

Geoffrey C. Poole, Ph.D.
Fluvial Landscape Ecologist

- Contact Information** Address: Department of Land Resources and Environmental Sciences
Montana State Univ., PO Box 173120, Bozeman, MT 59717
Phone: 406.994.5564
Email: gpoole@montana.edu
Web: <http://montana.edu/fll>
- Education** Ph.D. in Forestry (Hydrology/Stream Ecology), University of Montana, 2000.
Steven W. Running and Jack A. Stanford, graduate advisers.
M.S. in Forest Systems Ecology, Utah State University, 1989.
David W. Roberts, graduate adviser.
B.S. with Honors in Natural Resources, Cornell University, 1987.
Timothy J. Fahey and James P. Lassoie, honors thesis advisers.
- Academic Appointments/
Employment** Associate Professor of Fluvial Landscape Ecology, Dept. of Land Resources
and Environmental Sciences, Montana State University, Bozeman, MT.
2014 – present
Assistant Professor of Fluvial Landscape Ecology, Dept. of Land Resources
and Environmental Sciences, Montana State University, Bozeman, MT.
2008 – 2014
President & Research Scientist, Eco-metrics, Inc., Tucker, GA. 2001 - 2008.
Landscape Ecologist, U.S. E.P.A., Seattle WA and Atlanta GA. 1998 - 2001.
Staff Research Scientist/Information Systems Specialist, Flathead Lake
Biological Station *and* Numerical Terradynamic Simulation Group, The
University of Montana. 1992 - 1998.
- Affiliations* Faculty Affiliate, Flathead Lake Biological Station, University of Montana.
2006 - present.
Faculty Affiliate, Computer Science Department, Montana State University,
Bozeman, MT. 2011 – 2013.
Adjunct Research Scientist, Odum School of Ecology *and* Graduate Faculty,
University of Georgia. 2001 - 2011.
- RESEARCH**
- Interests** Eco-hydrology, geomorphology, and biogeochemistry of fluvial landscapes
and river networks.
Land-use influences on aquatic ecosystem structure and function.
Aquatic ecosystem conservation and restoration.
- Grant Awards** (Poole’s budget in parenthesis when funds were allocated among PIs.)
E. Shanahan, E. Raile, J. McEvoy, C. Izurieta, and G. Poole. The Impacts of
Narrative-based Risk Communication on Hazard Preparedness. Funded by
the National Science Foundation. 2016 - 2019. \$550K (\$177K)

Grant Awards
(continued)

- G. Poole. Regional Assessment of Geomorphic and Hyporheic Influences on River Temperature. Funded by the Confederated Tribes of the Umatilla Indian Reservation. 2012-2017. \$300K (summed over multiple contracts).
- E. Wohl, R. Hall, D. Walters, and G. Poole. Leaky Rivers: Nutrient Retention and Productivity in Rocky Mountain Streams Under Alternate Stable States. Funded by the National Science Foundation. 2012-2016. \$1.2M (\$259K)
- G. Poole. Assessing Hydrologic, Hyporheic, and Surface Water Temperature Responses to Stream Restoration. 2012-2014 Funded by the USGS via the Montana Water Center. \$14K.
- G. Poole. Meacham Creek Restoration Monitoring. Funded by the Confederated Umatilla Tribes. 2010–2013 \$80K.
- E. Bernhardt, G. Poole, A. Burgin, and C. Izurieta. Coupled C, N, and S Cycling in Coastal Plain Wetlands: How Will Climate Change and Salt Water Intrusion Alter Ecosystem Dynamics? Funded by the National Science Foundation. 2010-2014. \$1.2M (\$425K)
- G. Poole. Meacham Creek Restoration Monitoring. Funded by the Confederated Tribes of the Umatilla Indian Reservation. 2010-2011. \$34.5K.
- G. Poole and B. McGlynn. Assessing hydrologic response to channel reconfiguration: Science to inform the restoration process, Silver Bow Creek, Montana. Funded by the USGS via the Montana Water Center. 2010-2011. \$8.3K
- R. Hauer and 9 others. Cyberinfrastructure for a Virtual Observatory and Ecological Informatics System (VOEIS). Funded by the National Science Foundation. 2009-2012 \$6M.
- G. Poole and B. McGlynn: Silver Bow Creek Monitoring Project. Funded by the Montana Department of Justice. 2009-2010. \$27.5K.
- J. Stanford and 11 others. The Salmonid Rivers Observatory Network (SaRON): relating habitat quantity and quality to salmon productivity for Pacific Rim rivers. Funded by the Gordon and Betty Moore Foundation. 2007 - 2010. \$5M (\$250K).
- G. Poole. Synergies of excess sediment and nitrogen: degraded hyporheic dynamics and compromised river ecosystem resilience. Funded by USDA. 2005 - 2010. \$325K.
- J. Meyer, L. Leff, G. Poole, C. Tague, and S. Thomas. FIBR planning: Microbiological networks – integrating hydrology, biogeochemistry, and microbiology within linked terrestrial-aquatic biological systems. Funded by the National Science Foundation. 2004 - 2005. \$50K.
- S. O’Daniel, G. Poole, and S. Thomas. Transport and fate of pesticides in the Umatilla River, Oregon. Funded by the Environmental Protection Agency. 2004 - 2005. Total award: \$50K (\$35K).
- S. O’Daniel, G. Poole, L. Mertes, and W. Woessner. Data-rich decision support environment for the development of water temperature standards and TMDLs in the Pacific Northwest. Funded by NASA. 2001 - 2004. \$1.9M (\$555K).

