

Curriculum vitae

BRETT MARSHALL

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EDUCATION

Montana State University

Ph.D. Zoology

Not Complete Medical

Original dissertation topic: Development of weighted evidence approach to invertebrate monitoring biocriteria development in Montana

Virginia Polytechnic Institute and State University

M.Sc. Entomology

1994

Thesis: Short-term effects of riparian defoliation by gypsy moth larvae on Appalachian headwater stream ecology: water chemistry, community structure, and community function.

University of Wisconsin—Superior

B.S. Biology, Honors: *magna cum laude*

1990

Concentration: Aquatic Population and Community Analysis

Minor: Chemistry (1 course short of double major)

Honors Thesis: Use of piperonyl butoxide to disrupt cytochrome P-450 in fish to aid modeling in predictive toxicology

AWARDS

Award for Ecological Project Quality, PCER, Academy of Natural Sciences, Philadelphia, PA

1997

James McDaniel Grayson Honorarium, Virginia Tech Department of Entomology

1993

Asa Fitch Memorial Award, Eastern Branch of the Entomological Society of America

1992

Honorable Mention (2nd place), Graduate Research Completion, Entomological Society of America

1991

Competitive Instructional Fee Scholarships, Virginia Tech Department of Entomology

1990, 1991, 1992, 1993

Biology Student of the Year, Department of Math and Sciences, University of Wisconsin-Superior

1990

Army Achievement Medal for Meritorious Service, US ARMY

1986

Army Achievement Medal for Meritorious Service, US ARMY

1985

Letter of Commendation, US ARMY EUROPE (USAREUR)

1984, 1985

TEACHING EXPERIENCE

Philadelphia University

Adjunct Instructor of Environmental Science

1999

Instructed 5 sections per day, 1 day per week, while at the Academy of Natural Sciences.

Virginia Polytechnic Institute and State University

Teaching Assistant—Dr. Voshell, Aquatic Entomology

1992, 1993

Prepared reference collections, prepared laboratory examinations, presented laboratory lectures, graded entomology collections.

Virginia Polytechnic Institute and State University

Teaching Assistant—Dr. Voshell, Biological Monitoring of Aquatic Ecosystems using Invertebrates and Fish

1993

Collaborated on curriculum development, developed final project scenarios and datasets, provided all laboratory instruction for invertebrate exercises, prepared laboratory section grades, and graded analysis portion of final projects.

Montana State University

Ad hoc instruction at Montana State University Department of Ecology

2000-2005

Co-lead discussions of Advanced Stream Ecology with Bob Bramblett in 2000.

I occasionally filled in for Dr. Kerans, Biology 101 instruction and for Adjunct Instructor Dr. Richards' Stream Ecology instruction.

RELATED EXPERIENCE

River Continuum Concepts

Director

2006 – present

I provide invertebrate ecology and laboratory services to a variety of clients.
 I prepare proposals, budgets, field, laboratory, statistical analyses, and reporting.
 I independently and successfully started, funded, equipped and staffed a modern macroinvertebrate laboratory.

Academy of Natural Sciences, Patrick Center for Environmental Science, Philadelphia, PA **2010 — present**

Adjunct Research Associate: Invertebrate Ecology

I developed technical aspects of proposals, and followed up with field sampling, laboratory analysis, statistical analysis and reporting macroinvertebrate assessments across the USA.

EcoAnalysts, Inc., Bozeman, MT

Senior Aquatic Ecologist

2004-2006

Proposed study plans, statistical analysis, reporting.
 Supervised technical, non-technician staff

Rhithron Associates, Inc., Missoula, MT

Aquatic Entomologist

2003

Quality Assurance, reporting, proposal preparation, invertebrate taxonomy, analysis

Inter-Mountain Laboratories, Bozeman, MT

Aquatic Entomologist

2002-2003

Quality Assurance, reporting, proposal preparation, taxonomy

Montana State University, Bozeman, MT

Graduate Research Assistant

2000-2002

Academy of Natural Sciences, Patrick Center for Environmental Research, Philadelphia, PA

Section Leader: Invertebrate Zoology

1996-2000

I proposed, budgeted and implemented field and laboratory elements of aquatic ecological investigations across the USA as part of a multi-disciplinary team.

I provided statistical analysis of invertebrate and environmental data and synthesized technical and non-technical reports.

