

## *Curriculum Vita*

### **Johnnie N. Moore**

#### **Education:**

Ph.D. in Geology, 1976, University of California, Los Angeles  
M.S. in Geology, 1973, University of California, Los Angeles  
B.S. in Geology, 1970, California State University, Northridge

#### **Synopsis:**

Presently, I am Chair and Professor in the Department of Geoscience at the University of Montana (<http://www2.umt.edu/Geology/faculty/moore/moore.htm>). I have been on the faculty at U of M since 1977 and have a wide range of experience in teaching, research, administration and policy. I am also the co-founder of the University of Montana *River Center* (<http://www.umt.edu/rivercenter/>), the goal of which is to inform the broad community of river scientists, managers and restoration practitioners in innovative and sound methodologies to improve river management and restoration skill. I also supervise the *Environmental Biogeochemistry Laboratory* (<http://www.umt.edu/geosciences/faculty/langner/EBL/index.htm>), a central laboratory for geochemical analyses. From 2004-2006, I served as the Lead Scientist for the *California Bay-Delta Authority, Science Program*, in Sacramento, CA (<http://science.calwater.ca.gov/>), which oversees science conducted for the CALFED Program, a multi-year, billion-dollar ecosystem restoration and water management program in the Sacramento-San Joaquin River-Delta system. At the University of Montana, I teach and do research in environmental geoscience, specifically, river restoration, environmental geochemistry and hydrologic response to global climate change and direct human actions. I presently teach courses in Science of Climate Change (Freshman), Global Change (Senior), and Environmental Geochemistry (Graduate), Human Effects on Rivers and River Restoration (Graduate) and Climate Change and Western Water (Graduate). Much of my teaching/mentoring is field/lab oriented revolving around direct student involvement in examining and solving local/regional/global environmental problems and datasets. I have authored about fifty refereed journal publications, many reports, two books, and many abstracts/papers presented at professional meetings; close to sixty grants and contracts since 1979 total approximately \$6 million. My other professional achievements include: Appointment as inorganic geochemistry symposia leader of the Geochemistry Division, American Chemical Society; Expert consultant for Mountain Water Co., Missoula MT; Expert consultant for USEPA/USDoJ Superfund litigation, and the State of Montana Clark Fork River Damage Assessment; Expert witness for American Home Ins. Co.; oversight of specific USEPA Superfund sites in Montana and USDoE Subsurface Science Program experiments at Hanford; Chair of special sessions for Amer. Geophysical Union and Geological Society of America meetings; University of Montana Distinguished Scholar; Member of the Executive Committee of the Faculty Senate and member of the Academic Standards and Regulations Committee; Member of the Board of Directors of Citizens for Science in Public Participation; Member of the Editorial Board of *Advances in Environmental Research*, Pergamon Press; Associate Editor, *San Francisco Estuary and Watershed Science*, California Bay-Delta Authority Service Award in June 2005 for my contributions to that program as Lead Scientist.

## Experience/Employment

*August 2010-present:* Chair of the Department of Geosciences, University of Montana, Missoula, MT 59812.

*September 1987-present:* Professor of Geoscience, University of Montana, Missoula, MT 59812.

*July 2004-June 2006:* Lead Scientist of the California Bay-Delta Authority Science Program, Sacramento, CA 95814; Professor of Geosciences (academic leave), University of Montana, Missoula, MT 59812.

*September 1988 to June 1989:* Visiting Research Scientist at the US Geological Survey, Water Resource Division, National Research Program, Menlo Park, California 94025; Professor of Geology (sabbatical leave), University of Montana, Missoula, MT 59812.

*September 1980 to September 1987:* Associate Professor of Geology, University of Montana, Missoula, MT 59812.

*September 1977 to September 1980:* Assistant Professor of Geology, University of Montana, Missoula, MT 59812.

*September 1976 to June 1977:* Lecturer, Fresno State University, Fresno, California.

