

Charles H. Luce, Research Hydrologist

USDA Forest Service Rocky Mountain Research Station, Boise, Idaho, USA

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Professional Experience

1991-Present: Research Hydrologist, U.S. Forest Service

1989-1991 Hydrologist, U.S. Forest Service, Siskiyou National Forest

Education

Ph.D. Civil Engineering	Utah State University	2000
M.S. Forest Hydrology	University of Washington	1990
B.S. Forest Management	University of Washington	1986

Research Experience

Research has centered around hydrology, geomorphology, and ecology of forests and streams, with an emphasis on applications toward solving critical conservation challenges like climate change, wildfire, and drought. Some of the more interesting work has addressed subjects like runoff generation and erosion processes on forest roads and after wildfires, hydroclimatic trends and their potential consequences, snow hydrology and thermal dynamics, groundwater-surface water interactions, interactions of fish with streamflow variations and wildfire disturbances, and stream temperature drivers, patterns, and sensitivities.

Publications

- 1) Elshobary, A., Luce, CH, Kukal, M, Boschetti, L & Tonina, D (2026). Quantifying Wildfire Impacts on Water Yield via Multi-Scale BACI and Remotely Sensed Evapotranspiration. *Hydrol. Process.*, 40(5), e70561.
- 2) Holden, Z. A., Swanson, A. K., Sadegh, M., Luce, C. H., Noonan-Wright, E., & Parsons, R. A. (2025). Soil moisture is a stronger predictor of forest fire spread potential than weather in the US Northern Rocky Mountains. *Geophysical Research Letters*, 52(16), e2025GL116248.
- 3) Bertagnoli, A., Luce, C., Kampen, R. v., Schneidewind, U., Berkel, M. v., Tranmer, A.W., Vandersteen, G., Krause, S., & Tonina, D. (2024). iFLOW: A framework and GUI to quantify effective thermal diffusivity and advection in permeable materials from temperature time series. *Water Resour. Res.*, 60(11), e2024WR037370
- 4) Van Loon, A. F., Kchouk, S., Matanó, A., Tootoonchi, F., Garreton, C. A., Hassaballah, K. E., . . . Werner, M. (2024). Drought as a continuum: memory effects in interlinked hydrological, ecological, and social systems. *Natural Hazards and Earth System Sciences, NHESS*, 24(9), 3173-3205.
- 5) Alvis, A. D., Luce, C. H., Istanbuluoglu, E., Black, T., Dieu, J., & Black, J. (2024). Using additional roughness to characterize erosion control treatment effectiveness in roadside ditch lines. *Earth Surface Processes and Landforms*, 49(4), 1255-1272.
- 6) Alizadeh, M. R., Abatzoglou, J. T., Luce, C. H., Adamowski, J. F., Farid, A., & Sadegh, M. (2021). Warming enabled upslope advance in western US forest fires. *Proc. Natl. Acad. Sci. U.S.A.*, 118(22), e2009717118.
- 7) Holden, Z. A., A. Swanson, C. H. Luce, W. M. Jolly, M. Maneta, J. W. Oyler, D. A. Warren, R. Parsons, and D. Affleck (2018), Decreasing fire season precipitation increased recent western U.S. forest wildfire activity, *Proc. Natl. Acad. Sci. U.S.A.*, 115(36), E8349-E8357.
- 8) Kormos, P., C. Luce, S. J. Wenger, and W. R. Berghuijs (2016), Trends and Sensitivities of Low Streamflow Extremes to discharge Timing and Magnitude in Pacific Northwest Mountain Streams, *Water Resour. Res.*, 52(7), 4990-5007.