I provided educational outreach to state agencies, local schools, and conservation organizations.

National Park Service: New River Gorge National River, WV

Biological Science Technician

1995-1996

Long-term ecological monitoring of fish and invertebrate communities

Landscape Architecture Department, Virginia Tech, Blacksburg, VA

Aquatic Ecology Consultant

1995

Assessed stream flow status (perennial, intermittent, ephemeral) using invertebrate communities for the EIS of alternative routes of the New River Parkway

Virginia Tech Department of Entomology, Blacksburg, VA

Graduate Research Assistant

1991-1994

With my mentor, I conducted laboratory and planning work for the Long-term Ecological Monitoring System (LTEMs) of macroinvertebrate assemblages of New River Gorge National River and Shenandoah National Park.

I conducted independent research on the effects of gypsy moth on aquatic resources of Shenandoah National Park.

U.S. Environmental Protection Agency, National Water Quality Laboratory, Duluth, MN

Biological Science Aide

1987-1990

Assisted in various aspects of laboratory work supporting the predictive toxicology research unit.

PUBLICATIONS AND PAPERS

- Marshall, B.D. 2017. AQUATIC INSECTS. *IN*: Academy of Natural Sciences [Eds]. 2015 Ecological assessment of the Sabine River, near Longview, TX. 298pp. Prepared for Texas Eastman, Longview, TX
- Marshall, B. D. 2017. HENRY'S FORK MACROINVERTEBRATE DATA AND REVIEW: BASELINE ECOLOGICAL MONITORING. Prepared for the Henry's Fork Foundation, Ashton, ID.
- Marshall, B.D. 2016. THE EFFECTS OF ABUNDANT INVERTEBRATE SPECIES ON DIVERSITY AND RICHNESS ESTIMATES OF SAMPLES COLLECTED USING STANDARD EPA METHODS: A MODELING APPROACH. Presented at the annual meeting of the Pacific Northwest Chapter of the Society of Freshwater Science. Astoria Oregon.
- Marshall, B. D. 2016. HENRY'S FORK MACROINVERTEBRATE DATA AND REVIEW: YEAR 2016 DIVERSITY AND ENVIRONMENTAL INDICATORS. Prepared for the Henry's Fork Foundation, Ashton, ID.
- Marshall, B.D. 2015. THE EFFECTS OF SUBSAMPLING ON VARIATION IN INVERTEBRATE METRICS FROM COMPOSITE SAMPLES. Presented at the annual meeting of the Pacific Northwest Chapter of the Society of Freshwater Science. Bellingham Washington.
- Marshall, B.D. 2015. HENRY'S FORK MACROINVERTEBRATE DATA AND REVIEW: IN PREPARATION FOR A DNA BARCODING STUDY OF INVERTEBRATE DIVERSITY. Prepared for the Henry's Fork Foundation, Ashton, ID.
- Richards, D.C., T. Miller, and B.D. Marshall. 2015. CHAPTER 12: ADDRESSING UNCERTAINTY IN INVERTEBRATE MONITORING PROGRAMS. In: Ostermiller and Gaddis (Eds). Development of Nitrogen Criteria for Utah Streams. Utah Division of Water Quality, Salt Lake City, UT.
- Marshall, B.D. 2014. PROBLEMS WITH USING BIOASSESSMENT METHODS FOR NON-BIOASSESSMENT PURPOSES, PART IV: EFFECTS OF THE FIXED-COUNT SUBSAMPLE ON STANDARD UNIT EFFORT. Presented at: Joint Aquatic Sciences Meeting, Portland, OR
- Marshall, B.D. 2013. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2012: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical report. Prepared for Sublette County Conservation District, Pinedale, WY.
- Marshall, B.D. 2013. EFFECTS OF FIXED-COUNT SUBSAMPLING ON THE STANDARD UNIT EFFORT FOR MACROINVERTEBRATE DENSITY ESTIMATES. Presented at: Western Division, American Fisheries Society. Boise, ID.
- Marshall, B.D. 2013. EFFECTS OF THE 2011 EXXON OIL SPILL ON MACROINVERTEBRATE COMMUNITIES OF THE YELLOWSTONE RIVER. Presented at: Montana Chapter American Fisheries Society, Fairmont Hot Springs, MT
- Marshall, B.D. 2013. A SURVEY OF THE BENTHIC MACROINVERTEBRATES OF STREAMS IN BOZEMAN, MONTANA. Technical report. Prepared for Gallatin Local Water Quality District, Bozeman, MT.
- Marshall, B.D. 2012. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2011: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.
- Marshall, B.D. 2012. AQUATIC INSECTS. *IN*: Academy of Natural Sciences [Eds]. 2010 Ecological assessment of the Sabine River, near Longview, TX. 298pp. Prepared for Texas Eastman, Longview, TX.
- Haag, W.R., R.J Stephano, S. Fennessy, and B.D. Marshall. 2012. INVERTEBRATES AND PLANTS. pp: 435-519. *IN*: A.V. Zale, D.L. Parrish, and T.M. Sutton. *Fisheries Techniques, Third Edition*. American Fisheries Society, Bethesda, MD.
- Marshall, B.D. 2011. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2010: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.
- Marshall, B.D. 2011. BASELINE BIOLOGICAL CONDITION OF THE HOBACK RIVER, SUBLETTE COUNTY, WYOMING, 2002-2007: A BASELINE ASSESSMENT OF MACROINVERTEBRATE ASSEMBLAGES AND COMMONLY USED ECOLOGICAL METRICS. Prepared for the Sublette County Conservation District, Pinedale, WY.
- Marshall, B.D. 2011. AQUATIC INSECTS. *IN*: Academy of Natural Sciences [Eds]. 2010 Ecological Assessment of the Holston River, near Kingsport, TN. 380pp. Technical Report. Prepared for Tennessee Eastman, Kingsport, TN.
- Marshall, B.D. 2010. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2009: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.
- Marshall B.D. and J.M. Dunnigan. 2008. RELATIONSHIPS AMONG BIOFILM DENSITY AND MACROINVERTEBRATES COMMUNITIES IN A SYSTEM INFLUENCED BY DIHYMOSPHEMIA GEMINATA BLOOM. North American Benthological Society, Salt Lake City, UT.





