

WINSOR HAYES LOWE

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APPOINTMENTS

June 2005 - 2011: Assistant Professor, University of Montana
June 2011 - present: Associate Professor, University of Montana

EDUCATION

Postdoctoral Associate, Institute of Ecosystem Studies, February 2003 - April 2005
Ph.D., Dartmouth College, Ecology and Evolutionary Biology, December 2002
M.S., University of Montana, Organismal Biology and Ecology, 1997
B.A., Middlebury College, Biology and Environmental Studies, *cum laude*, 1994

HONORS

2010 Helen and Winston Cox Educational Excellence Award, College of Arts and Sciences, University of Montana. Based on superior teaching, advising, mentoring, and accessibility to students beyond office hours and class time.
2009 Merit Award for outstanding faculty performance, University of Montana.
2006 Merit Award for outstanding faculty performance, University of Montana.
2002 Student Award Finalist, Society for Conservation Biology.
1998 Alumni Award, Department of Biological Sciences, Dartmouth College.
1994 Departmental Honors, Environmental Studies, Middlebury College.

GRANTS

2012 U.S. National Science Foundation, Arlington, VA, "REU Supplement: Coexistence in stream metacommunities". \$7,500
2011 USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO, "A national synthesis of wildlife habitat corridors and connectivity", with Mike Schwartz and Kevin McKelvey. \$50,000
2011 USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO, "Detection and monitoring rare species presence and nonnative species invasions using environmental DNA", with Kevin McKelvey, Mike Young, and Mike Schwartz. \$125,000
2011 U.S. National Science Foundation, Arlington, VA, "Coexistence in stream metacommunities". \$380,000
2011 Amphibian Research and Monitoring Initiative, USGS, Alexandria, VA, "Buffering stream salamander populations against the potential loss of tributary habitat", with Evan Grant and Bill Fagan. \$383,697
2010 USDA, San Dimas Technology and Development Center, San Dimas, CA, "Amphibian movement through road-stream crossings". \$81,994
2009 Park Oriented Biological Support, USGS, Alexandria, VA, "Assessing the threat of

- climate change to headwater amphibians in Glacier National Park”, with Steve Corn and Blake Hossack (*graduate student*). \$71,931
- 2008 University of Montana Faculty Grant, Missoula, MT, “The importance of population genetics in understanding and predicting amphibian declines: an application to boreal toad (*Bufo boreas*) conservation in Glacier National Park”, with Mike Machura (*graduate student*). \$5,000
- 2008 Five Valleys Land Trust / Rock Creek Trust, Missoula, MT, “Ecological effects of constructed ponds in the Rock Creek drainage”, with Jonathan Ebel (*undergraduate student*). \$17,500
- 2008 USGS Water Center, Bozeman, MT, “The importance of ecologically connected streams to the biological diversity”, with Adam Sepulveda (*graduate student*). \$6,930
- 2008 Northeastern States Research Cooperative, USDA Forest Service, Newtown Square, PA, “Forest succession and terrestrial-aquatic biodiversity in Northern Forest watersheds”, with Keith Nislow, David King, Robert Brooks, and Steve Coughlan. \$58,944
- 2008 Amphibian Research and Monitoring Initiative, USGS, Alexandria, VA, “Sublethal effects of wildfire and logging on amphibians: synergistic effects on vigor, stress, and disease”, with Steve Corn and Blake Hossack (*graduate student*). \$74,672
- 2007 Charlotte Martin Foundation, Seattle, WA, “The importance of ecologically connected streams to the biological diversity of watersheds”, with Chris Frissell and Adam Sepulveda (*graduate student*). \$10,640
- 2007 Northeastern States Research Cooperative, USDA Forest Service, Newtown Square, PA, “Bioaccumulation and biomagnification of mercury in upland food webs of the Northeast”, with Nick Rodenhouse and Renate Gebauer. \$78,716
- 2004 Conservation Stewardship Program Grant, Sweet Water Trust, Boston, MA, “Designing and promoting stream-based ecological reserves”, with Gene Likens. \$10,000
- 2003 Andrew W. Mellon Foundation Grant, “Effects of longitudinal variation in stream pH on salamander populations”, with Gene Likens. \$14,000
- 2000 Dissertation Improvement Grant, U.S. National Science Foundation, Arlington, VA, “Local controls of landscape abundance patterns of a stream salamander”, with Doug Bolger. \$8,265
- 1999 Watershed Action Program Grant, Sweet Water Trust, Boston, MA, “Assessing aquatic biodiversity in northeastern headwater streams using an amphibian indicator”. \$10,720
- 1998 Watershed Action Program Grant, Sweet Water Trust, Boston, MA, “Northeast headwaters conservation project”. \$9,600