*Research/Interests:* Human-induced changes in runoff within the context of natural hydrologic variability in the Rocky Mountains; River processes and restoration; Metal and metalloid contamination in aquatic systems resulting from agricultural, industrial, mining and smelting operations; Partitioning and transfer of contaminants within water-sediment-biota in aquatic systems; Mobilization of metals and metalloids from contaminated sediments and soils.

*Graduate Teaching Experience:* River restoration and management; western water and climate change; environmental geochemistry; geochemistry of metal contamination; geochemistry of As, Sb and Se; Metals transport in aqueous systems; sediment and contaminant transport; stratigraphic and sedimentologic analysis; tectonics and sedimentation; environmental analysis.

*Undergraduate Teaching Experience:* Environmental geology; oceanography; climate change, global change; environmental geochemistry, introductory geology; field geology; stratigraphy and sedimentation; mineralogy and petrology; structural geology.

### *Selected Professional Organization Service:*

Co-Chair of special session, *Characterization and Remediation of Environmental Impacts from Metal Mines and Smelter Operations in the Rocky Mountains*, Geol. Soc. of Amer., Rocky Mountain Section, 1995 Annual Meeting, Bozeman, MT (1995).

Co-Chair of special session, *Contamination of Aquatic Systems from Metal Mining (H22D)*, Amer. Geophys. Union, 1994 Fall Annual Meeting, San Francisco, CA (1994).

Member of the Proposal Peer Review Board of the Montana Water Resources Research Center, Bozeman, MT (1994).

Inorganic Geochemistry Symposia Leader for the Geochemical Division, American Chemical Society (1992-3).

Member of the Editorial Advisory Board of *Advances in Environmental Research* (1996-present).  
Member of the NSF Montana EPSCoR (MONTA) Review Panel, 1997.  
Member of the USGS National Water Quality Assessment Program Liaison Committee (1997-98).  
Member of the University of Montana Science Research Planning Committee (1999-2000).

*Awards:*

California Bay-Delta Authority Service Award in June 2005.  
University of Montana Distinguished Scholar for 1995.  
University of Montana Merit Awards in 1983, 1986, 1989, 1991, 1993, 1997, 1999, 2001 & 2005.

*Board Memberships:*

Editorial Board of the journal, *Advances in Environmental Research*, Pergamon Press, N.Y. (1996-2004).

Member of the Board of Directors, *Center for Science in Public Participation* (2001-2005).  
<http://www.csp2.org/>.

Associate Editor, *San Francisco Estuary and Watershed Science* (2008-present)  
<http://repositories.cdlib.org/jmie/sfews/>.

*Other:* Expert consultant for San Francisco Public Utilities Commission, California Bay Delta Program, Mountain Water Company; Expert witness for American Home Insurance; Expert consultant for US Department of Justice on recovery of costs of remediation of Milltown Reservoir Superfund Site; International Panelist for the Restoration of the Rio Quadiamar, Andalusia, Spain; Expert consultant/witness and PI for State of Montana, Clark Fork River Basin Damage Assessment Program; Invited Scientist to USFS Project on Mercury Contamination in the Orinoco River Basin, Venezuela; Oversight of contractor Superfund work on various operable units in the Clark Fork Basin complex of Superfund sites for the State of Montana; Invited scientist for Tell Nimrin archaeological excavation in Jordan Valley, Jordan; Advisor to the Governor's Council on Ground Water Quality; Advisor to Battelle NW Laboratories on subsurface science field site, Hanford, WA; Visiting Scientist at US Geological Survey, Water Resource Division, National Research Program; Visiting Sedimentologist, Deep Sea Drilling Project, Leg 79; Invited Scientist, Univ. MT-BYU archeological expedition to the northern rift valley of Syria; Author of textbook and Lab Manual on Stratigraphy and Sedimentation. Recreational interests include: Autocross racing, canoeing, biking, hiking, bird-watching, and general exploration.