- Grant Awards**
(continued)
- S. O'Daniel, G. Poole, and L. Mertes. Habitat diversity in alluvial rivers. Funded by the Bonneville Power Administration. 2001 - 2003. \$330K (\$120K).
- J. Stanford and 9 others. Biocomplexity – dynamic controls on emergent properties of river flood plains. Funded by the National Science Foundation. 2001 - 2005. \$2.6M (\$240K).
- P. Mulholland and 11 others. LINX2 – Nitrate uptake and retention in streams: mechanisms and effects of human disturbances from stream reaches to landscapes. Funded by the National Science Foundation. 2001 - 2006. \$3M (\$103K).

Peer Reviewed Publications

(Underline indicates Poole's student, post-doc, or technician.)

- (48) Payn, R. A., R. O. Hall, Jr., T. A. Kennedy, **G. C. Poole**, L. A. Marshall. A coupled metabolic-hydraulic model and calibration scheme for estimating whole-river metabolism during dynamic flow conditions. *Limnology and Oceanography: Methods*. 15(10), 847-866.
- (47) Reinhold, A.M., R.G. Bramblett, A.V. Zale, **G.C. Poole**, and D.W. Roberts. 2017. Spatially-dependent responses of a large-river fish assemblage to bank stabilization and side channels. *Transactions of the American Fisheries Society*. 146, 967-982.
- (46) Della-Croce, P., **G.C. Poole**, R.A. Payn, R.E. Gresswell. 2017. Early detection of non-native alleles in fish populations: when sample size actually matters. *Fisheries*. 42(1), 44-56
- (45) Reinhold, A.M., R.G. Bramblett, A.V. Zale, D.W. Roberts, and **G.C. Poole**. 2016. Comparative use of side and main channels by small-bodied fish in a large, unimpounded river. *Freshwater Biology*. 61(10), 1611-1626.
- (44) Della Croce, P., **G.C. Poole**, and G. Luikart. 2016. Detecting and quantifying introgression in hybridized populations: simplifying assumptions yield overconfidence and uncertainty. *Molecular Ecology Resources*. doi:10.1111/1755-0998.12520
- (43) Helton, A.M., M.S. Wright, E.S. Bernhardt, **G.C. Poole**, R.M. Cory, and J.A. Stanford. 2015. Dissolved organic carbon lability increases with water residence time in the alluvial aquifer of a river-floodplain ecosystem. *Journal of Geophysical Research – Biogeosciences*. 120(4), 693-706.
- (42) Vatland, S.J., R.E. Gresswell, and **G.C. Poole**. 2015. Quantifying stream thermal regimes at multiple scales: Combining thermal infrared imagery and stationary stream temperature data in a novel modeling framework. *Water Resources Research*. 51(1), 31-46.
- (41) Payn, R.A., A.M. Helton, **G.C. Poole**, C. Izurieta, A.J. Burgin, and E.S. Bernhardt. 2014. A generalized optimization model of microbially driven aquatic biogeochemistry based on thermodynamic, kinetic, and stoichiometric ecological theory. *Ecological Modelling*. 294: 1-18.

**Peer Reviewed
Publications**
(continued)

- (40) Della Croce, P., **G.C. Poole**, R.A. Payn, and C. Izurieta. 2014. Simulating the effects of stream network topology on the spread of introgressive hybridization across fish populations. *Ecological Modelling*. 279: 68-77.
- (39) Dodds, W.K., J.R. Webster, C.L. Crenshaw, A.M. Helton, J.M. O'Brien, E. Martí, A.E. Hershey, J.L. Tank, A.J. Burgin, N.B. Grimm, S.K. Hamilton, D.J. Sobota, **G.C. Poole**, J.J. Beaulieu, L.T. Johnson, L.R. Ashkenas, R.O. Hall, S.L. Johnson, W.M. Wollheim, and W.B. Bowden. 2014. The Lotic Intersite Nitrogen Experiments: An example of a successful collaborative network for ecological research. *Freshwater Science*. 33(3):700-710.
- (38) McCluney, K. E., N. L. Poff, M. A. Palmer, J. H. Thorp, **G. C. Poole**, B. S. Williams, M. R. Williams, and J. S. Baron. 2014. Riverine macrosystems ecology: sensitivity, resistance, and resilience of whole river basins with human alterations. *Frontiers in Ecology and the Environment*. 12(1): 48-58.
- (37) Helton, A. M., **G. C. Poole**, R. A. Payn, C. Izurieta, and J. A. Stanford. 2014. Relative influences of the river channel, floodplain surface, and alluvial aquifer on simulated hydrologic residence time in a montane river floodplain. *Geomorphology* 205:17–26.
- (36) Mason, S. J. K., S. B. Cleveland, P. Llovet, C. Izurieta, and **G. C. Poole**. 2014. A centralized tool for managing, archiving, and serving point-in-time data in ecological research laboratories. *Environmental Modelling & Software*. 51:59–69.
- (35) Luhr, R., D. Reimanis, R. Cross, C. Izurieta, **G. C. Poole**, and A. M. Helton. 2013. Natural Science Visualization Using Digital Theater Software: Adapting Existing Planetarium Software to Model Ecological Systems. 2013 International Conference on Information Science and Applications (ICISA).
- (34) Mason, S. J. K., B. L. McGlynn, and **G. C. Poole**. 2012. Hydrologic response to channel reconfiguration on Silver Bow Creek, Montana. *Journal of Hydrology*. 438-439:125-136.
- (33) Izurieta, C., **G. C. Poole**, R. A. Payn, I. Griffith, R. Nix, A.M. Helton, E.S. Bernhardt, and A J. Burgin. 2012. Development and Application of a Simulation Environment (NEO) for Integrating Computational Investigations of System-Level Complexity. International Conference on Information Science and Applications, Suwon, South Korea.
- (32) Helton, A. M., **G. C. Poole**, R. A. Payn, C. Izurieta, and J. A. Stanford. 2012. Scaling flow path processes to fluvial landscapes: An integrated field and model assessment of temperature and dissolved oxygen dynamics in a river-floodplain-aquifer system. *Journal of Geophysical Research* 117:G00N14.