PUBLICATIONS

- Hossack, B.R., **W.H. Lowe**, J.L. Ware, and P.S. Corn. *In press*. Disease in a dynamic landscape: host behavior and wildfire reduce amphibian chytrid infection. *Biological Conservation*. (*graduate student 1st author*)
- Hossack, B.R., **W.H. Lowe**, R.K. Honeycutt, S.A. Parks, and P.S. Corn. *In press*. Interactive effects of wildfire, forest management, and isolation on amphibian and parasite abundance. *Ecological Applications*. (*graduate students 1st and 3rd authors*)
- Hossack, B.R., **W.H. Lowe**, and P.S. Corn. *In press*. Rapid increases and time-lagged declines in amphibian occupancy after wildfire. *Conservation Biology*. (*graduate student 1st author*)
- Sepulveda, A.J., **W.H. Lowe**, and P.P. Marra. 2012. Using stable isotopes to test for trophic niche partitioning: a case study with stream salamanders and fish. *Freshwater Biology* 57:1399-1409. (*graduate student 1st author*)

- Lowe, W.H.**, M.A. McPeck, G.E. Likens, and B.J. Cosentino. 2012. Decoupling of genetic and phenotypic divergence in a headwater landscape. *Molecular Ecology* 21:2399-2409.
- Brooks, R.T., K.H. Nislow, **W.H. Lowe**, M.K. Wilson, and D.I. King. 2012. Forest succession and terrestrial-aquatic biodiversity in small forested watersheds: a review of principles, relationships, and implications for management. *Forestry* 85:315-328. (graduate student 3rd author)
- Cosentino, B.J., C.A. Phillips, R.L. Schooley, **W.H. Lowe**, and M.R. Douglas. 2012. Linking extinction-colonization dynamics to genetic structure in a salamander metapopulation. *Proceedings of the Royal Society B* 279:1575-1582. (graduate student 1st author)
- Lowe, W.H.** 2012. Climate change is linked to long-term decline in a stream salamander. *Biological Conservation* 145:48-53.
- Lowe, W.H.**, and M.A. McPeck. 2012. Can natural selection maintain long-distance dispersal? Insight from a stream salamander system. *Evolutionary Ecology* 26:11-24.
- Sepulveda, A.J., and **W.H. Lowe**. 2011. Coexistence in streams: Do source-sink dynamics allow salamanders to persist with fish predators? *Oecologia* 166:1043-1054. (graduate student 1st author)
- Lowe, W.H.** 2010. Explaining long-distance dispersal: effects of dispersal distance on survival and growth in a stream salamander. *Ecology* 10:3008-3015.
- Lowe, W.H.**, and F.W. Allendorf. 2010. What can genetics tell us about population connectivity? *Molecular Ecology* 19:3038-3051.
- Grant, E.H.C., J.D. Nichols, **W.H. Lowe**, and W.F. Fagan. 2010. Use of multiple dispersal pathways facilitates amphibian persistence in stream networks. *Proceedings of the National Academy of Sciences (USA)* 107:6936-6940.
- Mullen, L.B., H.A. Woods, J.M. Schwartz, A.J. Sepulveda, and **W.H. Lowe**. 2010. Scale-dependent genetic structure of Idaho giant salamanders (*Dicamptodon aterrimus*) in stream networks. *Molecular Ecology* 19:898-909. (graduate student 1st author, with cover photo)
- Lowe, W.H.** 2009. What drives long-distance dispersal? A test of theoretical predictions. *Ecology* 90:1456-1462.
- Hossack, B.R., M.J. Adams, E.H.C. Grant, C.A. Pearl, J.B. Bettaso, W.J. Barichivich, **W.H. Lowe**, K. True, J.L. Ware, and P.S. Corn. 2010. Low prevalence of chytrid fungus (*Batrachochytrium dendrobatidis*) in U.S. headwater amphibians. *Journal of Herpetology* 44:253-260. (graduate student 1st author)
- Sepulveda, A.J., and **W.H. Lowe**. 2009. Local and landscape-scale influences on the occurrence and density of *Dicamptodon aterrimus*, the Idaho Giant Salamander. *Journal of Herpetology* 43:469-484. (graduate student 1st author)
- Grant, E.H.C., L.E. Green, and **W.H. Lowe**. 2009. Salamander occupancy in headwater stream networks. *Freshwater Biology* 54:1370-1378.
- Sepulveda, A.J., W.T. Colyer, **W.H. Lowe**, and M.R. Vinson. 2009. Using nitrogen stable isotopes to detect long-distance movement in a threatened cutthroat trout. *Canadian Journal of Fisheries and Aquatic Sciences* 66:672-682. (graduate student 1st author)
- Lowe, W.H.** 2009. Amphibia of aquatic ecosystems. In G. E. Likens, editor. *Encyclopedia of Inland Waters*. Elsevier, Oxford, UK.
- Cosentino, B.J., **W.H. Lowe**, and G.E. Likens. 2009. Population biology and movement of the northern spring salamander, *Gyrinophilus porphyriticus*, in four New Hampshire headwater streams. *Verh. Internat. Verein. Limnol.* 30:677-680 (undergraduate 1st author)
- Lowe, W.H.**, M.A. McPeck, G.E. Likens, and B.J. Cosentino. 2008. Linking movement behavior to dispersal and divergence in plethodontid salamanders. *Molecular Ecology* 17:4459-4469.