## Selected Publications (last ~10 years):

1. K. L. Plathe, K.L., F. von der Kammer, M. Hassellöv, J.N. Moore; M. Murayama, T. Hofmann, and M.F. Hochella, Jr., 2012, The role of nanominerals and mineral nanoparticles in the transport of toxic trace metals: Field-flow fractionation and analytical TEM analyses after nanoparticle isolation and density. *Geochimica et Cosmochimica Acta.*, 102, pp 213-225, DOI: 10.1016/j.gca.2012.10.029.
2. Moore, J.N., A.S. Arrigoni and A.C. Wilcox, 2012, Impacts of dams on annual flow regimes in three headwater sub-basins of the Columbia River Basin, USA, *Journal American Water Resources Association*, DOI: 10.1111/j.1752-1688.2012.00660.x
3. Moore, J.N. and H.W. Langner, 2012, Can a river heal itself? Natural attenuation of metal contamination in river sediment, *Environmental Science and Technology*, DOI: 10.1021/es203810j Publication Date (Web): February 9, 2012.
4. Woelfle-Erskine, Cleo, A.C. Wilcox and Johnnie N. Moore, 2012, Historical perspectives on geomorphic processes and river restoration in the Clark Fork River, Montana, USA, *Earth Surface Processes and Landforms*. (in press)
5. Arrigoni, A., M. Greenwood, and J. Moore, 2010, The relative impact of anthropogenic modifications versus climate change on the natural flow regimes of rivers in the Northern Rocky Mountains, USA, *Water Resources Research*, doi:10.1029/2010WR009162. [[PDF](#)]
6. Plathe, K.L., F. von der Kammer, M. Hassellöv, J. Moore, M. Murayama, T. Hofmann, M.F. Hochella, Jr., 2010, Using FIFFF and aTEM to determine trace metal – nanoparticle associations in riverbed sediment, *Environmental Chemistry*, 7 (82–93), doi:10.1071/EN09111.
7. Gillan, B. J., Harper, J. T., and J. N. Moore, 2010, Time Probability Distribution of Snowmelt Timing from High Elevations in Northwestern Montana, *Water Resources Research*, 46, W01507, doi:10.1029/2009WR007861. [[PDF](#)]
8. Feris, K.P., Ramsey, P.W., Gibbons, S.M., Frazar, C., Rillig, M.C., Moore, J.N., Gannon, J.E., and W.E. Holben, 2009, Hyporheic microbial community development is a sensitive indicator of metal contamination, *Environmental Science & Technology*, 43 (16), pp 6158–6163, DOI: 10.1021/es9005465.
9. Greenwood, M., Harper, J., Moore, J., 2009, An Application of Statistics in Climate Change: Detection of Nonlinear Changes in a Streamflow Timing Measure in the Columbia and Missouri Headwaters. In P.S. Bandyopadhyay and M. Forster, eds., *Handbook of the Philosophy of Science, Vol. 7: Statistics*, Elsevier.
10. Luoma, S.N., Moore, J.N., Farag, A., Hilman, T.H., Cain, D.J. and M. Hornberger, 2008, Mining Impacts on Fish in the Clark Fork River, Montana: A Field Ecotoxicology Case Study, Chap. 19, in *The Toxicology of Fishes*, R.T. Di Giulio and D.E. Hinton, Eds., CRC Press, Boca Raton, Florida.