**Peer Reviewed
Publications**
(continued)

- (31) Beaulieu, J. J., J. L. Tank, S. K. Hamilton, W. M. Wollheim, R. O. Hall, P. J. Mulholland, B. J. Peterson, L. R. Ashkenas, L. W. Cooper, C. N. Dahm, W. K. Dodds, N. B. Grimm, S. L. Johnson, W. H. McDowell, **G. C. Poole**, H. M. Valett, C. P. Arango, M. J. Bernot, A. J. Burgin, C. L. Crenshaw, A. M. Helton, L. T. Johnson, J. M. O'Brien, J. D. Potter, R. W. Sheibley, D. J. Sobota, and S. M. Thomas. 2011. Nitrous oxide emission from denitrification in stream and river networks. *Proceedings of the National Academy of Sciences*. 108:214-219.
- (30) Helton, A. M., **G. C. Poole**, J. L. Meyer, W. M. Wollheim, B. J. Peterson, P. J. Mulholland, Emily S. Bernhardt, J. A. Stanford, and 15 others. 2011. Thinking outside the channel: modeling nitrogen cycling in networked river ecosystems. *Frontiers in Ecology and the Environment*. 9:229–238.
- (29) Bernot, M. J., D. J. Sobota, R. O. Hall, P. J. Mulholland, W. K. Dodds, J. R. Webster, J. L. Tank, L. R. Ashkenas, L. W. Cooper, C. N. Dahm, S. V. Gregory, N. B. Grimm, S. K. Hamilton, S. L. Johnson, W. H. McDowell, J. L. Meyer, B. Peterson, **G. C. Poole**, H. M. Valett, C. Arango, J. J. Beaulieu, A. J. Burgin, C. Crenshaw, A. M. Helton, L. Johnson, J. Merriam, B. R. Niederlehner, J. M. O'Brien, J. D. Potter, R. W. Sheibley, S. M. Thomas, and K. Wilson. 2010. Inter-regional comparison of land-use effects on stream metabolism. *Freshwater Biology* 55:1874-1890.
- (28) **Poole, G. C.** 2010. Stream hydrogeomorphology as a physical-science basis for advances in stream ecology. *Journal of the North American Benthological Society*. 29:12-25.
- (27) Duncan, W. W., **G. C. Poole**, and J. L. Meyer. 2009. Large channel confluences influence geomorphic heterogeneity of a southeastern united states river. *Water Resources Research* 45:W10405.
- (26) Hester, E. T., M. W. Doyle, and **G. C. Poole**. 2009. The influence of in-stream structures on summer water temperature via induced hyporheic exchange. *Limnology and Oceanography* 51:355-367.
- (25) Hall, R. O., Jr., J. L. Tank, D. J. Sobota, P. J. Mulholland, J. M. O'Brien, W. K. Dodds, and 24 others (including **G. C. Poole**, and A. M. Helton). 2009. Nitrate removal in stream ecosystems measured by 15n addition experiments: Total uptake. *Limnology and Oceanography*. 54:3: 653-665.
- (24) Mulholland, P. J., R. O. Hall, Jr, D. J. Sobota, W. K. Dodds, S. E. G. Findlay, N. B. Grimm, S. K. Hamilton, W. H. McDowell, J. M. O'Brien, J. L. Tank, and 21 others (including **G. C. Poole**, and A. M. Helton). 2009. Nitrate removal in stream ecosystems measured by 15n addition experiments: Denitrification. *Limnology and Oceanography*. 54:3: 666.680.
- (23) Arrigoni, A.S., **G. C. Poole**, L. A. K. Mertes, S. J. O'Daniel, S. A. Thomas, W. W. Woessner, and B. R. Boer. 2008. Buffered, lagged, or cooled? Disentangling hyporheic influences on temperature cycles in stream channels. *Water Resources Research*. 44:W09418

**Peer Reviewed
Publications**
(continued)

- (22) Meynecke, J.-O., **G.C. Poole**, J. Werry, S.Y. Lee. Use of PIT tags and underwater video recording in assessing estuarine fish movement in a high intertidal mangrove and salt marsh creek. 2008. *Estuarine, Coastal, and Shelf Sciences*. 79:168-178.
- (21) Mulholland, P.J., A.M. Helton, **G.C. Poole** and 29 others. 2008. Stream denitrification across biomes and its response to anthropogenic nitrate loading. *Nature*. 452 (7184): 202-204.
- (20) **Poole, G.C.**, S.J. O'Daniel, K.L. Jones, E.S. Bernhardt, A.M. Helton, W.W. Woessner, J.A. Stanford, and B.R. Boer. 2008. Hydrologic spirals: conceptualizing the hydrologic template of stream and river ecosystems. *River Research and Applications*. 24:1018-1031.
- (19) Jones, K.L., **G.C. Poole**, S.J. O'Daniel, L.A.K. Mertes, and J.A. Stanford. 2008. Hydrology of low-relief landscapes: mapping geomorphic controls on surface water routing using LIDAR. *Remote Sensing of Environment*. 112:4148-4158.
- (18) Jones, K.L., **G.C. Poole**, W.W. Woessner, M.V. Vitale, B.R. Boer, S.J. O'Daniel, S.A. Thomas, and B.A. Geffen. 2008. Geomorphology, hydrology, and aquatic vegetation drive seasonal hyporheic flow patterns across a gravel-dominated floodplain. *Hydrological Processes*. 22:2105-2113.
- (17) **Poole, G.C.**, J.A. Stanford, S.W. Running, and C.A. Frissell. 2006. Multiscale geomorphic drivers of groundwater flow paths: subsurface hydrologic dynamics and hyporheic habitat diversity. *Journal of the North American Benthological Society*. 25(2): 288-303.
- (16) Jones, K.L., **G.C. Poole**, J.L. Meyer, W. Bumback, and E.A. Kramer. 2006. Quantifying expected ecological response to natural resource legislation: a case study of riparian buffers, aquatic habitat, and trout populations. *Ecology and Society*. 11(2): 15.
- (15) Kondolf, G.M., A.J. Boulton, S.J. O'Daniel, **G.C. Poole**, F.J. Rahel, E.H. Stanley, E. Wohl, Å. Bång, J. Carlstrom, C. Cristoni, H. Huber, S. Koljonen, P. Louhi, and K. Nakamura. 2006. Process-based ecological river restoration: visualizing three-dimensional connectivity and dynamic vectors to recover lost linkages. *Ecology and Society*. 11(2): 5.
- (14) Johnson, A.N., B.R. Boer, W.W. Woessner, J.A. Stanford, **G.C. Poole**, S.A. Thomas, and S.J. O'Daniel. 2005. Evaluation of an inexpensive, small diameter temperature logger for documenting ground water – river interactions. *Ground Water Monitoring and Remediation*. 25(4): 68-74.
- (13) **Poole, G.C.**, J.A. Stanford, S. W. Running, C. A. Frissell, W.W. Woessner, and B.K. Ellis. 2004. A patch hierarchy approach to modeling surface and sub-surface hydrology in complex flood-plain environments. *Earth Surface Processes and Landforms*. 29: 1259-1274.

