>
- Gartner, M. A., T. T. Veblen, R. L. Sherriff, and T. Schoennagel. 2012. Proximity to grasslands influences fire frequency and sensitivity to climate variability in *Pinus ponderosa* forests of the Colorado Front Range. ***International Journal of Wildland Fire***. 21: 562–571.
- Smith, J.M. S.J. Hart, T.B. Chapman, T.T. Veblen, T. Schoennagel. 2012. Dendroecological reconstruction of 1980s mountain pine beetle outbreak in lodgepole pine forests in northwestern Colorado. ***EcoScience***. 19(2): 113-126.
- Schoennagel, T., T.T. Veblen, J.F. Negrón, J.M. Smith. 2012. Effects of mountain pine beetle on fuels and expected fire behavior in lodgepole pine forests, Colorado, USA. ***PLoS ONE***. 7(1): e30002. doi:10.1371/journal.pone.0030002.
- Parisien, M.A., S. Snetsinger, J.A. Greenberg, C.R. Nelson, T. Schoennagel, S.Z. Dobrowski, and M.A. Moritz. 2012. Spatial variability in wildfire probability across the western United States. ***International Journal of Wildland Fire***. 21: 313-327.
- Platt, R.V., T. Schoennagel, Veblen, T.T., R.L. Sherriff. 2011. Modeling wildfire potential in residential parcels: A case study of the North-Central Colorado Front Range. ***Landscape and Urban Planning***. 102: 117– 126
- Schoennagel, T., R.L. Sherriff, T.T. Veblen. 2011. Fire history and tree recruitment in the upper montane zone of the Colorado Front Range: Implications for forest restoration. ***Ecological Applications***. 21(6): 2210-2222.

- Schoennagel, T., C.R. Nelson. 2010. Restoration relevance of recent National Fire Plan treatments in forests of the Western US. *Frontiers in Ecology and Environment*. 9(5): 271–277.
- Keith, R.P., T.T. Veblen, T. Schoennagel, R.L. Sherriff. 2010. Understory vegetation indicates historic fire regimes in ponderosa pine-dominated ecosystems in the Colorado Front Range. *Journal of Vegetation Science*. 21: 488–499.
- Schoennagel, T., C.R. Nelson, D.M. Theobald, G. Carnwath, T.B. Chapman. 2009. Implementation of National Fire Plan fuel treatments near the wildland-urban interface in the western U.S. *Proceedings of the National Academy of Sciences*. 106 (26): 10706-10711.
- Schoennagel, T., C.R. Nelson, D.M. Theobald, G. Carnwath, T.B. Chapman. 2009. Reply to Fitzsimmons: Transparency needed in defining fire-mitigation effort near the wildland–urban interface. *Proceedings of the National Academy of Sciences*. vol. 106 no. 33 E88
- Platt, R.V., T. Schoennagel. 2009. An object-oriented approach to assessing changes in tree cover in the Colorado Front Range 1938-1999. *Forest Ecology and Management*. 258: 1342–1349.
- Krasnow, K., T. Schoennagel, T.T. Veblen. 2009. Forest fuel mapping and validation of LANDFIRE fuel maps in Boulder County, Colorado. *Forest Ecology and Management*. 257: 1603-1612.
- Schoennagel, T., E.A. Smithwick, M.G. Turner. 2008. Landscape heterogeneity following large fires: Insights from Yellowstone National Park, USA. Invited Paper for Special Issue on Large Fires. *International Journal of Wildland Fire*. 17: 742-753.
- Nelson, C.R., T. Schoennagel, and E. Gregory. 2008. Opportunities for academic training in the science and practice of restoration within the United States and Canada. *Restoration Ecology*. 16(2): 125-230.
- Kaufmann, M.R.; G.H. Aplet, M.G. Babler, W.L. Baker, B. Bentz, M. Harrington, B.C. Hawkes, L. Huckaby, Stroh; M.J. Jenkins, D.M. Kashian, R.E. Keane, D. Kulakowski, W. McCaughey, C. McHugh, J. Negron, J. Popp, W.H. Romme, T. Schoennagel, W. Shepperd, F.W. Smith, E.K. Sutherland, D. Tinker, T.T. Veblen. 2008. *The status of our scientific understanding of lodgepole pine and mountain pine beetles - a focus on forest ecology and fire behavior*. GFI technical report 2008-2. Arlington, VA: *The Nature Conservancy*. 13 p.
- Schoennagel, T., T.T. Veblen, D. Kulakowski, and A. Holz. 2007. Multidecadal climate variability and climate interactions affect subalpine fire occurrence, western Colorado (USA). *Ecology* 88(11): 2891-2902.