- Greene, B.T., **W.H. Lowe**, and G. E. Likens. 2008. Forest succession and prey availability influence the strength and scale of terrestrial-aquatic linkages in a headwater salamander system. *Freshwater Biology* 53:2234-2243. (undergraduate 1st author)
- Grant, E.H.C., **W.H. Lowe**, and W.F. Fagan. 2007. Living in the branches: population dynamics and ecological processes in dendritic networks. *Ecology Letters* 10:165-175. (with cover photo)
- Lowe, W.H.**, G.E. Likens, and B.J. Cosentino. 2006. Self-organization in streams: the relationship between movement behaviour and body condition in a headwater salamander. *Freshwater Biology* 51:2052-2062. (with cover photo)
- Lowe, W.H.**, G.E. Likens, and M.E. Power. 2006. Linking scales in stream ecology. *BioScience* 56:591-597. (with cover photo)
- Lowe, W.H.**, G.E. Likens, M.A. McPeck, and D.C. Buso. 2006. Linking direct and indirect data on dispersal: isolation by slope in a headwater stream salamander. *Ecology* 87:334-339.
- Lowe, W.H.** 2006. The trouble with rivers. *BioScience* 56:260-263.
- Nislow, K.H., and **W.H. Lowe**. 2006. Influences of logging history and riparian forest characteristics on macroinvertebrates and brook trout (*Salvelinus fontinalis*) in headwater streams (New Hampshire, U.S.A.). *Freshwater Biology* 51:388-397.
- Lowe, W.H.** 2005. Factors affecting stage-specific distribution in the stream salamander *Gyrinophilus porphyriticus*. *Herpetologica* 61:135-144.
- Lowe, W.H.**, and G.E. Likens. 2005. Moving headwater streams to the head of the class. *BioScience* 55:196-197.
- Bernhardt, E.S., G.E. Likens, R.O. Hall, D.C. Buso, S.G. Fisher, T.M. Burton, J.L. Meyer, W.H. McDowell, M.S. Mayer, W.B. Bowden, S.E.G. Findlay, K.H. Macneale, R.S. Stelzer, and **W.H. Lowe**. 2005. Can't see the forest for the stream? The role of instream processing in modifying terrestrial nitrogen exports. *BioScience* 55:219-230.
- Lowe, W.H.**, K.H. Nislow, and G.E. Likens. 2005. Forest structure and stream salamander diets: implications for terrestrial-aquatic connectivity. *Verh. Internat. Verein. Limnol.* 29:279-286.
- Lowe, W.H.**, K.H. Nislow, and D.T. Bolger. 2004. Stage-specific and interactive effects of sedimentation and trout on a headwater stream salamander. *Ecological Applications* 14:164-172.
- Lowe, W.H.** 2003. Linking dispersal to local population dynamics: a case study using a headwater salamander system. *Ecology* 84:2145-2154.
- Nislow, K.H., and **W.H. Lowe**. 2003. Influences of logging history and stream pH on brook trout in 1st-order streams in New Hampshire. *Transactions of the American Fisheries Society* 132:166-171.
- Lowe, W.H.** 2002. Landscape-scale spatial population dynamics in human-impacted stream systems. *Environmental Management* 30:225-233.
- Lowe, W.H.**, and D.T. Bolger. 2002. Local and landscape-scale predictors of salamander abundance in New Hampshire headwater streams. *Conservation Biology* 16:183-193.
- Hauer, F.R., J.A. Stanford, J.J. Giersch, and **W.H. Lowe**. 2001. Distribution and abundance patterns of macroinvertebrates in a mountain stream: an analysis along multiple environmental gradients. *Verh. Internat. Verein. Limnol.* 27:1485-1488.
- Lowe, W.H.**, and F.R. Hauer. 1999. Ecology of two large, net-spinning caddisflies in a mountain stream: distribution, abundance, and metabolic response to a thermal gradient. *Canadian Journal of Zoology* 77:1637-1644.
- Articles in review:**
- McGuire, K.J., C.E. Torgerson, G.E. Likens, D.C. Buso, **W.H. Lowe**, and S.W. Bailey. *In*