**Peer Reviewed
Publications**
(continued)

- (12) **Poole, G.C.**, J. Dunham, D. Keenan, and 12 others. 2004. The case for regime-based water quality standards. *BioScience*. 54: 155-161.
- (11) Ralph, S.C, and **G.C. Poole**. 2003. Putting monitoring first: designing accountable ecosystem restoration and management plans. In: *Restoration of Puget Sound Rivers*. D. Montgomery, S. Bolton, and D. Booth, eds. University of Washington Press, Seattle. pp. 226-247
- (10) **Poole, G.C.**, J.A. Stanford, S.W. Running, and C.A. Frissell. 2002. Three-dimensional mapping of geomorphic controls on flood-plain hydrology and connectivity from aerial photos. *Geomorphology*. 48: 329-347.
- (9) **Poole, G.C.** 2002. Fluvial landscape ecology: addressing uniqueness within the river discontinuum. *Freshwater Biology*. 47: 641-660.
- (8) **Poole, G.C.**, and C. Berman. 2001. An ecological perspective on in-stream temperature: natural heat dynamics and mechanisms of human-caused thermal degradation. *Environmental Management*. 27(6): 787-802.
- (7) Hauer, F.R., **G.C. Poole**, J.T. Gangemi, and C.V. Baxter. 1999. Large woody debris in Bull Trout spawning streams of logged and wilderness watersheds in northwest Montana. *Canadian Journal of Fisheries and Aquatic Sciences*. 56(6): 915-924.
- (6) Holmes, M.E., and **G.C. Poole**. 1998. Management of a long term biological database: FlatDat for the Flathead Lake Biological Station. In: *Data and Information Management in the Ecological Sciences: A Resource Guide*. W.K. Michener, J.H. Porter and S.G. Stafford, eds. University of New Mexico, Albuquerque.
- (5) **Poole, G.C.**, C.A. Frissell, and S.C. Ralph. 1997. In-stream habitat unit classification: inadequacies for monitoring and some consequences for management. *Journal of the American Water Resources Association*. 33(4): 879-896.
- (4) **Poole, G.C.**, R.J. Naiman, J. Pastor, and J.A. Stanford. 1997. Uses and limitations of ground penetrating RADAR in two riparian systems. In: *Groundwater/Surface Water Ecotones: Biological and Hydrological Interactions and Management Options*. J. Gibert, J. Mathieu, and F. Fournier, eds. Cambridge University Press, Cambridge.
- (3) Stanford, J.A., and **G.C. Poole**. 1996. A protocol for ecosystem management. *Ecological Applications*. 6(3): 741-744.
- (2) Ralph, S.C., **G.C. Poole**, L.L. Conquest, and R.J. Naiman. 1994. Stream channel morphology and woody debris in logged and unlogged basins of western Washington. *Canadian Journal of Fisheries and Aquatic Sciences*. 51: 37-51.
- (1) Haefner, J.W., **G.C. Poole**, P.V. Dunn, and R.T. Decker. 1991. Edge effects in computer models of spatial competition. *Ecological Modelling*. 56: 221-244.

Manuscripts*Submitted or
In Revision*

Poole, G.C., S.J. O'Daniel, K.L. Jones, W.W. Woessner. Channelization, hyporheic exchange, and river temperature: a case study of the Umatilla River, Oregon, USA. *Freshwater Science*.

Quaempts, E.J., K.L. Jones, S.J. O'Daniel, T.J. Beechie, and **G. C. Poole**. Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA. *Ecology and Society*.

Reinhold, A.M., G.C. Poole, R. Bramblett, A. Zale, and D.W. Roberts. Side-channel plugs may accelerate loss of whole-floodplain side-channel habitat. *Canadian Journal of Fisheries and Aquatic Sciences*.

Amerson, B.E., and **G.C. Poole**. The role of dispersion, conduction, and temperature signal frequency on thermal energy transport in expansive, highly conductive alluvial aquifer. In preparation for submission to *Water Resources Research*.

Drafts

Carlson, S.P. and **G.C. Poole**. Predicting channel temperatures across stream networks with abundant alpine lakes. In preparation for submission to *Water Resources Research*.