11. Moore, J.N. and R. Shlemon, 2008, Chap. 5: Levee System Fragility. In Healey, M.C., M.D. Dettinger, and R.B. Norgaard, eds. 2008. *The State of Bay-Delta Science, 2008*. Sacramento, CA: CALFED Science Program. 174 pp. <http://www.science.calwater.ca.gov/publications/sbds.html>
12. Moore, J. N., J. T. Harper, and M. C. Greenwood, 2007, Significance of trends toward earlier snowmelt runoff, Columbia and Missouri Basin headwaters, western United States, *Geophysical Research Letters*, 34, L16402, doi:16410.11029/12007GL031022.
13. M.H. Hofmann, M.S. Hendrix, J.N. Moore and M. Sperazza, 2006, Late Pleistocene and Holocene depositional history of sediments in Flathead Lake, Montana: Evidence from high-resolution seismic reflection interpretation. *Sedimentary Geology*, vol. 184, Issues 1-2, p 111-131.
14. Hochella, M.F. Jr.; Moore, J.N.; Putnis, C.V.; Putnis, A.; Kasama, T.; Eberl, D.D., 2005, Direct observation of heavy metal-mineral association from the Clark Fork River Superfund Complex: Implications for metal transport and bioavailability. *Geochimica et Cosmochimica Acta*, vol. 69, Issue 7, p. 1651-1663.
15. Hochella, M.F., Jr.; Kasam, T.; Putnis, A.; Putnis, C.V. and Moore, J.N., 2005, Environmentally important, poorly crystalline Fe/Mn hydrous oxides: Ferrihydrite and a possibly new vernadite-like mineral from the Clark Fork River Superfund Complex. *American Mineralogist*, vol. 90, p. 718–724. DOI: 10.2138/am.2005.1591 718.
16. Feris, K. P., P. W. Ramsey, M. Rillig, J.N. Moore, J. E. Gannon, and W.E. Holben, 2004, Hyporheic microbial communities: Determining rates of change and evaluating group-level resiliency differences in response to fluvial heavy metal deposition. *Applied and Environmental Microbiology*, August 2004, p. 4756-4765, Vol. 70, No. 8. DOI: 10.1128/AEM.70.8.4756-4765.2004
17. Sperazza, M, Moore, J.N. and M.S. Hendrix, 2004, High-resolution particle size analysis of naturally occurring very fine-grained sediment through laser diffractometry. *Journal of Sedimentary Research*, vol. 74, no. 5, p. 736–743.
18. Feris, K. P., P. W. Ramsey, C. F. Frazar, J.N. Moore, J. E. Gannon, and W.E. Holben, 2003, Structure and seasonal dynamics of hyporheic zone microbial communities in free-stone rivers of the Western United States. *Microbial Ecology*, DOI: 10.1007/s00248-002-0100-x.
19. Nagorski, S. A. , J.N. Moore, and T.E. McKinnon, 2003, Seasonal and storm-scale variations in heavy metal concentrations of two mining-contaminated streams, Montana, USA. *Journal de Physique IV, Journal de Physique IV*, vol. 107, p. 909-911, C. Boutron and C. Ferrari, Eds.
20. Feris, K. P., P. W. Ramsey, C. F. Frazar, J.N. Moore, J. E. Gannon, and W.E. Holben, 2003, Differences in hyporheic zone microbial community structure along a heavy metal gradient. *Appl. Environ. Microbio*, vol. 69, p. 5563-5573.
21. Nagorski, S. A., J.N. Moore, T.E. McKinnon and D.B. Smith, 2003, Scale-dependent temporal variations in stream water geochemistry: *Environmental Science and Technology*, 37(5): 859-864.