- DellaSala, D., J. Karr, T. Schoennagel, D. Perry, R. Noss, D. Lindenmayer, R. Beschta, R. Hutto, M. Swanson, and J. Evans. 2006. Post-disturbance logging debate ignores many issues. *Science* 314: 51-52.
- Noss, R. F., J. F. Franklin, W. L. Baker, T. Schoennagel, and P. B. Moyle. 2006. Managing fire-prone forests in the western United States. *Frontiers in Ecology and the Environment* 8(3): 481-487.
- Schoennagel, T., M.G. Turner, D. M. Kashian, and A. Fall. 2006. Influence of fire regimes on lodgepole pine stand age and density across the Yellowstone National Park (USA) landscape. *Landscape Ecology* 21:1281–1296.
- Romme, W. H., J. Clement, J. Hicke, D. Kulakowski, L. H. MacDonald, T. Schoennagel, and T. T. Veblen. 2006. Recent forest insect outbreaks and fire risk in Colorado forests: a brief synthesis of relevant research. *Colorado Forest Restoration Institute*, Fort Collins, CO.
- Schoennagel, T., T.T. Veblen, W.H. Romme, J.S. Sibold, E.R Cook. 2005. ENSO and PDO variability affect drought-induced fire occurrence in Rocky Mountain subalpine forests. *Ecological Applications* 15(6): 2000-2014.
- Schoennagel, T., T.T. Veblen, W.H. Romme. 2004. The interaction of fire, fuels and climate across Rocky Mountain forests. *BioScience* 54(7) 661-676.
- Schoennagel T., Veblen T.T., Romme W.H. 2004. Evaluation of the efficacy of forest manipulations still needed - Response from Schoennagel and colleagues. *BioScience* 54 (11): 980-981.
- Schoennagel, T., D.M. Waller, M.G. Turner, W.H. Romme. 2004. The influence of fire interval on postfire plant communities in Yellowstone National Park (USA). *Journal of Vegetation Science* 15: 797-806.
- Schoennagel, T. 2004. Integrating landscape ecology into natural resource management: a review. *Landscape Ecology* 19: 911-912.
- Schoennagel, T., M.G. Turner, W.H. Romme. 2003. The influence of fire interval and serotiny on postfire lodgepole pine density in Yellowstone National Park. *Ecology* 8: 2967-2978.
- Maxwell, T., J. Berkson, T. Schoennagel, K. Poiani, R. Constanza. 2003. Educational investments in environmental science and management. In V.D. Dale (ed), *Ecological modeling for resource management*. Springer-Verlag: New York.
- Schoennagel, T. 2003. Landscape ecology and resource management: a review. *Society and Ecology* 7(2): 3.

Schoennagel, T. and D.M. Waller. 1999. Understory responses to fire and artificial seeding in an eastern Cascades *Abies grandis* forest, USA. *Canadian Journal of Forest Research* 29: 1393-1401.