Poole, G.C., S.K. Fogg, S.J. O'Daniel, B.E. Amerson, A.M. Reinhold, and S.J. Carlson. The hydrologic geometry of expansive hyporheic zones. In preparation for submission to *Freshwater Science*.

S.K. Fogg, **G.C. Poole**, S.J. O'Daniel, B.E. Amerson, A.M. Reinhold, and S.J. Carlson. Thermal insulation versus. capacitance: a comparison of shading and hyporheic exchange on daily and annual stream temperature cycles. In preparation for submission to *Water Resources Research*.

Wohl, E., R.O. Hall Jr., **G.C. Poole**, and D. Walters. How the valley rules the stream. In preparation for submission to *BioScience*.

**Theses and
Dissertation**

Poole, G.C. 2000. Analysis and dynamic simulation of morphologic controls on surface- and ground-water flux in a large alluvial floodplain. Doctoral dissertation, The University of Montana, Missoula.

Poole, G.C. 1989. Modeling forest dynamics based on stand-level resource allocation. M.S. Thesis, Utah State University, Logan.

Poole, G.C. 1987. Prediction of soil water depletion, transpiration, and net photosynthesis in high-elevation Lodgepole Pine stands of Southern California. Senior Honors Thesis, Cornell University, Ithaca, New York.

**Agency
Technical
Reports**

Poole, G.C., J. Risley, and M. Hicks. 2001. Spatial and temporal patterns of stream temperature (revised). U.S. Environmental Protection Agency Technical Report EPA-910-D-01-003. Seattle, WA.

Poole, G.C., and 11 others. 2001. Technical synthesis: Scientific issues relating to temperature criteria for salmon, trout, and char native to the Pacific Northwest. US Environmental Protection Agency, Technical Report EPA-910-R-01-007. Seattle, WA.

**Keynote
Addresses &
Invited
Presentations**

- Poole, G.C.** The Hydrologic Geometry of the Hyporehic Zone. Montana Aquatic Research Colloquium, Flathead Lake Biological Station, Polson, MT. March, 2017
- Poole, G.C.** A Framework for Linking Land Use and Restoration to Resource Transport and Processing in Stream Corridors with Expansive Hyporheic Zones. Annual Meeting of the Association for the Sciences of Limnology and Oceanography. Waikiki, HI. March 2017.
- Poole, G.C.** Hydrologic Responses to Stream Restoration: Implications for Riverine Ecosystem Resilience and the Management of Water Quality. River Restoration Northwest Annual Symposium. Stevens, WA. February 2013.
- Poole, G.C.** Modeling Functional Heterogeneity of interactive Ecological Currencies: Understanding Dynamics of Channel, Floodplain, and Aquifer Systems. Montana Institute on Ecosystems “Rough Cut” Seminar Series. Missoula and Bozeman, MT. Sept. 2012
- Poole, G.C.,** S.J. O’Daniel, K.L. Jones, W.W. Woessner, A.S. Arrigoni, and A.M. Helton. The interdependence of diel temperature cycles in surface and hyporheic water on the Umatilla River floodplain, Oregon. Annual meeting of the Geological Society of America, Portland, OR. October, 2009
- Poole, G.C.** “What’s the river temperature?” and other unanswerable questions: lessons in stream temperature dynamics from the Umatilla River, Oregon. Student Chapter of the American Fisheries Society. Bozeman. December 2008.
- Poole, G.C.** and A.M. Helton. Scaling stream ecosystem dynamics from microcosms to drainage networks: current advances and future research needs. CUAHSI Biennial Colloquium on Hydrologic Science and Engineering, Boulder, Colorado. July, 2008
- Poole, G.C.** Rethinking alluvial rivers. Research seminar. Montana State University, Bozeman. September 2006.
- Poole, G.C.** Quantitative river and floodplain assessments to support river restoration. Keynote address. 3rd Annual Conference, Center for Riverine Sciences and Stream Renaturalization. The University of Montana, Missoula. September 2005.
- Poole, G.C.** The interdependence of surface and subsurface habitat diversity. Invited presentation. Annual meeting of the North American Benthological Society. New Orleans. June 2005.
- Poole, G.C.** Hydrologic controls on lotic ecosystem processes. CUAHSI workgroup: emerging issues in floodplain research. Madison. July 2004.
- Poole, G.C.** Linking hydrology and aquatic ecology in fluvial landscapes. Research seminar, Univ. of New Mexico, Albuquerque. October 2001.
- Poole, G.C.** Fluvial landscape ecology: integrating pattern, process, hierarchy, and scale into lotic ecosystem theory and quantitative assessment. First International Symposium on Landscape Dynamics of Riverine Corridors, Ascona, Switzerland. March 2001.

**Keynote
Addresses &
Invited
Presentations
(continued)**

- Poole, G.C.** A foray into fluvial landscape ecology: using coarse-scale morphologic patterns to infer lotic ecosystem processes. Research seminar, University of Georgia, Athens. August 2000.
- Poole, G.C., C.A. Frissell, and S.C. Ralph.** In-stream habitat unit classification: inadequacies for monitoring and some consequences for management. Flathead Lake Lecture Series. Polson. August 1997.