22. Nagorski, S. A. , J.N. Moore, T.E. McKinnon and D.B. Smith, 2003, Geochemical response to variable streamflow conditions in contaminated and uncontaminated streams: *Water Resources Research*, 39(2): 1044-1058.
23. Moore, J.N., and W.W. Woessner, 2003, Arsenic Contamination in the Water Supply of Milltown, Montana, in Welch, A.H., and Stollenwerk, K.G., eds., *Arsenic in Ground Water: Geochemistry and Occurrence*: Norwell, Massachusetts, Kluwer Academic Publishers, p. 329-350.
24. Nicholas, D. R., Ramamoorthy, S., Spring, S., Moore, J. N., and R.F. Rosenzweig, 2003, Biogeochemical transformations of arsenic in circumneutral freshwater sediments: *Biodegradation*, (in press).
25. Nagorski, S.A., Moore, J.N. and D.B. Smith, 2002, Distribution of metals in water and bed sediment in a mineral-rich watershed, Montana, USA: *Mine Water and the Environment*, 21:121-136.
26. White, K.D. and J.N. Moore, 2002, Impacts of Dam Removal on Riverine Ice Regime: *ASCE Journal of Cold Regions Engineering*, 16(1): 1-50.
27. Moore, J.N., and W.W. Woessner, 2000, Solute and solid phase relationships in the surface hyporheic zone of a metals contaminated stream, Silver Bow Creek, MT. Proceedings of the Ground-Water/Surface Water Interactions Workshop, USEPA, EPA/542/R-00/007, July 2000, p. 151-155.
28. Castro, J.M. and J.N. Moore, 2000, Pit Lakes: Their characteristics and the potential for their remediation. *Environmental Geology*, 39 (11): 1254-1260.
29. Nagorski, S.A., T.E. McKinnon, J.N. Moore and D.B. Smith, 2000, Geochemical characterization of surface water and streambed sediment of the Blackfoot River, Montana, during low flow conditions, August 16-20, 1998. U.S. Geological Survey Open-File Report 00-003, 59 p.
30. Hochella, M.F., J.N. Moore, U. Golla and A. Putnis, 1999. A TEM study of sample from acid mine drainage systems: Metal-mineral association with implications for transport. *Geochimica et Cosmochimica Acta*, 63(19-20): 3395-3406.
31. Wielinga, B, J.K. Lucy, J.N. Moore, O.F. Seastone and J.E. Ganon, 1999, Microbial and geochemical characterization of fluvially deposited sulfide mine tailings. *Applied and Environmental Microbiology*, 65(4): 1548-1555.
32. Nagorski, S. and J. N. Moore, 1999. Arsenic mobilization in the hyporheic zone of a contaminated stream. *Water Resources Research*, 35(11): 3441-3450.
33. Zhang, Y.Q., W.T. Frankenberger, Jr. and J.N. Moore. 1999. Effect of soil moisture on dimethylselenide transport and transformation to nonvolatile selenium. *Environmental Science and Technology*, 33(19): 3415-3420.

34. Zhang, Y.Q., J.N. Moore and W.T. Frankenberger, Jr. 1999. Speciation of Soluble Selenium in Agricultural Drainage Waters and Aqueous Soil-Sediment Extracts Using Hydride Generation Atomic Absorption Spectrometry. *Environmental Science and Technology*, 33(10): 1652-1656.
35. Zhang, Y.Q., W.T. Frankenberger, Jr. and J.N. Moore. 1999. Measurement of Selenite in Sediment Extracts by Using Hydride Generation Atomic Absorption Spectrometry. *Science of the Total Environment*, 229:183-193.
36. Castro, J.M, Wielinga, W.W., Gannon, J.E. and J.N. Moore, 1999, Simulation of sulfate-reducing bacteria in lake water from a former open-pit mine through addition of organic wastes: *Water Environment Research*, 71(2):218-223.
37. Moore, J.N. and E.M. Landrigan, 1999, Mobilization of metal-contaminated sediment by ice-jam floods: *Environmental Geology*, 37(1-2): 96-101.
38. Nimick, D.A., Moore, J.N., Dalby, C.E, and M.W. Savka, 1998, The fate of geothermal arsenic in the Madison and Missouri Rivers, Montana and Wyoming: *Water Resources Research*, 34(11): 3051-3067.
39. Nagorski, S.A., Shifflett, J.A., Moore, J.N. and D.B. Smith, 1998, Geochemical Baseline Studies and Relations Between Water Quality and Streamflow in the Upper Blackfoot River Watershed, Montana: Progress Report for July 1997-March 1998: U.S. Geological Survey Open-File Report 98-499, 133 p.
40. McCarty, D.K., Moore, J.N. and A. Marcus, 1998, Mineralogy and trace element association in an acid mine drainage iron oxide precipitate: comparison of selective extractions: *Applied Geochemistry*, 13: 165-176.
41. Zhang, Y. and J. N. Moore, 1998, Selenium Accumulation in a Wetland Channel, *in*, Frankenberger, W. and Engberg, R. (Eds.), *Environmental Chemistry of Selenium*. Macel Dekker, Inc., N.Y., Chap. 14, p. 243-257.