## OUTREACH and SYNERGISTIC ACTIVITIES

- 2018 **Invited speaker.** Lead scientist in the American Geosciences Institute Policy & Critical Issues Webinar: ***Adapting Wildfire Management to 21st Century Conditions.***
- 2017 **Documentary film.** Contributed to documentary film produced by James Balog and Olivia Ahnemann, ***The Human Element***, about the impact of climate change on wildfire, air and water.
- 2017 **Congressional witness.** Provided expert testimony in the U.S. House of Representatives Subcommittee on Federal Lands Hearing on ***“Seeking Better Management of America’s Overgrown, Fire-Prone National Forest”***. Washington, D.C.
- 2017 **Invited participant.** Workshop on *Defining ecological and social resilience in fire-prone ecosystems*, Missoula, MT.
- 2016 **Invited participant.** Workshop on *Fire and bark beetles*, organized by the Northern Rockies Fire Science Network. Missoula, MT.
- 2015 **Invited expert.** Provided testimony to the Colorado Legislature’s *Wildfire Matters Review Committee*, Denver, CO.
- 2015 **Invited participant.** Advanced fire policy workshop. COMPASS, Boulder, CO.
- 2015 **Invited panelist.** Screening of the film, *Unacceptable Risk: Fire fighters on the Front lines of Climate Change*. Boulder & Denver.
- 2014 **Invited participant.** The science of fire: Advanced communication workshop. COMPASS, Seattle, WA.
- 2014 **Board of Advisors.** Boulder County Wildfire Partners. Science advisor to voluntary program helping homeowners in Boulder County prepare for wildfire.
- 2013 **Science Advisor** to Union of Concerned Scientists, on climate change impacts to forests and landscapes of the mountain West.
- 2012-2014 **Outreach to elementary schools**, Mountain Pine Beetles and Our Forests. Mapleton Montessori, Whittier International Elementary, Boulder, CO.
- 2012 **Contributor** to the National Climate Change Assessment, chapter on Ecological Impacts (disturbance) in the Southwestern US, and a report on fire-climate interactions in the southwestern US for the US Global Change Research Program.
- 2011 **Science mentor** to Fairview High School student conducting an independent research project on Fourmile Canyon Fire.
- 2011 **Fire ecology expert.** National Public Radio All Things Considered 5.20.2011
- 2011 **Invited speaker.** 17th Annual Boulder County Ecosystem Symposium: "Boulder Burns", Sponsored by Boulder County Audubon Society.
- 2011 **Science advisor** to BLM Middle Rockies Ecoregional and Forest Mortality Assessment.
- 2010 **Science advisor** to US Forest Service Collaborative Forest Landscape Restoration Projects to restore ponderosa pine forests in the Colorado Front Range.

- 2010 **Invited participant.** Roundtable with Forest Service Rocky Mountain Regional Forester and managers on the Science of Lodgepole Pine Forests in Colorado and Southern Wyoming.
- 2009 **Panelist.** Making Connections: Pine Beetles, Water, Climate, Fire, and the Future Forest. Western Water Assessment and the Colorado Forest Restoration Institute. NOAA. Boulder, CO.
- 2009 **Outreach to CU Alumni.** Contributed to Feature Article on mountain pine beetle-fire research in the University of Colorado Arts and Sciences Magazine.
- 2009 **Science expert.** Interviewed by numerous regional and national news outlets on research about the location of National Fire Plan fire-mitigation treatments near the western US wildland-urban interface: New York Times, USA Today, Wall St. Journal, Scripps News, CBS.com, LA Times, Denver Post, Oregonian, Seattle Times, Missoulian, Salt Lake Tribune, Arizona Republic, Science Daily, etc.
- 2009 **Outreach to afterschool science program.** Presented talk on Mountain Pine Beetles and climate change to the High Peaks Elementary 5<sup>th</sup> grade after school science team “Global Coolers”. Their project on this topic won in the First Lego League competition, an international science and engineering program.
- 2008 **Science expert.** Interviewed on KGNU about FIREWISE practices in the Wildland-Urban Interface. Boulder, CO.
- 2008 **Invited participant.** State Forest Resource Assessment Working Group, US Forest Service and The Nature Conservancy. Assist with the identification of priority landscapes needing forest treatment in support of a comprehensive forest resource assessment throughout CO. Boulder, CO.
- 2008 **Science expert.** Advances in Fire Practice for the Wildland Fire Lessons Learned Center, a “one-stop shop” website for fire science and practice. Interviewed for article about fire risk and the CO beetle outbreak.
- 2008 **Invited participant.** Lodgepole Pine Science Team, The Nature Conservancy. Assess the status of scientific knowledge of lodgepole pine ecology and fire behavior in relation to the mountain pine beetle epidemic. Produce report for managers and public. Boulder, CO.
- 2007 **Invited speaker.** Colorado Bark Beetle Cooperative, US Forest Service. Presented talks to forest managers (May) and the public (Sept.) about bark beetle outbreaks and fire risk in subalpine forests. Snow Mountain Ranch, CO.
- 2007 **Science expert.** Interviewed on KGNUs “How on Earth” program, about forest fires and people in the Wildland-Urban Interface. Boulder, CO.
- 2007 **Invited speaker.** Denver Water. Presented information to water managers on potential impacts of insect outbreaks and fires on water resources.
- 2007 **Invited participant.** Roundtable on Climate Change and Conservation in the Greater Yellowstone Ecosystem. Bozeman, MT.
- 2007 **Invited speaker.** Colorado State Foresters Training Academy. Presented talk to State foresters on insect outbreaks and fire risk. Facilitated discussion on forest management responses to Mountain Pine Beetle outbreak in lodgepole pine forests. Ft. Collins, CO.
- 2006 **Invited speaker.** Summit County Bark Beetle Taskforce. Presented talk on current scientific understanding of why the insects are irrupting in Colorado,