Pfeiffer, J., E. Kosnicki, M. Bilger, B. D. Marshall, and W. Davis, 2008. TAXONOMIC AIDS FOR MID-ATLANTIC BENTHIC MACROINVERTEBRATES. EPHEMEROPTERA: BAETIDAE, PLECOPTERA: CAPNIIDAE/LEUCTRIDAE, DIPTERA: SIMULIIDAE. U.S. Environmental Protection Agency Technical Publication [EPA-260-R-08-014]. U.S. EPA, Office of Environmental Information, Washington DC.

Marshall, B.D. 2009. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2008: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.

Marshall, B.D. 2008. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2007: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.

Marshall, B.D. 2007. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2006: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.

Marshall, B.D. 2007. BASELINE BIOLOGICAL CONDITION OF THE GREEN RIVER, SUBLETTE COUNTY, WYOMING, 2001-2006: A BASELINE ASSESSMENT OF MACROINVERTEBRATE ASSEMBLAGES AND COMMONLY USED ECOLOGICAL METRICS. Prepared for the Sublette County Conservation District, Pinedale, WY.

Marshall, B.D. 2007. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2006 AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.

Marshall, B.D. 2006. ASSESSMENT OF THE BIOLOGICAL CONDITION OF THE NEW FORK RIVER, IN THE VICINITY OF THE PINEDALE ANTICLINE PROJECT AREA, 2005: AN ASSESSMENT OF CHANGES AMONG MACROINVERTEBRATE ASSEMBLAGES. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.

Velinsky, D. J. , D. A. Kreeger, T. E. Johnson¹, T. Clason, J. DeAlteris, L. Fuselier, H. Hertler, B. D. Marshall, and P. F. Overbeck. 2006. FOOD WEB SYSTEMATICS IN URBAN STREAMS: STABLE ISOTOPE VARIATIONS. Presented at the North American Benthological Society, Anchorage, AK.

Marshall, B.D. 2006. WITH-IN SITE VARIATION OF MACROINVERTEBRATE METRICS AND BIOCRITERIA FROM STREAMS IN SUBLETTE COUNTY, WYOMING. Presented at the North American Benthological Society, Anchorage, AK.

Marshall, B.D. 2005. BASELINE BIOLOGICAL AND CHEMICAL CONDITIONS OF THE NEW FORK RIVER, SUBLETTE COUNTY, WYOMING, 2000-2004: BASELINE BENTHIC MACROINVERTEBRATE ASSEMBLAGES, CHEMICAL TRENDS, AND ECOLOGICAL METRICS. Technical Report. Prepared for Sublette County Conservation District, Pinedale, WY.