review. Network analysis reveals multi-scale controls on streamwater chemistry.

Popular articles:

- Lowe, W.H.** 2012. Climate change is linked to long-term decline in a stream salamander. *FrogLog*, Winter.
- Margolis, A., K.H. Nislow, and **W.H. Lowe**. 2006. Headwater logging makes food for trout. *Northern Woodlands*, Winter.
- Lowe, W.H.** 2003. Salamanders, sediment, and trout: a bad mix. *Northern Woodlands*, Spring.
- Lowe, W.H.** 2003. Spring salamanders and stream conservation. *News from Hudsonia* 18:1-3.
- Lowe, W.H.**, and D.T. Bolger. 2002. Logging history, brook trout, and drainage structure affect salamander abundance in New Hampshire headwater streams. *N.H. Audubon* 38:8-10.

INVITED SEMINARS

- Dartmouth College, Hanover, NH, April 2011
- Coweeta Hydrologic Laboratory, Otto, NC, June 2010
- University of Missouri, Columbia, MO, November 2009
- Yale University, New Haven, CT, October 2008
- Smithsonian National Zoological Park, Washington, DC, October 2008
- Northwest Fisheries Science Center, NOAA Fisheries Service, Seattle, WA, May 2008.
- University of Illinois, Champagne-Urbana, IL, May 2008.
- Landscapes to Riverscapes Symposium, Moscow, ID, May 2007.
- Patuxent Wildlife Research Center, Laurel, MD, March 2006.
- Victoria University, Wellington, NZ, November 2005.
- University of Massachusetts, Amherst, MA, March 2005.
- University of Montana, Missoula, MT, February 2004.
- 3rd International Wildlife Management Congress, Christchurch, NZ, December 2003.
- University of Maine, Orono, ME, October 2002.