- what can be done to stop them, what are the subsequent fire risks and how these risks can be effectively mitigated. Dillon, CO.
- 2006 **Expert witness.** U.S. House of Representatives, Subcommittee on Forests and Forest Health. Science forum on post-disturbance ecology and logging. Washington, DC.
- 2005 **Invited speaker and panelist.** Presented talk on integrating science into forest policy at workshop on *Conservation, collaboration and community*. Santa Fe, NM.
- 2004 **Science expert.** Forest Health Roundtable, Front Range Fuel Treatment Partnership. Contributed to development of forest restoration and fire risk reduction policy on public and private lands in the Colorado Front Range. Lakewood, CO.
- 2004 **Science expert.** Colorado Public Radio (KUNC). Provided expert opinion about fire and forest management in the West. Ft. Collins, CO.
- 2004 **Invited speaker and panelist.** Boulder County Fire Education Forum. Provided expert opinion about forest restoration and fire mitigation in the wildland-urban interface of Boulder County. City Council Chambers, Boulder, CO.
- 2003 **Science expert.** TIME Magazine (August 18, 2003). Interviewed for article on western wildland fire and forest management strategies.
- 2003 **Invited participant.** Wildland Fire Workshop. Bridging the worlds of fire managers and applied fire researchers. April 16-17, 2003. Ft. Collins, CO.

## PROFESSIONAL DEVELOPMENT

- 2018 **Congressional Witness Training:** COMPASS, Washington, DC.
- 2015 **Advanced Fire Policy Training:** COMPASS, Boulder, CO.
- 2014 **Leadership Retreat:** Smith Fellows 15<sup>th</sup> Anniversary retreat with Barefoot Thinking, to help foster innovation and creativity among scientists and conservation leaders, Seeley Lake, MT.
- 2014 **Fire Science Advanced Communication Workshop:** COMPASS, Seattle, WA.
- 2007 Conservation in the Non-Profit World, Smith Fellows Training, New York, N.Y.
- 2007 **Media Training for Scientists:** Bridging the Gap between Science and Journalism, Smith Fellows Training, Atlanta, GA.
- 2006 **Popular Writing for Scientists:** Smith Fellows Training, Big Sur, CA.
- 2006 **Leadership and Business Models for Conservation:** Smith Fellows Training, Loveland, CO.

## PAST RESEARCH GRANTS and FELLOWSHIPS

- 2012-2015 **Wilburforce Foundation**, Conservation Science Program. *Wildfire policy Insights; Mountain Pine Beetle effects on fire extent and severity across the western US; Fire-mitigation treatments and their probability of burning.* PI/Co-PI, \$75,000.
- 2008-2011 **National Science Foundation**, Ecological Biology Program, *Collaborative Research: Wildfire and Mountain Pine Beetle Outbreaks in Subalpine Forests: Cross-scale Interactions Under Varying Climate.* Co-PI, \$352,000.