### **Selected Abstracts and Papers Presented at Meetings (last 10 years):**

1. Moore, J. and J. Harper, 2006, Apparent Shift in Time of Spring Runoff due to Annual Discharge Variability in the Headwaters of the Columbia-Missouri Rivers, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract H13B-1388.
2. Greenwood, M.C., Harper, J.T., Moore, J.N., 2007, Yearly Streamflow Discharge Analysis Using Functional Regression Models. *Eos Trans. AGU* 88(52), Fall Meet. Suppl. Abstract H21G-0817.
3. Meierbachtol, T.W., Harper, J.T., Moore, J.N., 2007, Modeling Spring Snowmelt Dynamics in a Northern Rockies Basin using a Modified Temperature-Index Model. *Eos Trans. AGU* 88(52), Fall Meet. Suppl. Abstract C21B-0475.
4. Bell, A.L., Moore, J.N., Greenwood, M.C., 2007, Comparing Least Squares and Robust Methods

in Linear Regression Analysis of the Discharge of the Flathead River, Northwestern Montana. *Eos Trans. AGU* 88(52), Fall Meet. Suppl. Abstract H11C-0652.

5. Moore, J.N., Harper, J.T., Woessner, W.W., Running, S., 2007, Headwaters of the Missouri and Columbia Rivers WATERS Test Bed site: Linking Time and Space of Snow Melt Runoff in the Crown of the Continent. *Eos Trans. AGU* 88(52), Fall Meet. Suppl. Abstract H13A-0964.
6. Arrigoni, A.S., Moore, J.N., 2007, The Hydrological Response of Snowmelt Dominated Catchments to Climate Change. *Eos Trans. AGU* 88(52), Fall Meet. Suppl. Abstract GC41A-0103.
7. Woessner, W., Moore, J., Harper, J. and S. Running, 2006, Headwaters of the Missouri and Columbia Rivers WATERS Test Bed site: Linking Time and Space of Snow Melt Runoff in the Crown of the Continent, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract H21F-1428.
8. Hochella, M.F. Jr., A.S. Madden, and J.N. Moore, 2004, The importance of nanoparticles and their unusual properties in sediments and soils from heavy-metal contaminated sites: Geological Society of America 2004 Denver Annual Meeting (November 7–10, 2004), Denver, CO.
9. Ramsey, P.W., Rillig, M. Moore, J. and J. Gannon, 2004, Biological and geochemical change along a steep functional gradient in mine waste contaminated soil: 10<sup>th</sup> Annual International Symposium on Microbial Ecology, Cancun, Mexico, Aug. 22-27, 2004.
10. Nagorski, S.A., McKinnon, T.E. and J. Moore, 2003, Seasonal and storm-scale variations in heavy metal concentrations of two mining-contaminated streams, Montana, U.S.A.: XIIth International Conference on Heavy Metals in the Environment, Grenoble, France. Published in Proceedings, see publications above).
11. Frazar, C.D., P.W. Ramsey, K.P. Feris, W.E. Holben, J.N. Moore, and J.E. Gannon, 2002, Heavy Metal Tolerance of Sediment Microbial Communities to Mine Tailings. American Society for Microbiology, 2002 General Meeting, Salt Lake City, Utah. May 2002.
12. P.N. Ball, K.P. Feris, P.W. Ramsey, J.E. Gannon, J.N. Moore, and W. E. Holben, 2002, Life in the Pit: Microbial Community Structure of a mining pit lake. American Society for Microbiology, 2002 General Meeting, Salt Lake City, Utah. May 2002.
13. Feris, W.P., P.W. Ramsey, J. Harris, J.N. Moore, J.E. Gannon, and B.E. Holben. Molecular Characterization of microbial communities in metal-impacted and pristine river sediments. 9th International Symposium on Microbial Ecology. August 26, 2001, Amsterdam. (Poster)
14. Hothem, R.L., J.N. Moore, J.T. May, J. Gibson, and B. Rasmussen, 2003, Metals contamination at Whiskeytown National Recreation Area, California: An assessment of the effects of historical mining on the environmental quality of aquatic ecosystems: The George Wright Society Biennial Conference. Protecting our diverse heritage: The role of parks, protected areas, and cultural sites. The GWS/CR2003 Joint Conference. (Abstract, page138).  
<http://www.georgewright.org/2003.html>
15. Sperazza, Michael, Thomas Gerber, Marc S. Hendrix, and Johnnie N. Moore, 2003, Lacustrine Record of Climatic Transition in Flathead Lake, Montana: Late Pleistocene through Holocene: International Limnogeology Congress, Tucson, AZ..