**Contributed
Oral & Poster
Presentations
2013-2017**

- Carlson, S.P., G.C. Poole, R.O. Hall, E. Wohl, D. Walters , and M. Venarsky. Factors influencing the relative contribution of large and small streams to whole-network denitrification. Annual Meeting of the Society for Freshwater Science, Raleigh, NC. June 6, 2017.
- Poole, G. C., S.K. Fogg, B. Amerson, A.M. Reinhold, and S.P. Carlson.** The hydrologic geometry of the hyporheic zone. Annual Meeting of the Society for Freshwater Science, Raleigh, NC. June 5, 2017.
- Fogg, S.K., G.C. Poole, S.J. O'Daniel, and A.M. Reinhold. A comparison of channel shade and hyporheic exchange on seasonal patterns of stream temperature. Annual Meeting of the Society for Freshwater Science, Raleigh, NC. June 5, 2017.
- Reinhold, A.M., G.C. Poole, R. Bramblet, A. Zale, and D.W. Roberts. Small flow obstructions implicated in accelerating whole-floodplain side-channel loss. Annual Meeting of the Society for Freshwater Science, Raleigh, NC. June 5, 2017.
- Fogg, S.K., G.C. Poole, S.J. O'Daniel, R.A. Payn, S.P. Carlson, A.M. Reinhold, and A. Hyman. When and how dynamic hyporheic temperature mosaics influence channel temperature regimes. Annual meeting of the Montana Chapter of the American Water Resources Association. October 14, 2016.
- Reinhold, A.M., G.C. Poole, A.M. Helton, C. Izurieta, R.A. Payn, and E.S. Bernhardt. A Constraint-Based, Compound Specific, Approach to Modeling Linked Biogeochemical Cycles. Annual Meeting of the Society for Freshwater Science, Sacramento, CA. May 25, 2016.
- Poole, G.C., S.P. Carlson, R.O. Hall, E. Wohl, M. Venarsky, and D. Walters.** Temperature Effects on Stream Network Nitrate Removal: Exploring Physical Drivers of Seasonal Variation. Annual Meeting of the Society for Freshwater Science. Sacramento, CA. May 24, 2016.
- Carlson, S.P., G.C. Poole, R.O. Hall, E. Wohl, M. Venarsky, and D. Walters. Temperature Effects on Stream Network Nitrate Removal: Reconsidering the Role of Large Streams.
- Fogg, S.K., G.C. Poole, S.J. O'Daniel, R.A. Payn, S.P. Carlson, A.M. Reinhold, and A. Hyman. When and how dynamic hyporheic temperature mosaics influence channel temperature regimes. Annual Meeting of the Society for Freshwater Science. Sacramento, CA. May 23, 2016.
- Amerson, B., G.C. Poole, S.J. O'Daniel, and M. Lambert. Selecting Annual Temperature Signals for Inverse Modeling of Aquifer Hydraulic Properties. Annual Meeting of the Society for Freshwater Science. Sacramento, CA. May 23, 2016.

**Contributed
Oral & Poster
Presentations
2013-2017
(continued)**

- Fogg, S.K., **G.C. Poole**, S.J. O'Daniel, and A.M. Reinhold. A Novel Approach to Simulating Hyporheic Influences on Stream Channel Temperature. Seminar Series: Department of Land Resources and Environmental Sciences. Montana State University, Bozeman, MT. April 24, 2016.
- Reinhold, A.M., R. Bramblett, A. Zale, **G.C. Poole**, and D.W. Roberts. Evaluating the importance of side channels to fish in the last best place – the Yellowstone River, Montana. USDA Agricultural Research Service – Northern Plains Agricultural Research Laboratory. Sidney, MT. April 8, 2016.
- Reinhold, A.M., **G.C. Poole**, A.M. Helton, C. Izurieta, R. Payn, and E.S. Bernhardt. A Thermodynamic Approach to Simulating Linked Biogeochemical Cycles using Constraint-Based, Compound Specific Models. USDA Agricultural Research Service - Livestock and Range Agricultural Research Laboratory. Miles City, MT. April 7, 2016.
- Amerson, B., **G.C. Poole**, S.J. O'Daniel, and M. Lambert. Meacham Creek Hyporheic Restoration and Monitoring. Upper Columbia River Science Conference, Wenatchee, WA. January 27, 2016.
- Reinhold, A.M., **G.C. Poole**, A.M. Helton, R.A. Payn, C. Izurieta, E.S. Bernhardt, and A.J. Burgin. Simulating Concurrent Metabolic Pathways in Biogeochemical Systems. Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.
- Poole, G.C.**, B. Amerson, S.K. Fogg, S.J. O'Daniel, R.A. Payn, A.M. Reinhold and C. Izurieta. Limits of Transient Storage Assumptions for Heat: Using Residence Time Distribution to Estimate Mean Temperature of Hyporheic Discharge in Montane Alluvial Streams. 2015 Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.
- Payn, R.A., C. Izurieta, and **G.C. Poole**. An Exploration of Convergent Evolution in Academia: Why Ecosystem Ecologists and Biogeochemists Should Think about the Tools of Software Engineering. 2015 Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.
- Venarsky, M., D. Walters, A. Hendrich. D. Wenkelman, B. Livers, E. Wohl, R. Hall, and **G.C. Poole**. The Legacy of Log Jam Loss on Benthic Macroinvertebrate Biomass and Insect Emergence in Mountain Streams. Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.
- Amerson, B., S.J. O'Daniel, M.B. Lambert and **G.C. Poole**. Use of Annual Hyporheic Temperature Signals to Evaluate the Effects of Channel Realignment. Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.
- Fogg, S. K., **G.C. Poole**, S.J. O'Daniel, A.M. Reinhold, R.A. Payn, S. Carlson, and A. Hyman. A Novel Approach to Simulating Hyporheic Influences on Stream Channel Temperature. Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.