- 2007-2008 **Wilburforce Foundation**, Conservation Science Program, *Spatial assessment of fuel treatments across the western US*. PI, \$54,000.
- 2006-2009 **National Science Foundation**, Geography Program, *Fire Risk and Forest Restoration in the Wildland-Urban Interface of the Colorado Front Range*. Co-PI, \$235,000.
- 2006-2008 **David H. Smith Conservation Research Fellowship**, Society for Conservation Biology, *Fire Mitigation and Forest Restoration Opportunities in the Wildland-Urban Interface of the Colorado Front Range*. PI, \$140,000.
- 2003-2006 **National Science Foundation**, *Climatic variation and disturbance interactions in subalpine Rocky Mountain forests*. Co-Investigator, \$300,000.
- 2003-2005 **National Science Foundation**, Biological Informatics Postdoctoral Research Program, *Regional and local influences on climatically sensitive disturbance in the Rocky Mountains*. PI, \$100,000.
- 1999-2002 **DOE Global Change Education Program**, Graduate Research Environmental Fellowship, *Climatically altered fire regimes on successional patterns in Yellowstone National Park*. \$54,000.

#### INVITED PRESENTATIONS

2018. **Recent trends and strategies for adaptation to wildfire in the U.S.** American Geosciences Institute Policy & Critical Issues Webinar Series: *Adapting Wildfire Management to 21st Century Conditions*. May 16, 2018. <https://www.americangeosciences.org/policy-critical-issues/webinars>.

2015. **Fire and bark beetles in subalpine forests.** Department of Forest and Rangeland Stewardship and Colorado Forest Restoration Institute, Colorado State University. April 7, 2015. Fort Collins, CO.

2014. **Linked and compound disturbances in subalpine forests: bark beetles and fire**, Oral Session organized by Monica Turner and Jill Johnstone: *Climate Warming, Changing Disturbance Regimes, and Forest Resilience*. 99<sup>th</sup> Ecological Society of America Annual Meeting. Aug 11-15. Sacramento, CA.

2011. **Managing human-wildfire interactions in a changing climate**, in the Oral Session organized by ESA presidents Steward Pickett, Terry Chapin and Mary Power: *Identifying Emerging Issues and Opportunities for Planetary Stewardship*. 96<sup>th</sup> Ecological Society of America Annual Meeting. Aug 7-12. Austin TX.

2011. **Fire History and Fire Risk in Boulder County Forests**, 17<sup>th</sup> Annual Boulder County Ecosystem Symposium: "Boulder Burns", Sponsored by Boulder County Audubon Society. April 9, 2011. University of Colorado-Boulder, CO.

2009. **An overview of current research: Wildfire and Mountain Pine Beetle Outbreaks in Subalpine Forests, Cross- Scale Interactions Under Varying Climate.** Mountain Pine Beetle Science Symposium, Dec 11, 2009. Colorado State University, Ft Collins, CO.

2009. **Bugs and bugaboos: Mountain pine beetles, fire and ecological restoration.** Environmental Studies Colloquium Series, Sept. 30, 2009. University of Colorado-Boulder, CO.

2009. **Causes and consequences of Mountain Pine Beetle outbreaks in Rocky Mountain forests: implications for management and climate change.** Oct 2, 2009. Dept. of Biology, Western State College, Gunnison, CO.

2009. **Mixed-severity fire regimes in the Rocky Mountains.** Session organizer: Tom Spies. North American Forest Ecology Workshop. Logan Utah. June 22-26. Logan, Utah.

2008. **A spatial assessment of fire mitigation and forest restoration treatments in the western US.** Dept. of Geography, University of Colorado-Boulder, CO.

2007. **Recent forest insect outbreaks and fire risk in Colorado forests: a brief synthesis of relevant research.** National Seasonal Assessment Workshop: Weather, climate, fuels outlooks for the Western U.S. and Alaska. NOAA Climate Diagnostics Center. Boulder, CO.

2007. **A review of forest ecology research relevant to climate change in the Greater Yellowstone Ecosystem.** The Greater Yellowstone Ecosystem Climate Change and Conservation Roundtable, Bozeman MT.