15. Sperazza, Michael, Thomas Gerber, Marc S. Hendrix, and Johnnie N. Moore, 2002, Record of Late Pleistocene Through Holocene Climate Change in a Regional Lake System: Flathead Lake Basin, Northwestern Montana: American Geophysical Union annual meeting, San Francisco, CA, AGU Abstracts with Programs, v. 83.
16. Sperazza, M., J.N. Moore, and M.S. Hendrix, 2002, Methodology for Lacustrine Sediment Grain Size Analysis by Laser Diffraction: A High Resolution Application. Geological Society of America annual meeting, Denver, CO, Abstracts with Programs 34/6., p. 207.
17. Hendrix, M.S., M. Sperazza, J.N. Moore, and T. Gerber, 2001, Record of the Late Pleistocene to Holocene Transition, Flathead Lake, Montana: American Geophysical Union, San Francisco, CA, AGU Abstracts with Programs, v. 82, p. 47.
18. Woessner, W.W. and J.N. Moore, 2001, Arsenic Release from Milltown Reservoir: American Water Resources Association Annual Rocky Mountain Section Meeting, Session B. Groundwater. October 4, 2001, INVITED.
19. Nagorski, S. A., McKinnon, T. E., Moore, J. N. and D.B. Smith, 2000, Geochemical Variability at Seasonal to Bi-hourly Timescales in Selected Western Montana Rivers: EOS, Trans., Amer. Geophys. Union, Fall Meeting, December 2000.
20. Moore, J.N., 2000, Arsenic speciation and mobility within the hyporheic zone: Abstract No. 50563, Geological Society of America Abstracts with Programs, Vol. 32, No. 7, November 2000. INVITED
21. Luoma, S.N. and J.N. Moore, 2000, Global mine contamination and bioavailability of metals in mine wastes. Plenary Presentation, International Conference on Heavy Metals in the Environment, 6-10 August, 2000, Ann Arbor, Michigan, USA (<http://www.sph.umich.edu/eih/heavymetals/sesssched.htm>). INVITED
22. Nagorski, S.A. and Moore, J.N., 1998, Arsenic mobility in the hyporheic zone of an intermontane stream in Montana: EOS, Trans., Amer. Geophys. Union 1998 Spring Meeting, Boston, MA.

### **Invited Seminars and Public Presentations (last 10 years):**

*Climate Change: What we can say about the local response to global warming*, April 23, 2009, Montana Law Review Symposium, University of Montana, Missoula, MT.

*Challenges in Restoration of the Country's Largest Superfund Site: The Clark Fork River Superfund Complex, Montana*, January 2004, California Bay-Delta Authority, Sacramento, CA.

*Arsenic and Old Waste: Examples from Western Montana*, March, 2003, Utah State University Water Resources Program Seminar, Logan, UT.

*Arsenic in Waters of Western Montana*, November, 2001, Sigma Xi Lecture, University of Montana, Missoula, MT.

*Arsenic Geochemistry and Contamination at Milltown Reservoir*, September, 2001, Bonner Milltown Community Forum invited presentation, Bonner, MT.

*Arsenic in Waters of Western Montana*, November, 2001, University of Montana, Sigma Xi Society invited lecture, Missoula, MT.

*Arsenic geochemistry and transport in rivers of Montana*, April, 2000, Central Washington University, Department of Geological Sciences, Ellensburg, WA.