Marshall, B.D. 2005. THE WYOMING EDUCATIONAL BENTHIC IMAGING PROJECT (WEBIP): VISUAL AIDS FOR WATERSHED GROUPS AND TEACHERS. Prepared for the Wyoming Association of Conservation Districts. Cheyenne, WY.

Marshall, B.D. and B.L. Kerans. 2005. APPLICATION OF STATISTICAL POWER ANALYSIS FOR SCALING AND SCORING METRICS FOR MULTIMETRIC RAPID BIOASSESSMENT PROTOCOLS (RBPs). Presented at the North American Benthological Society, New Orleans, LA.

Marshall, B.D. and B. Kerans. 2003. A CRITICAL APPRAISAL OF BIOASSESSMENT PROTOCOLS TO ASSESS THE STREAMS AND RIVERS OF MONTANA USING BENTHIC MACROINVERTEBRATES. Technical Report: Prepared for Montana Department of Environmental Quality, Helena, MT.

L.M. Tronstad, B.D. Marshall, R.C. Krueger, and B.L. Kerans. 2002. SALMONID WHIRLING DISEASE SEVERITY AND ASSEMBLAGES OF CHIRONOMIDAE. Presented at the North American Benthological Society, Pittsburgh, PA.

Marshall, B.D. and B.L. Kerans. 2002. Errors Associated with Best-Value Reference Criteria in Montana's Rapid Bioassessment Protocols (RBPs). Presented at the North American Benthological Society, Keystone, CO.



Marshall, B.D. 2001. AN EVALUATION OF THE SENSITIVITY OF A MACROINVERTEBRATE BIOMONITORING STUDY IN HEADWATER STREAMS OF NEW RIVER GORGE NATIONAL RIVER. *Journal of Freshwater Ecology*, 16 (3): 415-428.



Hession, W.C., T.E. Johnson, D.F. Charles, R.J. Horwitz, D.A. Kreeger, B.D. Marshall, J.E. Pizzuto and D.J. Velinsky. 2004. ECOLOGICAL BENEFITS OF RIPARIAN REFORESTATION IN URBAN WATERSHEDS. pp. 273-382. *IN: M. Clar, D. Carpenter, J. Gracie, and L. Slate [Eds.] SYMPOSIUM ON PROTECTION AND RESTORATION OF URBAN AND RURAL STREAMS. Reviewed Proceedings. American Society of Civil Engineers, New York, NY.*

Marshall, B.D., T. E. Johnson, and W. C. Hession. 2001. EFFECTS OF RIPARIAN STATUS ON BENTHIC MACROINVERTEBRATE ASSEMBLAGES ALONG AN URBAN GRADIENT IN SOUTHEASTERN PENNSYLVANIA, USA. North American Benthological Society, La Crosse, WI



Hession, WC, T.E. Johnson, D.F. Charles, D.D. Hart, R.J. Horwitz, D.A. Kreeger, J.E. Pizzuto, D.J. Velinsky, J.D. Newbold, C. Cianfrani, T Clason, A.M. Compton, N. Coulter, L Fuselier, B.D. Marshall, J Reed. 2000. ECOLOGICAL BENEFITS OF RIPARIAN REFORESTATION IN URBAN WATERSHEDS: STUDY DESIGN AND PRELIMINARY RESULTS. *Environmental Monitoring and Assessment*, 63 (1): 211-222.

Numerous technical reports through the Academy Natural Sciences. 1996-2000. All relating to macroinvertebrates and environmental conditions of water bodies in AR, DE, GA, NC, NJ, NY, PA, SC, TN, TX

A Complete list of projects, dating back to 1987, can be provided upon request.

MEMBERSHIPS

Society for Freshwater Science (formerly North American Benthological Society)
American Fisheries Society
Entomological Society of America
American Entomological Society
Ecological Society of America
W.B. Allwood Entomological Society, Vice President 1993

REFERENCES

David Richards, Ph.D.
Oreohelix Consulting
406-580-7816

Kathy Raper
Sublette County Conservation District
307-367-2257

Roger Thomas
Leader, Project Support Section, Patrick Center for Environmental Research, Academy of Natural Sciences
215- 299-1105