2006. **Landscape heterogeneity following large fires: insights from Yellowstone National Park, USA.** Symposium: Large fires in landscapes: diversity or disaster? Introduction and overview. 3<sup>rd</sup> International Fire Ecology and Management Congress. Nov. 13-17, 2006. San Diego, CA.

2005. **Integrating science into forest policy.** Conservation, collaboration and community: Responding to the Healthy Forests Initiative. Santa Fe, NM.

2004. **Climatic teleconnections affecting drought-induced fire occurrence in Rocky Mountain subalpine forests.** Environmental and Societal Impacts Group, National Center for Atmospheric Research. Boulder, CO.

## CONTRIBUTED PRESENTATIONS

Schoennagel, T. C.R. Nelson. **Restoration relevance of recent National Fire Plan treatments in forests of the Western US.** 24<sup>th</sup> International Congress of the Society for Conservation Biology. 3-7 July 2010. Edmonton, Alberta.

Schoennagel, T., R. Sherriff, T.T. Veblen. ***Current tree densities linked to late-19th century high-severity fires in Colorado Front Range upper montane forests.*** 94<sup>th</sup> Annual Meeting of the Ecological Society of America. August 2-7, 2009. Albuquerque, NM.

Schoennagel, T., C.R. Nelson, T.B. Chapman, G. Carnwath, D.M. Theobald. ***A spatial assessment of fire mitigation and forest restoration treatments in the western US.*** 93<sup>rd</sup> Annual Meeting of the Ecological Society of America. August 3-8, 2008. Milwaukee, WI.

Schoennagel, T., T.T. Veblen, D. Kulakowski, and A. Holz. ***Multidecadal climate variability and interactions among Pacific and Atlantic sea surface temperature anomalies affect subalpine fire occurrence, western Colorado (USA).*** 92<sup>nd</sup> Annual Meeting of the Ecological Society of America. August 5-10, 2007. San Jose, CA.

Schoennagel, T., T.T. Veblen, W.H. Romme, J.S. Sibold, E.R Cook. ***ENSO and PDO interactions affect drought-induced fire occurrence in Rocky Mountain subalpine forests.*** Fire History and Climate Synthesis in Western North America. April 30-May 3, 2005. Flagstaff, AZ.

Schoennagel, T., T.T. Veblen, W.H. Romme. ***Appropriate forest restoration and effective fuel treatments in Rocky Mountain forests: where and how?*** Colorado Forest Restoration Workshop. November 8-10, 2004. Glenwood Springs, CO.

Schoennagel, T., T.T. Veblen, W.H. Romme, J.S. Sibold, E.R Cook. ***Climatic teleconnections affecting drought-induced fire occurrence in Rocky Mountain subalpine forests.*** 89<sup>th</sup> Annual Meeting of the Ecological Society of America. August 1-6, 2004. Portland, OR.

Schoennagel, T., M.G. Turner, A. Fall, D.M. Kashian. ***The influence of climatically altered fire regimes on successional patterns across the Yellowstone landscape.*** 88<sup>th</sup> Annual Meeting of the Ecological Society of America. August 3-8, 2003. Savannah, GA.

Schoennagel, T., M.G. Turner, A. Fall, D.M. Kashian. ***Altered fire regimes and successional patterns across the Yellowstone landscape.*** 18<sup>th</sup> Annual Meeting of the US Regional Chapter of the International Association of Landscape Ecology, April 2-6, 2003. Banff, Alberta.

Schoennagel, T., D.M. Waller, M.G. Turner, W.H. Romme. ***The influence of fire interval, elevation and soil fertility on postfire plant communities in Yellowstone National Park.*** 17<sup>th</sup> Annual Symposium of the International Association for Landscape Ecology. April 23-27, 2002. Lincoln, Nebraska.

Schoennagel, T., M.G. Turner, W.H. Romme, D.M. Waller. ***Temporal and spatial effects of fire on initial pathways of succession across the Yellowstone landscape.*** The 86<sup>th</sup> Annual Meeting of the Ecological Society of America, August 5-10, 2001. Madison, WI.