**Contributed
Oral & Poster
Presentations
2013-2017
(continued)**

- Carlson, S., **G.C. Poole**, R.O. Hall, N. Day, E. Wohl, B. Livers, and H. Madinger. Simulating Stream Temperature Modulation of Benthic Nitrate Removal Patterns Across Stream Networks. Annual Meeting of the Society for Freshwater Science, Milwaukee, WI, May, 2015.
- Amerson, B., M.B. Lambert, S.J. O'Daniel and **G.C. Poole**. Meacham Creek Hyporheic Restoration Monitoring Project. Salmon Recovery Conference, Vancouver, WA. May, 2015
- Payn, R.A., R.O. Hall, L.A. Marshall, T.A. Kennedy, and **G.C. Poole**. Gross Primary Production is a Primary Control on the Credibility of Gas Exchange Rates Inferred Directly From Dissolved Oxygen Data. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- Hall, R. O.; E.E. Wohl, M. Venarsky, N. Sutfin, B. Livers, D.M. Walters, **G.C. Poole**, and S.P. Carlson. The Capacity for Rivers to Store Carbon: Combining Geomorphic and Ecological Perspectives. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- Reinhold, A. M., R.G. Bramblett, A.V. Zale, **G.C. Poole**, and D.W. Roberts. Fish Assemblage and Habitat Differences Between Side And Main Channels In The Lower Yellowstone River. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- M.P. Venarsky, D.M. Walters, E.E. Wohl, R.O. Hall, **G.C. Poole**, D. Winkelman, B. Livers, N. Day, H. Madinger, and A. Herdrich. Western Mountain Streams Past and Present: The Influence of Forest Stand Age and Logjam Density on Aquatic Community Structure and Function. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- Amerson, B. E.; **G.C. Poole**, S.J. O'Daniel, and M. Lambert. Predicting Water Movement Throughout Coarse-Grained Alluvial Aquifers Via Analysis of Annual Temperature Signals. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- O'Daniel, S. J.; **G.C. Poole**, S.K. Fogg, S.P. Carlson, A. Hyman. Characterizing Hyporheic Effects on Diel and Annual Stream Temperature Cycles Across Variable Channel Morphology and Aquifer Characteristics. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- Poole, G. C.**; A.M. Helton, C. Izurieta, R.A. Payn, J.A. Stanford. E.S. Bernhardt, and A.J. Burgin. Simulating the Hydro-Ecology of a Large River Floodplain and Alluvial Aquifer: Progress and Future Directions. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- Carlson, S. P., **G.C. Poole**, R.O. Hall, E.E. Wohl, D.M. Walters, M. Venarsky, B. Livers, N.A. Sutfin. Relationships Between Stream Denitrification, Respiration, and Nitrate Concentration Provide the Foundation For a Coupled C-N Network Model. Joint Aquatic Science Meeting, Portland, OR. May 18-23, 2014.
- Della Croce, P., and **G.C. Poole**. An Individual-based Simulation Model to Guide the Conservation of Native Species Threatened by Introgression. 2014 Annual Meeting of the American Fisheries Society. Quebec City, Quebec, Canada. August 17-21, 2014.

**Contributed
Oral & Poster
Presentations
2013-2017
(continued)**

Amerson, B. E., **G.C. Poole**, S.J. O’Daniel, and M. Lambert. The Importance of Thermal Dispersivity in Predicting Water Movement Through Coarse-grained Alluvial Aquifers by Analysis of Seasonal Temperature Signals. 2014 Fall Meeting of the American Geophysical Union. San Francisco, CA. December 2014.

Helton, A.M., **G.C. Poole**, R.A. Payn, C. Izurieta, M.E. Wright, E.S. Bernhardt, and J.A. Stanford. Scaling Hydrologic and Biogeochemical Processes in a Large River Floodplain and Alluvial Aquifer. 2014 Fall Meeting of the American Geophysical Union. San Francisco, CA. December 2014.

Hall, R.O., N. Day, H. Madinger, E.E. Wohl, B. Livers, S.E. Carlson, M. Plemel, **G.C. Poole**, D. Walters, and M. Venarsky. Forest Age, Channel Morphology, and Biogeochemical Processes in Mountain Rivers. 2014 Fall Meeting of the American Geophysical Union. San Francisco, CA. December 2014.

Amerson, B. E., **G.C. Poole**, and S.J. O’Daniel. Coupled Radon and Water Temperature Measurements to Characterize the Effects of Altered Stream Channel Planform. Fall Meeting of the American Geophysical Union. San Francisco. Dec 9-13, 2013.

Bernhardt, E.S., A.M. Helton, J.L. Morse, and **G.C. Poole**. Scaling up in the face of uncertainty – controls on trace gas fluxes in heterogeneous landscapes. Fall Meeting of the American Geophysical Union. San Francisco. Dec 9-13, 2013.

Payn, R. A., A.M. Helton, **G.C. Poole**, C. Izurieta, E.S. Bernhardt, and A.J. Burgin. A Generalized Model of Aquatic Microbial Metabolism based on Thermodynamic, Kinetic, and Stoichiometric Theory. 2013 Annual Meeting of the Society for Freshwater Science. Jacksonville, FL. May 19-23, 2013

Stanford, J. A., **G.C. Poole**. The Hydrology, Biogeochemistry, and Food Web Dynamics of the Nyack Flood Plain – A Linked Channel, Flood Plain, and Aquifer Ecosystem. 2013 Annual Meeting of the Society for Freshwater Science. Jacksonville, FL. May 19-23, 2013.

Amerson, B. E., **G.C. Poole**, and S.J. O’Daniel. Stream Temperature “Hysteresis Plots” as a Tool for Inferring Hyporheic Exchange in a Restored River. 2013 Annual Meeting of the Society for Freshwater Science. Jacksonville, FL. May 19-23, 2013.

Della Croce, P., **G.C. Poole**, and G. Luikart. Detecting and Quantifying Hybridization: Non-random Genome Sampling Reduces Power and Overestimates Confidence. The 46th Annual Meeting of the Montana Chapter of the American Fisheries Society. Fairmont Hot Springs (Butte, Montana). Feb 5-8, 2013.

(Plus 80 additional contributions prior to 2013.)