CONFERENCE PRESENTATIONS

- 1st Joint Congress of Evolutionary Biology, July 2012, Ottawa, ON. B.R. Addis, **W.H. Lowe**, and F.W. Allendorf. Up high and down low: elevation strongly influences genetic structure in boreal toads (*Bufo boreas boreas*).
- World Congress of Herpetology, August 2012, Vancouver, BC. B.R. Hossack, **W.H. Lowe**, and P.S. Corn. Interactive effects of wildfire, forest management, and isolation on amphibian and parasite abundance.
- Northwest Partners in Amphibian and Reptile Conservation, March 2012, Hood River, OR. B.R. Hossack, **W.H. Lowe**, and P.S. Corn. Interactive effects of wildfire, forest management, and isolation on amphibian and parasite abundance.
- Ecological Society of America, August 2011, Austin, TX. **W.H. Lowe**. Climate change and long-term decline in a stream salamander population.
- American Fisheries Society Meeting, UMT Student Chapter, May 2011, Missoula, MT. M.K. Wilson and **W.H. Lowe**. The influence of watershed-scale forest characteristics on the supply of terrestrial prey to eastern brook trout (*Salvelinus fontinalis*).
- Society for Northwest Vertebrate Biology, March 2011, Gigg Harbor, WA. B.R. Hossack, **W.H. Lowe**, and P.S. Corn. Wildfire and fragmentation: effects on amphibian populations and associated nematodes.
- Ecological Society of America, August 2010, Pittsburgh, PA. **W.H. Lowe**. The causes and consequences of variation in dispersal distance.

- Annual Meeting of the Hubbard Brook Cooperators, July 2010, West Thronton, NH. **W.H. Lowe**. Causes and consequences of variation in dispersal distance.
- The North American Benthological Society, June 2010, Santa Fe, NM. A.J. Sepulveda and **W.H. Lowe**. Coexistence in streams: do source-sink dynamics allow salamanders to persist with fish predators?
- Ecological Society of America, August 2009, Albuquerque, NM. **W.H. Lowe**. What drives long-distance dispersal? A test of theoretical predictions.
- Annual Meeting of the Hubbard Brook Cooperators, July 2008, West Thronton, NH. **W.H. Lowe**, G.E. Likens, M.A. McPeck, and B.J. Cosentino. Linking movement behavior to dispersal and divergence in plethodontid salamanders.
- Ecological Society of America, August 2008, Milwaukee, WI. **W.H. Lowe**, M.A. McPeck, G.E. Likens, and B.J. Cosentino. Dispersal and divergence in plethodontid salamanders.
- Society for Northwest Vertebrate Biology National Meeting, February 2007, Missoula, MT. A.J. Sepulveda and **W.H. Lowe**. Influences of stream network connectivity and habitat quality on the distribution and abundance of Idaho Giant Salamanders, *Dicamptodon aterrimus*.
- 5th Conference on the Biology of Plethodontid Salamanders, August 2007, San Cristobal de las Casas, MEX. **W.H. Lowe**, M.A. McPeck, G.E. Likens, B.J. Cosentino. Dispersal and divergence in plethodontid salamanders.
- Ecological Society of America, August 2007, San Jose, CA. E.H.C. Grant, **W.H. Lowe**, L.E. Greene, and W.F. Fagan. Life in the branches: population distribution and persistence in dendritic ecological networks.
- International Congress of Limnology, August 2007, Montreal, CAN. B.J. Cosentino, **W.H. Lowe**, and G.E. Likens. Demography and movement of the northern spring salamander, *Gyrinophilus porphyriticus*, in four New Hampshire headwater streams.
- American Society of Limnology and Oceanography, June 2006, Victoria, CAN. **W.H. Lowe**, G.E. Likens, M.A. McPeck, D.C. Buso, B.J. Cosentino, and B.T. Greene. Controls and consequences of dispersal in streams.
- Ecological Society of America, August 2005, Montreal, CAN. **W.H. Lowe**, G.E. Likens, M.A. McPeck, and D.C. Buso. Linking direct and indirect data on dispersal: isolation by slope in a headwater stream salamander.
- The North American Benthological Society, June 2005, New Orleans, LA. D.L. Strayer and **W.H. Lowe**. Plenary: Linking the abiotic environment to biodiversity in running waters.
- Land Trust Alliance, October 2004, Providence, RI. **W.H. Lowe** and G.E. Likens. Capitalizing on headwater streams for land conservation.
- International Congress of Limnology, August 2004, Lahti, FI. **W.H. Lowe**, K.H. Nislow, and G.E. Likens. Forest structure and stream salamander diets: implications for terrestrial-aquatic connectivity.
- Society for Conservation Biology, July 2004, New York, NY. **W.H. Lowe**, K.H. Nislow, and D.T. Bolger. Stage-specific and interactive effects of sedimentation and trout on a headwater stream salamander.
- Annual Meeting of the Hubbard Brook Cooperators, July 2004, West Thronton, NH. **W.H. Lowe**, G.E. Likens, M.A. McPeck, and D.C. Buso. Gene flow in 3D: isolation by slope and distance in a headwater stream salamander.
- The North American Benthological Society, June 2004, Vancouver, CAN. **W.H. Lowe**, K.H. Nislow, and D.T. Bolger. Effects of logging on stream macroinvertebrate communities and vertebrate populations in New England headwater streams.