- 9) Isaak, D. J., M. K. Young, C. H. Luce, S. W. Hostetler, S. J. Wenger, E. E. Peterson, J. M. Ver Hoef, M. C. Groce, D. L. Horan, and D. E. Nagel (2016), Slow climate velocities of mountain streams portend their role as refugia for cold-water biodiversity, *Proc. Natl. Acad. Sci. U.S.A.*, 113(16), 4374-4379,
- 10) Luce, C. H., V. Lopez-Burgos, and Z. Holden, (2014), Sensitivity of snowpack storage to precipitation and temperature using spatial and temporal analog models, *Water Resour. Res.*, 50, 9447-9462.
- 11) Luce, CH, B Staab, M Kramer, S Wenger, D Isaak, C McConnell, (2014), Sensitivity of Summer Stream Temperature to Climate Variability in the Pacific Northwest. *Water Resour. Res.* 50: 3428-3443.
- 12) Luce, C. H., Abatzoglou, J. T., Holden, Z. A., (2013), The Missing Mountain Water: Slower Westerlies Decrease Orographic Enhancement in the Pacific Northwest USA, *Science*, 342(6164), 1360-1364.
- 13) Gariglio, F., D. Tonina, and C.H. Luce, (2013), Spatio-temporal variability of hyporheic exchange through a pool-riffle-pool sequence, *Water Resour. Res.* 49, 7185 – 7204.
- 14) Luce, C. H., D. Tonina, F. P. Gariglio, and R. Applebee, (2013), Solutions for the diurnally forced advection-diffusion equation to estimate bulk fluid velocity and diffusivity in streambeds from temperature time series, *Water Resour. Res.*, 49(1), 488-506.
- 15) Goode, J. R., C. H. Luce, and J. M. Buffington. (2012). Enhanced sediment delivery in a changing climate in semi-arid mountain basins: Implications for water resource management and aquatic habitat in the northern Rocky Mountains. *Geomorphology* 139-140: 1-15.
- 16) Adams, H.D., C.H. Luce, D.D. Breshears, M. Weiler, V.C. Hale, C.D. Allen, A.M.S. Smith, T.E. Huxman, (2012). Ecohydrological consequences of drought- and infestation- triggered tree die-off: insights and hypotheses. *Ecohydrology*, 5: 145-159.
- 17) Wenger, SJ, Isaak, DJ, Luce, CH, Neville, HM, Fausch, K, Dunham, JB, Dauwalter, DC, Young, MK, Elsner, MM, Rieman, BE, Hamlet, AF, Williams, JE (2011), Flow regime, temperature, and biotic interactions drive differential declines of trout species under climate change. *Proc. Natl. Acad. Sci. USA.*, 108(34),14175-14180.
- 18) Luce, C. H., and Z. A. Holden (2009), Declining annual streamflow distributions in the Pacific Northwest United States, 1948–2006, *Geophys. Res. Lett.*, 36, L16401, doi:10.1029/2009GL039407.
- 19) Istanbuluoglu, E., D.G. Tarboton, R.T.Pack and C.H. Luce, (2004), Modeling of the Interactions between Forest Vegetation, Disturbances and Sediment Yields, *JGR - Earth Surface*, 109(F1): F01009,
- 20) Luce, C. H., and T. A. Black, (1999), Sediment production from forest roads in western Oregon, *Water Resour. Res.*, 35, 2561-2570.
- 21) Luce, C. H., Tarboton, D. G., Cooley, K. R., (1998), The Influence of the Spatial Distribution of Snow on Basin-Averaged Snowmelt, *Hydrol. Process.*, 12, 1671-1683.
- 22) Luce, C. H., and T. W. Cundy, (1992), Modification of the kinematic wave - Philip infiltration overland flow model, *Water Resour. Res.* 28(4):1179-1186.

Awards and Honors

Distinguished Alumni, Utah State University Dept. Civil and Environmental Engineering, 2024
 Fellow, American Geophysical Union, 2022
 USDA Forest Service Jim Sedell Research Achievement Award, 2017
 Water Resources Research Editors' Citation for Excellence in Refereeing, 2003

Professional Society Memberships

American Geophysical Union, Member, 1988-Present
 European Geosciences Union, Member, 2010-Present
 American Society for Advancement of Science, Member, 2012-Present