TEACHING

Undergraduate and Graduate Courses ENSC448: Stream Restoration Ecology (Fall 2010-2014, 2016)
 ENSC511: Environmental Data Management (Spring 2012, 2014, 2016)
 LRES580: Advanced topics in spatial analysis for hydrology, biogeochemistry, and fluvial ecology (Spring 2009)
 LRES570: Spatial Analysis in Aquatic Systems (Spring 2011)
 LRES110: Introduction to Land Resources and Environmental Sciences (guest lectures each semester; Fall 2009 – 2016)

Advisees *(Current advisees are underlined)**Research Faculty*Ann Marie Reinhold, Montana State University, (2017 – Present)*Post Doc.*Ann Marie Reinhold, Montana State University, (2014 – 2017)
Robert Payn, Montana State University (2009 – 2013)*Ph.D.*S. Katie Fogg, Montana State University (beginning Fall 2017)
Elizabeth Mohr, Montana State University (beginning Fall 2017)
Sam Carlson, Montana State University (2013 – Present)
Byron Amerson, Montana State University (2010 – Present)
Patrick Della Croce, Montana State University (2008 - 2015)
Ashley Helton, University of Georgia (2006 - 2011)*M.S.*S. Katie Fogg, Montana State University (2015 – Present)
Matthew Scrafford, Montana State University (2009 - 2011)
Victoria Bunn, Montana State University (2008 - 2011)
Eva Jordanna Black, Montana State University (2008 - 2010)
Seth Kurt Mason, Montana State University (2008 - 2010)
Ashley Helton, University of Georgia (2004 - 2006)
Krista Jones, University of Georgia (2002 - 2004)
Alicia Arrigoni, UC Santa Barbara (2002 - 2004)*Graduate Committees*Katherine Hendricks, Montana State University (2015 – Present, Ph.D.)
Andrew Bobst, Montana State University (2014 – Present, Ph.D.)
Meryl Storb, Montana State University (2014 – Present, Ph.D.)
Issac Griffith, Montana State University (2011 - Present, Ph.D.)
Jim Junker, Montana State University (2012 - Present, Ph.D.)
Luhr, Rachael, Montana State University (2012 – 2015, M.S.)
Ann Marie Reinhold, Montana State University (2009 – 2014, Ph.D.)
Alison Appling, Duke University (2008 – 2012, Ph.D.)
Cory Davis, Montana State University (2008 – 2011, M.S.)
Erich Hester, Virginia Tech (2004-2008, Ph.D.)
Will Duncan, University of Georgia (2005 – 2008; Ph.D.)*Undergrad Research Advisees*Mathew Bain, Amanda Hyman, Isaac Griffith, Matt Mitchell, Ellie Zignego,
Michael Paulson

SERVICE**Peer Review**

Associate Editor Freshwater Science (formerly Journal of the North American Benthological Society). 2010 – Present.
Landscape Ecology. 2009 – 2010.

Peer Reviewer The American Naturalist
Fundamental and Applied Limnology/Archiv fuer Hydrobiologie
Canadian Journal of Fisheries and Aquatic Sciences
Conservation Biology
Ecological Applications
Ecosystems
Environmental Management
Environmental Science & Technology
Freshwater Biology
Freshwater Science
Frontiers in Ecology and the Environment
Journal of the American Water Resources Association
Journal of Environmental Management
Journal of the North American Benthological Society
Journal of Hydrology
Landscape Ecology
Regulated Rivers: Research and Management
Remote Sensing of Environment
Restoration Ecology
Science
Water Resources Research

Proposals National Science Foundation Electronic Proposal Review
Montana Agricultural Experiment Station Faculty Proposal Review

Professional Societies

Society for Freshwater Science
Association for the Sciences of Limnology and Oceanography
American Geophysical Union

Service and Outreach

Session Organizer, 2017 National Meeting of the Society for Freshwater Science, Raleigh, NC. 2016-2016.
Science Enrichment Teacher. Upper Elementary Classroom. Middle Creek Montessori. Bozeman, MT. 2014 – 2015.
Data Base Manager. Montana Gathering of Friends, Montana, 2012 - Present
Guest Panelist, “Montana Ag Live” television program, Montana PBS, 4/29/2012
Campus Research Focus Leader, Montana Institute on Ecosystems, Montana State University, Bozeman. 2011 – Present.
Presenter. Leadership Montana Conference. Montana State University, Bozeman. November 18, 2009.
Planning Committee, Montana Institute on Ecosystems. Montana State University. 2009 - Present

**Service and
Outreach**
(Continued)

Executive Committee, North American Benthological Society. 2005 - 2008.
Science Coordinator, Green Guild of St. Bartholomew's Episcopal Parish,
Atlanta, GA 2005 - 2008.
Technical Chairperson, Regional Technical Workgroup for Development of
Water Temperature Standards Criteria. 1999-2002.
Presenter, National Marine Fisheries Service briefing for the Regional
Administrator on Salmon and Cold Water Refugia. Geomorphic and
Hydrologic Controls on Thermal Diversity in Alluvial Rivers. Portland,
OR. Aug 16, 2002.
Montana Forest Stewardship Program Steering Committee. 1994-1998.

HONORS

2012 Award for Excellence – Faculty Mentor. Montana State University.
2004 Gold Medal for Service, U.S. Environmental Protection Agency.
2000 National Science Foundation Student Fellowship, first place submission,
4th GIS/Environmental Monitoring Conference, Banff, Alberta.
1998 Boggess Award finalist (annual award for the best paper in the Journal of
the American Water Resources Association).
1987-88 President's Fellowship, Utah State University.
1988 Graduate Student Association Fellowship, Utah State University.
1988 Xi Sigma Pi, Forestry Honor Society, Utah State University. President,
Lambda Chapter.
1988 Phi Kappa Phi, Collegiate Honor Society, Utah State University.
1986 Gamma Sigma Delta, Agricultural Honor Society, Cornell University.