Schoennagel, T., M.G. Turner, W.H. Romme, D.M. Waller. ***Spatial and temporal influences of fire regimes on initial pathways of succession across the Yellowstone Landscape.*** The 16<sup>th</sup> Annual Symposium of the US Regional Chapter of the International Association of Landscape Ecology, April 25-27, 2001. Tempe, Arizona.

Schoennagel, T., M.G. Turner, W.H. Romme, D.M. Waller. ***The effect of fire interval on successional patterns in Yellowstone National Park.*** The 85<sup>th</sup> Annual Meeting of the Ecological Society of America, August 6-10, 2000. Snowbird, Utah.

## INVITED LECTURES

2010. ***Bugs and bugaboos: Mountain pine beetles, fire and ecological restoration.*** EBIO 4800/5800-002: Understanding local manifestations of global environmental change: Invasions, transformations, and novel ecosystems. Ecology and Evolutionary Biology Dept., University of Colorado-Boulder, CO.

2009. ***Fire Regimes, Forest Restoration and Fire Risk across Rocky Mountain Landscapes*** GEOG 1001: Environmental Systems: Climate and Vegetation. Dept. of Geography. University of Colorado-Boulder, CO.

2009. ***Subalpine Forests in Rocky Mountain Landscapes: Fire Regimes and Forest Restoration.*** GEOG 4371: Forest Geography. Dept. of Geography. University of Colorado-Boulder, CO.

2009. ***Bugs and bugaboos: Mountain pine beetles, fire and ecological restoration.*** EBIO 4800/5800-002: Critical Thinking: Understanding local manifestations of global environmental change. Ecology and Evolutionary Biology Dept., University of Colorado-Boulder, CO.

2008. ***An introduction to disturbance ecology of Colorado forests: implications for forest management.*** GEOG 3351: Biogeography. Dept. of Geog.. University of Colorado-Boulder, CO.

2007. ***The ecology and management of bark beetles in subalpine forests.*** EBIO 4800: Disease Ecology. Ecology and Evolutionary Biology Dept., University of Colorado-Boulder, CO.

2005. ***A field course in fire ecology of the Rocky Mountains.*** Iowa State University, Department of Forestry, Forestry Camp. Rocky Mountain National Park, CO.

2005. ***Conservation issues in the Greater Yellowstone Ecosystem.*** GEOG 4430: Conservation Trends. University of Colorado-Boulder, CO.

2004. ***The interaction of fire, fuels and climate across Rocky Mountain forests.*** EBIO 5310: Landscape Ecology. Ecology and Evolutionary Biology Dept., University of Colorado-Boulder, CO.

2003. ***The influence of fire regimes on successional patterns in Yellowstone National Park.*** Department of Forest, Rangeland, and Watershed Stewardship, Colorado State U. Ft Collins, CO.

## ADVISING

Actively serve(d) on graduate committees of the following University of Colorado Geography students: Teresa Chapman (MS, 2009; PhD *pending*), Cameron Naficy (PhD, 2016), Miranda Redmond (EBIO PhD, 2015), Meredith Gartner (MS, 2008; PhD, 2015), Rebecca Harriss (EBIO

MS, 2013), Jeremy Smith (PhD, 2012), Kerry Malm (MS, 2009), Kevin Krasnow (MS,2007), Robin Keith (MS, 2007); Undergraduate advising of research assistants: Sarah Drinkwater (2004), Dan Jarvis (2005-6), Larissa Meyers (2006), Jennifer Perry (2007), Paul Sitzmann (2008).

#### **MANUSCRIPT and PROPOSAL REVIEWS**

*BioScience*

*Conservation Biology*

*Ecology*

*Ecology and Society*

*Ecological Applications*

*Ecological Restoration*

*Ecosystems*

*Geophysical Research Letters*

*Forest Ecology and Management*

*Journal of Applied Ecology*

*J. of Applied Meteorology and Climatology*

*Journal of Biogeography*

*Landscape Ecology*

*National Science Foundation*

*PLoS ONE*

*Proc. of the National Academies of Science*

#### **AFFILIATIONS**

The Ecological Society of America

The Society for Conservation Biology

The International Association of Landscape Ecology