*Consideration of Ground Water–Surface Water Interaction for the Remediation of the Rio Guadamar*, June 1999, Workshop-Oversight on the Remediation of Contamination in the Rio Guadamar. Held in Sevilla, Spain, Sponsored by the Andulucia Government.

*Arsenic geochemistry and transport in rivers of Montana*. December, 1999, Stanford University, Department of Geological and Environmental Sciences.

*The Clark Fork Superfund Complex of Western Montana: An Overview*. Lead presentation for the Clark Fork River Remediation Workshop, October, 1999, Lawrence Livermore National Laboratory, Livermore, CA.

*Arsenic in surface, ground and hyporheic-zone waters: Some observations from Montana Superfund sites, rivers and reservoirs*. May 7, 1999, University of Arizona, Department of Hydrology and Water Resources, Tucson, AZ.

*Arsenic in surface, ground and hyporheic-zone waters: Some observations from Montana Superfund sites, rivers and reservoirs*. March 22, 1999, Los Alamos National Laboratory, Earth and Environmental Sciences (EES-15), Los Alamos, NM.

*Arsenic in surface, ground and hyporheic-zone waters: Some observations from Montana Superfund sites, rivers and reservoirs*. February 24, 1999, California Institute of Technology. Environmental Engineering Science Department, Pasadena, CA.

## **Grants and Contracts**

### **(~10 years, including joint projects with other PIs (J)):**

1. Linking Time and Space Scales of Snowmelt Runoff: Crown of the Continent Hydrologic Observatory (\$300,000): NSF Hydrologic Sciences Program and CUAHSI via NSF (\$300,000) (2006-2010). (J)
2. Monitoring Linkages among river restoration, physical habitat ecosystem processes & water quality--Upper Blackfoot River (\$254,000): USEPA through USDA Forest Service, Lolo National Forest (2009-2011). (J)
3. An autonomous freshwater pH sensor: development and applications (\$300,239): NSF Hydrologic Sciences Program (2003-06). (J)
4. Sampling Water and Sediments for Contaminants at Whiskeytown NRA (\$21,851): NPS Cooperative agreement (2003).

5. Missoula Air Quality Research Assistantship (\$52,246): Stone Container Corporation (2002-2003). (J)
6. Metal Contamination of the Clark Fork River, Western Montana: A Comparative Study of Metal Concentrations in Fine-Grained Bed Sediment and Source Material (\$1500): NSF EPSCoR Undergraduate Research Internship for Jennifer Butler (2003).
7. Analysis of Contaminant Metals and Arsenic Levels of Silver Bow Creek (\$1500): NSF EPSCoR Undergraduate Research Internship for Danielle Hughes (2003).
8. Grain Size Effects on Metal Concentrations in Lake Sediments (\$1500): NSF EPSCoR Undergraduate Research Internship for Shishona Thurston (2003).
9. Monthly Variations in Metal and Arsenic Concentrations of Bed Sediment Upstream and Downstream of Milltown Dam, Milltown, MT (\$1500): NSF EPSCoR Undergraduate Research Internship for Elizabeth Nichols (2003).
10. Understanding the Record of Rapid and Gradual Climate Change in Large Lakes; Late Pleistocene and Holocene Sedimentation in Flathead Lake, MT (\$282,316): National Science Foundation (2002-2005). (J)
11. Trace Metals in Sediment from Mine-impacted Rivers (\$183,146): U.S. Geological Survey Cooperative Agreement (2001-2006).
12. Microbial community diversity, structural and functional responses to multi-component metal contamination of river benthic systems (\$140,000): Re-grant of SEER#1: US Environmental Protection Agency, EPSCoR Program (2001-2003) (J).
13. Life in the Pit: Unique Biogeochemical Cycling in Highly Stratified, Metal-Rich, Aquatic Environments (\$99,981): National Science Foundation (2001-2002) (J).
14. Missoula Air Quality Research Assistantship (\$44,118): Stone Container Corporation (2001-2001) (J).
15. Wildfire History from Charcoal Variation in the Holocene Sediments of Flathead Lake, Montana (\$1500): NSF-EPSCoR Program, student intern support (2002).
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