- Long Term Ecological Research Network All Scientists Meeting, September 2003, Seattle, WA. **W.H. Lowe** and G.E. Likens. Multi-scale controls on salamander distribution and abundance in headwater stream networks.
- 10th Cary Conference, April 2003, Institute of Ecosystem Studies, Millbrook, NY. **W.H. Lowe**. Effects of habitat heterogeneity at multiple spatial scales on the distribution and abundance of a headwater stream salamander.
- Ecological Society of America, August 2002, Tucson, AZ. **W.H. Lowe**. The role of dispersal in local population dynamics of a headwater stream salamander.
- Society for Conservation Biology, July 2002, Canterbury, UK. **W.H. Lowe**. Landscape-scale spatial population dynamics in human-impacted stream systems.
- Society for Conservation Biology, June 2000, Missoula, MT. **W.H. Lowe** and D.T. Bolger. Local and landscape-scale predictors of salamander abundance in New Hampshire headwater streams.
- The North American Benthological Society, June 1997, San Marcos, TX. **W.H. Lowe** and F.R. Hauer. Ecology of two large, net-spinning caddisflies in a mountain stream: distribution, abundance and metabolic response to a thermal gradient.

COURSES TAUGHT

- Freshwater Ecology* (BIOE 428, 5 credits)
Advanced Population and Community Ecology (BIOB 513, 4 credits)
Landscape Genetics (BIOL 561, 1 credit)

GRADUATE ADVISING

Major professor to:

- Adam Sepulveda (Ph.D., 2010), Lindy Mullen (M.S., 2009), Blake Hossack (Ph.D., 2011), Matt Wilson (M.S., 2012), Brett Addis (Ph.D., ongoing), Ken Honeycutt (M.S., ongoing), Claire Bayer (Ph.D., ongoing)

PROFESSIONAL SERVICE

- Aquatic Biodiversity Training Workshop, Jakar, Bhutan, Spring 2010, Spring 2012
- NSF Doctoral Dissertation Improvement Grant Panel, Population and Community Ecology, Spring 2010, Spring 2012
- NSF Doctoral Dissertation Improvement Grant Panel, Evolutionary Processes, Spring 2012
- NSF Pre-Proposal Panel, Population and Community Ecology, Spring 2012
- *Reviewer for:* American Naturalist, Amphibia-Reptilia, Biological Conservation, Conservation Genetics, Copeia, Ecological Applications, Ecological Modelling, Ecology of Freshwater Fish, Ecology, Ecology Letters, Freshwater Biology, Herpetologica, Israel Science Foundation, Journal of Animal Ecology, Journal of Applied Ecology, Journal of Environmental Engineering, Journal of Fish Biology, Journal of Herpetology, Journal of the North American Benthological Society, Limnology and Oceanography, Molecular Ecology, Naturwissenschaften, Proceedings of the Royal Society – B, Southeastern Naturalist, Theoretical Population Biology, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. National Science Foundation, Wetlands